PTO/SB/96 (07-09)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Oxygenator Water Technologies, Inc. d/b/a Water D.O.G. Works

Application No./Patent No.: Unknown Filed/Issue Date: Filed Herewith

Titled: FLOW-THROUGH OXYGENATOR (Reissue of U.S. Patent No. 7,670,495)

Oxygenator Water Technologies, Inc. , a corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [ ] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

B. [X] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: James Andrew Senkiw To: Aqua Innovations, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 020546 , Frame 0241-0242 , or for which a copy thereof is attached.

2. From: Aqua Innovations, Inc. To: Oxygenator Water Technologies, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 021354 , Frame 0676-0681 , or for which a copy thereof is attached.

3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____ , Frame _____ , or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[X] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Philip Caspers/ 03/30/2016
Signature Date

Philip P. Caspers USPTO Reg. No. 33,227
Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

United States Patent and Trademark Office

Assignments on the Web > Patent Query

Patent Assignment Details

NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Reel/Frame: 020546/0241 **Pages:** 6

Recorded: 02/22/2008

Attorney Dkt #: 4056.02US02/03

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 2

1 **Patent #:** NONE **Issue Dt:** **Application #:** 12023416 **Filing Dt:** 01/31/2008
Publication #: US20080202995 **Pub Dt:** 08/28/2008
Title: FLOW-THROUGH OXYGENATOR

2 **Patent #:** 7670495 **Issue Dt:** 03/02/2010 **Application #:** 12023431 **Filing Dt:** 01/31/2008
Publication #: US20080179259 **Pub Dt:** 07/31/2008
Title: FLOW-THROUGH OXYGENATOR

Assignor

1 SENKIW, JAMES ANDREW **Exec Dt:** 05/25/2006

Assignee

1 AQUA INNOVATIONS, INC.
6101 BAKER ROAD
MINNETONKA, MINNESOTA 55345

Correspondence name and address

J. PAUL HAUN
4800 IDS CENTER, 80 SOUTH 8TH STREET
MINNEAPOLIS, MN 55402

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Patent Assignment Details

NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Reel/Frame: 021354/0676 **Pages:** 6

Recorded: 08/11/2008

Attorney Dkt #: 4056.00-00-01

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 7

1	**Patent #:** 6689262	**Issue Dt:** 02/10/2004	**Application #:** 10372017	**Filing Dt:** 02/21/2003
	Publication #: US20030164306	**Pub Dt:** 09/04/2003		
	Title: MICROBUBBLES OF OXYGEN			
2	**Patent #:** 7396441	**Issue Dt:** 07/08/2008	**Application #:** 10732326	**Filing Dt:** 12/10/2003
	Publication #: US20040118701	**Pub Dt:** 06/24/2004		
	Title: FLOW-THROUGH OXYGENATOR			
3	**Patent #:** NONE	**Issue Dt:**	**Application #:** 11367134	**Filing Dt:** 03/04/2006
	Publication #: US20060150491	**Pub Dt:** 07/13/2006		
	Title: Flow-through oxygenator			
4	**Patent #:** NONE	**Issue Dt:**	**Application #:** 11810540	**Filing Dt:** 06/06/2007
	Publication #: US20070284245	**Pub Dt:** 12/13/2007		
	Title: Water treatment system			
5	**Patent #:** NONE	**Issue Dt:**	**Application #:** 12023416	**Filing Dt:** 01/31/2008
	Publication #: US20080202995	**Pub Dt:** 08/28/2008		
	Title: FLOW-THROUGH OXYGENATOR			
6	**Patent #:** 7670495	**Issue Dt:** 03/02/2010	**Application #:** 12023431	**Filing Dt:** 01/31/2008
	Publication #: US20080179259	**Pub Dt:** 07/31/2008		
	Title: FLOW-THROUGH OXYGENATOR			
7	**Patent #:** NONE	**Issue Dt:**	**Application #:** 12055723	**Filing Dt:** 03/26/2008
	Publication #: US20080237060	**Pub Dt:** 10/02/2008		
	Title: METHODS AND APPARATUS FOR ELECTROLYTIC TREATMENT OF WATER			

Assignor

1 AQUA INNOVATIONS, INC. **Exec Dt:** 08/08/2008

Assignee

1 OXYGENATOR WATER TECHNOLOGIES, INC. D/B/A WATER D.O.G. WORKS
6101 BAKER ROAD, SUITE 206
MINNETONKA, MINNESOTA 55345

Correspondence name and address

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United States Patent and Trademark Office

Assignments on the Web > Patent Query

Patent Assignment Details

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Reel/Frame: 026079/0823 **Pages:** 10

Recorded: 02/09/2011

Conveyance: PROMISSORY NOTES GRANTING SECURITY INT

Total properties: 3

1	**Patent #:** 6689262	**Issue Dt:** 02/10/2004	**Application #:** 10372017	**Filing Dt:** 02/21/2003
	Publication #: US20030164306	**Pub Dt:** 09/04/2003		
	Title: MICROBUBBLES OF OXYGEN			
2	**Patent #:** 7396441	**Issue Dt:** 07/08/2008	**Application #:** 10732326	**Filing Dt:** 12/10/2003
	Publication #: US20040118701	**Pub Dt:** 06/24/2004		
	Title: FLOW-THROUGH OXYGENATOR			
3	**Patent #:** 7670495	**Issue Dt:** 03/02/2010	**Application #:** 12023431	**Filing Dt:** 01/31/2008
	Publication #: US20080179259	**Pub Dt:** 07/31/2008		
	Title: FLOW-THROUGH OXYGENATOR			

Assignors

1 OXYGENATOR WATER TECHNOLOGIES, INC. **Exec Dt:** 09/09/2008

2 WATER O.O.G. WORKS **Exec Dt:** 10/24/2008

Assignee

1 BRINK, JEFFREY P.
2003 SUGAR WOODS DRIVE
ORONO, MINNESOTA USA 55356

Correspondence name and address

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901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402

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Web interface last modified: July 25, 2011 v.2.2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION REISSUE PATENT

Applicant(s)	James Andrew Senkiw
Serial No.	Unknown
Filing Date	Filed Herewith
Continuation Reissue of U.S. Patent No.	7,670,495
Issued:	March 2, 2010
Examiner Name	Unknown
Group Art Unit	Unknown
Attorney Docket No.	3406.005US3
Customer Number:	38846
Confirmation No.	Unknown
Title:	FLOW-THROUGH OXYGENATOR

Consent by Assignee of Security Interest to File a Second Continuation Reissue Application of U.S. Patent No. 7,670,495 pursuant to 37 C.F.R. §1.172

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I, Jeffrey P. Brink, declare that:

1. I am the same Jeffrey P. Brink identified on recorded assignment document reel and frame number 026079/0823 of the Patent Assignment, Abstract of Title recordation department of the U.S. Patent and Trademark Office as holding a promissory note security interest in and to U.S. Patent No. 7,670,495.

2. I further declare that I received the above-described security interest from the Assignee of record of all right, title and interest, Oxygenator Water Technologies, Inc. D/B/A Water D.O.G. Works and that this Assignee received its assignment of all right title and interest according to the chain of title transfer from the inventor, Mr. James Andrew Sekiw to Aqua Innovations, Inc. and hence from Aqua Innovations, Inc. to Oxygenator Water Technologies, Inc. as shown by the assignment documents recorded respectively at reel and frame numbers 020546/0241 and 021354/0676 of the Patent Assignment, Abstract of Title recordation department of the U.S. Patent and Trademark Office.

3. I understand that the owner and assignee of U.S. Patent No. 7,670,495, Oxygenator Water Technologies, Inc., has requested herewith a continuation reissue application of a prior continuation reissue application (Serial No. 14/601,340) which is a

continuation reissue of an original broadening reissue application (application Serial No. 13/247,241, now U.S. Patent No. RE45,415) which original reissue application was made relative to U.S. Patent No. 7,670,495.

4. Pursuant to 37 C.F.R. §1.172 and as an Assignee of a security interest in and to this patent, I state that I consent to the filing of the broadening continuation reissue application submitted herewith which is a continuation reissue application of reissue application Serial No. 14/601,340 which in turn is a continuation reissue application of reissue application Serial No. 13/247,241 which in turn is a reissue application of U.S. Patent No. 7,670,495 and to the enlargement of the claimed subject matter as presented by the preliminary amendment filed herewith.

5. I further declare that all statements made herein of my own knowledge are true and that all statements make on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

6. Further Declarant sayeth not.

Jeffrey P. Brink
Declarant

3/18/16
Date

PTO/SB/96 (07-09)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Oxygenator Water Technologies, Inc. d/b/a Water D.O.G. Works

Application No./Patent No.: Unknown Filed/Issue Date: Filed Herewith

Titled: FLOW-THROUGH OXYGENATOR (Reissue of U.S. Patent No. 7,670,495)

Jeffrey P. Brink (Name of Assignee), a person holding security interest (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. [X] the assignee of a security interest in the entire right, title and interest.

2. [ ] an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [ ] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

B. [X] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: James Andrew Senkiw To: Aqua Innovations, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 020546, Frame 0241-0242, or for which a copy thereof is attached.

2. From: Aqua Innovations, Inc. To: Oxygenator Water Technologies, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 021354, Frame 0676-0681, or for which a copy thereof is attached.

3. From: Oxygenator Water Technologies, Inc. To: Jeffrey P. Brink
The document was recorded in the United States Patent and Trademark Office at
Reel 026079, Frame 0823-0832, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[X] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Philip Caspers/ (Signature) 03/30/2016 (Date)

Philip P. Caspers (Printed or Typed Name) USPTO Reg. No. 33,227 (Title)

United States Patent and Trademark Office

Assignments on the Web > Patent Query

Patent Assignment Details

NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Reel/Frame: 020546/0241 **Pages:** 6

Recorded: 02/22/2008

Attorney Dkt #: 4056.02US02/03

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 2

1 **Patent #:** NONE **Issue Dt:** **Application #:** 12023416 **Filing Dt:** 01/31/2008
Publication #: US20080202995 **Pub Dt:** 08/28/2008
Title: FLOW-THROUGH OXYGENATOR

2 **Patent #:** 7670495 **Issue Dt:** 03/02/2010 **Application #:** 12023431 **Filing Dt:** 01/31/2008
Publication #: US20080179259 **Pub Dt:** 07/31/2008
Title: FLOW-THROUGH OXYGENATOR

Assignor

1 SENKIW, JAMES ANDREW **Exec Dt:** 05/25/2006

Assignee

1 AQUA INNOVATIONS, INC.
6101 BAKER ROAD
MINNETONKA, MINNESOTA 55345

Correspondence name and address

J. PAUL HAUN
4800 IDS CENTER, 80 SOUTH 8TH STREET
MINNEAPOLIS, MN 55402

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Patent Assignment Details

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Reel/Frame: 021354/0676 **Pages:** 6

Recorded: 08/11/2008

Attorney Dkt #: 4056.00-00-01

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 7

1	**Patent #:** 6689262	**Issue Dt:** 02/10/2004	**Application #:** 10372017	**Filing Dt:** 02/21/2003
	Publication #: US20030164306	**Pub Dt:** 09/04/2003		
	Title: MICROBUBBLES OF OXYGEN			
2	**Patent #:** 7396441	**Issue Dt:** 07/08/2008	**Application #:** 10732326	**Filing Dt:** 12/10/2003
	Publication #: US20040118701	**Pub Dt:** 06/24/2004		
	Title: FLOW-THROUGH OXYGENATOR			
3	**Patent #:** NONE	**Issue Dt:**	**Application #:** 11367134	**Filing Dt:** 03/04/2006
	Publication #: US20060150491	**Pub Dt:** 07/13/2006		
	Title: Flow-through oxygenator			
4	**Patent #:** NONE	**Issue Dt:**	**Application #:** 11810540	**Filing Dt:** 06/06/2007
	Publication #: US20070284245	**Pub Dt:** 12/13/2007		
	Title: Water treatment system			
5	**Patent #:** NONE	**Issue Dt:**	**Application #:** 12023416	**Filing Dt:** 01/31/2008
	Publication #: US20080202995	**Pub Dt:** 08/28/2008		
	Title: FLOW-THROUGH OXYGENATOR			
6	**Patent #:** 7670495	**Issue Dt:** 03/02/2010	**Application #:** 12023431	**Filing Dt:** 01/31/2008
	Publication #: US20080179259	**Pub Dt:** 07/31/2008		
	Title: FLOW-THROUGH OXYGENATOR			
7	**Patent #:** NONE	**Issue Dt:**	**Application #:** 12055723	**Filing Dt:** 03/26/2008
	Publication #: US20080237060	**Pub Dt:** 10/02/2008		
	Title: METHODS AND APPARATUS FOR ELECTROLYTIC TREATMENT OF WATER			

Assignor

1 AQUA INNOVATIONS, INC. **Exec Dt:** 08/08/2008

Assignee

1 OXYGENATOR WATER TECHNOLOGIES, INC. D/B/A WATER D.O.G. WORKS
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Patent Assignment Details

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Reel/Frame: 026079/0823 **Pages:** 10

Recorded: 02/09/2011

Conveyance: PROMISSORY NOTES GRANTING SECURITY INT

Total properties: 3

1	**Patent #:** 6689262	**Issue Dt:** 02/10/2004	**Application #:** 10372017	**Filing Dt:** 02/21/2003
	Publication #: US20030164306	**Pub Dt:** 09/04/2003		
	Title: MICROBUBBLES OF OXYGEN			
2	**Patent #:** 7396441	**Issue Dt:** 07/08/2008	**Application #:** 10732326	**Filing Dt:** 12/10/2003
	Publication #: US20040118701	**Pub Dt:** 06/24/2004		
	Title: FLOW-THROUGH OXYGENATOR			
3	**Patent #:** 7670495	**Issue Dt:** 03/02/2010	**Application #:** 12023431	**Filing Dt:** 01/31/2008
	Publication #: US20080179259	**Pub Dt:** 07/31/2008		
	Title: FLOW-THROUGH OXYGENATOR			

Assignors

1 OXYGENATOR WATER TECHNOLOGIES, INC. **Exec Dt:** 09/09/2008

2 WATER O.O.G. WORKS **Exec Dt:** 10/24/2008

Assignee

1 BRINK, JEFFREY P.
2003 SUGAR WOODS DRIVE
ORONO, MINNESOTA USA 55356

Correspondence name and address

WILLIAM J. O'BRIEN
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901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402

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Web interface last modified: July 25, 2011 v.2.2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION REISSUE PATENT

Applicant(s)	James Andrew Senkiw	Statement of Right of Assignee to Act Pursuant to 37 C.F.R. §3.73(c)
Serial No.	Unknown	
Filing Date	Filed Herewith	
Continuation Reissue of U.S. Patent No.	7,670,495	
Issued:	March 2, 2010	
Examiner Name	Unknown	
Group Art Unit	Unknown	
Attorney Docket No.	3406.005US3	
Customer Number:	38846	
Confirmation No.	Unknown	
Title:	FLOW-THROUGH OXYGENATOR	

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

As a duly authorized representative of Oxygenator Water Technologies, Inc., I hereby state that Oxygenator Water Technologies, Inc. (d/b/a Water D.O.G. Works) has the right under 37 C.F.R. §3.73 to assert its status to transact all business before the U.S. Patent and Trademark Office in connection with the above identified continuation reissue application because Oxygenator Water Technologies, Inc. is the assignee of U.S. Patent No. 7,670,495, corresponding reissue application nos. 13/247,241 and 14/601,340 and the present reissue patent application filed herewith which is a continuation reissue of reissue application serial no. 14/601,340 as shown by the assignment records recorded at 017998/0954 showing the assignment of the sole inventor to Aqua Innovations Inc.; at 020480/0246 showing the assignment of Aqua Innovations Inc. to Oxygenator Water Technologies, Inc. (d/b/a Water D.O.G. Works). The security interest indicated by record 021354/0676 is not an assignment of ownership but rather is a security interest in and to the designated patent.

I further state that I am authorized to act on behalf of the assignee, Oxygenator Water Technologies, Inc.

Respectfully submitted,
Carlson, Caspers, Vandenburgh, Lindquist & Schuman, P.A.
225 S. Sixth Street, Suite 4200
Minneapolis, MN 55402

Date: 03/30/2016

By: /Philip Caspers/

Philip P. Caspers
Reg. No. 33,227

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US3
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
Mr.	James	Andrew	Senkiw	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Minneapolis	State/Province	MN	Country of Residence	USA

Mailing Address of Inventor:

Address 1	4750 Aldrich Ave N.		
Address 2			
City	Minneapolis	State/Province	MN
Postal Code	55430	Country i	USA

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	38846		
Email Address	pcaspers@carlsoncaspers.com	Add Email	Remove Email

Application Information:

Title of the Invention	FLOW-THROUGH OXYGENATOR		
Attorney Docket Number	3406.005US3	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US3
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	38846		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
The present application is a	reissue continuation of	14/601340	2015-01-21

PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US3
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14/801340 is a	reissue continuation of	13/247241	2011-09-28	RE45415	2015-03-17
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/247241 is a	reissue of	12/023431	2008-01-31	7670495	2010-03-02
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12/023431 is a	Division of	10/732326	2003-12-10	7396441	2008-07-08
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
10/732326 is a	Continuation in part of	10/372017	2003-02-21	6689262	2004-02-10
Prior Application Status	Expired				Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
10/372017	Claims benefit of provisional	60/358534	2002-02-22		

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US3
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US3
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US3
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Oxygenator Water Technologies, Inc.		
Mailing Address Information For Applicant:			
Address 1	1660 Highway 100 South		
Address 2			
City	St. Louis Park	**State/Province**	MN
Country	USA	Postal Code	55416
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US3
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Philip Caspers/			Date (YYYY-MM-DD)	**2016-03-30**
First Name	Philip	Last Name	Caspers	Registration Number	33,227

Additional Signature may be generated within this form by selecting the Add button.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US3
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Doc Code: PA..
Document Description: Power of Attorney

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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	Unknown
Filing Date	Filed herewith.
First Named Inventor	James Andrew Senkiw
Title	FLOW-THROUGH OXYGENATOR
Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	3406.005US3

SIGNATURE of Applicant or Patent Practitioner

Signature	/Philip Caspers/	Date (Optional)	03/30/2016
Name	Philip P. Caspers	Registration Number	33,227
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

United States Patent Application

REISSUE DECLARATION OF INVENTORSHIP

As a below named inventor I hereby declare as follows.

1. My residence, post office address and citizenship are as stated below next to my name.

2. I believe I am the original, first and sole inventor of: (a) the subject matter which is described and claimed in U.S. Patent No. 7,670,495 (the '495 patent) which was issued on March 2, 2010; (b) the subject matter claimed in the broadening reissue patent application Serial No. 13/247,241 which was filed January 31, 2008 and which issued as U.S. Patent No. RE45,415 on March 17, 2015; (c) the subject matter claimed in the pending broadening reissue patent application Serial No. 14/601,340 which was filed January 21, 2015 as a continuation reissue from application Serial No. 13/247,241; and (d) the subject matter claimed in the present broadening reissue patent application filed herewith. The present reissue application is a continuation of reissue application Serial No. 14/601,340 which is a continuation of reissue application Serial No. 13/247,241 and thus is a continuation reissue application of the '495 patent. The '495 patent is related to U.S. Patent No. 6,689,262 which issued on February 10, 2004 (the '262 patent) and U.S. Patent No 7,396,441 which issued on July 8, 2008 (the '441 patent).

3. I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by the amendment that is being filed with this declaration. A copy of the amended claims is attached hereto as Exhibit A.

4. I acknowledge the duty to disclose information which is material to the patentability of this reissue application in accordance with 37 C.F.R. § 1.56 (attached hereto). I state that the present application is a broadening reissue application of U.S. Patent No. 7,670,495 and a continuation reissue application of Serial No. 14/601,340 which is a continuation reissue of U.S. Patent No. RE45,415. Because of the continuation relationship with Serial No. 14/601,340 and U.S. Patent No. RE45,415, this present application has an original filing date within two years of the issuance of the '495 patent.

ERRORS CORRECTED

5. I state pursuant to 37 C.F.R. § 1.175(a) that I, the Applicant, believe the original patent to be partly inoperative or invalid by reason of the patentee claiming less than the patentee had a right to claim in the patent. I believe that the errors to be relied upon as the basis for reissue are to be found in the text of the claims of Patent No. 7,670,495 in that they do not encompass the full scope of my invention and unnecessarily limit that scope. The errors that are being addressed can be found , for example, in method claim 1 of the '495 patent, which is directed to a method for treating waste water that includes providing a flow-through oxygenator comprising an emitter for electrolytic generation of microbubbles of oxygen and which recites certain structural features of the emitter.

6. In paragraphs 7 and 8 below I discuss examples of how claim 1 is too broad in some respects, and that it was an error not to include method claims that include varying combinations of the features disclosed in the emitter embodiment corresponding to FIGS. 7A and 7B of the '495 patent. In paragraph

9 below I discuss examples of how claim 1 is too narrow in some respects, and that it was an error not to include method claims without certain limitations of claim 1.

7. Claim 1, for example, is too broad in that it does not recite the use of an emitter having certain features of the disclosed emitter embodiment corresponding to FIGS. 7A and 7B which I was entitled to claim but did not claim. These features are shown in the embodiment of FIGS 7A and 7B and include, for example: the electrodes are positioned in the outer perimeter of the oxygenation chamber; this positioning of the electrodes provides an unobstructed passageway for water to flow; in that unobstructed passageway, water may flow from the water inlet to the water outlet without passing through a space between the electrodes of opposite polarity; and a portion of at least one of the first and second electrodes is in contact with a wall of the tubular housing.

8. It was an error in the '495 patent not to include method claims that recite the use of an emitter having the features discussed in paragraph 7 that relate to a specific arrangement of the electrodes. To correct that error, varying combinations of those exemplary features are presented in the claims of the present application, using claim language of varying scope shown below. The claims presented by the present application are narrower than claim 1 of the '495 patent at least in these respects.

Claim 13 now recites:

> each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and
>
> so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches... .

Claim 27 now recites:

> the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,
>
> wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, ...
>
> wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode... .

Claim 37 now recites:

> a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, ...
>
> wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches... .

Claim 50 now recites:

> wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and
>
> so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches.

Claim 62 now recites:

> the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis ...
>
> the electrodes being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;
>
> wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway... .

9. Claim 1 of the '495 patent is too narrow, for example, in that it requires treating waste water and is limited to creating microbubbles of oxygen. Therefore, I identify claim 1 of U.S. Patent No. 7,760,495 as a claim that the application seeks to broaden in the present claims at least with respect to the removal of the waste water limitation and the microbubble limitation. It was an error in the '495 patent, not to include method claims to the use of an emitter with the features discussed in paragraph 7 that relate to a specific arrangement of the electrodes and without all of the limitations of claim 1 of the '495 patent such as the waste water limitation and the microbubbles limitation.

10. The examples of errors provided herein are not intended to be exhaustive or exclusive, but are presented for stating at least one error being relied upon as the basis for reissue pursuant to 37

C.F.R. 1.175. These and additional errors are addressed and corrected by the independent and dependent claims presented by the amendment filed herewith.

NO DECEPTIVE INTENT

11. I state that all errors present in the original patent and in the present reissue application up to the time of filing of this Reissue Declaration, and errors which are addressed and corrected by any amendment concurrently filed with this Reissue Declaration, which correction of errors I have reviewed, arose without any deceptive intention on the part of the Applicant.

12. I understand that pursuant to 37 C.F.R. §3.71, the assignee, Oxygenator Water Technologies, Inc., has granted the power of attorney, for prosecuting this reissue patent application and for transacting all related business, to attorneys and agents of the firm of Carlson, Caspers, Vandenburgh, Lindquist & Schuman, **Customer Number 38846.** I confirm and agree with this appointment.

13. Please direct all correspondence and all communications to **Carlson, Caspers, Vandenburgh, Lindquist & Schuman,** at the address provided by the following customer number.

Customer Number: 38846

[Intentionally Left Blank]

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of James Andrew Senkiw
Citizenship: U.S.A
Residence: Minneapolis, MN
Post Office Address: 4750 Aldrich Ave N, Minneapolis MN 55430-3529

Signature: _____ Date: 03-25-2016
James Andrew Senkiw

§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application:

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

Exhibit A to James Andrew Senkiw's
Reissue Declaration of Inventorship
(Duplicate Copy of Claims)

13. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet;

at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing;

each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the electrodes producing oxygen in said water via electrolysis.

14. (New) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis; and

wherein at least one of the first and second electrodes is positioned in the tubular housing closer to the inward-facing surface than said distance separating the electrodes.

15. (New) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein said portions of electrodes extend in a direction parallel to the longitudinal axis; and

wherein each electrode of the emitter is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing.

16. (New) The method of claim 13 wherein at least one of the electrodes is a stainless steel mesh or screen.

17. (New) The method of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing.

18. (New) The method of claim 17 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the tubular housing.

19. (New) The method of claim 17 wherein the first and second electrodes comprise an outside electrode and an inside electrode,

wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is,

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-

sectional area of the unobstructed passageway.

20. (New) The method of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of that portion of one of the electrodes positioned within the housing;

wherein the first and second electrodes comprise an outside electrode and an inside electrode;

wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing;
the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway; and

wherein the tubular housing of the emitter is round.

21. (New) The method of claim 19 wherein said inward-facing surface is a concave surface.

22. (New) The method of claim 13 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

23. (New) The method of claim 13 wherein the oxygen produced comprises microbubbles.

24. (New) The method of claim 13 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

25. (New) The method of claim 13 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

26. (New) The method of claim 13 wherein the oxygen produced comprises nanobubbles.

27. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches,

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode; and

a power source in electrical communication with the electrodes, the power source

configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

passing water through the oxygenation chamber while electrical current is applied to the electrodes to produce oxygen in said water via electrolysis.

28. (New) The method of claim 27 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber.

29. (New) The method of claim 27 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

30. (New) The method of claim 29 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

31. (New) The method of claim 30 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

32. (New) The method of claim 27 wherein the emitter includes first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

33. (New) The method of claim 27 wherein the oxygen produced comprises nanobubbles.

34. (New) The method of claim 27 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

35. (New) The method of claim 27 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

36. (New) The method of claim 35 wherein the oxygen produced comprises nanobubbles.

37. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;

at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches, a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, said portion being a portion that opposes the other of the first and second electrodes, wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the electrodes to

produce oxygen in said water via electrolysis.

38. (New) The method of claim 37 wherein the tubular housing has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal center axis; and

wherein each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis.

39. (New) The method of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis,

wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis, and

wherein at least one of the first and second electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes.

40. (New) The method of claim 39 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

41. (New) The method of claim 37 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

42. (New) The method of claim 37 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

43. (New) The method of claim 42 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the chamber.

44. (New) The method of claim 42 wherein the chamber has an inward-facing surface that runs parallel to the longitudinal axis;

wherein the first and second electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is; and

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

45. (New) The method of claim 37 wherein the emitter includes first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

46. (New) The method of claim 37 wherein the oxygen produced comprises microbubbles.

47. (New) The method of claim 37 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

48. (New) The method of claim 37 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

49. (New) The method of claim 37wherein the oxygen produced comprises nanobubbles.

50. (New) A method for treating water comprising:
providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber, said housing having an inward-facing surface that defines at least in part the oxygenation chamber, the tubular housing having a water inlet, and a water outlet;

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that runs parallel to the inward-facing surface, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber;

wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.

51. (New) The method of claim 50 wherein at least one of the inside and outside electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes, and

wherein the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and wherein the unobstructed passageway includes the longitudinal center axis.

52. (New) The method of claim 50 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

53. (New) The method of claim 52 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

54. (New) The method of claim 50 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

55. (New) The method of claim 54 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

56. (New) The method of claim 55 wherein said inward-facing surface is a concave surface.

57. (New) The method of claim 50 wherein the emitter includes first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

58. (New) The method of claim 50 wherein the oxygen produced comprises microbubbles of oxygen.

59. (New) The method of claim 50 wherein the electrical current is applied to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

60. (New) The method of claim 50 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

61. (New) The method of claim 50 wherein the oxygen produced comprises nanobubbles of oxygen.

62. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;

the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, the electrodes being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway; and

passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.

63. (New) The method of claim 62 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the

oxygenation chamber.

64. (New) The method of claim 63 wherein the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

65. (New) The method of claim 62 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

66. (New) The method of claim 62 wherein said outer wall includes an inwardly-facing concave surface.

67. (New) The method of claim 62 wherein the emitter includes first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

68. (New) The method of claim 62 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

69. (New) The method of claim 68 wherein the oxygen produced comprises nanobubbles of oxygen.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION REISSUE PATENT

Applicant(s)	James Andrew Senkiw	Preliminary Amendment for Continuation Reissue Application of U.S. Patent No. 7,670,495 Pursuant to 37 C.F.R. §1.173(b)
Serial No.	Unknown	
Filing Date	Filed Herewith	
Continuation Reissue of U.S. Patent No.	7,670,495	
Issued:	March 2, 2010	
Examiner Name	Unknown	
Group Art Unit	Unknown	
Attorney Docket No.	3406.005US3	
Customer Number:	38846	
Confirmation No.	Unknown	
Title:	FLOW-THROUGH OXYGENATOR	

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Prior to examination of the above identified CONTINUATION reissue patent application, please enter the following preliminary amendment of the claims.

IN THE CLAIMS

Please cancel original claims 1-12.

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Cancelled)
7. (Cancelled)
8. (Cancelled)
9. (Cancelled)
10. (Cancelled)
11. (Cancelled)
12. (Cancelled)

Please add the following new claims.

13. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet;

at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing;

each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to

28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the electrodes producing oxygen in said water via electrolysis.

14. (New) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis; and

wherein at least one of the first and second electrodes is positioned in the tubular housing closer to the inward-facing surface than said distance separating the electrodes.

15. (New) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein said portions of electrodes extend in a direction parallel to the longitudinal axis; and

wherein each electrode of the emitter is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing.

16. (New) The method of claim 13 wherein at least one of the electrodes is a stainless steel mesh or screen.

17. (New) The method of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing.

18. (New) The method of claim 17 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the tubular housing.

19. (New) The method of claim 17 wherein the first and second electrodes comprise an outside electrode and an inside electrode,

wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is,

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

20. (New) The method of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of that portion of one of the electrodes positioned within the housing;

wherein the first and second electrodes comprise an outside electrode and an inside electrode;

wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing;
the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway; and

wherein the tubular housing of the emitter is round.

21. (New) The method of claim 19 wherein said inward-facing surface is a concave surface.

22. (New) The method of claim 13 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

23. (New) The method of claim 13 wherein the oxygen produced comprises microbubbles.

24. (New) The method of claim 13 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

25. (New) The method of claim 13 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

26. (New) The method of claim 13 wherein the oxygen produced comprises nanobubbles.

27. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches,

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode; and

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

passing water through the oxygenation chamber while electrical current is applied to the electrodes to produce oxygen in said water via electrolysis.

28. (New) The method of claim 27 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber.

29. (New) The method of claim 27 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

30. (New) The method of claim 29 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

31. (New) The method of claim 30 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

32. (New) The method of claim 27 wherein the emitter includes first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

33. (New) The method of claim 27 wherein the oxygen produced comprises nanobubbles.

34. (New) The method of claim 27 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

35. (New) The method of claim 27 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

36. (New) The method of claim 35 wherein the oxygen produced comprises nanobubbles.

37. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;

at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches, a portion of at least one of the first and second

electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, said portion being a portion that opposes the other of the first and second electrodes, wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the electrodes to produce oxygen in said water via electrolysis.

38. (New) The method of claim 37 wherein the tubular housing has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal center axis; and

wherein each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis.

39. (New) The method of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis,

wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis, and

wherein at least one of the first and second electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes.

40. (New) The method of claim 39 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

41. (New) The method of claim 37 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

42. (New) The method of claim 37 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

43. (New) The method of claim 42 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the chamber.

44. (New) The method of claim 42 wherein the chamber has an inward-facing surface that runs parallel to the longitudinal axis;

wherein the first and second electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is; and

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

45. (New) The method of claim 37 wherein the emitter includes first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

46. (New) The method of claim 37 wherein the oxygen produced comprises microbubbles.

47. (New) The method of claim 37 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

48. (New) The method of claim 37 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

49. (New) The method of claim 37wherein the oxygen produced comprises nanobubbles.

50. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber, said housing having an inward-facing surface that defines at least in part the oxygenation chamber, the tubular housing having a water inlet, and a water outlet;

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that runs parallel to the inward-facing surface, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber;

wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.

51. (New) The method of claim 50 wherein at least one of the inside and outside electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes, and

wherein the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and wherein the unobstructed passageway includes the longitudinal center axis.

52. (New) The method of claim 50 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

53. (New) The method of claim 52 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

54. (New) The method of claim 50 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

55. (New) The method of claim 54 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

56. (New) The method of claim 55 wherein said inward-facing surface is a concave surface.

57. (New) The method of claim 50 wherein the emitter includes first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

58. (New) The method of claim 50 wherein the oxygen produced comprises microbubbles of oxygen.

59. (New) The method of claim 50 wherein the electrical current is applied to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

60. (New) The method of claim 50 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

61. (New) The method of claim 50 wherein the oxygen produced comprises nanobubbles of oxygen.

62. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;

the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs

for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, the electrodes being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway; and

passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.

63. (New) The method of claim 62 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

64. (New) The method of claim 63 wherein the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

65. (New) The method of claim 62 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

66. (New) The method of claim 62 wherein said outer wall includes an inwardly-facing concave surface.

67. (New) The method of claim 62 wherein the emitter includes first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

68. (New) The method of claim 62 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

69. (New) The method of claim 68 wherein the oxygen produced comprises nanobubbles of oxygen.

REMARKS

Applicant and Assignee present the continuation reissue application associated with this preliminary amendment pursuant to 35 U.S.C. §251; 37 C.F.R. §1.177 and M.P.E.P §1451. This reissue application is a continuation of pending reissue application Serial No. 14/601,340 which is a continuation reissue application of reissue application Serial No 13/247,241. Because the present continuation reissue application has a priority date established by the original reissue application (Serial No. 13/247,241, filed September 28, 2011), Applicant and Assignee have satisfied the requirement of 35 U.S.C. §251 (d) concerning submission of a broadening reissue within two years of the issuance of the original patent to be reissued.

Applicant presents this preliminary amendment in connection with this continuation reissue application to correct errors of the claims of original U.S. Patent No. 7,670,495. As stated in the inventor's reissue declaration submitted herewith, the inventor had a right to claim the above described subject matter but did not do so. As explained in the present inventor's reissue declaration and in the original reissue declaration filed in the first reissue application, the claims of the '495 patent recite subject matter that is less in scope than Applicant was entitled to claim. All errors that are addressed and corrected by this preliminary amendment arose without any deceptive intent on the part of Applicant.

The new claims presented by this preliminary amendment are directed to the same general invention as that disclosed by the original patent as required by 35 U.S.C. §251. Current new claims 13-69 generally are directed to a method of treating water to produce oxygen bubbles. The method uses a flow-through oxygenator comprising an emitter having particular arrangements of electrodes. The claims describe features of the emitter embodiment shown in FIGS. 7a and 7b of the patent specification.

Specifically, support in the specification for the new claims is provided in the following chart.

CHART SHOWING SPECIFICATION SUPPORT FOR THE NEW CLAIMS

Claim Language	Location[1]
Claim 13	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16
providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B
a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet	3:26-32 9:7-11 FIGS. 7A-7B
at least two opposing electrodes in the tubular housing separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing	FIG. 7A 9:5-33
and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:5-33 3:23-30 3:11-14

1 The citation (eg., 2:63-67) means column 2, lines 63-67 of the '495 patent specification.

power source of voltage and amperage	9:35-45 (Table III)
passing water through the tubular housing while electrical current is applied to the electrodes producing oxygen in said water via electrolysis	3:27-35 2:63-67 9:3-33 9:35-45 (Table III)
Claim 14	
an inward-facing surface that runs parallel to the longitudinal axis	FIG. 7A 9:7-12
electrodes extend in a direction that is parallel to the longitudinal axis	FIG. 7A FIG. 7B 9:7-12 3:25-30
an electrode positioned in the tubular housing closer to the inward-facing surface than the distance separating the electrodes	FIG. 7A 9:7-12
Claim 15	
an inward-facing surface that runs parallel to the longitudinal axis	FIG. 7A 9:7-12
electrodes extend in a direction parallel to the longitudinal axis	FIG. 7A FIG. 7B 9:7-12 3:25-30
each electrode of the system is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing	FIG. 7A 9:7-12

Claim 16	
an electrode is stainless steel mesh or screen	3:6-8 4:63-64
Claim 17	
the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing	FIG. 7A FIG. 7B 9:7-18
Claim 18	
the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the electrodes	FIG. 7A
Claim 19	
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
electrodes extend in a direction parallel to the longitudinal axis	FIGS. 7A-7B 9:7-12 3:25-30
an inward-facing surface of the tubular housing	FIG. 7A 9:7-12
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 20	

electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of that portion of one of the electrodes positioned within the housing	FIG. 7A FIG. 7B 9:7-18
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
electrodes extend in a direction parallel to the longitudinal axis	FIGS. 7A-7B 9:7-12 3:25-30
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
the tubular housing of the system is round	FIG. 7A
Claim 21	
inward-facing surface is concave	FIG. 7A
Claim 22	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 23	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28

Claim 24	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 25	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 26	
the oxygen comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28
Claim 27	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16
providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B
a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface parallel to the water flow axis and defines at least in part the oxygenation chamber	3:26-32 9:7-12 FIG. 7A

an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis, electrodes extend in a direction that is parallel to the longitudinal axis	3:25-30 FIG. 7A FIG. 7B 9:7-18
electrodes separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
the position and size of each electrode within the chamber defines a cross-section that has a water flow area through which at least some water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0. 005 inches to 0 .140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:5-33 3:23-30 3:11-14
a portion of the outside electrode is closer to the inward-facing surface than the distance separating the inside and outside electrodes	FIG. 7A 3:25-28
power source of voltage and amperage	9:35-45 (Table III)
passing water through the oxygenation chamber while electrical current is applied to the electrodes to produce oxygen in said water via electrolysis.	3:27-35 2:63-67 9:3-33 9:35-45 (Table III)
Claim 28	
each electrode of the system is positioned closer to the inward-facing surface of the chamber than to a longitudinal	FIG. 7A 9:7-12

center axis of the oxygenation chamber	
Claim 29	
electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber	FIG. 7A FIG. 7B 9:7-18
Claim 30	
the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the electrodes	FIG. 7A
Claim 31	
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 32	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 33	
the oxygen comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28
Claim 34	
ratio of current to active electrode area	9:35-45 (Table III)

Claim 35	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 36	
the oxygen comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28
Claim 37	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16
providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B
a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;	3:26-32 9:7-12 FIG. 7A
electrodes separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular	FIG. 7A

housing, the portion being a portion that opposes the other of the first and second electrodes	
each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows at least some water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches	FIG. 7A 9:5-33 3:11-14
power source of voltage and amperage	9:35-45
passing water through the tubular housing while electrical current is applied to the electrodes producing oxygen in said water via electrolysis	3:27-35 2:63-67 9:3-33 9:35-45 (Table III)
Claim 38	
an inward-facing surface that runs parallel to a longitudinal center axis of the tubular housing	FIG. 7A 3:26-32 9:7-12
each electrode of the system is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis	FIG. 7A
Claim 39	
the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis, wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis	3:26-32 9:7-12 FIG. 7A

an electrode is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes	FIG. 7A 9:7-12
Claim 40	
each electrode of the system is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber	FIG. 7A 9:7-12
Claim 41	
the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing	FIG. 7A
Claim 42	
the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber	FIG. 7A FIG. 7B 9:7-18
Claim 43	
the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes	FIG. 7A
Claim 44	
an inward-facing surface that runs parallel to a longitudinal center axis of the chamber	FIG. 7A 3:26-32 9:7-12

an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 45	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 46	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 47	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 48	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 49	
the oxygen comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28

Claim 50	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16
providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B
a tubular housing defining an oxygenation chamber, and having and an inward-facing surface that defines at least in part the oxygenation chamber, a water inlet, and a water outlet	3:26-32 9:7-12 FIGS. 7A-7B
inside and outside electrodes extending parallel to the inward facing surface,	3:25-28 FIG 7A 9:7-18
electrodes separated by a distance of between 0.005 inches to 0.140 inches	3:11-14 4:54 5:4-11
each electrode of the electrolysis cell is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches	FIGS. 7A-7B 9:7-11 3:23-30 3:11-14

passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.	3:27-35 2:63-67 9:3-33 9:35-45 (Table III)
Claim 51	
an electrode is closer to the inward-facing surface than said distance separating the electrodes	FIG. 7A 9:7-11
the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and the unobstructed passageway includes the longitudinal center axis	FIG. 7A 9:7-11
Claim 52	
electrodes is in contact with at least one wall of the tubular housing	FIG. 7A
Claim 53	
electrode in contact with a wall of the tubular housing is in contact with a curved wall	FIG. 7A
Claim 54	
the unobstructed passageway is multiple times wider than the distance separating the opposing electrodes	FIG. 7A
Claim 55	
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18

Claim 56	
the inward-facing surface is a concave surface	FIG. 7A
Claim 57	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 58	
oxygen produced comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 59	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 60	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 61	
oxygen comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28
Claim 62	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B
a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,	3:26-32 9:7-12 FIGS. 7A-7B
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
opposing electrodes separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length	FIG. 7A FIG. 7B 9:7-18
the electrodes being positioned so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:7-12 3:23-30 3:11-14

cross-sectional area between outside electrode and outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.	3:27-35 2:63-67 9:3-33 9:35-45 (Table III)
Claim 63	
an electrode is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber	FIG. 7A
Claim 64	
the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing	FIG. 7A
Claim 65	
the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes	FIG. 7A
Claim 66	
outer wall includes an inwardly-facing concave surface	FIG. 7A
Claim 67	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17

Claim 68	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 69	
oxygen comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28

Applicant submits that the new claims presented by this preliminary amendment are fully supported by the specification and that the new claims do not add new matter to the subject matter disclosed in that specification.

Applicant states that one prior reissue application has issued as patent no. RE45,415 and that there is a pending prior continuation reissue application No. 14/601,340. There are no other prior or concurrent proceedings in which U.S. Patent No. 7,670,495 is or was involved, including interferences, reissues, reexaminations, or litigations, or is or was the result of such proceedings.

Applicant requests a favorable examination of his continuation application for re-issue of U.S. Patent No. 7,670,495.

Respectfully submitted,

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(12) **United States Patent**
Senkiw

(10) **Patent No.: US 7,670,495 B2**
(45) **Date of Patent: *Mar. 2, 2010**

(54) **FLOW-THROUGH OXYGENATOR**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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(60) Division of application No. 10/732,326, filed on Dec. 10, 2003, now Pat. No. 7,396,441, which is a continuation-in-part of application No. 10/372,017, filed on Feb. 21, 2003, now Pat. No. 6,689,262.

(60) Provisional application No. 60/358,534, filed on Feb. 22, 2002.

(51) **Int. Cl.**

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C25B 1/04	(2006.01)

(52) **U.S. Cl.** **210/748**; 210/600; 210/243; 204/245; 204/232; 205/628

(58) **Field of Classification Search** 210/748, 210/600, 243; 204/278, 242, 243, 275.1, 204/232, 286.1, 554, 660; 205/633–638
See application file for complete search history.

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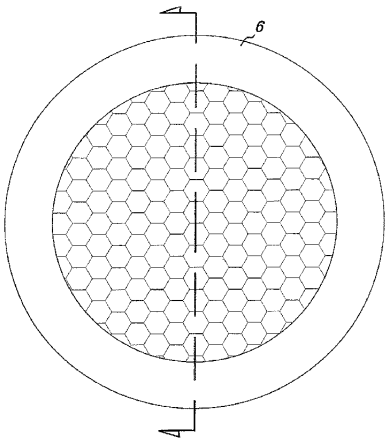
(57) **ABSTRACT**

An oxygen emitter which is an electrolytic cell is disclosed. When the anode and cathode are separated by a critical distance, very small microbubbles and nanobubbles of oxygen are generated. The very small oxygen bubbles remain in suspension, forming a solution supersaturated in oxygen. A flow-through model for oxygenating flowing water is disclosed. The use of supersaturated water for enhancing the growth of plants is disclosed. Methods for applying supersaturated water to plants manually, by drip irrigation or in hydroponic culture are described. The treatment of waste water by raising the dissolved oxygen with the use of an oxygen emitter is disclosed.

12 Claims, 8 Drawing Sheets



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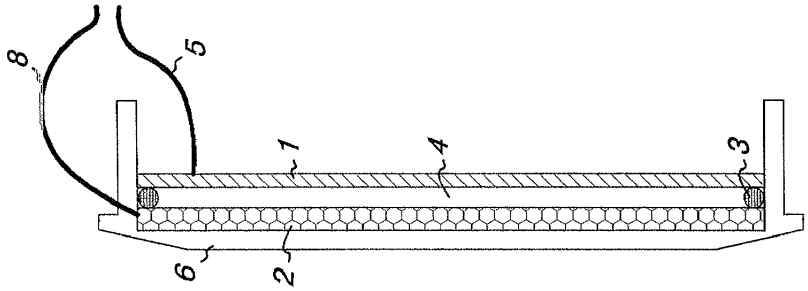


Fig. 1B

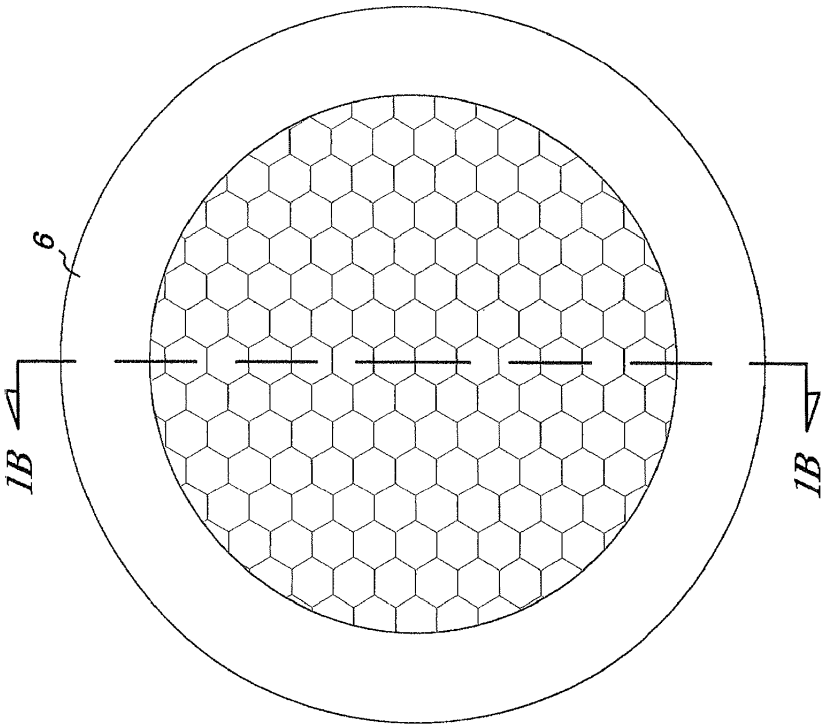


Fig. 1A

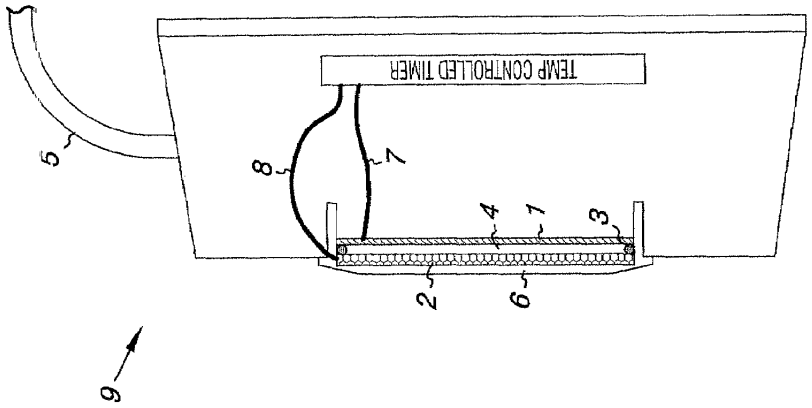


Fig. 2B

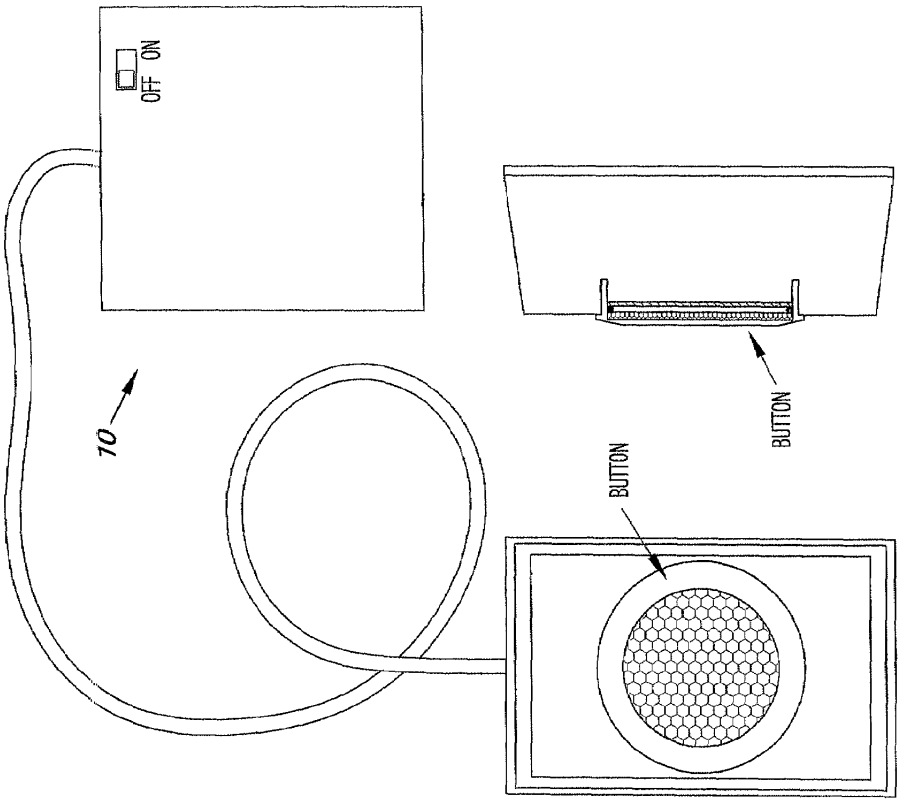


Fig. 2A

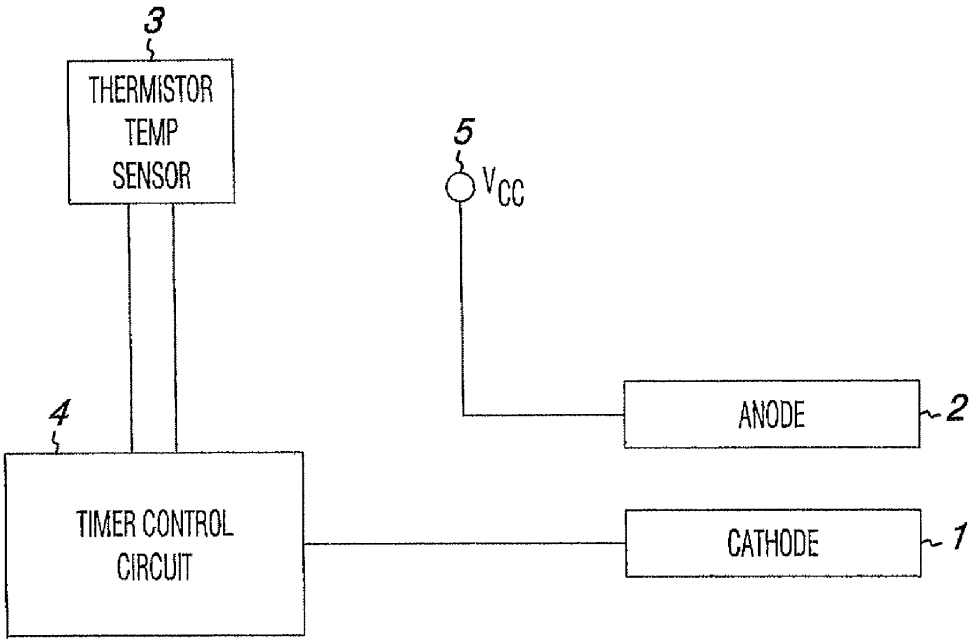

3
THERMISTOR TEMP SENSOR
5
V_{CC}
4
TIMER CONTROL CIRCUIT
ANODE
2
CATHODE
1

Fig. 3

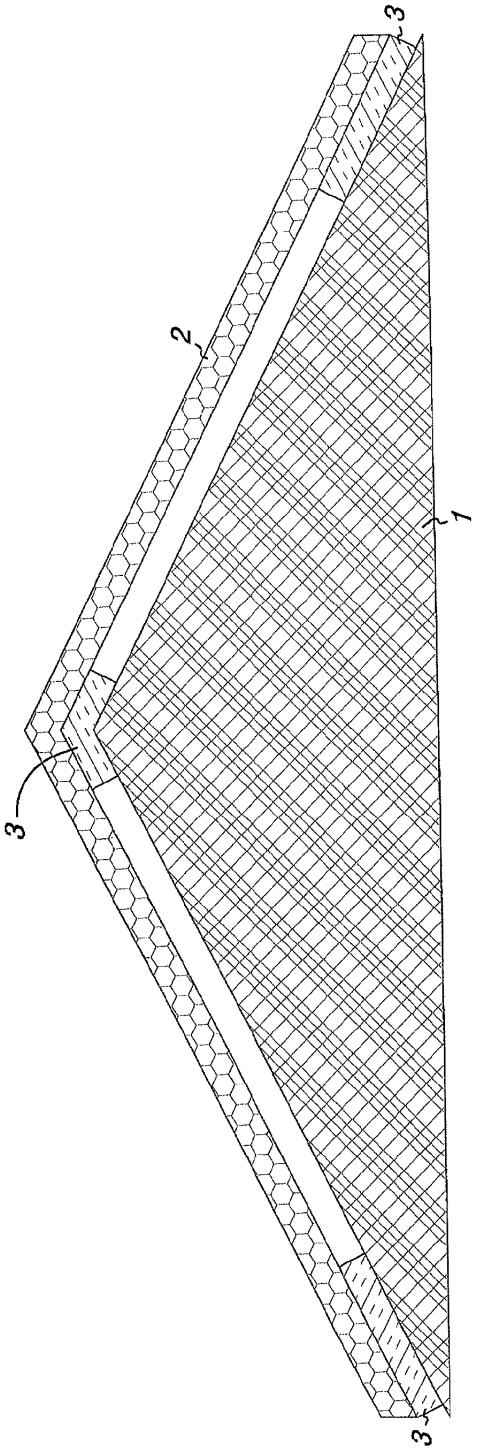


Fig. 4

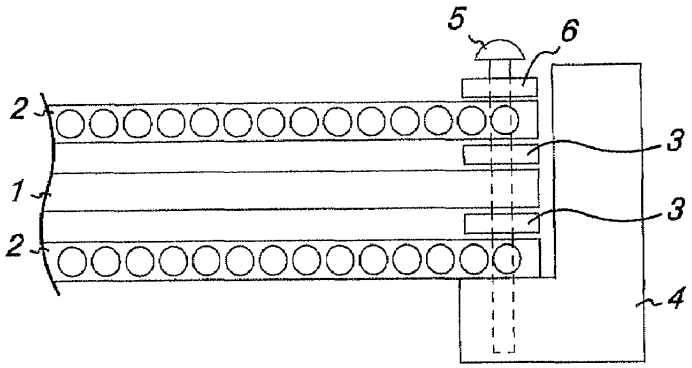


Fig. 5A

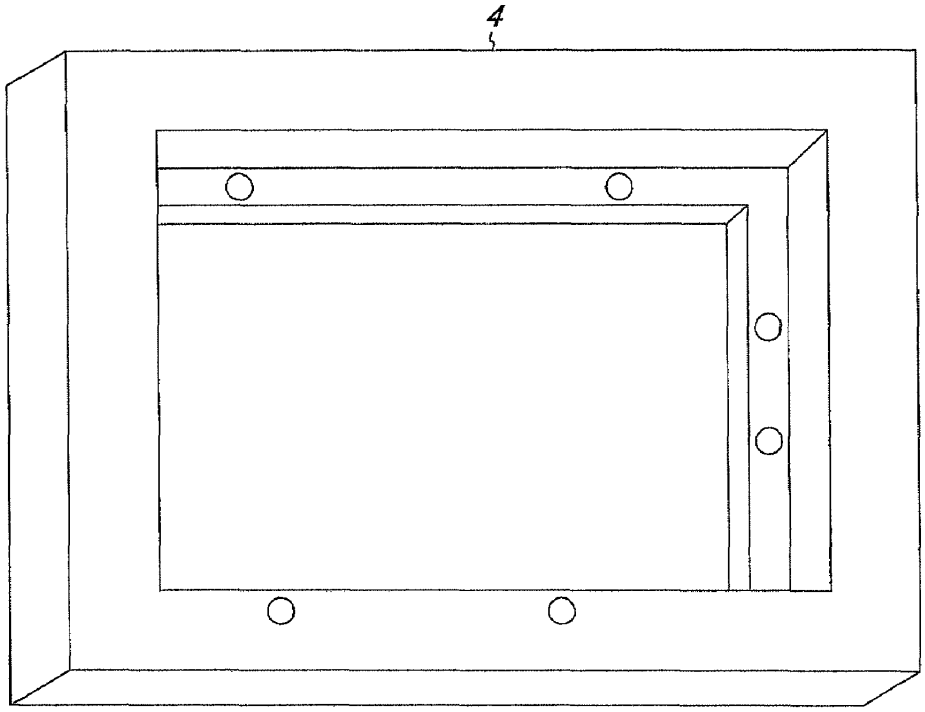


Fig. 5B

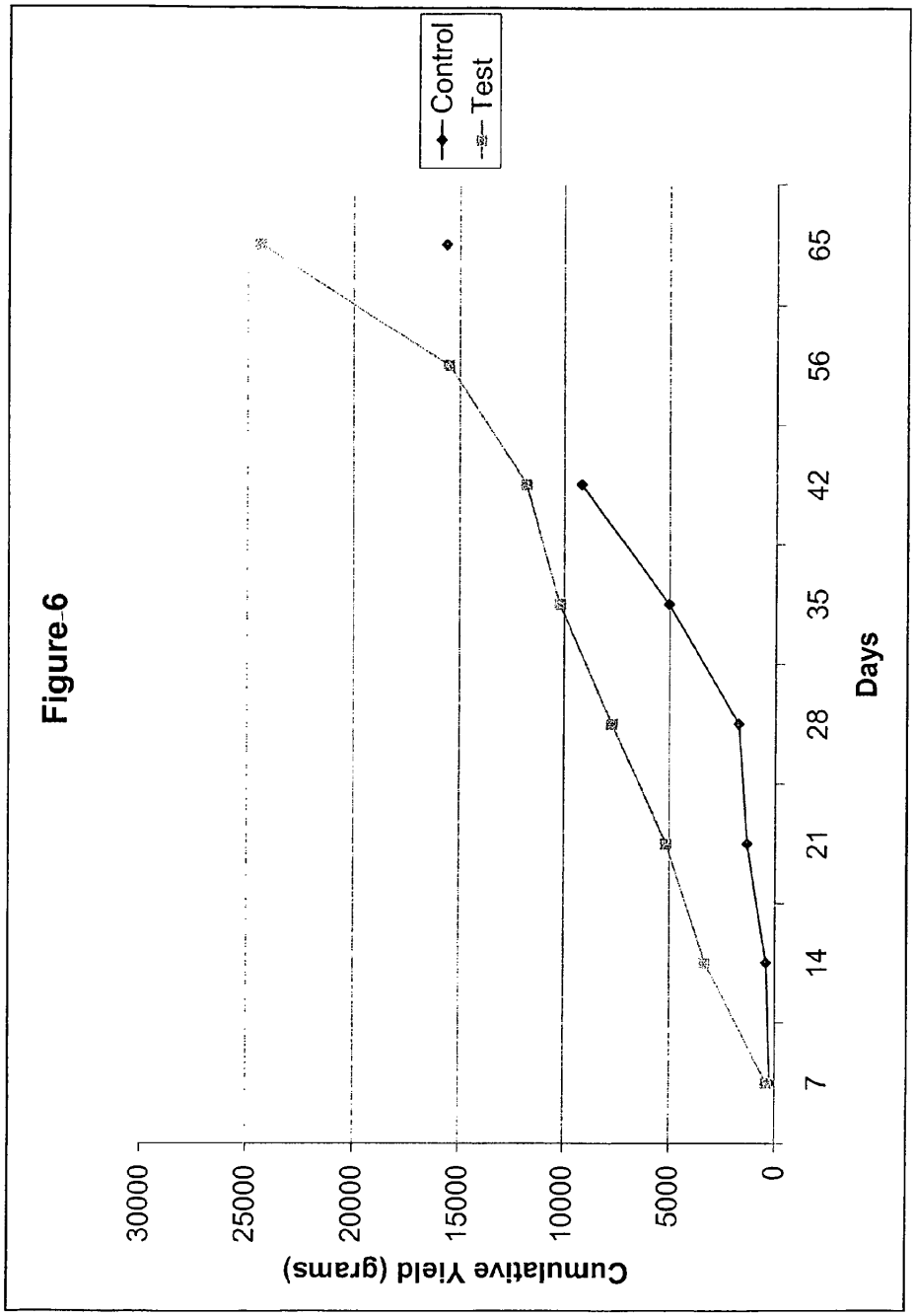

Control
Test
Cumulative Yield (grams)
30000
25000
20000
15000
10000
5000
0
Days
7
14
21
28
35
42
56
65

Figure 6

Fig. 7A

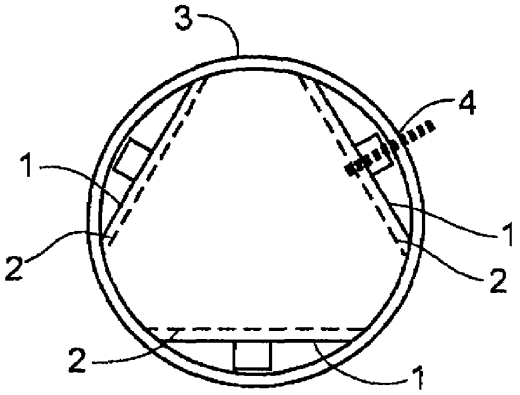
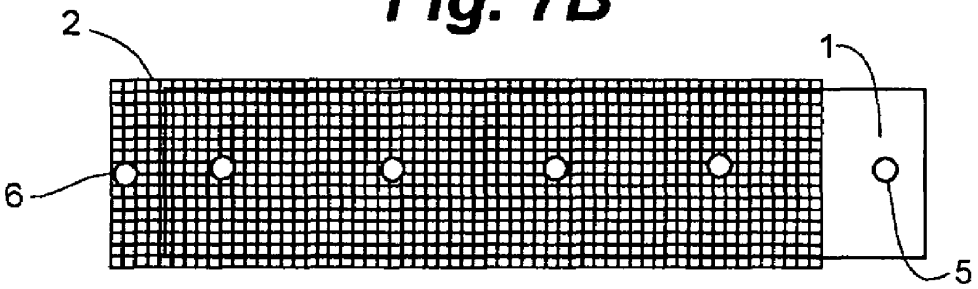


Fig. 7B



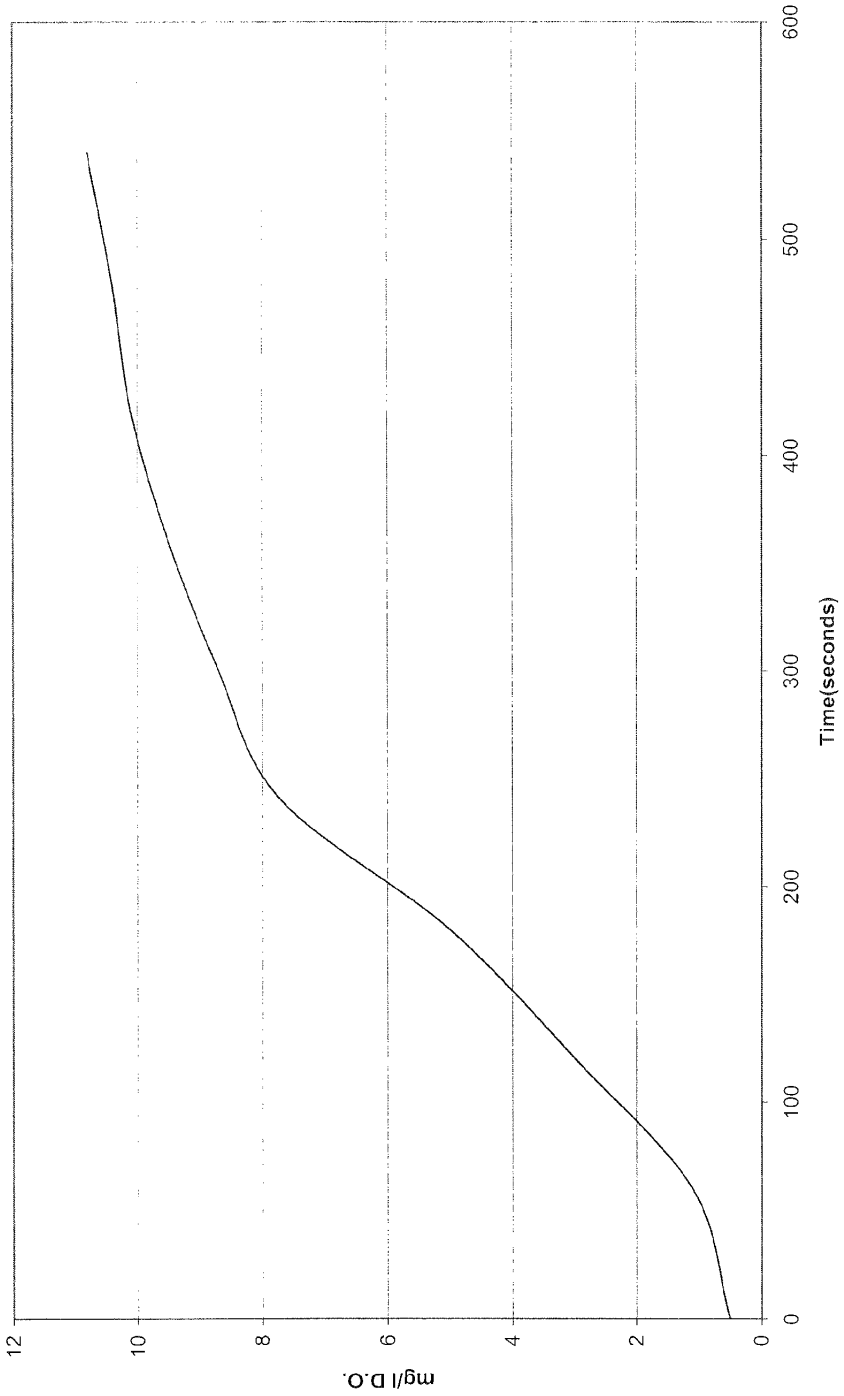


Fig. 8 Time vs D.O.

FLOW-THROUGH OXYGENATOR

RELATED APPLICATIONS

This application is a division of application Ser. No. 10/732,326 filed Dec. 10, 2003, which in turn is a continuation-in-part of application Ser. No. 10/372,017, filed Feb. 21, 2003, now U.S. Pat. No. 6,689,262, which claims the benefit of U.S. Provisional Application No. 60/358,534, filed Feb. 22, 2002, each of which is hereby fully incorporated herein by reference.

FIELD OF THE INVENTION

This invention relates to the electrolytic generation of microbubbles of oxygen for increasing the oxygen content of flowing water. This invention also relates to the use of super-oxygenated water to enhance the growth and yield of plants. The flow-through model is useful for oxygenating water for hydroponic plant culture, drip irrigation and waste water treatment.

BACKGROUND OF THE INVENTION

Many benefits may be obtained through raising the oxygen content of aqueous media. Efforts have been made to achieve higher saturated or supersaturated oxygen levels for applications such as the improvement of water quality in ponds, lakes, marshes and reservoirs, the detoxification of contaminated water, culture of fish, shrimp and other aquatic animals, biological culture and hydroponic culture. For example, fish held in a limited environment such as an aquarium, a bait bucket or a live hold tank may quickly use up the dissolved oxygen in the course of normal respiration and are then subject to hypoxic stress, which can lead to death. A similar effect is seen in cell cultures, where the respiring cells would benefit from higher oxygen content of the medium. Organic pollutants from agricultural, municipal and industrial facilities spread through the ground and surface water and adversely affect life forms. Many pollutants are toxic, carcinogenic or mutagenic. Decomposition of these pollutants is facilitated by oxygen, both by direct chemical detoxifying reactions or by stimulating the growth of detoxifying microflora. Contaminated water is described as having an increased biological oxygen demand (BOD) and water treatment is aimed at decreasing the BOD so as to make more oxygen available for fish and other life forms.

The most common method of increasing the oxygen content of a medium is by sparging with air or oxygen. While this is a simple method, the resulting large bubbles produced simply break the surface and are discharged into the atmosphere. Attempts have been made to reduce the size of the bubbles in order to facilitate oxygen transfer by increasing the total surface area of the oxygen bubbles. U.S. Pat. No. 5,534,143 discloses a microbubble generator that achieves a bubble size of about 0.10 millimeters to about 3 millimeters in diameter. U.S. Pat. No. 6,394,429 ("the '429 patent") discloses a device for producing microbubbles, ranging in size from 0.1 to 100 microns in diameter, by forcing air into the fluid at high pressure through a small orifice.

When the object of generating bubbles is to oxygenate the water, either air, with an oxygen content of about 21%, or pure oxygen may be used. The production of oxygen and hydrogen by the electrolysis of water is well known. A current is applied across an anode and a cathode which are immersed in an aqueous medium. The current may be a direct current from a battery or an AC/DC converter from a line. Hydrogen gas is produced at the cathode and oxygen gas is produced at the anode. The reactions are:

AT THE CATHODE:	$4H_2O + 4e^- \rightarrow 4OH^- + 2H_2$
AT THE ANODE:	$2H_2O \rightarrow O_2 + 4H^+ + 4e^-$
NET REACTION:	$6H_2O \rightarrow 4OH^- + 4H^+ + 2H_2 + O_2$

286 kilojoules of energy is required to generate one mole of oxygen.

The gasses form bubbles which rise to the surface of the fluid and may be collected. Either the oxygen or the hydrogen may be collected for various uses. The "electrolytic water" surrounding the anode becomes acidic while the electrolytic water surrounding the cathode becomes basic. Therefore, the electrodes tend to foul or pit and have a limited life in these corrosive environments.

Many cathodes and anodes are commercially available. U.S. Pat. No. 5,982,609 discloses cathodes comprising a metal or metallic oxide of at least one metal selected from the group consisting of ruthenium, iridium, nickel, iron, rhodium, rhenium, cobalt, tungsten, manganese, tantalum, molybdenum, lead, titanium, platinum, palladium and osmium. Anodes are formed from the same metallic oxides or metals as cathodes. Electrodes may also be formed from alloys of the above metals or metals and oxides co-deposited on a substrate. The cathode and anodes may be formed on any convenient support in any desired shape or size. It is possible to use the same materials or different materials for both electrodes. The choice is determined according to the uses. Platinum and iron alloys ("stainless steel") are often preferred materials due to their inherent resistance to the corrosive electrolytic water. An especially preferred anode disclosed in U.S. Pat. No. 4,252,856 comprises vacuum deposited iridium oxide.

Holding vessels for live animals generally have a high population of animals which use up the available oxygen rapidly. Pumps to supply oxygen have high power requirements and the noise and bubbling may further stress the animals. The available electrolytic generators likewise have high power requirements and additionally run at high voltages and produce acidic and basic water which are detrimental to live animals. Many of the uses of oxygenators, such as keeping bait or caught fish alive, would benefit from portable devices that did not require a source of high power. The need remains for quiet, portable, low voltage means to oxygenate water.

It has also been known that plant roots are healthier when oxygenated water is applied. It is thought that oxygen inhibits the growth of deleterious fungi. The water sparged with air as in the '429 patent was shown to increase the biomass of hydroponically grown cucumbers and tomatoes by about 15%.

The need remains for oxygenator models suitable to be placed in-line in water distribution devices so as to be applied to field as well as hydroponic culture.

SUMMARY OF THE INVENTION

This invention provides an oxygen emitter which is an electrolytic cell which generates very small microbubbles and nanobubbles of oxygen in an aqueous medium, which bubbles are too small to break the surface tension of the medium, resulting in a medium supersaturated with oxygen.

The electrodes may be a metal or oxide of at least one metal selected from the group consisting of ruthenium, iridium, nickel, iron, rhodium, rhenium, cobalt, tungsten, manganese, tantalum, molybdenum, lead, titanium, platinum, palladium and osmium or oxides thereof. The electrodes may be formed into open grids or may be closed surfaces. The most preferred cathode is a stainless steel mesh. The most preferred mesh is a {fraction (1/16)} inch grid. The most preferred anode is platinum and iridium oxide on a support. A preferred support is titanium.

In order to form microbubbles and nanobubbles, the anode and cathode are separated by a critical distance. The critical distance ranges from 0.005 inches to 0.140 inches. The preferred critical distance is from 0.045 to 0.060 inches.

Models of different size are provided to be applicable to various volumes of aqueous medium to be oxygenated. The public is directed to choose the applicable model based on volume and power requirements of projected use. Those models with low voltage requirements are especially suited to oxygenating water in which animals are to be held.

Controls are provided to regulate the current and timing of electrolysis.

A flow-through model is provided which may be connected in-line to a watering hose or to a hydroponic circulating system. The flow-through model can be formed into a tube with triangular cross-section. In this model, the anode is placed toward the outside of the tube and the cathode is placed on the inside, contacting the water flow. Alternatively, the anodes and cathodes may be in plates parallel to the long axis of the tube, or may be plates in a wafer stack. Alternately, the electrodes may be placed in a side tube ("T" model) out of the direct flow of water. Protocols are provided to produce superoxygenated water at the desired flow rate and at the desired power usage. Controls are inserted to activate electrolysis when water is flowing and deactivate electrolysis at rest.

This invention includes a method to promote growth and increase yield of plants by application of superoxygenated water. The water treated with the emitter of this invention is one example of superoxygenated water. Plants may be grown in hydroponic culture or in soil. The use of the flow-through model for drip irrigation of crops and waste water treatment is disclosed.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is the O_2 emitter of the invention.

FIG. **2** is an assembled device.

FIG. **3** is a diagram of the electronic controls of the O_2 emitter.

FIG. **4** shows a funnel or pyramid variation of the O_2 emitter.

FIG. **5** shows a multilayer sandwich O_2 emitter.

FIG. **6** shows the yield of tomato plants watered with superoxygenated water.

FIG. **7** shows an oxygenation chamber suitable for flow-through applications. FIG. **7**A is a cross section showing arrangement of three plate electrodes. FIG. **7**B is a longitudinal section showing the points of connection to the power source.

FIG. **8** is a graph showing the oxygenation of waste water.

DETAILED DESCRIPTION OF THE INVENTION

Definitions

For the purpose of describing the present invention, the following terms have these meanings:

"Critical distance" means the distance separating the anode and cathode at which evolved oxygen forms microbubbles and nanobubbles.

"Critical distance" means the distance separating the anode and cathode at which evolved oxygen forms microbubbles and nanobubbles.

"O_2 emitter" means a cell comprised of at least one anode and at least one cathode separated by the critical distance.

"Metal" means a metal or an alloy of one or more metals.

"Microbubble" means a bubble with a diameter less than 50 microns.

"Nanobubble" means a bubble with a diameter less than that necessary to break the surface tension of water. Nanobubbles remain suspended in the water, giving the water an opalescent or milky appearance.

"Supersaturated" means oxygen at a higher concentration than normal calculated oxygen solubility at a particular temperature and pressure.

"Superoxygenated water" means water with an oxygen content at least 120% of that calculated to be saturated at a temperature.

"Water" means any aqueous medium with resistance less than one ohm per square centimeter; that is, a medium that can support the electrolysis of water. In general, the lower limit of resistance for a medium that can support electrolysis is water containing more than 2000 ppm total dissolved solids.

The present invention produces microbubbles and nanobubbles of oxygen via the electrolysis of water. As molecular oxygen radical (atomic weight 8) is produced, it reacts to form molecular oxygen, O_2. In the special dimensions of the invention, as explained in more detail in the following examples, O_2 forms bubbles which are too small to break the surface tension of the fluid. These bubbles remain suspended indefinitely in the fluid and, when allowed to build up, make the fluid opalescent or milky. Only after several hours do the bubbles begin to coalesce on the sides of the container and the water clears. During that time, the water is supersaturated with oxygen. In contrast, the H_2 formed readily coalesces into larger bubbles which are discharged into the atmosphere, as can be seen by bubble formation at the cathode.

The first objective of this invention was to make an oxygen emitter with low power demands, low voltage and low current for use with live animals. For that reason, a small button emitter was devised. The anode and cathode were set at varying distances. It was found that electrolysis took place at very short distances before arcing of the current occurred. Surprisingly, at slightly larger distances, the water became milky and no bubbles formed at the anode, while hydrogen continued to be bubbled off the cathode. At distance of 0.140 inches between the anode and cathode, it was observed that the oxygen formed bubbles at the anode. Therefore, the critical distance for microbubble and nanobubble formation was determined to be between 0.005 inches and 0.140 inches.

EXAMPLE 1

Oxygen Emitter

As shown in FIG. **1**, the oxygen evolving anode **1** selected as the most efficient is an iridium oxide coated single sided sheet of platinum on a support of titanium (Eltech, Fairport Harbor, Ohio). The cathode **2** is a (fraction (1/16)} inch mesh (size 8 mesh) marine stainless steel screen. The anode and cathode are separated by a non-conducting spacer **3** containing a gap **4** for the passage of gas and mixing of anodic and cathodic water and connected to a power source through a

connection point **5**. FIG. **2** shows a plan view of the assembled device. The O_2 emitter **6** with the anode connecting wire **7** and the cathode connecting wire **8** is contained in an enclosure **9**, connected to the battery compartment **10**. The spacer thickness is critical as it sets the critical distance. It must be of sufficient thickness to prevent arcing of the current, but thin enough to separate the electrodes by no more than 0.140 inches. Above that thickness, the power needs are higher and the oxygen bubbles formed at higher voltage will coalesce and escape the fluid. Preferably, the spacer is from 0.005 to 0.075 inches thick. At the lower limits, the emitter tends to foul more quickly. Most preferably, the spacer is about 0.050 inches thick. The spacer may be any nonconductive material such as nylon, fiberglass, Teflon®, polymer or other plastic. Because of the criticality of the space distance, it is preferable to have a non-compressible spacer. It was found that Buna, with a durometer measure of 60 was not acceptable due to decomposition. Viton, a common fluoroelastomer, has a durometer measure of 90 and was found to hold its shape well.

In operation, a small device with an O_2 emitter 1.485 inches in diameter was driven by 4AA batteries. The critical distance was held at 0.050 inches with a Viton spacer. Five gallons of water became saturated in seven minutes. This size is suitable for raising oxygen levels in an aquarium or bait bucket.

It is convenient to attach a control circuit which comprises a timer that is thermostatically controlled by a temperature sensor which determines the off time for the cathode. When the temperature of the solution changes, the resistance of the thermistor changes, which causes an off time of a certain duration. In cool water, the duration is longer so in a given volume, the emitter generates less oxygen. When the water is warmer and therefore hold less oxygen, the duration of off time is shorter. Thus the device is self-controlled to use power most economically. FIG. **3** shows a block diagram of a timer control with anode **1**, cathode **2**, thermistor temperature sensor **3**, timer control circuit **4** and wire from a direct current power source **5**.

EXAMPLE 2

Measurement of O_2 Bubbles

Attempts were made to measure the diameter of the O_2 bubbles emitted by the device of Example 1. In the case of particles other than gasses, measurements can easily be made by scanning electron microscopy, but gasses do not survive electron microscopy. Large bubble may be measured by pore exclusion, for example, which is also not feasible when measuring a gas bubble. A black and white digital, high contrast, backlit photograph of treated water with a millimeter scale reference was shot of water produced by the emitter of Example 1. About 125 bubbles were seen in the area selected for measurement. Seven bubbles ranging from the smallest clearly seen to the largest were measured. The area was enlarged, giving a scale multiplier of 0.029412.

Recorded bubble diameters at scale were 0.16, 0.22, 0.35, 0.51, 0.76, 0.88 and 1.09 millimeters. The last three were considered outliers by reverse analysis of variance and were assumed to be hydrogen bubbles. When multiplied by the scale multiplier, the assumed O_2 bubbles were found to range from 4.7 to 15 microns in diameter. This test was limited by the resolution of the camera and smaller bubbles in the nanometer range could not be resolved. It is known that white light cannot resolve features in the nanometer size range, so monochromatic laser light may give resolution sensitive enough to measure smaller bubbles. Efforts continue to increase the sensitivity of measurement so that sub-micron diameter bubbles can be measured.

EXAMPLE 3

Other Models of Oxygen Emitter

Depending on the volume of fluid to be oxygenated, the oxygen emitter of this invention may be shaped as a circle, rectangle, cone or other model. One or more may be set in a substrate that may be metal, glass, plastic or other material. The substrate is not critical as long as the current is isolated to the electrodes by the nonconductor spacer material of a thickness from 0.005 to 0.075 inches, preferably 0.050 inches. It has been noticed that the flow of water seems to be at the periphery of the emitter, while the evolved visible bubbles (H_2) arise at the center of the emitter. Therefore, a funnel or pyramidal shaped emitter was constructed to treat larger volumes of fluid. FIG. **4** is a cross sectional diagram of such an emitter. The anode **1** is formed as an open grid separated from a marine grade stainless steel screen cathode **2** by the critical distance by spacer **3** around the periphery of the emitter and at the apex. This flow-through embodiment is suitable for treating large volumes of water rapidly.

The size may be varied as required. A round emitter for oxygenating a bait bucket may be about 2 inches in diameter, while a 3-inch diameter emitter is adequate for oxygenating a 10 to 40 gallon tank. The live well of a fishing boat will generally hold 40 to 80 gallons of water and require a 4-inch diameter emitter. It is within the scope of this invention to construct larger emitters or to use several in a series to oxygenate larger volumes. It is also within the scope of this invention to vary the model to provide for low voltage and amperage in cases where the need for oxygen is moderate and long lasting or conversely, to supersaturate water very quickly at higher voltage and amperage. In the special dimensions of the present invention, it has been found that a 6 volt battery supplying a current as low as 40 milliamperes is sufficient to generate oxygen. Such a model is especially useful with live plants or animals, while it is more convenient for industrial use to use a higher voltage and current. Table I shows a number of models suitable to various uses.

TABLE I

Emitter Model	Gallons	Volts	Amps Max.	Ave	Watts
Bait keeper	5	6	0.090	0.060	0.36
Livewell	32	12	0.180	0.120	1.44
OEM 2 inch	10	12	0.210	0.120	1.44
Bait store	70	12	0.180	0.180	2.16
Double cycle	2	12	0.180	0.180	2.16
OEM 3 inch	50	12	0.500	0.265	3.48
OEM 4 inch	80	12	0.980	0.410	4.92
Water pail	2	24	1.200	1.200	28.80
Plate	250	12	5.000	2.500	30.00

EXAMPLE 4

Multilayer Sandwich O_2 Emitter

An O_2 emitter was made in a multilayer sandwich embodiment. (FIG. **5**) An iridium oxide coated platinum anode **1** was formed into a grid to allow good water flow and sandwiched between two stainless steel screen cathodes **2**. Spacing was held at the critical distance by nylon spacers **3**. The embodiment illustrated is held in a cassette **4** which is secured by nylon bolt **5** with a nylon washer **6**. The dimensions selected were:

cathode screen	0.045 inches thick
nylon spacer	0.053 inches thick
anode grid	0.035 inches thick
nylon spacer	0.053 inches thick
cathode screen	0.045 inches thick,

for an overall emitter thickness of 0.231 inches thick inches.

If a more powerful emitter is desired, it is within the scope of this invention to repeat the sequence of stacking. For example, an embodiment may easily be constructed with this sequence: cathode, spacer, anode, spacer, cathode, spacer, anode, spacer, cathode, spacer, anode, spacer, cathode. The number of layers in the sandwich is limited only by the power requirements acceptable for an application.

EXAMPLE 5

Effect of Superoxygenated Water on the Growth of Plants

It is known that oxygen is important for the growth of plants. Although plants evolve oxygen during photosynthesis, they also have a requirement for oxygen for respiration. Oxygen is evolved in the leaves of the plants, while often the roots are in a hypoxic environment without enough oxygen to support optimum respiration, which can be reflected in less than optimum growth and nutrient utilization. Hydroponically grown plants are particularly susceptible to oxygen deficit in the root system. U.S. Pat. No. 5,887,383 describes a liquid supply pump unit for hydroponic cultures which attain oxygen enrichment by sparging with air. Such a method has high energy requirements and is noisy. Furthermore, while suitable for self-contained hydroponic culture, the apparatus is not usable for field irrigation. In a report available on the web, it was shown that hydroponically grown cucumbers and tomatoes supplied with water oxygenated with a device similar to that described in the '429 patent had increased biomass of about 12% and 17% respectively. It should be noted that when sparged with air, the water may become saturated with oxygen, but it is unlikely that the water is superoxygenated.

A. Superoxygenated Water in Hydroponic Culture.

Two small hydroponic systems were set up to grow two tomato plants. Circulation protocols were identical except that the 2 ½ gallon water reservoir for the Control plant was eroated with and aquarium bubbler and that for the Test plant was oxygenated with a five-inch strip emitter for two minutes prior to pumping. The cycle was set at four minutes of pumping, followed by four minutes of rest. The control water had an oxygen content of about 97% to 103% saturation, that is, it was saturated with oxygen. The test water had an oxygen content of about 153% to 165% saturation, that is, it was supersaturated. The test plant was at least four times the volume of the control plant and began to show what looked like fertilizer burn. At that point the fertilizer for the Test plant was reduced by half. Since the plants were not exposed to natural light but to continuous artificial light in an indoor environment without the natural means of fertilization (wind and/or insects), the experiment was discontinued after three months. At that time, the Test plant but not the Control plant had blossomed.

B. Superoxygenated Water in Field Culture.

A pilot study was designed to ascertain that plants outside the hydroponic culture facility would benefit from the application of oxygen. It was decided to use water treated with the emitter of Example 1 as the oxygen carrier. Since water so treated is supersaturated, it is an excellent carrier of oxygen.

Tomato seeds (Burpee "Big Boy") were planted in one-inch diameter peat and dirt plugs encased in cheese cloth and placed in a tray in a southwest window. Controls were watered once a day with tap water ("Control") or oxygenated water ("Test"). Both Controls and Test sprouted at one week. After five weeks, the Test plants were an average of 11 inches tall while the Controls were an average of nine inches tall. At this time, May 10, when the threat of frost in Minnesota was minimal, the plants were transplanted to 13 inch diameter pots with drainage holes. Four inches of top soil was added to each pot, topped off with four inches of Scott's Potting Soil. The pots were placed outside in a sunny area with at least eight hours a day of full sun. The plants were watered as needed with either plain tap water (Control) or oxygenated water (Test). The oxygenated water was produced by use of the emitter of Example 1 run for one-half hour in a five-gallon container of water. Previous experiments showed that water thus treated had an oxygen content from 160% to 260% saturation. The Test plants flowered on June 4, while the Controls did not flower until June 18. For both groups, every plant in the group first had flowers on the same day. All plants were fertilized on July 2 and a soaker hose provided because the plants were now so big that watering by hand was difficult. The soaker hose was run for one half to one hour each morning, depending on the weather, to a point at which the soil was saturated with water. One half hour after the soaker hose was turned off, about 750 ml of superoxygenated water was applied to each of the Test plants.

The Test plants were bushier than the Controls although the heights were similar. At this time, there were eight Control plants and seven Test plants because one of the Test plants broke in a storm. On July 2, the control plants averaged about 17 primary branches from the vine stem, while the control plants averaged about 13 primary branches from the vine stem. As the tomatoes matured, each was weighed on a kitchen scale at harvest. The yield history is shown in Table II.

TABLE II

Week of:	Control, grams tomatoes from eight plants/ cumulative total		Test, grams tomatoes from seven plants/ cumulative total	
July 27	240		400	
August 3	180	420	2910	3310
August 10	905	1325	1830	5140
August 17	410	1735	2590	7730
August 24	3300	5035	2470	10200
August 31	4150	9175	1580	11780
September 15	not weighed		3710	15490
Final Harvest September 24	6435	15620	8895	24385

The total yield for the eight Control plants was 15620 grams or 1952 grams of tomatoes per plant.

The total yield for the seven Test plants was 24385 grams or 3484 grams of tomatoes per plant, an increase in yield of about 79% over the Control plants.

FIG. **6** shows the cumulative total as plotted against time. Not only did the Test plants blossom and bear fruit earlier, but that the Control plants never caught up to the test plants in the short Minnesota growing season. It should be noted that the experiment was terminated because of predicted frost. All fruits, both green and red, were harvested and weighed at that point.

EXAMPLE 6

Flow-Through Emitter for Agricultural Use

In order to apply the findings of example 5 to agricultural uses, an emitter than can oxygenate running water efficiently was developed. In FIG. **7**(A), the oxygenation chamber is comprised of three anodes **1** and cathodes **2**, of appropriate size to fit inside a tube or hose and separated by the critical distance are placed within a tube or hose **3** at 120° angles to each other. The anodes and cathodes are positioned with stabilizing hardware **4**. The stabilizing hardware, which can be any configuration such as a screw, rod or washer, is preferably formed from stainless steel. FIG. **7**(B) shows a plan view of the oxygenation chamber with stabilizing hardware **4** serving as a connector to the power source and stabilizing hardware **5** serving as a connector to the power source. The active area is shown at **6**.

This invention is not limited to the design selected for this embodiment. Those skilled in the art can readily fabricate any of the emitters shown in FIG. **4** or **5**, or can design other embodiments that will oxygenate flowing water. One useful embodiment is the "T" model, wherein the emitter unit is set in a side arm. The emitted bubbles are swept into the water flow. The unit is detachable for easy servicing. Table III shows several models of flow through emitters. The voltage and flowrates were held constant and the current varied. The Dissolved oxygen (DO) from the source was 7.1 mg/liter. The starting temperature was 12.2° C. but the flowing water cooled slightly to 11 or 11.5° C. Without undue experimentation, anyone may easily select the embodiment that best suits desired characteristics from Table III or designed with the teachings of Table III.

TABLE III

MODEL	ACTIVE ELECTRODE AREA, SQ.IN.	VOLTAGE	CURRENT, AMPS.	FLOW RATE GAL/MINUTE	DO OF* SAMPLE AT ONE MINUTE
2-Inch "T"	2	28.3	0.72	12	N/A
3-inch "T"	3	28.3	1.75	12	N/A
2-plate Tube	20	28.3	9.1	12	8.4
3-Plate tube	30	28.3	12.8	12	9.6

*As the apparatus runs longer, the flowing water becomes milky, indicating supersaturation. The one-minute time point shows the rapid increase in oxygenation.

The following plants will be tested for response to superoxygenated water: grape vines, lettuce, and radishes in three different climate zones. The operators for these facilities will be supplied with units for drip irrigation. Drip irrigation is a technique wherein water is pumped through a pipe or hose with perforations at the site of each plant to be irrigated. The conduit may be underground or above ground. Since the water is applied directly to the plant rather than wetting the entire field, this technique is especially useful in arid climates or for plants requiring high fertilizer applications.

The superoxygenated water will be applied by drip irrigation per the usual protocol for the respective plants. Growth and yield will be compared to the same plants given only the usual irrigation water. Pest control and fertilization will be the same between test and control plants, except that the operators of the experiments will be cautioned to be aware of the possibility of fertilizer burn in the test plants and to adjust their protocols accordingly.

It is expected that the superoxygenated plants with drip irrigation will show more improved performance with more continuous application of oxygen than did the tomato plants of Example 5, which were given superoxygenated water only once a day.

EXAMPLE 7

Treatment of Waste Water

Waste water, with a high organic content, has a high BOD, due to the bacterial flora. It is desirable to raise the oxygen content of the waste water in order to cause the flora to flocculate. However, it is very difficult to effectively oxygenate such water. Using a 4 inch OEM (see Table I) with a 12 volt battery, four liters of waste water in a five gallon pail were oxygenated. As shown in FIG. **8**, the dissolved oxygen went from 0.5 mg/l to 10.8 mg/l in nine minutes.

Those skilled in the art will readily comprehend that variations, modifications and additions may in the embodiments described herein may be made. Therefore, such variations, modifications and additions are within the scope of the appended claims.

The invention claimed is:

1. A method for treating waste water comprising;

providing a flow-through oxygenator comprising an emitter for electrolytic generation of microbubbles of oxygen comprising an anode separated at a critical distance from a cathode and a power source all in electrical communication with each other,

placing the emitter within a conduit; and

passing waste water through the conduit.

2. An emitter for electrolytic generation of microbubbles of oxygen in an aqueous medium comprising: an anode separated at a critical distance from a cathode, a nonconductive spacer maintaining the separation of the anode and cathode, the nonconductive spacer having a spacer thickness between 0.005 to 0.050 inches such that the critical distance is less than 0.060 inches and a power source all in electrical communication with each other, wherein the critical distance results in the formation of oxygen bubbles having a bubble diameter less than 0.0006 inches, said oxygen bubbles being incapable of breading the surface tension of the aqueous medium such that said aqueous medium is supersaturated with oxygen.

3. The emitter of claim **2**, wherein the anode is a metal or a metallic oxide or a combination of a metal and a metallic oxide.

4. The emitter of claim **2**, wherein the anode is platinum and iridium oxide on a support.

5. The emitter of claim **2**, wherein the cathode is a metal or metallic oxide or a combination of a metal and a metallic oxide.

6. The emitter of claim **2**, wherein the critical distance is 0.005 to 0.060 inches.

7. The emitter of claim **2**, comprising a plurality of anodes separated at the critical distance from a plurality of cathodes.

8. A method for oxygenating a non-native habitat for temporarily keeping aquatic animals, comprising:

inserting the emitter of claim **2** into the aqueous medium, the non-native habitat comprising an aquarium, a bait bucket or a live well.

9. A method for lowering the biologic oxygen demand of polluted water comprising:

passing the polluted water through a vessel containing the emitter of claim **2**.

10. A supersaturated aqueous product formed with the emitter of claim **2**, the supersaturated aqueous product having an approximately neutral pH.

11. The emitter of claim **2**, further comprising a timer control.

12. The emitter of claim **2**, wherein the anode and cathode are arranged such that the emitter assumes a funnel or pyramidal shaped emitter.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,670,495 B2
APPLICATION NO. : 12/023431
DATED : March 2, 2010
INVENTOR(S) : Senkiw

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 10, Line 55:
Delete "breading" and insert --breaking--.

Signed and Sealed this

First Day of June, 2010

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office

Electronic Patent Application Fee Transmittal	
Application Number:	
Filing Date:	
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Filer:	Philip Peter Caspers
Attorney Docket Number:	3406.005US3
Filed as Small Entity	

Filing Fees for Reissue (Utility)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility Reissue Basic	2014	1	140	140
Design and utility Reissue Basic	2114	1	300	300
Design and utility Reissue Basic	2314	1	1080	1080
Pages:				
Claims:				
Reissue claims in Excess of 20 for Small	2205	37	40	1480
Reissue- Independent Claims	2204	2	210	420
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**3420**

Electronic Acknowledgement Receipt	
EFS ID:	25351786
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Philip Peter Caspers
Filer Authorized By:	
Attorney Docket Number:	3406.005US3
Receipt Date:	30-MAR-2016
Filing Date:	
Time Stamp:	18:08:42
Application Type:	Reissue (Utility)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$3420
RAM confirmation Number	5294
Deposit Account	502880
Authorized User	CASPERS, PHILIP P
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 CFR 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 CFR 1.19 (Document supply fees)

Charge any Additional Fees required under 37 CFR 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	a_transmittal.pdf	92020 89c4458667726b1e27e46592c94f866704c16f5d	no	1
Warnings:					
Information:					
2	Transmittal Reissue Application	b_Reissue_Transmittal.pdf	1263101 d04ed66dff5e7fc6e552d3226aaf3f02b2fe4721	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	c_Fee_Transmittal_Form.pdf	533412 f555878496a001622350 49081419da1972a99468	no	1
Warnings:					
Information:					
4	Consent of Assignee accompanying the declaration	d_Consent_OWT.pdf	392369 57bbee3f894b106baa4d4fb68b24931d813d4fca	no	2
Warnings:					
Information:					
5	Assignee showing of ownership per 37 CFR 3.73	e_Form_96_Statement_OWT.pdf	640772 f8366693865fea61f5510b4e3e4564291128 8b41	no	1
Warnings:					
Information:					
6	Assignee showing of ownership per 37 CFR 3.73	f_Copy_of_Patent_Assignment_Details_Retrieved_from_USPTO_Assignments_on_the_Web_OWT.pdf	154505 f25ed42b9ef9d9b617b0a8c90a285055abfb2b1a	no	3
Warnings:					
Information:					
7	Consent of Assignee accompanying the declaration	g_Consent_by_Assignee_of_Sec_Interest.pdf	374106 460968283252126d23247726ed726acd5f5456bf	no	2
Warnings:					
Information:					

8	Assignee showing of ownership per 37 CFR 3.73	h_Form_96_Statement_Brink.pdf	656899 9dcf015c285b4216bf46f5d414fa377339ca6d73	no	1
Warnings:					
Information:					
9	Assignee showing of ownership per 37 CFR 3.73	i_Copy_of_Patent_Assignment_Details_Retrieved_from_USPTO_Assignments_on_the_Web_Brink.pdf	160830 3489e48909cb9772b8b773854843a1f4a318b453	no	4
Warnings:					
Information:					
10	Miscellaneous Incoming Letter	j_2016_03_16_Statement_of_Right_of_Assignee_to_Act.pdf	89089 e87c3ea9ce9424cb69f071e4612ab213f187439b	no	2
Warnings:					
Information:					
11	Application Data Sheet	k_Application_Data_Sheet.pdf	1817079 dac2dfee9cc6cd32a9b6f13f5942a9f31214b427	no	9
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
12	Power of Attorney	l_Power_of_Attorney.pdf	543674 2f94c51cbe5423f1b6876bb4afec996004d01a89	no	1
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
13	Power of Attorney	m_Power_of_Attorney_Transmittal.pdf	289152 0e5905c190621cb0f553cf46c03d378722f25bce	no	1
Warnings:					
Information:					
14	Reissue dec filed in accordance with MPEP 1414	n_Reissue_Declaration_with_Ex_A.pdf	6600926 b6ca99d837b90e58a240c02f537fd315d303f6f4	no	17
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
15	Preliminary Amendment	o_2016_03_16_Preliminary_Amendment.pdf	175955 d0c119dc74da20efe176b2ac6d3d4d610de994ca	no	32
Warnings:					
Information:					

16	Specification	p_Copy_of_7670495.pdf	790434 7d416d9bd2700ae1863641081e1d93550e8a6910	no	17
Warnings:					
Information:					
17	Fee Worksheet (SB06)	fee-info.pdf	38471 2b6a046ca2b91d60790efb0952bcb07fef6afbe9	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	14612794		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: James Andrew Senkiw
Title: FLOW-THROUGH OXYGENATOR (Continuation Reissue of U.S. Patent No. 7,670,495)
Attorney Docket No.: 3406.005US3
Customer No.: 38846

PATENT APPLICATION TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items and information (as indicated with an "X"):

X Utility –CON- REIS comprising:
- X Reissue Patent Application Transmittal (2 pgs)
- X Reissue Patent Application Fee Transmittal Form (1 pg)
- X Consent by Assignee of Entire Ownership (2 pgs)
- X Statement under 37 CFR §3.73(c) (1 pg)
- X Copy of Patent Assignment Details Retrieved from USPTO Assignments on the Web (3 pgs)
- X Consent by Assignee of Security Interest (2 pgs)
- X Statement under 37 CFR §3.73(c) (1 pg)
- X Copy of Patent Assignment Details Retrieved from USPTO Assignments on the Web (4 pgs)
- X Statement of Right of Assignee to Act Pursuant to 37 CFR 3.73(b) (2 pgs)
- X Application Data Sheet (9 pgs)
- X Power of Attorney (1 pg)
- X Power of Attorney Transmittal (1 pg)
- X Signed Reissue Declaration (17 pgs)
- X Preliminary Amendment for Continuation Reissue Application of Patent No. 7,670,495 (32 pgs)
- X Copy of U.S. Patent No. 7,670,495 (17 pages including Specification, Claims, Drawings and Certificate of Correction)
- X **Applicant Claims Small Entity Status**
- X **Authorization to charge Deposit Account 502880 in the amount of $3,420.00.**

The filing fee has been calculated below as follows:

	No. Filed	No. Extra	Rate	Fee
Total Claims	57-20	37	x $40.00 =	**$1480.00**
Ind. Claims	5-3	2	x $210.00 =	**$420.00**
Multiple Dependent Claims Presented (none)				**$0.00**
BASIC FEE				**$140.00**
SEARCH FEE				**$300.00**
EXAMINATION FEE				**$1080.00**
APLICATION SIZE FEE				**$0.00**
			TOTAL :	**$3420.00**

Please charge any additional required fees or credit overpayment to Deposit Account No. 502880. If applicable, any papers or fees supplied herewith are considered to be timely filed pursuant to 37 C.F.R. §1.7(a).

Carlson, Caspers, Vandenburgh, Lindquist & Schuman, P.A. By: /Philip Caspers/
Customer No. 38846 Philip P. Caspers (Reg. No. 33227)

Date of Deposit: 3/30/2016
This paper or fee is being filed on the date indicated above using the USPTO's electronic filing system EFS-Web, and is addressed to The Commissioner for Patents, P.O. Box 1450, Alexandria, CA 22313-1450.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 11/30/2014. OMB 0651-0051
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date
Unknown	Filed herewith

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

[X] I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 38846

OR

[ ] I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

[X] The address associated with the above-mentioned Customer Number

OR

[ ] The address associated with Customer Number:

OR

Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Oxygenator Water Technologies, Inc.

[ ] Inventor or Joint Inventor (title not required below)
[ ] Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)
[X] Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)
[ ] Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Mark Rolfes	Date (Optional)	03/18/2016
Name	Mark Rolfes		
Title	President, Oxygenator Water Technologies, Inc.		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

[ ] Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3

CONFIRMATION NO. 9995

38846
Carlson, Caspers, Vandenburgh, Lindquist &
Schuman, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

FORMALITIES LETTER

OC00000081889760

Date Mailed: 04/01/2016

NOTICE TO FILE MISSING PARTS OF REISSUE APPLICATION

Filing Date Granted

An application number and filing date have been accorded to this reissue application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- Assignee's statement under 37 CFR 3.73(c) establishing ownership of the patent is missing. 37 CFR 1.172 requires that all assignees consenting to the reissue application establish their ownership interest in the patent by filing in the reissue application a statement in accordance with 37 CFR 3.73(c).
- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **70** surcharge.
- $(**0**) previous unapplied payment amount.
- $ **70** TOTAL FEE BALANCE DUE.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/tlwilliams/

PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number: 15/085,741

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	140		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	1080		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	57 minus 20 =	* 37	x 40 =	1480	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	5 minus 3 =	* 2	x 210 =	420			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	3420		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/085,741	03/30/2016	1797	3420	3406.005US3	57	5

CONFIRMATION NO. 9995

38846
Carlson, Caspers, Vandenburgh, Lindquist & Schuman, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

FILING RECEIPT

OC000000081889759

Date Mailed: 04/01/2016

Receipt is acknowledged of this reissue patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

James Andrew Senkiw, Minneapolis, MN;

Applicant(s)

Oxygenator Water Technologies, Inc., St. Louis Park, MN, Assignee (with 37 CFR 1.172 Interest);

Power of Attorney: The patent practitioners associated with Customer Number 38846

Domestic Priority data as claimed by applicant

This application is a CON of 14/601,340 01/21/2015
which is a CON of 13/247,241 09/28/2011 PAT RE45415
which is a REI of 12/023,431 01/31/2008 PAT 7670495
which is a DIV of 10/732,326 12/10/2003 PAT 7396441
which is a CIP of 10/372,017 02/21/2003 PAT 6689262
which claims benefit of 60/358,534 02/22/2002

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 03/31/2016

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/085,741**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

FLOW-THROUGH OXYGENATOR

Preliminary Class

210

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

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NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION REISSUE PATENT

Applicant(s)	James Andrew Senkiw	Response to Notice to File Missing Parts of Reissue Application
Serial No.	15/085,741	
Filing Date	03/30/2016	
Continuation Reissue of U.S. Patent No.	7,670,495	
Issued:	March 2, 2010	
Examiner Name	Unknown	
Group Art Unit	Unknown	
Attorney Docket No.	3406.005US3	
Customer Number:	38846	
Confirmation No.	9995	
Title:	FLOW-THROUGH OXYGENATOR	

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Submitted Via EFS-Web

On April 1, 2016, the Office mailed a notice to file missing parts of reissue application in the above identified application. Specifically, the notice requested an assignee statement under 37 CFR 3.73(c) establishing its ownership interest.

Applicant notes that the application as filed included statements satisfying 37 CFR 3.73 from the assignee, Oxygenator Water Technologies, Inc., executed by assignee's president, Mark Rolfes, as well as from security interest holder, Jeffrey P. Brink. The first two paragraphs of each statement describe the chain of title for their interest and identify where documentary evidence of the chain of title is recorded by reel and frame number in the assignment records of the Office. Copies of the USPTO assignment database website showing the chain of title transactions referred to in the statements were also submitted along with the signed statements. Applicant attaches duplicate copies of these statements herewith. It is noted that the orientation of the statement by Jeffrey Brink appears to have been rotated during filing. The copy attached hereto corrects that orientation.

It is not believed that any additional documents are necessary, and, because these documents were submitted with the original filing, it is not believed that any fees such as the missing parts surcharge should be due. Nevertheless, the Director is authorized to charge any fees which may be required, including the missing parts surcharge, if necessary, to Deposit Account No. 502880.

Respectfully submitted,
Carlson, Caspers, Vandenburgh, Lindquist & Schuman, P.A.
225 S. Sixth Street, Suite 4200
Minneapolis, MN 55402

Date: April 28, 2016 By: /Samuel A. Hamer/

Samuel A. Hamer
Reg. No. 46,754

Attachments:

- Statement by assignee Oxygenator Water Technologies, Inc. (see ¶¶ 1 and 2 for statement establishing ownership satisfying 37 CFR 1.172 and 3.73) (2 pages)
- Copy of patent assignment details for Oxygenator Water Technologies, Inc. retrieved from USPTO assignments on the web (3 pages)
- Statement by security interest holder Jeffrey Brink (see ¶¶ 1 and 2 for statement establishing interest satisfying 37 CFR 1.172 and 3.73) (2 pages)
- Copy of patent assignment details for security interest of Jeffrey Brink retrieved from USPTO assignments on the web (4 pages)
- Copy of notice to file missing parts of reissue application dated April 1, 2016 (2 pages)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION REISSUE PATENT

Applicant(s)	James Andrew Senkiw	Consent by Assignee of Entire Ownership Interest to File a Second Continuation Reissue Application of U.S. Patent No. 7,670,495 pursuant to 37 C.F.R. §1.172
Serial No.	Unknown	
Filing Date	Filed Herewith	
Continuation Reissue of U.S. Patent No.	7,670,495	
Issued:	March 2, 2010	
Examiner Name	Unknown	
Group Art Unit	Unknown	
Attorney Docket No.	3406.005US3	
Customer Number:	38846	
Confirmation No.	Unknown	
Title:	FLOW-THROUGH OXYGENATOR	

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I, Mark Rolfes, declare that:

1. I am the President of Oxygenator Water Technologies, Inc. D/B/A Water D.O.G. Works identified on recorded assignment document reel and frame number 026079/0823 of the Patent Assignment, Abstract of Title recordation department of the U.S. Patent and Trademark Office as holding all right, title and interest to U.S. Patent No. 7,670,495 subject to the security interest held by Jeffrey P. Brinks as recorded at assignment document reel and frame number 026079/0823.

2. I state that Oxygenator Water Technologies, Inc. D/B/A Water D.O.G. Works received its assignment of all right title and interest according to the chain of title transfer from the inventor, Mr. James Andrew Sekiw to Aqua Innovations, Inc. and hence from Aqua Innovations, Inc. to Oxygenator Water Technologies, Inc. as shown by the assignment documents recorded respectively at reel and frame numbers 020546/0241 and 021354/0676 of the Patent Assignment, Abstract of Title recordation department of the U.S. Patent and Trademark Office.

3. As President and officer of Oxygenator Water Technologies, Inc., I have caused Oxygenator Water Technologies, Inc., to request herewith a continuation reissue application of a prior continuation reissue application (Serial No. 14/601,340) which

in turn is a continuation reissue of an original broadening reissue application (application Serial No. 13/247,241, now U.S. Patent No. RE45,415) which original reissue application was made relative to U.S. Patent No. 7,670,495.

4. Pursuant to 37 C.F.R. §1.172 and as an Assignee of all right, title, and interest in and to U.S. Patent No. 7,670,495, subject to the security interest to Jeffrey P. Brink, I state on behalf of Oxygenator Water Technologies, Inc. that Oxygenator Water Technologies, Inc. consents to the filing of the broadening continuation reissue application submitted herewith which is a continuation reissue application of reissue application Serial No. 14/601,340 which in turn is a continuation reissue application of reissue application Serial No. 13/247,241 which in turn is a reissue application of U.S. Patent No. 7,670,495 and to the enlargement of the claimed subject matter as presented by the preliminary amendment filed herewith.

5. I further declare that all statements made herein of my own knowledge are true and that all statements make on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

6. Further Declarant sayeth not.

Mark Rolfes
President, Oxygenator Water Technologies, Inc.
Declarant

03/15/2016
Date

United States Patent and Trademark Office

Assignments on the Web > Patent Query

Patent Assignment Details

NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Reel/Frame: 020546/0241 **Pages:** 6

Recorded: 02/22/2008

Attorney Dkt #: 4056.02US02/03

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 2

1 **Patent #:** NONE **Issue Dt:** **Application #:** 12023416 **Filing Dt:** 01/31/2008
Publication #: US20080202995 **Pub Dt:** 08/28/2008
Title: FLOW-THROUGH OXYGENATOR

2 **Patent #:** 7670495 **Issue Dt:** 03/02/2010 **Application #:** 12023431 **Filing Dt:** 01/31/2008
Publication #: US20080179259 **Pub Dt:** 07/31/2008
Title: FLOW-THROUGH OXYGENATOR

Assignor

1 SENKIW, JAMES ANDREW **Exec Dt:** 05/25/2006

Assignee

1 AQUA INNOVATIONS, INC.
6101 BAKER ROAD
MINNETONKA, MINNESOTA 55345

Correspondence name and address

J. PAUL HAUN
4800 IDS CENTER, 80 SOUTH 8TH STREET
MINNEAPOLIS, MN 55402

Search Results as of: 09/27/2011 03:33 PM
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Web interface last modified: July 25, 2011 v.2.2

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Patent Assignment Details

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Reel/Frame: 021354/0676 **Pages:** 6

Recorded: 08/11/2008

Attorney Dkt #: 4056.00-00-01

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 7

1	**Patent #:** 6689262	**Issue Dt:** 02/10/2004	**Application #:** 10372017	**Filing Dt:** 02/21/2003
	Publication #: US20030164306	**Pub Dt:** 09/04/2003		
	Title: MICROBUBBLES OF OXYGEN			
2	**Patent #:** 7396441	**Issue Dt:** 07/08/2008	**Application #:** 10732326	**Filing Dt:** 12/10/2003
	Publication #: US20040118701	**Pub Dt:** 06/24/2004		
	Title: FLOW-THROUGH OXYGENATOR			
3	**Patent #:** NONE	**Issue Dt:**	**Application #:** 11367134	**Filing Dt:** 03/04/2006
	Publication #: US20060150491	**Pub Dt:** 07/13/2006		
	Title: Flow-through oxygenator			
4	**Patent #:** NONE	**Issue Dt:**	**Application #:** 11810540	**Filing Dt:** 06/06/2007
	Publication #: US20070284245	**Pub Dt:** 12/13/2007		
	Title: Water treatment system			
5	**Patent #:** NONE	**Issue Dt:**	**Application #:** 12023416	**Filing Dt:** 01/31/2008
	Publication #: US20080202995	**Pub Dt:** 08/28/2008		
	Title: FLOW-THROUGH OXYGENATOR			
6	**Patent #:** 7670495	**Issue Dt:** 03/02/2010	**Application #:** 12023431	**Filing Dt:** 01/31/2008
	Publication #: US20080179259	**Pub Dt:** 07/31/2008		
	Title: FLOW-THROUGH OXYGENATOR			
7	**Patent #:** NONE	**Issue Dt:**	**Application #:** 12055723	**Filing Dt:** 03/26/2008
	Publication #: US20080237060	**Pub Dt:** 10/02/2008		
	Title: METHODS AND APPARATUS FOR ELECTROLYTIC TREATMENT OF WATER			

Assignor

1 AQUA INNOVATIONS, INC. **Exec Dt:** 08/08/2008

Assignee

1 OXYGENATOR WATER TECHNOLOGIES, INC. D/B/A WATER D.O.G. WORKS
6101 BAKER ROAD, SUITE 206
MINNETONKA, MINNESOTA 55345

Correspondence name and address

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MINNEAPOLIS, MN 55402

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Patent Assignment Details

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Reel/Frame: 026079/0823 **Pages:** 10

Recorded: 02/09/2011

Conveyance: PROMISSORY NOTES GRANTING SECURITY INT

Total properties: 3

1	**Patent #:** 6689262	**Issue Dt:** 02/10/2004	**Application #:** 10372017	**Filing Dt:** 02/21/2003
	Publication #: US20030164306	**Pub Dt:** 09/04/2003		
	Title: MICROBUBBLES OF OXYGEN			
2	**Patent #:** 7396441	**Issue Dt:** 07/08/2008	**Application #:** 10732326	**Filing Dt:** 12/10/2003
	Publication #: US20040118701	**Pub Dt:** 06/24/2004		
	Title: FLOW-THROUGH OXYGENATOR			
3	**Patent #:** 7670495	**Issue Dt:** 03/02/2010	**Application #:** 12023431	**Filing Dt:** 01/31/2008
	Publication #: US20080179259	**Pub Dt:** 07/31/2008		
	Title: FLOW-THROUGH OXYGENATOR			

Assignors

1	OXYGENATOR WATER TECHNOLOGIES, INC.	**Exec Dt:** 09/09/2008
2	WATER D.O.G. WORKS	**Exec Dt:** 10/24/2008

Assignee

1 BRINK, JEFFREY P.
2003 SUGAR WOODS DRIVE
ORONO, MINNESOTA USA 55356

Correspondence name and address

WILLIAM J. O'BRIEN
1400 AT&T TOWER
901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402

Search Results as of: 09/27/2011 03:30 PM

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Web interface last modified: July 25, 2011 v.2.2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION REISSUE PATENT

Applicant(s)	James Andrew Senkiw	Consent by Assignee of Security Interest to File a Second Continuation Reissue Application of U.S. Patent No. 7,670,495 pursuant to 37 C.F.R. §1.172
Serial No.	Unknown	
Filing Date	Filed Herewith	
Continuation Reissue of U.S. Patent No.	7,670,495	
Issued:	March 2, 2010	
Examiner Name	Unknown	
Group Art Unit	Unknown	
Attorney Docket No.	3406.005US3	
Customer Number:	38846	
Confirmation No.	Unknown	
Title:	FLOW-THROUGH OXYGENATOR	

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I, Jeffrey P. Brink, declare that:

1. I am the same Jeffrey P. Brink identified on recorded assignment document reel and frame number 026079/0823 of the Patent Assignment, Abstract of Title recordation department of the U.S. Patent and Trademark Office as holding a promissory note security interest in and to U.S. Patent No. 7,670,495.

2. I further declare that I received the above-described security interest from the Assignee of record of all right, title and interest, Oxygenator Water Technologies, Inc. D/B/A Water D.O.G. Works and that this Assignee received its assignment of all right title and interest according to the chain of title transfer from the inventor, Mr. James Andrew Sekiw to Aqua Innovations, Inc. and hence from Aqua Innovations, Inc. to Oxygenator Water Technologies, Inc. as shown by the assignment documents recorded respectively at reel and frame numbers 020546/0241 and 021354/0676 of the Patent Assignment, Abstract of Title recordation department of the U.S. Patent and Trademark Office.

3. I understand that the owner and assignee of U.S. Patent No. 7,670,495, Oxygenator Water Technologies, Inc., has requested herewith a continuation reissue application of a prior continuation reissue application (Serial No. 14/601,340) which is a

continuation reissue of an original broadening reissue application (application Serial No. 13/247,241, now U.S. Patent No. RE45,415) which original reissue application was made relative to U.S. Patent No. 7,670,495.

4. Pursuant to 37 C.F.R. §1.172 and as an Assignee of a security interest in and to this patent, I state that I consent to the filing of the broadening continuation reissue application submitted herewith which is a continuation reissue application of reissue application Serial No. 14/601,340 which in turn is a continuation reissue application of reissue application Serial No. 13/247,241 which in turn is a reissue application of U.S. Patent No. 7,670,495 and to the enlargement of the claimed subject matter as presented by the preliminary amendment filed herewith.

5. I further declare that all statements made herein of my own knowledge are true and that all statements make on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

6. Further Declarant sayeth not.

Jeffrey P. Brink
Declarant

3/18/16
Date

United States Patent and Trademark Office

Assignments on the Web > Patent Query

Patent Assignment Details

NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Reel/Frame: 020546/0241 **Pages:** 6

Recorded: 02/22/2008

Attorney Dkt #: 4056.02US02/03

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 2

1 **Patent #:** NONE **Issue Dt:** **Application #:** 12023416 **Filing Dt:** 01/31/2008
Publication #: US20080202995 **Pub Dt:** 08/28/2008
Title: FLOW-THROUGH OXYGENATOR

2 **Patent #:** 7670495 **Issue Dt:** 03/02/2010 **Application #:** 12023431 **Filing Dt:** 01/31/2008
Publication #: US20080179259 **Pub Dt:** 07/31/2008
Title: FLOW-THROUGH OXYGENATOR

Assignor

1 SENKIW, JAMES ANDREW **Exec Dt:** 05/25/2006

Assignee

1 AQUA INNOVATIONS, INC.
6101 BAKER ROAD
MINNETONKA, MINNESOTA 55345

Correspondence name and address

J. PAUL HAUN
4800 IDS CENTER, 80 SOUTH 8TH STREET
MINNEAPOLIS, MN 55402

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Web interface last modified: July 25, 2011 v.2.2

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Assignments on the Web > Patent Query

Patent Assignment Details

NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Reel/Frame: 021354/0676 **Pages:** 6

Recorded: 08/11/2008

Attorney Dkt #: 4056.00-00-01

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 7

1	**Patent #:** 6689262	**Issue Dt:** 02/10/2004	**Application #:** 10372017	**Filing Dt:** 02/21/2003
	Publication #: US20030164306	**Pub Dt:** 09/04/2003		
	Title: MICROBUBBLES OF OXYGEN			
2	**Patent #:** 7396441	**Issue Dt:** 07/08/2008	**Application #:** 10732326	**Filing Dt:** 12/10/2003
	Publication #: US20040118701	**Pub Dt:** 06/24/2004		
	Title: FLOW-THROUGH OXYGENATOR			
3	**Patent #:** NONE	**Issue Dt:**	**Application #:** 11367134	**Filing Dt:** 03/04/2006
	Publication #: US20060150491	**Pub Dt:** 07/13/2006		
	Title: Flow-through oxygenator			
4	**Patent #:** NONE	**Issue Dt:**	**Application #:** 11810540	**Filing Dt:** 06/06/2007
	Publication #: US20070284245	**Pub Dt:** 12/13/2007		
	Title: Water treatment system			
5	**Patent #:** NONE	**Issue Dt:**	**Application #:** 12023416	**Filing Dt:** 01/31/2008
	Publication #: US20080202995	**Pub Dt:** 08/28/2008		
	Title: FLOW-THROUGH OXYGENATOR			
6	**Patent #:** 7670495	**Issue Dt:** 03/02/2010	**Application #:** 12023431	**Filing Dt:** 01/31/2008
	Publication #: US20080179259	**Pub Dt:** 07/31/2008		
	Title: FLOW-THROUGH OXYGENATOR			
7	**Patent #:** NONE	**Issue Dt:**	**Application #:** 12055723	**Filing Dt:** 03/26/2008
	Publication #: US20080237060	**Pub Dt:** 10/02/2008		
	Title: METHODS AND APPARATUS FOR ELECTROLYTIC TREATMENT OF WATER			

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Web interface last modified: July 25, 2011 v.2.2

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Total properties: 3

1	**Patent #:** 6689262	**Issue Dt:** 02/10/2004	**Application #:** 10372017	**Filing Dt:** 02/21/2003
	Publication #: US20030164306	**Pub Dt:** 09/04/2003		
	Title: MICROBUBBLES OF OXYGEN			
2	**Patent #:** 7396441	**Issue Dt:** 07/08/2008	**Application #:** 10732326	**Filing Dt:** 12/10/2003
	Publication #: US20040118701	**Pub Dt:** 06/24/2004		
	Title: FLOW-THROUGH OXYGENATOR			
3	**Patent #:** 7670495	**Issue Dt:** 03/02/2010	**Application #:** 12023431	**Filing Dt:** 01/31/2008
	Publication #: US20080179259	**Pub Dt:** 07/31/2008		
	Title: FLOW-THROUGH OXYGENATOR			

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Search Results as of: 09/27/2011 03:30 PM

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Web interface last modified: July 25, 2011 v.2.2

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3

CONFIRMATION NO. 9995

38846
Carlson, Caspers, Vandenburgh, Lindquist &
Schuman, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

FORMALITIES LETTER

OC00000081889760

Date Mailed: 04/01/2016

NOTICE TO FILE MISSING PARTS OF REISSUE APPLICATION

Filing Date Granted

An application number and filing date have been accorded to this reissue application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- Assignee's statement under 37 CFR 3.73(c) establishing ownership of the patent is missing. 37 CFR 1.172 requires that all assignees consenting to the reissue application establish their ownership interest in the patent by filing in the reissue application a statement in accordance with 37 CFR 3.73(c).
- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **70** surcharge.
- $(**0**) previous unapplied payment amount.
- $ **70** TOTAL FEE BALANCE DUE.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

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/tlwilliams/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION REISSUE PATENT

Applicant(s)	James Andrew Senkiw	Information Disclosure Statement
Serial No.	15/085,741	
Filing Date	03/30/2016	
Continuation Reissue of U.S. Patent No.	7,670,495	
Issued:	March 2, 2010	
Examiner Name	Unknown	
Group Art Unit	Unknown	
Attorney Docket No.	3406.005US3	
Customer Number:	38846	
Confirmation No.	9995	
Title:	FLOW-THROUGH OXYGENATOR	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Submitted Via EFS-Web

Pursuant to M.P.E.P. §1406, Applicant understands that he is not required to submit the references that were cited during the original prosecution of U.S. 7,570,495. However, Applicant wishes to ensure that all such references are cited in this reissue application as M.P.E.P § 1406 prescribes.

Consequently in compliance with 37 C.F.R. §§ 1.97 *et. seq.,* references cited during the original prosecution of U.S. 7,570,495 are again cited on the enclosed PTO 1449 form. Also, references that have already been cited in related parent reissue application no. 14/601,340 are also cited on the enclosed PTO 1449 form. Applicant respectfully requests that this Information Disclosure Statement be entered and the documents listed on the attached PTO 1449 Form be confirmed as being of record. Pursuant to the provisions of MPEP 609, Applicant requests that a copy of the PTO 1449 Form, initialed as having been considered by the Examiner, be returned to the Applicant with the next official communication.

Pursuant to 37 C.F.R. § 1.97(b), the Commissioner is hereby authorized to charge any required fees to Deposit Account No. 502880 in order to have this Information Disclosure Statement considered.

Pursuant to 37 C.F.R. § 1.98(a)(2), copies of cited U.S. Patents and Published Applications, and Non-Published Applications identifiable by USPTO Serial Number, are no longer required to be provided to the Office. Applicant acknowledges the requirement to submit copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R § 1.98(a)(2). Applicant provides such copies herewith.

The Examiner is invited to contact the undersigned at the telephone number indicated if there are any questions regarding this communication.

Respectfully submitted,
Carlson, Caspers, Vandenburgh, Lindquist & Schuman, P.A.
225 S. Sixth Street, Suite 4200
Minneapolis, MN 55402

Date: April 28, 2016 By: /Samuel A. Hamer/

Samuel A. Hamer
Reg. No. 46,754

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	Complete if Known	
Substitute for form 1449A/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use as many sheets as necessary)	**Application Number**	15/085741
	Filing Date	March 30, 2016
	First Named Inventor	James Andrew Senkiw
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet | **1 of 5**	Attorney Docket No: 3406.005US3	

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Substitute for form 1449A/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use as many sheets as necessary)	**Application Number**	15/085741
	Filing Date	March 30, 2016
	First Named Inventor	James Andrew Senkiw
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet | **2 of 5**	Attorney Docket No: 3406.005US3	

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Substitute for form 1449A/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use as many sheets as necessary)	**Application Number**	15/085741
	Filing Date	March 30, 2016
	First Named Inventor	James Andrew Senkiw
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet | **3 of 5**	Attorney Docket No: 3406.005US3	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS		
Examiner Initial*	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T1
	Application Serial No. 12/023,431, Non Final Office Action mailed 03-27-09, 5 pgs	
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EXAMINER **DATE CONSIDERED**

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Substitute for form 1449A/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use as many sheets as necessary)	**Application Number**	15/085741
	Filing Date	March 30, 2016
	First Named Inventor	James Andrew Senkiw
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet | **4 of 5**	Attorney Docket No: 3406.005US3	

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EXAMINER **DATE CONSIDERED**

Electronic Acknowledgement Receipt	
EFS ID:	25628646
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Samuel Allen Hamer
Filer Authorized By:	
Attorney Docket Number:	3406.005US3
Receipt Date:	28-APR-2016
Filing Date:	30-MAR-2016
Time Stamp:	17:08:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2016_04_28_Response_to_Missing_Parts.pdf	1923993 5ec7bdbaa872249f59b125223f853fc2e45e8a4ed	yes	15

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Applicant Response to Pre-Exam Formalities Notice	1	2
	Assignee showing of ownership per 37 CFR 3.73	3	7
	Assignee showing of ownership per 37 CFR 3.73	8	13
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3	Information Disclosure Statement (IDS) Form (SB08)	Form_1449_15_085741.pdf	105721 d3bccd846ad5a1e9a679de2d6ec9acbf5a4f5c80	no	4
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10	Foreign Reference	WO9939561A1.pdf	788204 e50d0a8b609ac9ed2bb3069818818f12e6c92a12	no	21
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11	Non Patent Literature	Application_Serial_No_12_023431_Non_Final_Office_Action_mailed_03-27-09.pdf	62024 949d027ed1ee62c8fd28cbea2395ce06f5d61eef	no	5
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12	Non Patent Literature	Application_Serial_No_12_023431_Notice_of_Allowance_mailed_09-23-09.pdf	121465 3a339ac8a22000adaf75fae1db102d9455ca7b16	no	6
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13	Non Patent Literature	Application_Serial_No_12_023431_Preliminary_Amendment_filed_12-16-08.pdf	57213 a6795e1ba8945db07aeabb6879e220685fc5faa4	no	7
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14	Non Patent Literature	Application_Serial_No_12_023431_Response_filed_08-20-09.pdf	53488 ab94573735af1dbbd56ecdf2b85713b41220bc28	no	7
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15	Non Patent Literature	Application_Serial_No_13_247241_Examiner_Interview_Summary_mailed_05-23-13.pdf	64088 2004ed1390cff025ed92a287b45601388f2c5ada	no	3
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16	Non Patent Literature	Application_Serial_No_13_247241_Final_Office_Action_mailed_11-05-13.pdf	160956 670a00ed7192ec54bfd33714b227e194c7ae1814	no	16
Warnings:					

Information:					
17	Non Patent Literature	Application_Serial_No_13_247241_Non_Final_Office_Action_mailed_03-06-13.pdf	142232 6b0f35bb9dec06bc06845c9ba567f6412a250e13	no	14
Warnings:					
Information:					
18	Non Patent Literature	Application_Serial_No_13_247241_Non_Final_Office_Action_mailed_03-25-14.pdf	122741 79ad44230ef963e02a93f0f378137c8381fadcce	no	12
Warnings:					
Information:					
19	Non Patent Literature	Application_Serial_No_13_247241_Notice_of_Allowance_mailed_11-18-14.pdf	158025 6f85b23c99689c21c353791e1474317e10db727e	no	7
Warnings:					
Information:					
20	Non Patent Literature	Application_Serial_No_13_247241_Preliminary_Amendment_filed_09-28-11.pdf	230909 4878440eee66cfbf6d08531446e2dbd7b82197ba	no	18
Warnings:					
Information:					
21	Non Patent Literature	Application_Serial_No_13_247241_Response_filed_01-21-14.pdf	255241 274c6b2fed8d4c9210ca3e4755c825d21bc1216f	no	18
Warnings:					
Information:					
22	Non Patent Literature	Application_Serial_No_13_247241_Response_filed_05-13-14.pdf	59858 be4acea7f79e8adee6c5f542b160c7c2a5b88724	no	6
Warnings:					
Information:					
23	Non Patent Literature	Application_Serial_No_13_247241_Response_filed_07-08-13.pdf	199760 e132167c7f44c0d66ebe3fa8efcdb57f1a42957d	no	15
Warnings:					
Information:					
24	Non Patent Literature	Application_Serial_No_13_247241_Supplemental_Preliminary_Amendment_filed_07-18-14.pdf	53727 d15670f981861f5d012692515feceaa3f128499d	no	5
Warnings:					
Information:					
25	Non Patent Literature	Application_Serial_No_13_247241_Supplemental_Preliminary_Amendment_filed_09-17-14.pdf	112667 045c6525f170c801f7ddc7850d6efc99db70e415	no	12
Warnings:					

Information:					
26	Non Patent Literature	Application_Serial_No_13_247241_Supplemental_Preliminary_Amendment_filed_10-20-14.pdf	80038 857d4a06fa65e2325999b927bd2238cb15527738	no	6
Warnings:					
Information:					
27	Non Patent Literature	Application_Serial_No_14_601340_Preliminary_Amendment_dated_Jan_21_2015.pdf	1199299 f445011d2753d1e56260fedeca71f9a85413a91a	no	28
Warnings:					
Information:					
28	Non Patent Literature	Application_Serial_No_14_601340_Supplemental_Preliminary_Amendment_dated_4-27-2015.pdf	2558942 e75750f9d88340bc112af4ea670e23f6dfbaeb48	no	15
Warnings:					
Information:					
29	Non Patent Literature	Application_Serial_No_14_601340_Office_Action_dated_5-13-2015.pdf	232562 0275113fb52795acec0b01b0da7fda4a2c84069b	no	7
Warnings:					
Information:					
30	Non Patent Literature	Application_Serial_No_14_601340_Amendment_dated_07-06-2015.pdf	1803101 9ca16eada838f2a996c651b8c7fdd01e96c8db19	no	33
Warnings:					
Information:					
31	Non Patent Literature	Application_Serial_No_14_601340_Office_Action_dated_10-27-2015.pdf	364013 febe2576a72dc73bccfcd7e19981e1bf0612e0b1	no	10
Warnings:					
Information:					
32	Non Patent Literature	Application_Serial_No_14_601340_Response_to_Final_Action_11-15-2015.pdf	494474 6031557a32318624 1e6484202ebe3378782 5c991	no	10
Warnings:					
Information:					
33	Non Patent Literature	Application_Serial_No_14_601340_Advisory_Action_dated_11-21-2015.pdf	149333 8817912018944094 9efcad73285d74790cdd658d	no	3
Warnings:					
Information:					
34	Non Patent Literature	Application_Serial_No_14_601340_Interview_Request.pdf	207849 8ce3cbf9163245358937b1c05c4785610b104ab7	no	3
Warnings:					

Information:					
35	Non Patent Literature	Application_Serial_No_14_601340_Amendment_with_RCE_dated_01-26-2016.pdf	5276667 9fbafc283aee729669bbfe33a184938859c9aa87	no	46
Warnings:					
Information:					
36	Non Patent Literature	Effect_of_Oxgenated_Water_on_the_Growth.pdf	256986 76654028afd2141ebe8c4e617b5e9f04a853166c	no	5
Warnings:					
Information:					
37	Non Patent Literature	DA_Silva_Leonardo_Electrochemical_ozone_production.pdf	253791 9c29b5f46a2d2ec5787f2412c3796c6845df13c3	no	11
Warnings:					
Information:					
38	Non Patent Literature	Da_Silva_Leonardo_Electrochemistry_and_green_chemical_processes.pdf	256366 d19841aba9d4c7c1df1ca358d7c063d51bced4ed	no	9
Warnings:					
Information:					
39	Non Patent Literature	Foller_PC_The_Anodic_Evolution_of_Ozone_Journal.pdf	478781 fd197cde98da4927e6ae3bc5f10a12725cdcbd0c	no	10
Warnings:					
Information:					
40	Non Patent Literature	Stucki_S_Ozone_micro-bubble_disinfection_method_for_wastewater_reuses_system.pdf	606386 a608f076dce37951b6a3d5dec198514b220eca92	no	11
Warnings:					
Information:					
		Total Files Size (in bytes):	24062281		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3

CONFIRMATION NO. 9995

38846
Carlson, Caspers, Vandenburgh, Lindquist &
Schuman, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

FORMALITIES LETTER

OC000000086507151

Date Mailed: 10/17/2016

NOTICE OF INCOMPLETE REPLY (REISSUE)

Filing Date Granted

The U.S. Patent and Trademark Office has received your reply on 04/01/2016 to the Notice to File Missing Parts (Notice) mailed 04/01/2016 and it has been entered into the reissue application. The reply, however, does not include the following items required in the Notice.

The period of reply remains as set forth in the Notice. You may, however, obtain EXTENSIONS OF TIME under the provisions of 37 CFR 1.136 (a) accompanied by the appropriate fee (37 CFR 1.17(a)).

A complete reply must be timely filed to prevent ABANDONMENT of the above-identified application.

The required items noted below SHOULD be filed along with any items required above. The filing date of this reissue application will be the date of receipt of the items required above.

- Surcharge as set forth in 37 CFR 1.16(f) was not received.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.
- Assignee's statement under 37 CFR 3.73(c) establishing ownership of the patent is missing. 37 CFR 1.172 requires that all assignees consenting to the reissue application establish their ownership interest in the patent by filing in the reissue application a statement in accordance with 37 CFR 3.73(c).

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of the Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **70** surcharge.
- $(**0**) previous unapplied payment amount.
- $ **70** TOTAL FEE BALANCE DUE.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ddfelix/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3

CONFIRMATION NO. 9995

38846
Carlson, Caspers, Vandenburgh, Lindquist &
Schuman, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

WITHDRAWAL NOTICE

OC000000086543212

Date Mailed: 10/18/2016

Letter Regarding a New Notice and/or the Status of the Application

If a new notice or Filing Receipt is enclosed, applicant may disregard the previous notice mailed on 10/17/2016. The time period for reply runs from the mail date of the new notice. Within the time period for reply, applicant is required to file a reply in compliance with the requirements set forth in the new notice to avoid abandonment of the application.

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web. https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

If the reply is not filed electronically via EFS-Web, the reply must be accompanied by a copy of the new notice.

If the Office previously granted a petition to withdraw the holding of abandonment or a petition to revive under 37 CFR 1.137, the status of the application has been returned to pending status.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ddfelix/

UNITED STATES PATENT AND TRADEMARK OFFICE

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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3

CONFIRMATION NO. 9995

38846
Carlson, Caspers, Vandenburgh, Lindquist &
Schuman, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

FORMALITIES LETTER

OC000000086574347

Date Mailed: 10/18/2016

NOTICE OF INCOMPLETE REPLY (REISSUE)

Filing Date Granted

The U.S. Patent and Trademark Office has received your reply on 04/28/2016 to the Notice to File Missing Parts (Notice) mailed 04/01/2016 and it has been entered into the reissue application. The reply, however, does not include the following items required in the Notice.

The period of reply remains as set forth in the Notice. You may, however, obtain EXTENSIONS OF TIME under the provisions of 37 CFR 1.136 (a) accompanied by the appropriate fee (37 CFR 1.17(a)).

A complete reply must be timely filed to prevent ABANDONMENT of the above-identified application.

The required items noted below SHOULD be filed along with any items required above. The filing date of this reissue application will be the date of receipt of the items required above.

- Assignee's statement under 37 CFR 3.73(c) establishing ownership of the patent is missing. 37 CFR 1.172 requires that all assignees consenting to the reissue application establish their ownership interest in the patent by filing in the reissue application a statement in accordance with 37 CFR 3.73(c).

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

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For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ddfelix/

Electronic Acknowledgement Receipt

EFS ID:	25628646
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Samuel Allen Hamer
Filer Authorized By:	
Attorney Docket Number:	3406.005US3
Receipt Date:	28-APR-2016
Filing Date:	30-MAR-2016
Time Stamp:	17:08:54
Application Type:	Utility under 35 USC 111(a)

10/18/2016 SDIRETA1 00000002 502888 15085741
01 FC:2051 70.00 DA

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2016_04_28_Response_to_Missing_Parts.pdf	1923993 5ec7bdba872249f59b125223f853fc2e45e8a4ed	yes	15

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3

CONFIRMATION NO. 9995

38846
Carlson, Caspers, Vandenburgh, Lindquist &
Schuman, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

WITHDRAWAL NOTICE

OC000000086792573

Date Mailed: 10/27/2016

Letter Regarding a New Notice and/or the Status of the Application

If a new notice or Filing Receipt is enclosed, applicant may disregard the previous notice mailed on 10/18/2016. The time period for reply runs from the mail date of the new notice. Within the time period for reply, applicant is required to file a reply in compliance with the requirements set forth in the new notice to avoid abandonment of the application.

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web. https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

If the reply is not filed electronically via EFS-Web, the reply must be accompanied by a copy of the new notice.

If the Office previously granted a petition to withdraw the holding of abandonment or a petition to revive under 37 CFR 1.137, the status of the application has been returned to pending status.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ddfelix/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/085,741	03/30/2016	1797	3490	3406.005US3	57	5

CONFIRMATION NO. 9995

UPDATED FILING RECEIPT

38846
Carlson, Caspers, Vandenburgh, Lindquist &
Schuman, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

OC000000088792805

Date Mailed: 10/27/2016

Receipt is acknowledged of this reissue patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

James Andrew Senkiw, Minneapolis, MN;

Applicant(s)

Oxygenator Water Technologies, Inc., St. Louis Park, MN, Assignee (with 37 CFR 1.172 Interest);

Power of Attorney: The patent practitioners associated with Customer Number 38846

Domestic Priority data as claimed by applicant

This application is a CON of 14/601,340 01/21/2015
which is a CON of 13/247,241 09/28/2011 PAT RE45415
which is a REI of 12/023,431 01/31/2008 PAT 7670495
which is a DIV of 10/732,326 12/10/2003 PAT 7396441
which is a CIP of 10/372,017 02/21/2003 PAT 6689262
which claims benefit of 60/358,534 02/22/2002

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 03/31/2016

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/085,741**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

FLOW-THROUGH OXYGENATOR

Preliminary Class

210

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION REISSUE APPLICATION

Applicant(s)	James Andrew Senkiw	Preliminary Amendment for Continuation Reissue Application of U.S. Patent No. 7,670,495 Pursuant to 37 C.F.R. §1.173(b)
Serial No.	15/085,741	
Filing Date	March 30, 2016	
Continuation Reissue of U.S. Patent No.	7,670,495	
Issued:	March 2, 2010	
Examiner Name	JASTRZAB, KRISANNE MARIE	
Group Art Unit	3991	
Attorney Docket No.	3406.005US3	
Customer Number:	38846	
Confirmation No.	9995	
Title:	FLOW-THROUGH OXYGENATOR	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Prior to examination of the above identified CONTINUATION reissue patent application, please enter the following preliminary amendment of the claims.

IN THE CLAIMS

This listing of the claims will replace all prior listings of the claims.

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Cancelled)
7. (Cancelled)
8. (Cancelled)
9. (Cancelled)
10. (Cancelled)
11. (Cancelled)
12. (Cancelled)

13. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet;

at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing;

each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the electrodes producing oxygen in said water via electrolysis.

14. (New) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis; and

wherein at least one of the first and second electrodes is positioned in the tubular housing closer to the inward-facing surface than said distance separating the electrodes.

15. (New) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein said portions of electrodes extend in a direction parallel to the longitudinal axis; and

wherein each electrode of the emitter is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing.

16. (New) The method of claim 13 wherein at least one of the electrodes is a stainless steel mesh or screen.

17. (New) The method of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing.

18. (New) The method of claim 17 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the tubular housing.

19. (New) The method of claim 17 wherein the first and second electrodes comprise an outside electrode and an inside electrode,

wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is,

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

20. (New) The method of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of that portion of one of the electrodes positioned within the housing;

wherein the first and second electrodes comprise an outside electrode and an inside electrode;

wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing;
the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway; and

wherein the tubular housing of the emitter is round.

21. (New) The method of claim 19 wherein said inward-facing surface is a concave surface.

22. (New) The method of claim 13 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

23. (New) The method of claim 13 wherein the oxygen produced comprises microbubbles.

24. (New) The method of claim 13 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

25. (New) The method of claim 13 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

26. (New) The method of claim 13 wherein the oxygen produced comprises nanobubbles.

27. (New-Amended) An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a

distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches,

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than to a longitudinal center axis of the oxygenation chamber; and

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps.

28. (New-Amended) The emitter of claim 27 wherein each electrode is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

29. (New-Amended) The emitter of claim 27 wherein the electrodes are positioned away from the longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

30. (New-Amended) The emitter of claim 29 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

31. (New-Amended) The emitter of claim 30 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

32. (New-Amended) The emitter of claim 27 comprising first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in

a radial direction relative to the longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

33. (New-Amended) The emitter of claim 27 wherein during operation the oxygen produced by the emitter comprises nanobubbles.

34. (New-Amended) The emitter of claim 27 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

35. (New-Amended) The emitter of claim 27 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

36. (New-Amended) The emitter of claim 35 wherein during operation the oxygen produced by the emitter comprises nanobubbles.

37. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;

at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches, a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, said portion being a portion that opposes the other of the first and second electrodes, wherein each electrode is positioned

within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the electrodes to produce oxygen in said water via electrolysis.

38. (New) The method of claim 37 wherein the tubular housing has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal center axis; and

wherein each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis.

39. (New) The method of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis,

wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis, and

wherein at least one of the first and second electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes.

40. (New) The method of claim 39 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

41. (New) The method of claim 37 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

42. (New) The method of claim 37 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

43. (New) The method of claim 42 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the chamber.

44. (New) The method of claim 42 wherein the chamber has an inward-facing surface that runs parallel to the longitudinal axis;

wherein the first and second electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is; and

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

45. (New) The method of claim 37 wherein the emitter includes first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

46. (New) The method of claim 37 wherein the oxygen produced comprises microbubbles.

47. (New) The method of claim 37 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

48. (New) The method of claim 37 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

49. (New) The method of claim 37wherein the oxygen produced comprises nanobubbles.

50. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber, said housing having an inward-facing surface that defines at least in part the oxygenation chamber, the tubular housing having a water inlet, and a water outlet;

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that runs parallel to the inward-facing surface, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber;

wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.

51. (New) The method of claim 50 wherein at least one of the inside and outside electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes, and

wherein the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and wherein the unobstructed passageway includes the longitudinal center axis.

52. (New) The method of claim 50 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

53. (New) The method of claim 52 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

54. (New) The method of claim 50 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

55. (New) The method of claim 54 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

56. (New) The method of claim 55 wherein said inward-facing surface is a concave surface.

57. (New) The method of claim 50 wherein the emitter includes first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

58. (New) The method of claim 50 wherein the oxygen produced comprises microbubbles of oxygen.

59. (New) The method of claim 50 wherein the electrical current is applied to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

60. (New) The method of claim 50 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

61. (New) The method of claim 50 wherein the oxygen produced comprises nanobubbles of oxygen.

62. (New-Amended) An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;

the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, the electrodes being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway.

63. (New-Amended) The emitter of claim 62 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

64. (New-Amended) The emitter of claim 63 wherein the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

65. (New-Amended) The emitter of claim 62 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

66. (New-Amended) The emitter of claim 62 wherein said outer wall includes an inwardly-facing concave surface.

67. (New-Amended) The emitter of claim 62 comprising first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

68. (New-Amended) The emitter of claim 62 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

69. (New-Amended) The emitter of claim 68 wherein during operation the oxygen produced by the emitter comprises nanobubbles of oxygen.

REMARKS

Claims 13-69 are pending in this application. Claims 1-12 were previously cancelled. The claims are marked with respect to the claims of the original patent being reissued, U.S. Patent No. 7,670,495. Claims 27-36 and 62-69 are amended herein with respect to the claims presented in Applicant's preliminary amendment of March 30, 2016.

Claim Amendments

Claim 27 is amended herein with respect to the claims presented on March 30, 2016 to replace the preamble and transitional phrase of:

> A method for treating water comprising: providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

with "An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:". Claim 27 is also amended to replace the language:

> wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode

with

> wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than to a longitudinal center axis of the oxygenation chamber.

Finally, claim 27 is also amended to remove the language:

> passing water through the oxygenation chamber while electrical current is applied to the electrodes to produce oxygen in said water via electrolysis.

Dependent claims 28-36 are amended to replace the preamble of "The method" with "The emitter" except claim 32 is amended to replace "The method of claim 27 wherein the emitter includes" with "The emitter of claim 27 comprising". Claims 28-36 are also amended to change "a longitudinal center axis" to "the longitudinal center axis" where present. The body of claim 28 is also amended to remove the language "of the emitter", and the body of claim 32 is amended to remove the language "the emitter". Finally, claims 33 and 36 are amended to replace the language "wherein the oxygen produced comprises nanobubbles" with "wherein during operation the oxygen produced by the emitter comprises nanobubbles".

Claim 62 is amended herein with respect to the claims presented on March 30, 2016 to replace the preamble and transitional phrase of:

> A method for treating water comprising: providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

with "An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:". Claim 62 is also amended to remove the language:

> passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.

Dependent claims 63-69 are amended to replace the preamble of "The method" with "The emitter", except claim 67 is amended to replace the language The method of claim 62 wherein the emitter includes" with "The emitter of claim 62 comprising". Finally, claim 69 is amended to replace the language "wherein the oxygen produced comprises nanobubbles" with "wherein during operation the oxygen produced by the emitter comprises nanobubbles".

Support for the Claim Amendments

Amended claims 27-36 and 62-69 are directed to the same general invention as that disclosed by the original patent as required by 35 U.S.C. §251. Amended claims 27-36 and 62-69 generally are directed to an emitter for electrolytic generation of bubbles of oxygen in water. These amended claims describe the emitter embodiment shown in FIGS. 7a and 7b of the patent specification.

Specifically, support in the specification for the amended claims is provided in the following chart.

CHART SHOWING SPECIFICATION SUPPORT FOR THE AMENDED CLAIMS

Claim Language	Location[1]
Claim 27	
An emitter for electrolytic generation of bubbles of oxygen in water	Abstract 1:15-21 2:63-67 3:24-35 4:58 5:44-45 6:6 9:3-18 10:31-32
a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface parallel to the water flow axis and defines at least in part the oxygenation chamber	3:26-32 9:7-12 FIG. 7A
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis, electrodes extend in a direction that is parallel to the longitudinal axis	3:25-30 FIG. 7A FIG. 7B 9:7-18
electrodes separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11

1 The citation (eg., 2:63-67) means column 2, lines 63-67 of the '495 patent specification.

the position and size of each electrode within the chamber defines a cross-section that has a water flow area through which at least some water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0. 005 inches to 0 .140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:5-33 3:23-30 3:11-14
a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than to a longitudinal center axis of the oxygenation chamber.	FIG. 7A 9:7-12
Claim 28	
each electrode is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber	FIG. 7A 9:7-12
Claim 29	
electrodes are positioned away from the longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber	FIG. 7A FIG. 7B 9:7-18
Claim 30	
the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the electrodes	FIG. 7A

Claim 31	
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 32	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 33	
during operation the oxygen produced comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28
Claim 34	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 35	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 36	
during operation the oxygen produced comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28

Claim 62	
An emitter for electrolytic generation of bubbles of oxygen in water	Abstract 1:15-21 2:63-67 3:24-35 4:58 5:44-45 6:6 9:3-18 10:31-32
a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,	3:26-32 9:7-12 FIGS. 7A-7B
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
opposing electrodes separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length	FIG. 7A FIG. 7B 9:7-18

the electrodes being positioned so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:7-12 3:23-30 3:11-14
cross-sectional area between outside electrode and outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway.	FIG. 7A 9:7-18
Claim 63	
an electrode is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber	FIG. 7A
Claim 64	
the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing	FIG. 7A
Claim 65	
the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes	FIG. 7A
Claim 66	
outer wall includes an inwardly-facing concave surface	FIG. 7A
Claim 67	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17

Claim 68	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 69	
during operation oxygen produced comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28

Applicant submits that the amended claims presented by this preliminary amendment are fully supported by the specification and that the amended claims do not add new matter to the subject matter disclosed in that specification.

Applicant states that one prior reissue application has issued as patent no. RE45,415 and that there is a pending prior continuation reissue application No. 14/601,340. There are no other prior or concurrent proceedings in which U.S. Patent No. 7,670,495 is or was involved, including interferences, reissues, reexaminations, or litigations, or is or was the result of such proceedings.

Applicant requests a favorable examination of his continuation application for re-issue of U.S. Patent No. 7,670,495.

Respectfully submitted,

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Date March 17, 2017

By /Samuel A. Hamer/
Samuel A. Hamer
Reg. No. 46,754

Electronic Acknowledgement Receipt	
EFS ID:	28665276
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Samuel Allen Hamer/Aaron Pederson
Filer Authorized By:	Samuel Allen Hamer
Attorney Docket Number:	3406.005US3
Receipt Date:	17-MAR-2017
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Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		App_No_15085741_Prelim_Amend.pdf	153193 d43fee2793acb0741cc2fd7928f1f7c1b469c5ea	yes	22

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Claims	2	14
	Applicant Arguments/Remarks Made in an Amendment	15	22
Warnings:			
Information:			
	Total Files Size (in bytes):	153193	

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/085,741	Filing Date 03/30/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	03/17/2017	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 57	Minus	** 57	= 0	X $40 =	0
	Independent (37 CFR 1.16(h))	* 5	Minus	***5	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
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This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3	9995

38846 7590 08/17/2017

Carlson, Caspers, Vandenburgh, Lindquist & Schuman
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

EXAMINER	
JASTRZAB, KRISANNE MARIE	

ART UNIT	PAPER NUMBER
3991	

MAIL DATE	DELIVERY MODE
08/17/2017	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 15/085,741	Applicant(s) SENKIW, JAMES ANDREW	
	Examiner KRISANNE JASTRZAB	Art Unit 3991	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) 13-69 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) 13-69 is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date 4/28/2017.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

Reissue Applications

For reissue applications filed before September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the law and rules in effect on September 15, 2012. Where specifically designated, these are "pre-AIA" provisions.

For reissue applications filed on or after September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the current provisions.

Review of Prosecution History

Application 10/327,017 ("the '017 application) was filed 2/21/2003 and set forth claims drawn to an emitter for electrolytic generation of microbubbles of oxygen, a method of keeping aquatic animals alive, a method for lowering biological oxygen demand of polluted water and a supersaturated oxygen product. The '017 application issued as U.S. patent No. 6,689,262 ("the '262 patent") on first action without receiving an art rejection or a restriction requirement. Application 10/732,326 (the '326 application") was filed as a CIP of the '017 application on 12/10/2003 and set forth claims drawn to a flow through oxygenator, an oxygen supersaturated water product, a method for enhancing the growth of plants and a method of treating waste water. Restriction of those four groups was required and applicant elected the claims drawn to the flow through oxygenator. After extended prosecution applicant amended the independent flow through oxygenator claims to include the limitation "***the oxygen emitter including three matched sets of anodes and cathodes mounted to stabilizing hardware such that each matched set resides at a 120˚ angle to the adjacent matched sets***" to overcome the pending art rejection and a terminal disclaimer was filed to overcome an obviousness double patenting rejection over the claims in the parent '262 patent. The '326 application issued as U.S. patent No. 7,396,441 ("the '441 patent"). Application 12/023,431 ("the '431 application") was filed 1/31/2008 as a divisional of the '326 application and set forth a single method claim drawn to a method of treating waste water. A preliminary amendment was filed adding claims drawn to an emitter for electrolytic generation of microbubbles of

oxygen. No restriction requirement was made. An action issued rejecting all of the claims as obviousness-type double patenting over the claims of the '262 patent and rejecting the claims drawn to the emitter as obviousness-type double patenting over the claims of the '441 patent. No art rejections were made. Terminal disclaimers were filed and the '431 application issued as U.S. patent No. 7,670,495, the subject of the instant reissue application.

Specification

The disclosure is objected to because of the following informalities: the specification is lacking the required cross reference to the other reissues filed from the same patent (MPEP1451). Language such as "More than one reissue application has been filed for the reissue of Patent No. 9,999,999. The reissue applications are application numbers 09/999,994 (the present application), 09/999,995, and 09/999,998, all of which are divisional reissues of Patent No. 9,999,999." is required.

Appropriate correction is required.

Recapture

Claims 27-36 and 62-69 are rejected under 35 U.S.C. 251 as being an improper recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based. See *Greenliant Systems, Inc. et al v. Xicor LLC*, 692 F.3d 1261, 103 USPQ2d 1951 (Fed. Cir. 2012); *In re Shahram Mostafazadeh and Joseph O. Smith*, 643 F.3d 1353, 98 USPQ2d 1639 (Fed. Cir. 2011); *North American Container, Inc. v. Plastipak Packaging, Inc.*, 415 F.3d 1335, 75 USPQ2d 1545 (Fed. Cir. 2005); *Pannu v. Storz Instruments Inc.*, 258 F.3d 1366, 59 USPQ2d 1597 (Fed. Cir. 2001); *Hester Industries, Inc. v. Stein, Inc.*, 142 F.3d 1472, 46 USPQ2d 1641 (Fed. Cir. 1998); *In re Clement*, 131 F.3d 1464, 45 USPQ2d 1161 (Fed. Cir. 1997); *Ball Corp. v. United States*, 729 F.2d 1429, 1436, 221 USPQ 289, 295 (Fed. Cir. 1984). A broadening aspect is present in the reissue which was not present in the application for patent. The record of the application for the patent shows that the broadening aspect (in the reissue) relates to claimed subject matter that applicant previously surrendered during the prosecution of the application. Accordingly, the narrow scope of the claims in the patent was

not an error within the meaning of 35 U.S.C. 251, and the broader scope of claim subject matter surrendered in the application for the patent cannot be recaptured by the filing of the present reissue application.

The three step test for recapture is as follows:

1. determine whether, and in what respect, the reissue claims are broader in scope than the original patent claims;

2. determine whether the broader aspects of the reissue claims relate to the subject matter surrendered in the original prosecution; and

3. determine whether the reissue claims were materially narrowed in other respects, so that the claims may not have been enlarged.

With regard to step 1, the limitations of patented independent claim 2, of an oxygen emitter with "an anode separated from at a critical distance from a cathode, a nonconductive spacer maintaining the separation of the anode and cathode, the nonconductive spacer having a spacer thickness between 0.005 to 0.50 inches such that the critical distance is less than 0.060 inches" are not found in the emitter claims of the instant reissue application. Instead they recite the broader limitations "at least two electrodes comprising an inside electrode and an outside electrode" and "the outside electrode opposing and separated from the inside electrode by a distance between 0.0005 and 0.14 inches", without a limitation to a nonconductive spacer. Thus claims 27-36 and 62-69 are broader in aspects than the emitter claims 2-12 issued in the '495.

With regard to step 2, as noted in MPEP 1412.02 B. the "original application" includes the patent family's entire prosecution history thus the limitations added by amendment to the emitter of the flow through oxygenator claims of the '441 patent to overcome pending art rejections rise to the level of surrendered subject matter of the original application. That limitation, pointed out above as "***the oxygen emitter including three matched sets of anodes and cathodes mounted to stabilizing hardware such that each matched set resides at a 120˚ angle to the adjacent matched sets***" is not present in any of the newly presented emitter. As the broadened aspects of claims 27-36 and 64-69 are to the

configuration of the emitter, they clearly relate to the subject matter surrendered in the prosecution of the '441 patent.

With regard to step 3, claims 27-36 and 62-69 do not present limitations which materially narrow the claims such that they have not been enlarged.

The patent family's prosecution history did not produce a surrender generating limitation for the method claims (held as a patentably distinct invention by the restriction requirement of the '326 application) and as such they are free of recapture.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

The following is a quotation of 35 U.S.C. 112(d):

> (d) REFERENCE IN DEPENDENT FORMS.—Subject to subsection (e), a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

The following is a quotation of pre-AIA 35 U.S.C. 112, fourth paragraph:

> Subject to the following paragraph [i.e., the fifth paragraph of pre-AIA 35 U.S.C. 112], a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

Claims 13-69 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention. The following limitations, and all semantic variants thereof lack support in the original disclosure as discussed below:

"**at least portions of the first and second electrodes being positioned in the tubular housing**". Patent Owner does not point to support for this specific limitation beyond the general statement that Figs. 7A and 7B provide support for the new claims. The tubular housing 3 is only shown in Fig. 7A and depicts complete containment of electrodes 1 and 2. The specification does not discuss the placement of the electrodes with respect to "portions" thereof, nor does it teach or discuss the potential efficacy of placement of "portions" of electrodes in achieving the desired electrolysis and bubble formation. In fact, the specification discussing Fig. 7A states "three anodes 1 and cathodes 2, of appropriate size *to fit inside a tube or hose*" (emphasis added.).

"**at least one of the first and second electrodes is positioned in the tubular housing closer to the inward-facing surface than said distance separating the electrodes**". Patent Owner points to Fig. 7A and column 9, lines 7-12 in support of this positioning however, it is neither stated nor shown to be such. The distance separating electrodes is both claimed and taught as from 0.005 inches to 0.14 inches. Fig. 7A is not disclosed as drawn to scale, but even if it were the distance from the inward-facing surface of tube 3 to the electrodes 1 and 2 appears greater than the distance separating a pair of

electrodes. The specification pointed to describes 3 pairs of anodes/cathodes placed at 120˚ angles to each other but does not provide any guidance for determining the distance between an electrode and an inward-facing wall of the tube.

"**the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing**". Again Patent Owner points to Figs. 7A And 7B as well as column 9, lines 7-18 for support. 7B depicts electrodes but not the tube. The electrodes are always disclosed as pairs, specifically because they require the "critical distance" between them to achieve the claimed/desired electrolysis. There is no discussion or showing of a passageway that would run the length of a portion of one electrode and be capable of functioning as claimed and desired.

"**first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the house, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing**". Patent Owner points to Fig. 7A and column 9, lines 11-17 for support. Fig. 7A depicts connector 4 coupled to an electrode pair and exiting tube 3 in a radial direction relative to the longitudinal axis, and column 9, lines 11-17 state that the connector 4 serves as a connector to the power source (i.e. "conductor"). However, neither the drawings nor the specification depict or give guidance regarding first and second conductors coupled to the first and second electrodes, which must be 1 and 2 because those are the electrodes (anode 1 and cathode 2) separated the criticial distance. A conductor coupled to an electrode pair is shown and supported, not the configuration set forth above.

"**a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, said portion being a portion that opposes the other of the first and second electrodes**". Patent Owner points to Fig. 7A in support of this limitation. Fig. 7A depicts both the anode 1 and cathode 2 of each of the three electrode pairs with ends contacting the inner wall of tube 3, however, the contact points do not appear to have any connection to the opposing faces of the anodes and cathodes of the electrode pairs and thus do not support the limitation set forth above.

Claims 25, 27, 29-30, 35, 48, 60 and 68 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

The limitations required by claims 25, 35, 48, 60 and 68, are found to be vague and indefinite because it is unclear as to the relationship with previously claimed electrode structure. The claims from which each of these depends include language “at least two electrodes comprising a first (or "an outside”) and a second (or “an inside”) electrode” and “the first (or “outside”) electrode opposing and separated from the second (or “inside”) electrode by a distance of between 0.005 inches to 0.14 inches”. The specification only discloses the anode and cathode of an electrode set as separated by that critical distance of 0.005 inches to 0.14 inches, thus the “first” and “second” or "outside” or “inside” are an anode and cathode as disclosed. The structural relationship between the nonparallel anode portions and parallel, opposing cathode portions and the previously set forth electrodes is unclear.

With respect to claim 27, it is unclear whether the portion in “at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface” is the same portion as “at least portions of the outside and inside electrodes being positioned”.

With respect to claims 29 and 30, the structural differentiation between these claims and that already set forth in claim 27 is unclear.

Claims 29-30, 33-34, 36 and 69 are rejected under 35 U.S.C. 112(d) or pre-AIA 35 U.S.C. 112, 4th paragraph, as being of improper dependent form for failing to further limit the subject matter of the claim upon which it depends, or for failing to include all the limitations of the claim upon which it depends.

With respect to claims 29 and 30, these claims appear to be describing the electrode configuration already set forth in claim 27.

With respect to claims 33-34, 36 and 69, these claims set forth method limitations which fail to further limit the structure of the apparatus claims from which they depend.

Applicant may cancel the claim(s), amend the claim(s) to place the claim(s) in proper dependent form, rewrite the claim(s) in independent form, or present a sufficient showing that the dependent claim(s) complies with the statutory requirements.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed

determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claims 13-69 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 and 13-27 of U.S. Patent No. RE 45,415. Although the claims at issue are not identical, they are not patentably distinct from each other because they are of the same inventive concept utilizing an emitter with electrodes of the critical distance of from 0.005 to 0.14 inches and the same power requirements for the electrolytic generation of bubbles of oxygen in water.

Claims 13-69 are provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over claims 13-69 of copending Application No. 14/601,340. Although the claims at issue are not identical, they are not patentably distinct from each other because they are of the same inventive concept claiming an emitter with electrodes of the critical distance of from 0.005 to 0.14 inches and the same power requirements for the electrolytic generation of bubbles of oxygen in water within a tubular housing.

This is a provisional nonstatutory double patenting rejection because the patentably indistinct claims have not in fact been patented.

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter: the closest prior art of record fails to reasonably teach or suggest an emitter for the electrolytic generation of bubbles having at least two electrodes spaced from 0.005 to 0.14 inches apart and positioned within a tubular housing, in electrical communication with a power source configured to deliver a voltage of less than or equal to 28.3 volts and a current less than or equal to 12.8 amps. The electrodes positioned in the tubular housing such that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing (claim 13) or positioned

parallel to the longitudinal axis of the tubular housing and positioned to define a water flow area in a cross-section of an oxygenation chamber within the tubular housing greater than the cross-section area between electrodes of opposed polarity (claim 27), or positioned in contact with at least one wall in the tubular housing and so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes (claim 37) or positioned with an inside and outside electrode, the outside electrode being closer to an inward-facing surface and the inside electrode closer to the longitudinal center axis with both closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing (claim 50) or positioned away from the center axis and maintaining a longitudinal unobstructed passageway parallel to and including the center axis (claim 62).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KRISANNE JASTRZAB whose telephone number is (571)272-1279. The examiner can normally be reached on Mon.-Thurs. 8:00am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisors, Stephen Stein or Jean Witz can be reached on 571-272-1544 or 571-272-0927 respectively.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Krisanne Jastrzab/
Patent Reexamination Specialist
CRU 3991

/Elizabeth L McKane/
Patent Reexamination Specialist
CRU 3991

/Jean C. Witz/
Supervisory Patent Reexamination Specialist
CRU 3991

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SEARCH REPORT

STIC Database Tracking Number: 549408

To: Krisanne Jastrzab Location: MDE-4C07 Art Unit: N/A Monday, August 07, 2017 Case Serial Number: 15/085741	From: Kendra Mellerson Location: EIC1700 REM-4B28 Phone: (571)272-2516 kendra.mellerson@uspto.gov

Search Notes

Examiner Jastrzab:

No Cases Reported

US **7,670,340**

1 of 1 DOCUMENT

UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

7670340

Link to Claims Section

March 2, 2010

Endomedullary nail for the treatment of proximal femur fractures

INVENTOR: Brivio, Lodovico Renzi - Verona, Italian Republic (IT), Italian Republic () ; Lavini, Franco - Verona, Italian Republic (IT), Italian Republic () ; Coati, Michele - San Pietro in Cariano, Italian Republic (IT), Italian Republic () ; Marini, Graziano - Castel d'Azzano, Italian Republic (IT), Italian Republic () ; Rossi, Luigi - Peschiera del Garda, Italian Republic (IT), Italian Republic ()

APPL-NO: 233475 (11)

FILED-DATE: September 21, 2005

GRANTED-DATE: March 2, 2010

PRIORITY: September 27, 2004 - 04425717, European Patent Office (EP)

ASSIGNEE-PRE-ISSUE:
December 12, 2005 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., ORTHOFIX INTERNATIONAL B.V., JOHANNES VERMEERPLEIN, 11, AMSTERDAM, NETHERLANDS ( ), NL-1071, Reel and Frame Number: 016882/0370
September 11, 2006 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., ORTHOFIX S.R.L., VIA DELLE NAZIONI, 9, BUSSOLENGO (VR), ITALY ( ), 37012, Reel and Frame Number: 018224/0446

ASSIGNEE-AT-ISSUE:
Orthofix International B.V., Amsterdam, Kingdom of the Netherlands (NL), Foreign company or corporation (03)

LEGAL-STATUS:

December 12, 2005 - ASSIGNMENT
December 12, 2005 - ASSIGNMENT
September 11, 2006 - ASSIGNMENT
September 11, 2006 - ASSIGNMENT
March 11, 2013 - FEE PAYMENT
March 11, 2013 - Payment of Maintenance Fee, 4th Yr, Small Entity.

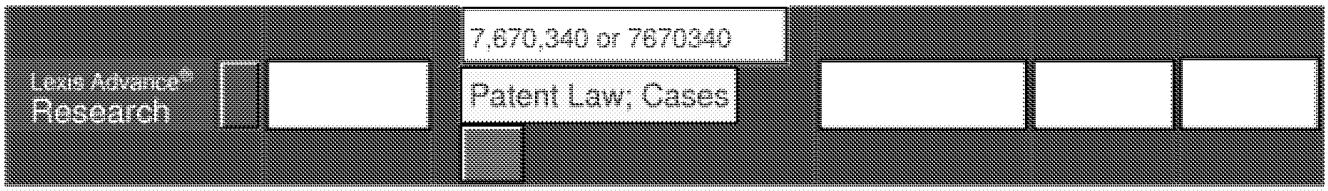
233475 (11) 7670340 March 2, 2010

CORE TERMS: screw, nail, hole, proximal, cephalic, femur, endomedullary, fracture, inserted, distal, thread, sleeve, slot, equipped, screwed, neck, convergent-axis, insertion, bone, orientation, passageway, pin, stabilisation, parallel-axis, transversal, selectively, dynamicity, elongate, circular, drawback

ENGLISH-ABST:

An endomedullary nail for the treatment of proximal femur fractures, comprising an elongate body (**12**) having a proximal portion (**14**) and a distal portion (**16**). The proximal portion (**14**) has a first and a second hole (**20, 21**) for a respective cephalic screw (**22, 23, 24, 25**), each having a transversal axis to the axis of the proximal portion (**14**). The first hole (**20**) is split into two passages each having a respective axis (A, B) with a predetermined angle relationship with respect to the axis (C) of the second hole (**21**). The passages (**30, 31**) are arranged to be selectively engaged by a respective cephalic screw (**22, 24**).

0 results for 7,670,340 or 7670340 (narrowed)



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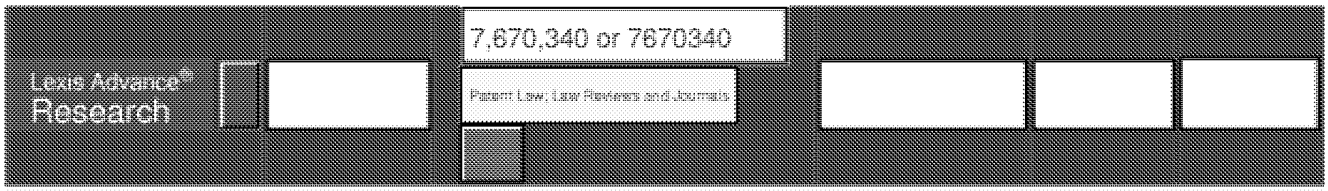

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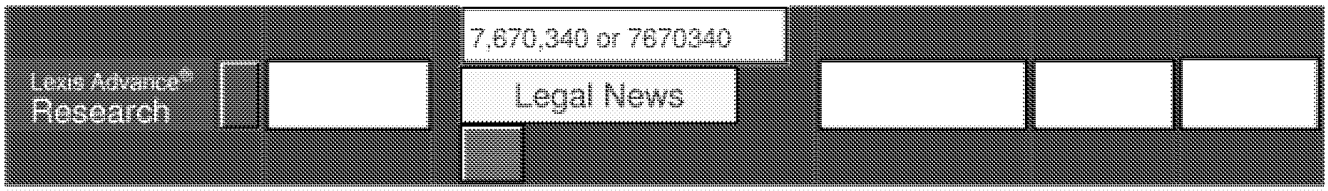

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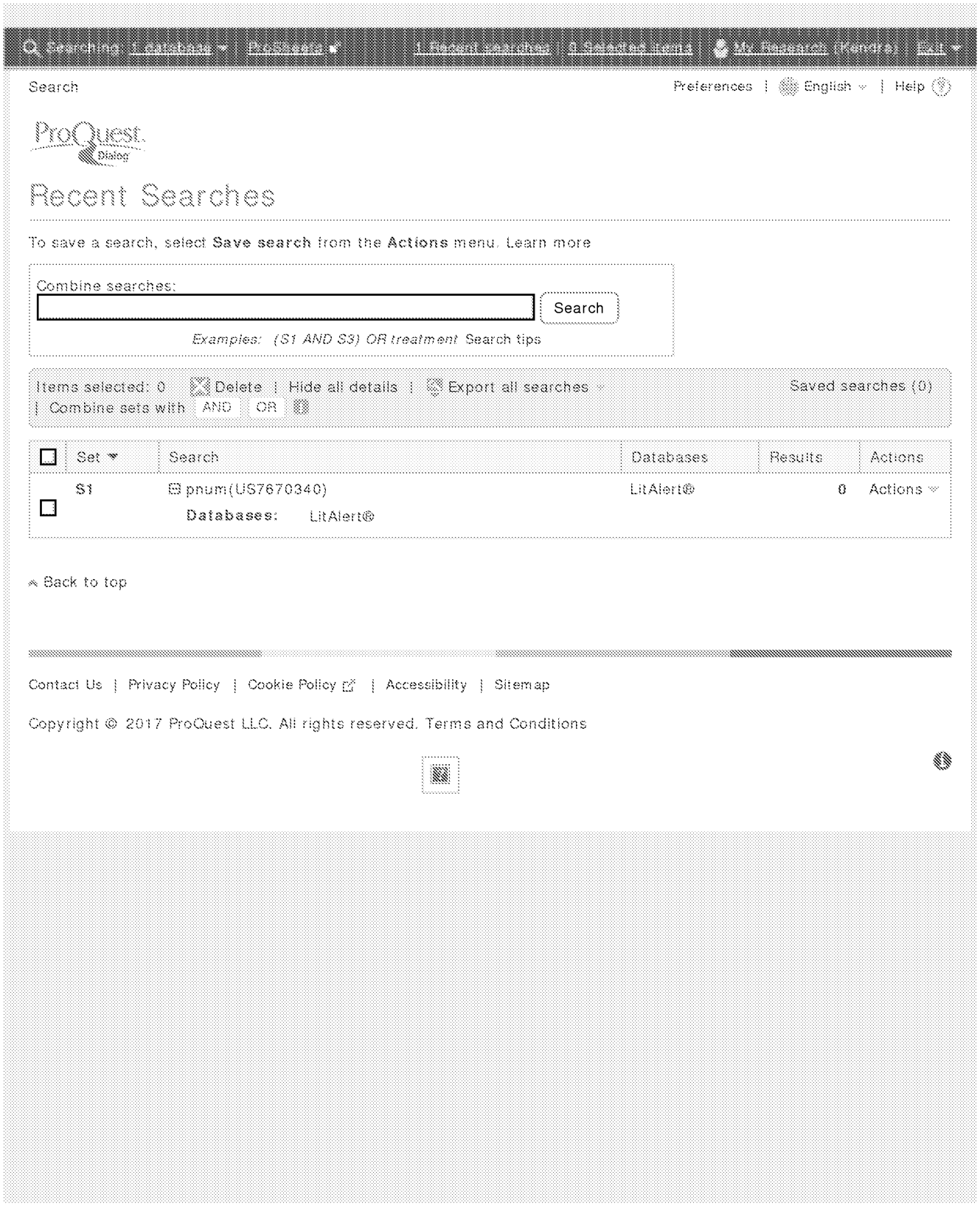
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Substitute for form 1449A/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use as many sheets as necessary)	**Application Number**	15/085741
	Filing Date	March 30, 2016
	First Named Inventor	James Andrew Senkiw
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet | **1 of 5**	Attorney Docket No: 3406.005US3	

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	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet | **2 of 5**	Attorney Docket No: 3406.005US3	

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	First Named Inventor	James Andrew Senkiw
	Group Art Unit	Unknown
	Examiner Name	Unknown
Sheet | **3 of 5**	Attorney Docket No: 3406.005US3	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS		
Examiner Initial*	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T1
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	Group Art Unit	Unknown
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Sheet | **4 of 5**	Attorney Docket No: 3406.005US3	

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	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments
1	BRS	L2	120	flow adj through adj oxygenator$1	US-PGPUB; USPAT; EPO; JPO; DERWENT	2017/08/10 11:50	
2	BRS	L3	29148313	(flow adj through adj oxygenator$1)@pd<="20031210"	US-PGPUB; USPAT; EPO; JPO; DERWENT	2017/08/10 11:53	
3	BRS	L4	16	2 and electrolysis	US-PGPUB; USPAT; EPO; JPO; DERWENT	2017/08/10 11:57	
4	BRS	L5	21	2 same water	US-PGPUB; USPAT; EPO; JPO; DERWENT	2017/08/10 11:58	
5	BRS	L6	16	5 not 4	US-PGPUB; USPAT; EPO; JPO; DERWENT	2017/08/10 11:58	

	Error Definition	Errors
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	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments
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7	BRS	L8	939208	flow adj1 through	US-PGPUB; USPAT; EPO; JPO; DERWENT	2017/08/10 12:00	
8	BRS	L9	737	8 same 7	US-PGPUB; USPAT; EPO; JPO; DERWENT	2017/08/10 12:00	

	Error Definition	Errors
6		
7		
8		

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15085741	SENKIW, JAMES ANDREW
	Examiner	**Art Unit**
	KRISANNE JASTRZAB	3991

CPC- SEARCHED		
Symbol	**Date**	**Examiner**
A01G31/00, A01G31/02, A01K63/042,C02F1/46109,C02F1/727,C02F3/26,C02F1/4672,C02F1/68,C02F7/00,C02F2001/46133,C02F2001/46138,C02F2001/46157,C02F2201/4612,C02F2201/4615,C02F2209/02,Y02E60/366,Y02W10/15,y	7/10/2017	KMJ
Y02P60/216		

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US CLASSIFICATION SEARCHED			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
reviewed the prosecution history for US 7,670,495 and family members US 7,396,441 and 6,689,262	7/10/2017	KMJ
text search, search notes attached		

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**

Continuation Sheet for Interview Request Form

Thank you for the opportunity to discuss this Office Action. Please call me at 612-436-9609. Below is an agenda. I look forward to speaking with you and the other Examiners.

Agenda Items

Recapture:

We do not believe that the claims improperly recapture subject matter. Among other reasons, the claim aspect identified in the Office Action's recapture rejection for step 2 is not the same aspect that is identified in step 1, as is required by the three step recapture test. The three step recapture test indicates that step 2 is to determine whether "the broader aspects" (identified in step 1) relate to subject matter surrendered in the original prosecution. The Office Action, however, uses a different aspect for step 2 than it does for step 1. The three step recapture test is discussed in MPEP 1412.02.

Additionally, the claim aspect identified in the Office Action's recapture rejection for step 2 was not surrendered by the Applicant. A subsequent continuing application was filed (resulting in U.S. Patent No. 7,670,495) off the '441 patent, and the claims of the continuing application did *not* include the limitation identified in the Office Action for step 2. If a continuing application is filed without limitations previously added or argued, such a continuing application results in non-surrender of the subject matter. See, In re Clement, 131 F.3d 1464 (Fed. Cir. 1997) (footnote 2). A copy of In re Clement is included herewith. Footnote 2 and its corresponding paragraph are present toward the bottom of page 7 and into page 8.

112 Rejections:

Included herewith is a listing of marked-up claims showing proposed amendments. I would like to discuss the amended claim language to ensure we address the 112 rejections.

Thank you,
Aaron Pederson
Reg. No. 58,607

Proposed Claim Amendments

1-12. (Cancelled)

13. (New-Amended) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet;

at least two electrodes comprising a first electrode and a second electrode, ~~at least portions of~~ the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing;

each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the electrodes producing oxygen in said water via electrolysis.

14. (New-Amended) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein ~~said portions of~~ the first and second electrodes extend in a direction that is parallel to the longitudinal axis~~; and~~

~~wherein at least one of the first and second electrodes is positioned in the tubular housing closer to the inward-facing surface than said distance separating the electrodes.~~

15. (New-Amended) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein ~~said portions of~~ the first and second electrodes extend in a direction parallel to the longitudinal axis; and

wherein each electrode of the emitter is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing.

16. (New) The method of claim 13 wherein at least one of the electrodes is a stainless steel mesh or screen.

17. (New-Amended) The method of claim 13 wherein ~~the electrodes are~~ each electrode of the emitter is positioned away from a longitudinal center axis of the tubular housing and maintains an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of ~~that portion of one of the~~ each electrode positioned within the tubular housing.

18. (New-Amended) The method of claim 17 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the tubular housing.

19. (New-Amended) The method of claim 17 wherein the first and second electrodes comprise an outside electrode and an inside electrode,

wherein ~~said portions of~~ the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing, the outside and inside electrodes being outside and inside electrodes respectively in that the first and second electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is.

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

20. (New-Amended) The method of claim 13 wherein ~~the electrodes are~~ each electrode of the emitter is positioned away from a longitudinal center axis of the tubular housing and maintains an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of ~~that portion of one of the~~ each electrodes positioned within the housing;

wherein the first and second electrodes comprise an outside electrode and an inside electrode;

wherein ~~said portions of~~ the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing;

the outside and inside electrodes being outside and inside electrodes respectively in that the first and second electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway; and

wherein the tubular housing of the emitter is round.

21. (New) The method of claim 19 wherein said inward-facing surface is a concave surface.

22. (New) The method of claim 13 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

23. (New) The method of claim 13 wherein the oxygen produced comprises microbubbles.

24. (New) The method of claim 13 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

25. (New-Amended) The method of claim 13 wherein the at least two electrodes includes ~~a first~~ an anode ~~electrode~~ portion that is nonparallel to ~~a second another~~ anode ~~electrode~~ portion, the ~~first and second~~ anode ~~electrode~~ portions each being parallel to respective opposing cathode ~~electrode~~ portions.

26. (New) The method of claim 13 wherein the oxygen produced comprises nanobubbles.

27. (New-Twice Amended) An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;

at least two electrodes comprising an outside electrode and an inside electrode, ~~at least portions of~~ the outside and inside electrodes being positioned in the oxygenation chamber, said ~~portions outside and inside electrodes~~ extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches,

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than to a longitudinal center axis of the oxygenation chamber; and

a power source in electrical communication with the outside and inside electrodes, the power source configured to deliver a voltage to the outside and inside electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the outside and inside electrodes, the current being less than or equal to 12.8 amps.

28. (New-Amended) The emitter of claim 27 wherein each electrode is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

29. (New-Twice Amended) The emitter of claim 27 wherein ~~the electrodes are~~ each electrode of the emitter is positioned away from the longitudinal center axis of the tubular housing and maintains an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of ~~that portion of one of the~~ each electrodes positioned within the chamber.

30. (New-Amended) The emitter of claim 29 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

31. (New-Amended) The emitter of claim 30 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

32. (New-Amended) The emitter of claim 27 comprising first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

33. (New-Twice Amended) The emitter of claim 27 wherein ~~during operation~~ the outside and inside electrodes are positioned close enough together such that the oxygen produced by the emitter comprises nanobubbles.

34. (New-Twice Amended) The emitter of claim 27 wherein the power source ~~delivers~~ is configured to deliver a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

35. (New-Twice Amended) The emitter of claim 27 wherein the at least two electrodes includes ~~a first~~ an anode ~~electrode~~ portion that is nonparallel to ~~a second~~ another anode ~~electrode~~ portion, the ~~first and second~~ anode ~~electrode~~ portions each being parallel to respective opposing cathode ~~electrode~~ portions.

36. (New-Twice Amended) The emitter of claim 35 wherein the outside and inside electrodes are positioned close enough together such that ~~during operation~~ the oxygen produced by the emitter comprises nanobubbles.

37. (New-Amended) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;

at least two electrodes comprising a first electrode and a second electrode, ~~at least portions of~~ the first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches, a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, ~~said portion being a portion that opposes the other of the first and second electrodes;~~ wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber

includes a water flow area that allows water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches;

a power source in electrical communication with the first and second electrodes, the power source configured to deliver a voltage to the first and second electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the first and second electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the first and second electrodes to produce oxygen in said water via electrolysis.

38. (New) The method of claim 37 wherein the tubular housing has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal center axis; and

wherein each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis.

39. (New-Amended) The method of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis,

wherein ~~said portions of~~ the first and second electrodes extend in a direction that is parallel to the longitudinal axis~~, and~~

~~wherein at least one of the first and second electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes.~~

40. (New) The method of claim 39 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

41. (New) The method of claim 37 wherein the at least one electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

42. (New-Amended) The method of claim 37 wherein ~~the electrodes are~~ each electrode of the emitter is positioned away from a longitudinal center axis of the tubular housing and maintains an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of ~~that portion of one of the~~ each electrodes positioned within the chamber.

43. (New-Amended) The method of claim 42 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the chamber.

44. (New-Amended) The method of claim 42 wherein the chamber has an inward-facing surface that runs parallel to the longitudinal axis;

wherein the first and second electrodes being outside and inside electrodes respectively in that the ~~first and second~~ electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is; and

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

45. (New) The method of claim 37 wherein the emitter includes first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

46. (New) The method of claim 37 wherein the oxygen produced comprises microbubbles.

47. (New) The method of claim 37 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

48. (New-Amended) The method of claim 37 wherein the at least two electrodes includes ~~a first~~ an anode ~~electrode~~ portion that is nonparallel to ~~a second~~ another anode ~~electrode~~ portion, the ~~first and second~~ anode ~~electrode~~ portions each being parallel to respective opposing cathode ~~electrode~~ portions.

49. (New) The method of claim 37 wherein the oxygen produced comprises nanobubbles.

50. (New-Amended) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber, said housing having an inward-facing surface that defines at least in part the oxygenation chamber, the tubular housing having a water inlet, and a water outlet;

at least two electrodes comprising an outside electrode and an inside electrode, ~~at least portions of~~ the outside and inside electrodes being positioned in the oxygenation chamber, said ~~portions~~ outside and inside electrodes extending in a direction that runs parallel to the inward-facing surface, the outside and inside electrodes being outside and inside electrodes respectively in that the outside and inside electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber;

wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.

51. (New-Amended) The method of claim 50 ~~wherein at least one of the inside and outside electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes and~~

wherein the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and wherein the unobstructed passageway includes the longitudinal center axis.

52. (New) The method of claim 50 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

53. (New-Amended) The method of claim 52 wherein the at least one electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

54. (New) The method of claim 50 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

55. (New) The method of claim 54 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

56. (New) The method of claim 55 wherein said inward-facing surface is a concave surface.

57. (New) The method of claim 50 wherein the emitter includes first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

58. (New) The method of claim 50 wherein the oxygen produced comprises microbubbles of oxygen.

59. (New) The method of claim 50 wherein the electrical current is applied to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

60. (New-Amended) The method of claim 50 wherein the at least two electrodes includes ~~a first~~ an anode ~~electrode~~ portion that is nonparallel to ~~a second~~ another anode ~~electrode~~ portion, the ~~first and second~~ anode ~~electrode~~ portions each being parallel to respective opposing cathode ~~electrode~~ portions.

61. (New) The method of claim 50 wherein the oxygen produced comprises nanobubbles of oxygen.

62. (New-Twice Amended) An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,

at least two electrodes comprising an outside electrode and an inside electrode, ~~at least portions of~~ the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;

~~the electrodes~~ each electrode of the emitter being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of ~~that portion of one of the~~ each electrode~~s~~ positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along

that length, ~~the each~~ electrodes being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway.

63. (New-Amended) The emitter of claim 62 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

64. (New-~~Twice~~ Amended) The emitter of claim 63 wherein the ~~at least one~~ electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

65. (New-Amended) The emitter of claim 62 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

66. (New-Amended) The emitter of claim 62 wherein said outer wall includes an inwardly-facing concave surface.

67. (New-Amended) The emitter of claim 62 comprising first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

68. (New-~~Twice~~ Amended) The emitter of claim 62 wherein the at least two electrodes includes ~~a first~~ an anode ~~electrode~~ portion that is nonparallel to ~~a second~~ another anode ~~electrode~~ portion,

the ~~first and second~~ anode ~~electrode~~ portions each being parallel to respective opposing cathode ~~electrode~~ portions.

69. (New-Twice Amended) The emitter of claim 68 wherein ~~during operation~~ the outside and inside electrodes are positioned close enough together to ~~the oxygen~~ produce~~d by the emitter comprises~~ nanobubbles of oxygen.

70. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, said outside and inside electrodes extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches,

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode; and

a power source in electrical communication with the outside and inside electrodes, the power source configured to deliver a voltage to the outside and inside electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the outside and inside electrodes, the current being less than or equal to 12.8 amps;

passing water through the oxygenation chamber while electrical current is applied to the outside and inside electrodes within the chamber to produce oxygen in said water via electrolysis.

71. (New) The method of claim 70 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber.

72. (New) The method of claim 70 wherein each electrode of the emitter is positioned away from a longitudinal center axis of the tubular housing and maintains an unobstructed passageway parallel to the longitudinal center axis, the passageway running longitudinally for at least the length of each electrode within the chamber.

73. (New) The method of claim 72 wherein the unobstructed passageway includes the longitudinal center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

74. (New) The method of claim 73 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

75. (New) The method of claim 70 wherein the emitter includes first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second

conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

76. (New) The method of claim 70 wherein the oxygen produced comprises nanobubbles.

77. (New) The method of claim 70 wherein the power source delivers a current to the outside and inside electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

78. (New) The method of claim 70 wherein the at least two electrodes includes an anode portion that is nonparallel to another anode portion, the anode portions each being parallel to respective opposing cathode portions.

79. (New) The method of claim 78 wherein the oxygen produced comprises nanobubbles.

80. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet;

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the outside and inside electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;

each electrode of the emitter being positioned away from the longitudinal center axis and maintaining a longitudinal, unobstructed passageway parallel to and including

the longitudinal center axis that runs for at least the length of each electrode positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, each electrode of the emitter being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway; and

passing water through the oxygenation chamber while applying electrical current to the outside and inside electrodes to produce oxygen in said water via electrolysis.

81. (New) The method of claim 80 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

82. (New) The method of claim 81 wherein the at least one electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

83. (New) The method of claim 80 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

84. (New) The method of claim 80 wherein said outer wall includes an inwardly-facing concave surface.

85. (New) The method of claim 80 wherein the emitter includes first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

86. (New) The method of claim 80 wherein the at least two electrodes includes an anode portion that is nonparallel to another anode portion, the anode portions each being parallel to respective opposing cathode portions.

87. (New) The method of claim 86 wherein the oxygen produced comprises nanobubbles of oxygen.

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In re Clement

United States Court of Appeals for the Federal Circuit

December 12, 1997, Decided

97-1202

Reporter
131 F.3d 1464 *; 1997 U.S. App. LEXIS 35023 **; 45 U.S.P.Q.2D (BNA) 1161 ***

IN RE CLEMENT

Prior History: [**1] Appealed from: Patent and Trademark Office Board of Patent Appeals and Interferences. (Serial No. 08/054,951).

Disposition: AFFIRMED IN PART AND VACATED IN PART.

Core Terms

reissue, suspension, fibrous, patent, contaminants, non-ink, energy, ink, particles, recapture, canceled, removing, mechanical, prior art, limitations, dispersing, pulp, detaching, surface, subject matter, conditions, degrees, steps, surrendered, temperature, patentee, room temperature, waste paper, fibers, consistency

Case Summary

Procedural Posture

Appellant patent applicant appealed from a decision of the United States Patent and Trademark Office Board of Patent Appeals and Interferences sustaining the rejection of claims in a reissue application under 35 U.S.C.S. § 251.

Overview

The applicant amended his patent application to overcome another patent during prosecution such that some claims corresponded to his earlier application and some claims were broadened. The patent appeals board sustained the examiner's rejection of the broadened claims for failure to comply with 35 U.S.C.S. § 251 and the rejection of both sets of claims because the reissue declaration was defective under 37 C.F.R. § 1.175. On appeal, the court affirmed in part, finding that the board correctly applied the recapture rule where the reissue claims were broader than the patent claims in a manner directly pertinent to the subject matter surrendered during prosecution. The court vacated the board's decision to reject the non-broadened claims because they were not subject to the recapture rule and a defective declaration would not thereby invalidate them.

Outcome

The court affirmed the rejection of claims in part and vacated in part because the board correctly applied the recapture rule to bar some claims and the other claims alone could not support the reissue application.

LexisNexis® Headnotes

Civil Procedure > Appeals > Standards of Review > Clearly Erroneous Review

Patent Law > Jurisdiction & Review > Standards of Review > General Overview

Civil Procedure > Appeals > Standards of Review > De Novo Review

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > General Overview

HN1[] **Standards of Review, Clearly Erroneous Review**

Determining whether an applicant has met the statutory requirements of 35 U.S.C.S. § 251 is a question of law, which the appellate court reviews de novo. This legal conclusion is based on underlying findings of fact, which the appellate court sustains unless they are clearly erroneous.

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > Requirements

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > General Overview

HN2[] **Reissue Proceedings, Requirements**

An attorney's failure to appreciate the full scope of the invention qualifies as an error under 35 U.S.C.S. § 251 and is correctable by reissue. Nevertheless, deliberate withdrawal or amendment cannot be said to involve the inadvertence or mistake contemplated by 35 U.S.C.S. § 251.

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > Broadening Reissues & Recapture

Patent Law > US Patent & Trademark Office Proceedings > General Overview

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > General Overview

HN3[] **Reissue Proceedings, Broadening Reissues & Recapture**

The recapture rule prevents a patentee from regaining through reissue the subject matter that he surrendered in an effort to obtain allowance of the original claims. Under this rule, claims that are broader than the original patent claims in a manner directly pertinent to the subject matter surrendered during prosecution are impermissible.

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > Broadening Reissues & Recapture

Patent Law > ... > Claims > Claim Language > Elements & Limitations

Patent Law > ... > Specifications > Description Requirement > General Overview

Patent Law > US Patent & Trademark Office Proceedings > General Overview

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > General Overview

HN4[] **Reissue Proceedings, Broadening Reissues & Recapture**

The first step in applying the recapture rule is to determine whether and in what "aspect" the reissue claims are broader than the patent claims. Although the scope of the claims is the proper inquiry, claim language, including limitations, defines claim scope. Courts must determine in which aspects the reissue claim is broader, which includes broadening as a result of an omitted limitation. The second step is to determine whether the broader aspects of the reissue claims relate to surrendered subject matter. To determine whether an applicant surrendered particular subject matter, the reviewing court looks to the prosecution history for arguments and changes to the claims made in an effort to overcome a prior art rejection.

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > General Overview

Patent Law > US Patent & Trademark Office Proceedings > General Overview

HN5[] **US Patent & Trademark Office Proceedings, Reissue Proceedings**

Although the recapture rule does not apply in the absence of evidence that the applicant's amendment was an admission that the scope of that claim was not in fact patentable, the court may draw inferences from changes in claim scope when other reliable evidence of the patentee's intent is not available.

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > General Overview

Patent Law > US Patent & Trademark Office Proceedings > General Overview

HN6[] **US Patent & Trademark Office Proceedings, Reissue Proceedings**

Deliberately canceling or amending a claim in an effort to overcome a reference strongly suggests that the applicant admits that the scope of the claim before the cancellation or amendment is unpatentable, but it is not dispositive because other evidence in the prosecution history may indicate the contrary.

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > General Overview

HN7[] **US Patent & Trademark Office Proceedings, Reissue Proceedings**

Amending a claim by the inclusion of an additional limitation has exactly the same effect as if the claim as originally presented had been canceled and replaced by a new claim including that limitation.

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > Broadening Reissues & Recapture

Patent Law > ... > Specifications > Description Requirement > General Overview

Patent Law > US Patent & Trademark Office Proceedings > General Overview

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > General Overview

HN8[] **Reissue Proceedings, Broadening Reissues & Recapture**

Once the court determines that an applicant has surrendered the subject matter of the canceled or amended claim, the court then determines whether the surrendered subject matter has crept into the reissue claim. Comparing the reissue claim with the canceled claim is one way to do this. If the scope of the reissue claim is the same as or broader than that of the canceled claim, then the patentee is clearly attempting to recapture surrendered subject matter and the reissue claim is, therefore, unallowable. In contrast, a reissue claim narrower in scope escapes the recapture rule entirely.

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > General Overview

HN9[] **US Patent & Trademark Office Proceedings, Reissue Proceedings**

If the reissue claim is as broad as or broader than the canceled or amended claim in all aspects, the recapture rule bars the claim; if it is narrower in all aspects, the recapture rule does not apply, but other rejections are possible; if the reissue claim is broader in some aspects, but narrower in others, then: (a) if the reissue claim is as broad as or broader in an aspect germane to a prior art rejection, but narrower in another aspect completely unrelated to the rejection, the recapture rule bars the claim; (b) if the reissue claim is narrower in an aspect germane to prior art rejection, and broader in an aspect unrelated to the rejection, the recapture rule does not bar the claim, but other rejections are possible.

Patent Law > ... > Specifications > Description Requirement > General Overview

Patent Law > ... > Specifications > Definiteness > General Overview

Patent Law > US Patent & Trademark Office Proceedings > General Overview

Patent Law > US Patent & Trademark Office Proceedings > Reissue Proceedings > General Overview

HN10[] **Specifications, Description Requirement**

The recapture rule does not apply when the broadening not only relates to an aspect of the claim that was never narrowed to overcome prior art, or argued as distinguishing the claim from the prior art, but also is not materially related to the alleged error.

Counsel: Lawrence M. Green, Wolf, Greenfield & Sacks, P.C., of Boston, Massachusetts, argued for the appellant. With him on the brief was Christopher S. Schultz.

John M. Whealan, Associate Solicitor, Office of the Solicitor, Patent and Trademark Office, of Arlington, Virginia, argued for the appellee. With him on the brief were Nancy J. Linck, Solicitor, Albin F. Drost, Deputy Solicitor, and Scott A. Chambers, Associate Solicitor.

Judges: Before MAYER, Circuit Judge, SMITH, Senior Circuit Judge, and CLEVENGER, Circuit Judge.

Opinion by: MAYER

Opinion

[***1162] [*1466] MAYER, Circuit Judge.

Jean-Marie Clement appeals the decision of the United States Board of Patent Appeals and Interferences sustaining the rejection of claims 1-18 and 49-52 in reissue application Serial No. 08/054,951 under 35 U.S.C. § 251 (1994). Because the board correctly applied the recapture rule to bar claims 49-52 and because claims 1-18 alone cannot support the reissue application, we affirm in part and vacate in part.

Background

This case is about U.S. Patent [**2] No. 4,780,179 (the '179 patent) issued to Jean-Marie Clement. The '179 patent claims a method for treating waste paper that removes "stickies," such as glues and plastics, under a first set of environmental conditions, before removing inks under a second set of environmental conditions.

The '179 patent issued from application Serial No. 06/822,943 (the '943 application), which was a continuation of application Serial No. 06/482,623 (the '623 application). During prosecution, Clement amended the claims to overcome U.S. Patent No. 4,360,402, issued to Ortner et al. (Ortner), and an article written by Michael Burns entitled "Waste Paper Preparation Plant and Systems," published in the June/August 1973 issue of Paper Technology (Burns). The broadest of the '623 application's claims, original claim 1, recites:

> A method of treating a mixture of printed and contaminated waste paper in order to produce pulps for the use in the manufacture of pulp and paper boards, which method comprises:
>
> (a) forming an aqueous pulp of said waste material at low temperature, low specific mechanical energy, thereby forming a pulpable slurry and releasing the non-ink contaminants from the surface [**3] of the paper but without dispersing them inside the fibrous suspension;
> (b) separating the non-ink contaminants from the pulp by mechanical separation, without the use of froth floatation or solvent extraction or other process, using conventional screens and centrifugal cleaners and without any further application of strong shear forces to the pulp;
> (c) softening of the ink particles vehicles and weakening of their bondings with the surface of the fibres by submitting the pulp at a consistency of more than 15% at the simultaneous actions of (A) high temperature - between 85 and 130 degrees C. - (B) high shear forces and (C) at least one de-inking agent, under alcaline [sic] conditions;
>
> (d) detaching the ink particles from the surface of the fibres and dispersing them [*1467] into the fibrous suspension by submitting the pulp to the simultaneous actions of (A) high temperature - between 85 and 130 degrees C. - (B) high shear forces and (C) at least one chemical dispersing agent, under alcaline [sic] conditions;
> (e) removing the free ink particles by means of the most appropriate known method and up to the degree of brightness required by the final use of the pulp.

[**4]

In an effort to overcome Ortner, Clement submitted a preliminary amendment in the '943 application dated January 27, 1986, which replaced original claim 1 with claim 42. Claim 42 is limited to: (1) carrying out step (a) at room temperature; (2) using mechanical energy less than 50 KW.H/Ton in step (a); (3) removing the ink by applying a combination of high temperature between 85 and 130 degrees C, mechanical energy greater than 50 KW.H/Ton, and a de-inking or chemical dispersing agent under alkaline conditions in steps (c) and (d), respectively; and (4) limiting the duration of steps (c) and (d) to between two and ten minutes. In this preliminary amendment, Clement argued that Ortner's process could not apply simultaneously the higher temperature and larger shear force

(mechanical energy greater than 50 KW.H/Ton) recited in steps (c) and (d). Clement also argued that using a higher temperature in Ortner's process would prevent the final product from having the necessary brightness.

In response, the examiner withdrew the Ortner reference, but relied on Burns until Clement's amendments dated December 23, 1986, and June 29, 1987, and an examiner's amendment dated May 16, 1988, **[**5]** added the following limitations: (1) steps (a) and (b) remove substantially all the non-ink contaminants **[***1163]** including the stickies; (2) steps (c) and (d) include strong alkaline conditions having a pH of at least 9; (3) the brightness of the final pulp in step (f) is at least 59 ISO; and (4) step (b) takes place at room temperature. The table at Appendix A shows claim 42 before the last two amendments. In his December 23, 1986, amendment, Clement specifically argued that Burns fails to disclose the strong alkaline conditions having a pH greater than 9 that he added to steps (c) and (d). In his June 29, 1987, amendment, he continued to traverse the examiner's assertion that Burns discloses removing the stickies at room temperature through the application of mechanical energy lower than 50 KW.H/Ton. The patent issued on October 25, 1988, with claim 42 becoming claim 1, as shown in the table at Appendix B.

On October 18, 1990, Clement filed reissue application Serial No. 07/600,012 (the '012 application). During prosecution of the '012 application, he admitted that he added "very specific process parameters" to issued claim 1 during prosecution of the '943 application "in order to distinguish **[**6]** over the prior art." Clement later abandoned the '012 application in favor of continuation reissue application Serial No. 08/054,951 (the '951 application), presently on appeal. The '951 application includes claims 1-18, which correspond to claims 1-18 of the '179 patent, and claims 49-52, which are admittedly broader than the '179 patent's claims. In his reissue declaration, Clement stated that as a result of his failure to understand the claims and his attorney's failure to appreciate the scope of his invention, claims 1-18 of the '179 patent are unduly limited because "step (a) recites forming the first fibrous suspension at room temperature by applying specific mechanical energy lower than 50 KW. H/Ton." In addition, "the temperature, mechanical energy and pH conditions set forth in steps (c) and (d)" unduly limit claim 1 and claims 2-18, which depend from it. Claim 49 eliminates these limitations and the room temperature limitation in the first claim's step (b). The table at Appendix B compares reissue claim 49 with claim 1 of the '179 patent with differences italicized.

The examiner rejected claims 49-52 under *35 U.S.C. § 251* [1] for being broadened in a reissue application **[**7]** filed outside the two year statutory period. The examiner also rejected **[*1468]** claims 1-18 and 49-52 under *section 251* for lacking a basis for reissue because recapture is not an error so correctable. The examiner found the reissue declaration defective under *37 C.F.R. § 1.175 (1997)* because it failed not only to mention the error in step (b), but also to explain sufficiently how any of the errors arose. The examiner determined that these defects were not curable because the recapture rule applied. Clement appealed the examiner's final rejection to the United States Board of Patent Appeals and Interferences (the board).

The board determined that Clement filed his broadening reissue application timely. It further found **[**8]** that during prosecution of the '179 patent, Clement added temperature, mechanical energy, and pH limitations to overcome prior art rejections. The board noted that the temperature limitation in step (a) and the temperature and mechanical energy limitations in steps (c) and (d) "were argued by [Clement] to be features not suggested by Ortner or Burns and . . . were accepted by the examiner as distinguishing over these references." It concluded that Clement implicitly admitted that "broader claims not restricted to . . . [these limitations] were not patentable over the prior art represented by Ortner." The board found that claims 49-52 do not include these limitations and concluded that the reissue claims seek to broaden the patent in a manner directly pertinent to subject matter that Clement deliberately surrendered to overcome prior art rejections. It therefore sustained the rejection of claims 49-52 for failing to comply with *35 U.S.C. § 251*, and the rejection of claims 1-18 and 49-52 based on a defective reissue declaration. Clement appeals.

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[1] *Section 251* allows patentees to correct "errors" made during prosecution, such as claiming less than the patentee had a right to claim. A reissue patent may not, however, enlarge the scope of the claims unless the patentee files the reissue application within two years of the grant of the patent.

Discussion

HN1[] Determining whether an applicant has met the statutory requirements of 35 U.S.C. § 251 is a question of law, [**9] which we review de novo. Mentor Corp. v. Coloplast, Inc., 998 F.2d 992, 994, 27 U.S.P.Q.2D (BNA) 1521, 1524 (Fed. Cir. 1993). This legal conclusion is based on underlying findings of fact, which we sustain unless they are clearly erroneous. In re Kemps, 97 F.3d 1427, 1430, 40 U.S.P.Q.2D (BNA) 1309, 1312 (Fed. Cir. 1996); Mentor, 998 F.2d at 994, 27 U.S.P.Q.2D (BNA) at 1524. HN2[] An attorney's failure to appreciate the full scope of the invention qualifies as an error under section 251 and is correctable by reissue. In re Wilder, 736 F.2d 1516, 1519, 222 U.S.P.Q. (BNA) 369, 370-71 (Fed. Cir. 1984). Nevertheless, [***1164] "deliberate withdrawal or amendment . . . cannot be said to involve the inadvertence or mistake contemplated by 35 U.S.C. § 251." Hallicizer v. United States, 174 Ct. Cl. 507, 356 F.2d 541, 545, 148 U.S.P.Q. (BNA) 565, 569 (Ct. Cl. 1966). HN3[] The recapture rule, therefore, prevents a patentee from regaining through reissue the subject matter that he surrendered in an effort to obtain allowance of the original claims. See Mentor, 998 F.2d at 995, 27 U.S.P.Q.2D (BNA) at 1524. Under this rule, claims that are "broader than the original patent claims in a manner directly pertinent to the subject matter surrendered during [**10] prosecution" are impermissible. Id. at 996, 27 U.S.P.Q.2D (BNA) at 1525.

HN4[] The first step in applying the recapture rule is to determine whether and in what "aspect" the reissue claims are broader than the patent claims. For example, a reissue claim that deletes a limitation or element from the patent claims is broader in that limitation's aspect. Clement argues that the board focused too much on the specific limitations that were omitted from the reissue claims. Although the scope of the claims is the proper inquiry, In re Richman, 56 C.C.P.A. 1083, 409 F.2d 269, 274, 161 U.S.P.Q. (BNA) 359, 362 (CCPA 1969), claim language, including limitations, defines claim scope. Altiox, Inc. v. Exitron Corp., 122 F.3d 1019, 1023, 43 U.S.P.Q.2D (BNA) 1545, 1548 (Fed. Cir. 1997); Bell Communications Research, Inc. v. Vitalink Communications Corp., 55 F.3d 615, 619, 34 U.S.P.Q.2D (BNA) 1816, 1819 (Fed. Cir. 1995) ("The language of the claim defines the scope of the protected invention."). Under Mentor, courts must determine in which aspects the reissue claim is broader, which includes broadening as a result of an omitted limitation. The board did not err by determining which limitations Clement deleted from the patent [**11] claims.

The second step is to determine whether the broader aspects of the reissue [*1469] claims relate to surrendered subject matter. To determine whether an applicant surrendered particular subject matter, we look to the prosecution history for arguments and changes to the claims made in an effort to overcome a prior art rejection. See Mentor, 998 F.2d at 995-96, 27 U.S.P.Q.2D (BNA) at 1524-25; Ball Corp. v. United States, 729 F.2d 1429, 1436, 221 U.S.P.Q. (BNA) 289, 294-95 (Fed. Cir. 1984).

HN5[] Although the recapture rule does not apply in the absence of evidence that the applicant's amendment was "an admission that the scope of that claim was not in fact patentable," Seattle Box Co. v. Industrial Crating & Packing, Inc., 731 F.2d 818, 826, 221 U.S.P.Q. (BNA) 568, 574 (Fed. Cir. 1984), "the court may draw inferences from changes in claim scope when other reliable evidence of the patentee's intent is not available," Ball, 729 F.2d at 1436, 221 U.S.P.Q. (BNA) at 294. HN6[] Deliberately canceling or amending a claim in an effort to overcome a reference strongly suggests that the applicant admits that the scope of the claim before the cancellation or amendment is unpatentable, but it is not dispositive because other [**12] evidence in the prosecution history may indicate the contrary. [2] See Mentor, 998 F.2d at 995-96, 27 U.S.P.Q.2D (BNA) at 1524-25; Ball, 729 F.2d at 1436, 221 U.S.P.Q. (BNA) at 296; Seattle Box Co., 731 F.2d at 826, 221 U.S.P.Q. (BNA) at 574 (declining to apply the recapture rule in the absence of evidence that the applicant's "amendment . . . was in any sense an admission that the scope of [the] claim was not patentable"); Hallicizer, 356 F.2d at 545, 148 U.S.P.Q. (BNA) at 569 (acquiescence in the rejection and acceptance of a patent whose claims include the limitation added by the applicant to distinguish the claims from the prior art shows intentional withdrawal of subject matter); In re Willingham, 46 C.C.P.A. 727, 282 F.2d 353, 354, 357, 127 U.S.P.Q. (BNA) 211, 213, 215 (CCPA 1960) (no intent to surrender where the applicant

[2] For example, if an applicant amends a broad claim in an effort to distinguish a reference and obtain allowance, but promptly files a continuation application to continue to traverse the prior art rejections, circumstances would suggest that the applicant did not admit that broader claims were not patentable - assuming that the applicant does not ultimately abandon the continuation application because the examiner refuses to withdraw the rejections.

canceled and replaced a claim without an intervening action by the examiner). HN7[] Amending a claim "by the inclusion of an additional limitation [has] exactly the same effect as if the claim as originally presented had been canceled and replaced by a new claim including that limitation." *In re Byers, 43 C.C.P.A. 803, 230 F.2d 451, 455, 109 U.S.P.Q. (BNA) 53, 55 (CCPA 1956)*.

[13]** HN8[] Once we determine that an applicant has surrendered the subject matter of the canceled or amended claim, we then determine whether the surrendered subject matter has crept into the reissue claim. Comparing the reissue claim with the canceled claim is one way to do this. *In re Wadlinger, 496 F.2d 1200, 1204, 181 U.S.P.Q. (BNA) 826, 830 (CCPA 1974)*; *Richman, 409 F.2d at 274, 161 U.S.P.Q. (BNA) at 362*. If the scope of the reissue claim is the same as or broader than that of the canceled claim, then the patentee is clearly attempting to recapture surrendered subject matter and the reissue claim is, **[***1165]** therefore, unallowable. *Ball, 729 F.2d at 1436, 221 U.S.P.Q. (BNA) at 295* ("The recapture rule bars the patentee from acquiring, through reissue, claims that are the same or of broader scope than those claims that were canceled from the original application.") (emphasis omitted); *Byers, 230 F.2d at 456, 109 U.S.P.Q. (BNA) at 56*. In contrast, a reissue claim narrower in scope escapes the recapture rule entirely. *Ball, 729 F.2d at 1436, 221 U.S.P.Q. (BNA) at 295*.

Some reissue claims, however, are broader than the canceled claim in some aspects, but narrower in others. In Mentor, for example, the issued claim, **[**14]** which was directed to a condom catheter, recited an adhesive means that was transferred from an outer to an inner surface without turning the condom inside-out. *998 F.2d at 993, 27 U.S.P.Q.2D (BNA) at 1523*. The issued claim also recited, inter alia, that the condom catheter included a "thin cylindrical sheath member of resilient material rolled outwardly upon itself to form consecutively larger rolls . . . ." One canceled claim recited an adhesive means between the rolls, but did not specify that the adhesive was transferred from the outer to the inner surface without turning the condom inside-out. Another canceled claim recited that **[*1470]** adhesive was transferred from the outer to the inner surface, but did not specify that this operation was done without turning the condom inside-out. The prior art rejections focused on the obviousness of the adhesive means positioned between the rolls and the process of transferring adhesive to the inner surface of the condom.

In making amendments to the claim, the applicant argued that "none of the references relied upon actually showed the transfer of adhesive from the outer surface to the inner surface as the sheath is rolled up and then unrolled." **[**15]** *Id. at 995-96, 27 U.S.P.Q.2D (BNA) at 1524-25* (emphasis in original). The reissue claim eliminated the limitation that adhesive was transferred from the outer to the inner layer, and was, therefore, broader in this aspect. The reissue claim was also narrower than the canceled claim because it recited that the catheter included "a thin, flexible cylindrical member of resilient material rolled outwardly upon itself to form a single roll . . . ." (Emphasis added). We held that, although the "flexible" and "single roll" limitations made the reissue claim narrower than both the canceled and issued claims, it did not escape the recapture rule because these limitations did not "materially narrow the claim[]." *Id. at 996-97, 27 U.S.P.Q.2D (BNA) at 1525-26*.

Similarly, in Ball, the issued claim recited "a plurality of feedlines" and a "substantially cylindrical conductor." *729 F.2d at 1432-33, 221 U.S.P.Q. (BNA) at 291-92*. The canceled claim recited "feed means including at least one conductive lead," and a "substantially cylindrical conductor." The prosecution history showed that the patentee added the "plurality of feedlines" limitation in an effort to overcome prior art, but the cylindrical **[**16]** configuration limitation was neither added in an effort to overcome a prior art rejection, nor argued to distinguish the claims from a reference. Id. The reissue claim included limitations not present in the canceled claims that related to the feed means element, but allowed for multiple feedlines. On balance, the claim was narrower than the canceled claim with respect to the feed means aspect. The reissue claim also deleted the cylindrical configuration limitation, which made the claim broader with respect to the configuration of the conductor. *729 F.2d at 1437, 221 U.S.P.Q. (BNA) at 295*. We allowed the reissue claim because the patentee was not attempting to recapture surrendered subject matter. *729 F.2d at 1436, 221 U.S.P.Q. (BNA) at 296*.

In both Mentor and Ball, the relevance of the prior art rejection to the aspects narrowed in the reissue claim was an important factor in our analysis. From the results and reasoning of those cases, the following principles flow: (1) HN9[] if the reissue claim is as broad as or broader than the canceled or amended claim in all aspects, the

recapture rule bars the claim; (2) if it is narrower in all aspects, the recapture rule does not apply, but other rejections [**17] are possible; (3) if the reissue claim is broader in some aspects, but narrower in others, then: (a) if the reissue claim is as broad as or broader in an aspect germane to a prior art rejection, but narrower in another aspect completely unrelated to the rejection, the recapture rule bars the claim; (b) if the reissue claim is narrower in an aspect germane to prior art rejection, and broader in an aspect unrelated to the rejection, the recapture rule does not bar the claim, but other rejections are possible. Mentor is an example of (3)(a); Ball is an example of (3)(b).

In our case, reissue claim 49 is both broader and narrower in areas relevant to the prior art rejections. Comparing reissue claim 49 with claim 42 before the May 1988 and June 1987, amendments (see the tables at Appendices A and B), we see that claim 49 is narrower in one area, namely, the brightness is "at least 59 ISO in the final pulp." This narrowing relates to a prior art rejection because, during the prosecution of the '179 patent, Clement added this brightness limitation in an effort to overcome Burns. Our comparison also reveals that reissue claim 49 [***1166] is broader in that it eliminates the room temperature [**18] and specific energy limitations of step (a), and the temperature, specific energy, and pH values of steps (c) and (d). This broadening directly relates to several prior art rejections because, in an effort to overcome Ortner, Clement added to step (a) the limitation that it is carried out "at room temperature," and applies "specific [*1471] mechanical energy lower than 50 KW.H/Ton to form a pumpable slurry . . . ." He argued, moreover, that the latter limitation overcame Burns despite the examiner's contention to the contrary. Clement also added to steps (c) and (d) the temperature and specific energy values in an effort to overcome Ortner, and the "strong" alkaline conditions "having a pH of at least 9" limitation in an effort to overcome Burns. Clement admitted, furthermore, that he added these "very specific process parameters . . . in order to distinguish over the prior art." Claim 49 omits each of these limitations.

On balance, reissue claim 49 is broader than it is narrower in a manner directly pertinent to the subject matter that Clement surrendered throughout the prosecution. Even with the additional limitations, claims 50-52 are also broader than they are narrower in a manner [**19] directly pertinent to the subject matter that Clement surrendered during prosecution.

We do not address whether the reissue claims in this case are broader than the canceled claims in a manner directly related to the alleged error supporting reissue because we see no dispositive significance in this inquiry. In Ball, we said that the recapture rule does not apply when the reissue claim is broader than the canceled claim in a manner unrelated to the alleged error supporting reissue, but did not address whether the recapture rule would apply if the broadening did relate to the alleged error. *729 F.2d at 1438, 221 U.S.P.Q. (BNA) at 296*. We can envision a scenario in which the patentee intentionally fails to enumerate an error so that he may eliminate a limitation that he argued distinguished the claim from a reference or added in an effort to overcome a reference and claim protection under Ball. We, therefore, think Ball is limited to its facts: *HN10*[] the recapture rule does not apply when the broadening not only relates to an aspect of the claim that was never narrowed to overcome prior art, or argued as distinguishing the claim from the prior art, but also is not materially related [**20] to the alleged error. Accordingly, Ball does not require us to determine whether the broader aspects of the reissue claims are related to the alleged error supporting reissue.

Clement argues that, although claim 49 is broader than the issued claims, it is materially narrower than original claim 1; therefore, the recapture rule should not apply. He relies on the unsupported assumption that, for purposes of the recapture rule, we should compare the scope of the reissue claims with that of only original claim 1 to determine whether or not the reissue claim is broader in a material way. Clement has chosen original claim 1 as the basis for comparison because, in his view, it does not include limitations enumerated by the board as missing from the reissue claims. These limitations are the room temperature limitation in step (a) and the specific values of the specific energy limitations in steps (c) and (d).

Clement's assumption ignores the board's finding that the reissue claims delete the value of the high temperature and pH limitations in steps (c) and (d) and the room temperature limitation of step (b). It also ignores much of the prosecution history. The prosecution history [**21] shows that Clement abandoned the subject matter of claim 42, as it existed before the examiner's amendment dated May 16, 1988, because he allowed the examiner to amend it to obtain allowance and no other evidence suggests that Clement did not intend to abandon it. He also abandoned the subject matter of claim 42, as it existed before his June 29, 1987, amendment, as it existed before his

December 23, 1986, amendment, and as it existed in his preliminary amendment. Based on his actions and statements in the prosecution history of the '179 patent and his admission in the history of the '012 application, every time Clement amended his claims, he intentionally omitted or abandoned the claimed subject matter. Furthermore, his argument that we should compare reissue claim 49 with original claim 1 is reminiscent of the patentee's unsuccessful argument in Byers. There, the patentee argued that the reissue claims were "intermediate in scope between certain broad claims which were canceled from [the patentee's] original application and the limited claim allowed in the patent." *230 F.2d at 457, 109 U.S.P.Q. (BNA) at 57*. In response, the court **[*1472]** noted that the "rejection is not based on the cancellation **[**22]** of the broader claims referred to in [the patentee's] brief . . . . The fact that there were other claims whose cancellation did not constitute such a bar is immaterial." Id.

We agree with the board's conclusion that the reissue claims are broader than the patent claims in a manner directly pertinent to the subject matter that Clement surrendered during prosecution. Therefore, it correctly applied the recapture rule, and we affirm the **[***1167]** board's decision to sustain the examiner's rejection of claims 49-52.

Because we affirm the board's decision on recapture, Clement cannot cure the allegedly defective declaration with respect to claims 49-52. As a result, we do not reach that issue. Because claims 1-18 are not subject to the recapture rule, however, a defective declaration would not, in and of itself, invalidate them. The Commissioner concedes this point and reminds that, because under *35 U.S.C. § 252 (1994)* the surrender of the '179 patent does not take effect until the reissue patent issues, "original claims 1-18 continue to exist with their normal presumption of validity," unaffected by the examiner's rejection based on the allegedly defective declaration. We, therefore, **[**23]** vacate the board's decision to the extent that it rejects claims 1-18 because of the allegedly defective declaration.

Claims 1-18 alone cannot support a reissue application. See *In re Keil, 808 F.2d 830, 830, 1 U.S.P.Q.2D (BNA) 1427, 1428 (Fed. Cir. 1987)* (*Section 251* requires a change in "either the patent specification or claims."); *In re Dien, 680 F.2d 151, 152 n.4, 214 U.S.P.Q. (BNA) 10, 12 n.4 (CCPA 1982)* ("It goes without saying that reissue of a patent in identical form with the original patent is not a possibility."). The '951 application would fail, therefore, to comply with *section 251* even if Clement were to cure the allegedly defective declaration.

Conclusion

Accordingly, the decision of the Board of Patent Appeals and Interferences sustaining the rejection of claims 49-52, and to reject the reissue application is affirmed, and its decision to reject original claims 1-18 is vacated.

COSTS

Each party shall bear its own costs.

AFFIRMED IN PART AND VACATED IN PART

APPENDIX A **[***1168]**

[*1473] Claim 42

Before Clement's Amendment on 6/29/87 Claim 42

Before Examiner's Amendment on 5/16/88

A method of treating a mixture **[**24]** of printed and contaminated waste paper in order to produce pulps for use in the manufacture of paper and paperboards, which method comprises: A method of treating a mixture of printed and contaminated waste paper in order to produce pulps for use in the manufacture of paper and paperboards, which method comprises:(a) forming an aqueous fibrous suspension of said waste paper at room temperature without deinking agents by applying specific mechanical energy lower that [sic] 50 KW.H/Ton to form a pumpable slurry and to release the non-ink contaminants, from the surface of the paper fibers in the absence of deinking agents and without dispersing such non-ink contaminants as finely divided particles throughout the fibrous suspension;(a)

forming a first aqueous fibrous suspension of said waste paper at room temperature by applying specific mechanical energy lower that [sic] 50 KW.H/Ton to form a pumpable slurry and to release the non-ink contaminants, from the surface of the paper and without dispersing such non-ink contaminants as finely divided particles throughout the fibrous suspension;(b) removing the released non-ink contaminants from the fibrous suspension by screening and cleaning;(b) **[**25]** removing the non-ink contaminants which have been released without dispersal as finely divided particles from the first fibrous suspension by screening and cleaning to form a second aqueous fibrous suspension substantially free of non-ink contaminants;(c) softening the ink vehicles and weakening their binding with the surface of the fibers by submitting the fibrous suspension at a consistency of more than 15% to the simultaneous actions of (A) a high temperature between 85 degrees and 130 degrees C, (B) high shear forces substantially corresponding to a specific mechanical energy of more than 50 KW.H/Ton applied at the said consistency of more than 15% and (C) at least one deinking agent under strong alkaline conditions having a pH preferably greater than 9;(c) after the step of removing the non-ink contaminants softening the ink vehicles and weakening their binding with the surface of the fibers by submitting the second fibrous suspension at a consistency of more than 15% to the simultaneous actions of (A) a high temperature between 85 degrees and 130 degrees C, (B) high shear forces substantially corresponding to a specific mechanical energy of more than 50 KW.H/Ton applied at the **[**26]** said consistency of more than 15% and (C) at least one deinking agent under strong alkaline conditions having a pH of at least 9; and(d) detaching the ink particles from the surface of the fibers and dispersing them into the fibrous suspension by submitting the fibrous suspension to the simultaneous actions of (A) high temperature between 85 degrees and 130 degrees C, (B) high shear forces substantially corresponding to a specific mechanical energy of more than 50 KW.H/Ton applied at the said consistency of more that [sic] 15% and (C) at least one chemical dispersing agent, under strong alkaline conditions having a pH preferably greater than 9;(d) detaching the ink particles from the surface of the fibers and dispersing them into the second fibrous suspension by submitting the second fibrous suspension to the simultaneous actions of (A) high temperature between 85 degrees and 130 degrees C, (B) high shear forces substantially corresponding to a specific mechanical energy of more that [sic] 50 KW.H/Ton applied at the said consistency of more than 15% and (C) at least one chemical dispersing agent, under strong alkaline conditions having a pH of at least 9 whereby higher specific **[**27]** energy inputs and higher temperatures are used to detach the ink particles from the fibers of the second fibrous suspension after removal of the non-ink contaminants than are used on the first fibrous suspension before removal of the non-ink contaminants;(e) limiting the total duration of the ink softening and detaching steps (c) and (d) to a range between 2 and 10 minutes and(e) limiting the total duration of the ink softening and detaching steps (c) and (d) to a range between 2 and 10 minutes and(f) removing the detached ink particles from the fibrous suspension to provide the degree of brightness required in the final product of the pulp.(f) removing the detached ink particles from the second fibrous suspension to provide the degree of brightness required in the final product of the pulp.

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APPENDIX B **[***1169]**

Patent Claim 1 Reissue Claim 49A method of treating a mixture of printed and contaminated waste paper in order to produce a pulp for use in the manufacture of paper and paperboards, said waste paper containing non-ink contaminants including stickies, which method comprises: A method of treating a mixture of printed and contaminated waste paper **[**28]** in order to produce a pulp for use in the manufacture of paper and paperboards, said waste paper containing non-ink contaminants including stickies, which method comprises:(a) forming a first aqueous fibrous suspension of said waste paper *at room temperature* **[*1474]** by applying *specific mechanical energy lower that [sic] 50 KW.H/Ton to* form a pumpable slurry and to release substantially all of the non-ink contaminants including the stickies, from the surface of the paper and without dispersing such non-ink contaminants as finely divided particles throughout the fibrous suspension;(a) forming a first aqueous fibrous suspension of said waste paper *at a temperature below the melting point of the non-ink contaminants* by applying *specific mechanical energy sufficient to* form a pumpable slurry and to release substantially all of the non-ink contaminants including the stickies, from the surface of the paper and without dispersing such non-ink contaminants as finely divided particles throughout the fibrous suspension;(b) removing substantially all of the non-ink contaminants including the stickies, which have been released without dispersal as finely divided particles from the first **[**29]** fibrous suspension by screening and cleaning *at room temperature* to form a second aqueous fibrous suspension substantially free of the

non-ink contaminants including the stickies;(b) removing substantially all of the non-ink contaminants including the stickies, which have been released without dispersal as finely divided particles from the first fibrous suspension by screening and cleaning to form a second aqueous fibrous suspension substantially free of the non-ink contaminants including the stickies;(c) after the step of removing the non-ink contaminants softening the ink vehicles and weakening their binding with the surface of the fibers by submitting the second fibrous suspension at a consistency of more than 15% to the simultaneous actions of *(A) a high temperature between 85 degrees and 130 degrees C., (B) high shear forces substantially corresponding to a specific mechanical energy of more than 50 KW.H/Ton* applied at the said consistency of more than 15% and *(C) at least one deinking agent under strong alkaline conditions having a pH of at least 9*; and(c) after the step of removing the non-ink contaminants, *(1)* softening the ink vehicles and weakening their binding **[**30]** with the surface of the fibers, and then *(2)* detaching the ink particles from the surface of the fibers and dispersing the particles into the second fibrous suspension by submitting the second fibrous suspension at a consistency of more than 15% to the simultaneous actions of temperature, pressure, specific energy and chemical dosing sufficient to insure softening of the ink vehicles, *(d)* detaching the ink particles from the surface of the fibers and dispersing them into the second fibrous suspension by submitting the second fibrous suspension to the simultaneous actions of *(A) high temperature between 85 degrees and 130 degrees C., (B) high shear forces substantially corresponding to a specific mechanical energy of more than 50 KW.H/Ton* applied at the said consistency of more that [sic] 15% and *(C) at least one chemical dispersing agent, under strong alkaline conditions having a pH of at least 9* whereby higher specific energy inputs and higher temperatures are used to detach the ink particles from the fibers of the second fibrous suspension after removal of the non-ink contaminants than are used on the first fibrous suspension before removal of the non-ink contaminants; detachment **[**31]** of the ink particles from the surface of the fibers and dispersion of the detached ink particles into the second fibrous suspension, whereby higher specific energy inputs and higher temperatures are used to detach the ink particles from the fibers of the second fibrous suspension after removal of the non-ink contaminants than are used on the first fibrous suspension before removal of the non-ink contaminants;*(e)* limiting the total duration of the ink softening and detaching steps (c) and *(d)* to a range between 2 and 10 minutes and*(d)* limiting the total duration of step (c)*(1)* and *(c)(2)* to a range between 2 and 10 minutes and*(f)* removing the detached ink particles from the second fibrous suspension to provide a brightness of at lesat [sic] 59 ISO [in] the final pulp.*(e)* removing the detached ink particles from the second fibrous suspension to provide a brightness of at least 59 ISO in the final pulp.

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Applicant Initiated Interview Request Form

Application No.: 15/085,741 First Named Applicant: Oxygenator Water Technologies, Inc.
Examiner: Jastrzab, Krisanne Marie Art Unit: 3991 Status of Application: Non-Final Office Action Mailed

Tentative Participants:
(1) Examiner Krisanne Jastrzab (2) Applicant's Represenative, Aaron Pederson
(3) _____ (4) _____

Proposed Date of Interview: Sept. 26 **Proposed Time:** 10:30 Central (◉AM ○PM)

Type of Interview Requested:
(1) ☑ Telephonic (2) ☐ Personal (3) ☐ Video Conference

Exhibit To Be Shown or Demonstrated: ☐ YES ☑ NO
If yes, provide brief description: _____

Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) Recapture	27-36, 62-69		☐	☐	☐
(2) Written Description	13-69		☐	☐	☐
(3) Indefiniteness	All Rejected		☐	☐	☐
(4) Improper Depedent	All Rejected		☐	☐	☐

☑ Continuation Sheet Attached ☑ Proposed Amendment or Arguments Attached
Brief Description of Arguments to be Presented: See continuation sheet.

An interview was conducted on the above-identified application on _____

NOTE: This form should be completed and filed by applicant in advance of the interview (see MPEP § 713.01). If this form is signed by a registered practitioner not of record, the Office will accept this as an indication that he or she is authorized to conduct an interview on behalf of the principal (37 CFR 1.32(a)(3)) pursuant to 37 CFR 1.34. This is not a power of attorney to any above named practitioner. See the Instruction Sheet for this form, which is incorporated by reference. By signing this form, applicant or practitioner is certifying that he or she has read the Instruction Sheet. After the interview is conducted, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible. This application will not be delayed from issue because of applicant's failure to submit a written record of this interview.

/Aaron W. Pederson/
Applicant/Applicant's Representative Signature

Examiner/SPE Signature

Aaron W. Pederson
Typed/Printed Name of Applicant or Representative

612-436-9609
Applicant's/Applicant's Representative's Telephone Number

58,607
Registration Number, if applicable

Electronic Acknowledgement Receipt	
EFS ID:	30411729
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Aaron Wesley Pederson
Filer Authorized By:	
Attorney Docket Number:	3406.005US3
Receipt Date:	19-SEP-2017
Filing Date:	30-MAR-2016
Time Stamp:	16:50:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Letter Requesting Interview with Examiner	App_No_15085741_Interview_Cont_Sheet.pdf	92761 6107c72fcfc17b5bed3d59565b7d76c4761138f1	no	1

Warnings:

Information:					
2	Claims	App_No_15085741_Proposed_Amends.pdf	133871 fc68558ab2bdb5f35e6865410eb7a5998fe3cdc8	no	17
Warnings:					
Information:					
3	Letter Requesting Interview with Examiner	In_re_Clement.pdf	196870 b9d5d83bcdff858701112ab655eaf527dd049c51	no	12
Warnings:					
Information:					
4	Letter Requesting Interview with Examiner	Interview_Req_Form.pdf	338182 75db792937d7660010816b3bf8da1b2472c0c585	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	761684		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3	9995

38846 7590 09/29/2017

Carlson, Caspers, Vandenburgh, Lindquist & Schuman
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

EXAMINER	
JASTRZAB, KRISANNE MARIE	

ART UNIT	PAPER NUMBER
3991	

MAIL DATE	DELIVERY MODE
09/29/2017	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Applicant-Initiated Interview Summary	**Application No.** 15/085,741	**Applicant(s)** SENKIW, JAMES ANDREW	
	Examiner KRISANNE JASTRZAB	**Art Unit** 3991	

All participants (applicant, applicant's representative, PTO personnel):

(1) *KRISANNE JASTRZAB*.

(2) *Aaron Pederson*.

(3) *Jean Witz*.

(4) *Elizabeth McKane*.

Date of Interview: *26 September 2017*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☒112 ☐102 ☐103 ☒Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: _____.

Identification of prior art discussed: *NA*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Mr. Pederson argued that recapture does not exist because the originally filed claims of the '495 patent did not include the limitation surrendered in the prosecution of the parent '441 patent and that the broadening aspect of the current reissue is not related to the surrendered limitation of the '441 patent. Mr. Pederson asserted that the absence of the spacer in the current claims is the broadening aspect with respect to claim 2 of the '495 patent. Mr. Pederson further argued that because the broadened aspect in the current reissue is not related to the surrendered limitation of the '441 patent and the '495 patent did not produce any surrender generating limitations, recapture is not proper. Mr. Pederson further pointed to In re Clement in support of his position as the '495 patent was a child of the '441 patent, however, Specialist Jastrzab noted that the '495 patent had not attempted to continue prosecution of the broader claim amended in the prosecution of the '441 patent, thus the circumstances do not match those of In re Clement. The Specialist agreed to fully consider all arguments with respect to the recapture rejection when filed in the upcoming response. Mr. Pederson included a proposed amendment to the claims to address the outstanding 112, 1st 2nd and 4th paragraph rejections (included with the filed Interview request form of 9/19/2017). Specialist Jastrzab indicated that the proposed amendment appeared to correct all but the last of the 112, 1st issues and the 112, 2nd issues related to claims 25, 27, 35, 48, 60 and 68 raised in the office action of 8/17/2017. She further indicated that the 112, 2nd issues regarding claims 29-30 were not clearly resolved with the proposed amendment. She further noted that the 112, 4th issues regarding claims 33-34, 36 and 69 were not resolved by the proposed amendment because "close enough together such that the oxygen produced by the emitter comprises nanobubbles" is dependent on the type of liquid that would be used in the device and is therefore still related to the method without properly and definitely further limiting the apparatus. Mr. Pederson indicated that he would consider all of the points raised by the Specialist when preparing his response. Specialist Jastrzab noted that full consideration would be given to the amendments and all arguments submitted with the upcoming response .

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/Krisanne Jastrzab/ Patent Reexamination Specialist CRU 3991	/Elizabeth L.McKane/ Patent Reexam Specialist CRU 3991	/Jean C. Witz/ Supervisory Patent Reexamination Specialist CRU 3991

U.S. Patent and Trademark Office
PTOL-413 (Rev. 8/11/2010) **Interview Summary** Paper No. 20170926

Continuation Sheet (PTOL-413) **Application No. 15085741**

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15085741
Filing Date	2016-03-30
First Named Inventor	Senkiw, James Andrew
Art Unit	3991
Examiner Name	Jastrzab, Krisanne Marie
Attorney Docket Number	3406.005US03

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15085741
	Filing Date	2016-03-30
	First Named Inventor	Senkiw, James Andrew
	Art Unit	3991
	Examiner Name	Jastrzab, Krisanne Marie
	Attorney Docket Number	3406.005US03

	1	Application Serial No. 14/601,340, Office Action, dated Oct. 5, 2017	
	2	Application Serial No. 14/601,340, Amendment and Response, filed Feb. 6, 2017	
	3	Application Serial No. 14/601,340, Applicant's Interview Summary, filed May 17, 2017	
	4	Application Serial No. 14/601,340, Examiner's Interview Summary, dated May 22, 2017	
	5	Application Serial No. 14/601,340, Final Office Action, dated June 5, 2017	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15085741
	Filing Date	2016-03-30
	First Named Inventor	Senkiw, James Andrew
	Art Unit	3991
	Examiner Name	Jastrzab, Krisanne Marie
	Attorney Docket Number	3406.005US03

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Aaron W. Pederson/	Date (YYYY-MM-DD)	2017-10-09
Name/Print	Aaron W. Pederson	Registration Number	58,607

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

EFS Web 2.1.17

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal	
Application Number:	15085741
Filing Date:	30-Mar-2016
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Filer:	Aaron Wesley Pederson
Attorney Docket Number:	3406.005US3
Filed as Small Entity	

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	90	90
		Total in USD ($)		**90**

Electronic Acknowledgement Receipt	
EFS ID:	30601750
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Aaron Wesley Pederson
Filer Authorized By:	
Attorney Docket Number:	3406.005US3
Receipt Date:	09-OCT-2017
Filing Date:	30-MAR-2016
Time Stamp:	17:03:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$90
RAM confirmation Number	101017INTEFSW00014252502880
Deposit Account	502880
Authorized User	Aaron Pederson
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.17 (Patent application and reexamination processing fees) 37 CFR 1.19 (Document supply fees)	

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		App_No_15085741_Resp_to_OA_dtd_8-17-2017.pdf	405937 7a1501b6fd9fae67cdded51451af08e8fefd249f	yes	34

Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal Letter	1	1
Specification	2	2
Claims	3	18
Applicant Arguments/Remarks Made in an Amendment	19	34

Warnings:

Information:

2	Information Disclosure Statement (IDS) Form (SB08)	App_No_15085741_IDS.pdf	1035123 a5e612705cb27d527beb835f8127daac8af4dad9	no	4

Warnings:

Information:

A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.

3	Non Patent Literature	Examiner_Int_Summary_dtd_5-22-2017.pdf	1290070 8dbb1272b914a2e401abf1d946ca40a93278dc9a	no	22

Warnings:

Information:

4	Non Patent Literature	FOA_dtd_6-5-2017.pdf	1008539 0dca4136f2dccc39603a706d05bef23a34b975d8	no	25

Warnings:					
Information:					
5	Non Patent Literature	Interview_Summary_dtd_5-17-2017.pdf	2199501 406062ef15f03d78b56fd34d3893da75579f41b1	no	22
Warnings:					
Information:					
6	Non Patent Literature	OA_dtd_10-5-2016.pdf	747247 444e0b62d17ac56698f99a0113d4f930f2f75550	no	19
Warnings:					
Information:					
7	Non Patent Literature	Response_dtd_2-6-2017.pdf	4947732 d52a430e330a43010dd39262ab777f665d60def7	no	76
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	30528 fb6979c4dddb642f7fa87f35fe1dee1dbb8c2540	no	2
Warnings:					
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION REISSUE APPLICATION

Applicant(s)	James Andrew Senkiw	Response for Continuation Reissue Application of U.S. Patent No. 7,670,495 Pursuant to 37 C.F.R. §1.173(b)
Serial No.	15/085,741	
Filing Date	March 30, 2016	
Continuation Reissue of U.S. Patent No.	7,670,495	
Issued:	March 2, 2010	
Examiner Name	JASTRZAB, KRISANNE MARIE	
Group Art Unit	3991	
Attorney Docket No.	3406.005US3	
Customer Number:	38846	
Confirmation No.	9995	
Title:	FLOW-THROUGH OXYGENATOR	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In response to the Non-Final Office Action mailed August 17, 2017, please consider the following:

Amendments to the Specification, beginning on page 2 of this paper;

Amendments to the Claims, beginning at page 3 of this paper; and

Remarks, beginning on page 18 of this paper.

AMENDMENTS TO THE SPECIFICATION

Please replace the first paragraph of the application as filed with the following replacement paragraph:

More than one reissue application has been filed for the reissue of U.S. Patent No. 7,670,495. This application is a continuation reissue application of application number 14/601,340, filed January 21, 2015, which is a continuation reissue application of application number 13/247,241, filed September 28, 2011, now U.S. Patent No. RE45,415, which is a reissue of U.S. Patent No. 7,670,495. U.S. Patent No. 6,760,495 is a division of application Ser. No. 10/732,326 filed Dec. 10, 2003, which in turn is a continuation-in-part of application Ser. No. 10/372,017, filed Feb. 21, 2003, now U.S. Pat. No. 6,689,262, which claims the benefit of U.S. Provisional Application No. 60/358,534, filed Feb. 22, 2002, each of which is hereby fully incorporated herein by reference.

IN THE CLAIMS

This listing of the claims will replace all prior listings of the claims.

1-12. (Cancelled)

13. (New-Amended) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet;

at least two electrodes comprising a first electrode and a second electrode, the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing;

each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the electrodes producing oxygen in said water via electrolysis.

14. (New-Amended) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein the first and second electrodes extend in a direction that is parallel to the longitudinal axis.

15. (New-Amended) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein the first and second electrodes extend in a direction parallel to the longitudinal axis; and

wherein each electrode of the emitter is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing.

16. (New) The method of claim 13 wherein at least one of the electrodes is a stainless steel mesh or screen.

17. (New-Amended) The method of claim 13 wherein the first and second electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of the first and second electrodes positioned within the tubular housing.

18. (New-Amended) The method of claim 17 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the tubular housing.

19. (New-Amended) The method of claim 17 wherein the first and second electrodes comprise an outside electrode and an inside electrode,

wherein the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing, the outside and inside electrodes being outside and inside electrodes respectively in that the first and second electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is,

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

20. (New-Amended) The method of claim 13 wherein the first and second electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of the first and second electrodes positioned within the housing;

wherein the first and second electrodes comprise an outside electrode and an inside electrode;

wherein the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing;

the outside and inside electrodes being outside and inside electrodes respectively in that the first and second electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway; and

wherein the tubular housing of the emitter is round.

21. (New) The method of claim 19 wherein said inward-facing surface is a concave surface.

22. (New-Amended) The method of claim 13 further including at least one conductor coupled to one of the first and second electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

23. (New) The method of claim 13 wherein the oxygen produced comprises microbubbles.

24. (New) The method of claim 13 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

25. (New-Amended) The method of claim 13 wherein the emitter comprises non-parallel anode portions.

26. (New) The method of claim 13 wherein the oxygen produced comprises nanobubbles.

27. (New-Twice Amended) An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, said outside and inside electrodes extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches,

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than to a longitudinal center axis of the oxygenation chamber; and

a power source in electrical communication with the outside and inside electrodes, the power source configured to deliver a voltage to the outside and inside electrodes, the voltage

being less than or equal to 28.3 volts, the power source being configured to deliver a current to the outside and inside electrodes, the current being less than or equal to 12.8 amps.

28. (New-Amended) The emitter of claim 27 wherein each electrode is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

29. (New-Twice Amended) The emitter of claim 27 wherein the outside and inside electrodes are positioned away from the longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of the outside and inside electrodes positioned within the chamber.

30. (New-Amended) The emitter of claim 29 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

31. (New-Amended) The emitter of claim 30 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

32. (New-Twice Amended) The emitter of claim 27 comprising at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

33. (Cancelled)

34. (New-Twice Amended) The emitter of claim 27 wherein the power source is configured to deliver a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

35. (New-Twice Amended) The emitter of claim 27 wherein the emitter comprises non-parallel anode portions.

36. (Cancelled)

37. (New-Amended) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;

at least two electrodes comprising a first electrode and a second electrode, the first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches, a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches;

a power source in electrical communication with the first and second electrodes, the power source configured to deliver a voltage to the first and second electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the first and second electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the first and second electrodes to produce oxygen in said water via electrolysis.

38. (New) The method of claim 37 wherein the tubular housing has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal center axis; and

wherein each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis.

39. (New-Amended) The method of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis,

wherein the first and second electrodes extend in a direction that is parallel to the longitudinal axis.

40. (New) The method of claim 39 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

41. (New-Amended) The method of claim 37 wherein the at least one electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

42. (New-Amended) The method of claim 37 wherein the outside and inside electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of the outside and inside electrodes positioned within the chamber.

43. (New) The method of claim 42 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the chamber.

44. (New-Amended) The method of claim 42 wherein the chamber has an inward-facing surface that runs parallel to the longitudinal axis;

wherein the first and second electrodes being outside and inside electrodes respectively in that the first and second electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the

inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is; and

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

45. (New-Amended) The method of claim 37 wherein the emitter includes at least one conductor coupled to one of the first and second electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to a longitudinal axis of the housing.

46. (New) The method of claim 37 wherein the oxygen produced comprises microbubbles.

47. (New) The method of claim 37 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

48. (New-Amended) The method of claim 37 wherein the emitter comprises non-parallel anode portions.

49. (New) The method of claim 37 wherein the oxygen produced comprises nanobubbles.

50. (New-Amended) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including

a tubular housing defining an oxygenation chamber, said housing having an inward-facing surface that defines at least in part the oxygenation chamber, the tubular housing having a water inlet, and a water outlet;

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, said outside and inside electrodes extending in a direction that runs parallel to the inward-facing surface, the outside and inside electrodes being outside and inside electrodes

respectively in that the outside and inside electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber;

wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.

51. (New-Amended) The method of claim 50 wherein the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and wherein the unobstructed passageway includes the longitudinal center axis.

52. (New) The method of claim 50 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

53. (New-Amended) The method of claim 52 wherein the at least one electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

54. (New) The method of claim 50 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

55. (New) The method of claim 54 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

56. (New) The method of claim 55 wherein said inward-facing surface is a concave surface.

57. (New-Amended) The method of claim 50 wherein the emitter includes at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

58. (New) The method of claim 50 wherein the oxygen produced comprises microbubbles of oxygen.

59. (New) The method of claim 50 wherein the electrical current is applied to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

60. (New-Amended) The method of claim 50 wherein the emitter comprises non-parallel anode portions.

61. (New) The method of claim 50 wherein the oxygen produced comprises nanobubbles of oxygen.

62. (New-Twice Amended) An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than

the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;

the at least two electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of the at least two electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, the at least two electrodes being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway.

63. (New-Amended) The emitter of claim 62 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

64. (New-Twice Amended) The emitter of claim 63 wherein the at least one electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

65. (New-Amended) The emitter of claim 62 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

66. (New-Amended) The emitter of claim 62 wherein said outer wall includes an inwardly-facing concave surface.

67. (New-Twice Amended) The emitter of claim 62 comprising at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

68. (New-Twice Amended) The emitter of claim 62 wherein the emitter comprises non-parallel anode portions.

69. (Cancelled)

70. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, said outside and inside electrodes extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches; and

a power source in electrical communication with the outside and inside electrodes, the power source configured to deliver a voltage to the outside and inside electrodes, the

voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the outside and inside electrodes, the current being less than or equal to 12.8 amps;

passing water through the oxygenation chamber while electrical current is applied to the outside and inside electrodes within the chamber to produce oxygen in said water via electrolysis.

71. (New) The method of claim 70 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber.

72. (New) The method of claim 70 wherein the outside and inside electrodes of the emitter is positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the longitudinal center axis, the passageway running longitudinally for at least the length of the outside and inside electrodes within the chamber.

73. (New) The method of claim 72 wherein the unobstructed passageway includes the longitudinal center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

74. (New) The method of claim 73 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

75. (New) The method of claim 70 wherein the emitter includes at least one conductors coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

76. (New) The method of claim 70 wherein the oxygen produced comprises nanobubbles.

77. (New) The method of claim 70 wherein the power source delivers a current to the outside and inside electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

78. (New) The method of claim 70 wherein the emitter comprises non-parallel anode portions.

79. (New) The method of claim 78 wherein the oxygen produced comprises nanobubbles.

80. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet;

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the outside and inside electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;

the at least two electrodes of the emitter being positioned away from the longitudinal center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the longitudinal center axis that runs for at least the length of the at least two electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, the at least two electrodes of the emitter being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway; and

passing water through the oxygenation chamber while applying electrical current to the outside and inside electrodes to produce oxygen in said water via electrolysis.

81. (New) The method of claim 80 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

82. (New) The method of claim 81 wherein the at least one electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

83. (New) The method of claim 80 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

84. (New) The method of claim 80 wherein said outer wall includes an inwardly-facing concave surface.

85. (New) The method of claim 80 wherein the emitter includes at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

86. (New) The method of claim 80 wherein the emitter comprises non-parallel anode portions.

87. (New) The method of claim 86 wherein the oxygen produced comprises nanobubbles of oxygen.

REMARKS

Claims 13-15, 17-20, 22, 25, 27, 29, 32, 34, 35, 37, 39, 41, 42, 44, 45, 48, 50, 51, 53, 57, 60, 62, 64, 67, and 68 are amended herein, claims 33, 36, and 69 are cancelled, and claims 70-87 are added. As a result, claims 13-32, 34, 35, 37-68, and 70-87 are pending in this application. The claims are marked with respect to the claims of the original patent being reissued, U.S. Patent No. 7,670,495. Reconsideration and withdrawal of the rejections to claims 13-32, 34, 35, and 36-68 is respectfully requested in light of the amendments and the following remarks.

Examiner Interview Summary

Applicant's representative, Aaron Pederson (Reg. No. 58,607), thanks Specialist Krisanne Jastrzab and Specialists Jean Witz and Elizabeth McKane for the opportunity to discuss aspects of this application during a telephone interview on September 26, 2017. Applicant's representative and the three Specialists are collectively referred to herein as "the interview participants".

The first rejection discussed was the recapture rejection. Applicant's representative asserted that claims 27-36 and 62-69 did not improperly recapture subject matter. In conjunction with this assertion, the interview participants discussed that none of the broadening aspects of the claims identified under step 1 of the three step recapture test were also surrendered subject matter identified under step 2 of the recapture test. The interview participants discussed that a broadening aspect of claims 27-36 and 62-69 is that the claims no longer require a spacer as was required by claim 2 of the patent being reissued (U.S. Patent No. 6,670,495). Since the spacer was never surrendered by the Applicant, however, it is not improper under recapture to remove the spacer limitation. Similarly, the interview participants also discussed that the limitation identified by the Office Action for step 2 was not a broadening aspect of the claims; therefore, the claims were not recapturing that limitation. Applicant already had claims without that limitation in the '495 patent. As such, the limitation identified by the Office Action for step 2 cannot be the basis for an improper recapture rejection.

The *In re Clement* case was also discussed. The interview participants discussed that the above analysis regarding the broadening aspect of step 1 not being surrendered subject matter under step 2 of the recapture test was sufficient to render the claim proper under the recapture

analysis. Nevertheless, Applicant's representative raised a second, independent reason why recapture does not apply here based on the *In re Clement* case. Applicant's representative noted that footnote 4 of *In re Clement* indicated that if a continuing application is filed and not abandoned, and that continuing application includes a claim without a limitation that was added or argued in a previous application, such a circumstance indicates that a previously added limitation has not been surrendered by the Applicant. Specialist Jastrzab responded that the '495 patent did not attempt to continue prosecution of the exact broader claim language amended during prosecution of the '441 patent.

No formal agreement was reached on recapture, however, Specialist Jastrzab agreed to further consider the rejection in light of the discussion and Applicant's written response.

Proposed claim amendments were also discussed. In particular, the interview participants discussed the 35 U.S.C. 112 rejections in light of the proposed claim amendments. Specialist Jastrzab indicated that four of the five phrases listed in the Office Action under the written description rejections would likely be moot in light of the proposed claim amendments which removed relevant language. With respect to the remaining phrase ("first and second conductors coupled to …"), the interview participants discussed what was disclosed in FIG. 7A and 7B as well as the corresponding portions of the description regarding this limitation. No agreement was reached as to this phrase, but Applicant's representative agreed to consider the discussion when preparing the formal response.

With respect to the indefiniteness rejections, the interview participants discussed that the proposed amendments likely addressed the rejection to claim 27. No agreement was reached on the indefiniteness rejections to claims 25, 29-30, 35, 48, 60, and 68, but Applicant's representative again agreed to consider the discussion when preparing a formal response.

Finally, with respect to the rejections under 112, 4th paragraph, the interview participants indicated that the discussion for claims 29 and 30 was similar to the discussion above with respect to the indefiniteness rejection. The interview participants also discussed the language of claims 33, 36, and 69. No agreement was reached on the rejections to those claims. The rejection of claim 34 was not discussed.

Applicant's representative believes the substance and scope of the telephone interview is accurately captured in the summary above and requests notification from the Specialists if there

is any discrepancy. Applicant's representative thanks Specialist Jastrzab for the thoughtful and productive interview.

Specification Objection

The disclosure was objected to because it was lacking the required cross reference to other reissues filed from the same patent. The first paragraph of the specification is amended herein to cross reference the two other reissue applications that have been filed from U.S. Patent No. 7,670,495. As a result, Applicant respectfully requests withdrawal of the objection to the specification.

Recapture Rejection

Claims 27-36 and 62-69 were rejected under 35 U.S.C. 251 as being an improper recapture of broadened claimed subject matter. Applicant respectfully traverses this rejection.

Claims 27-36 and 62-69 do not improperly recapture any subject matter, because there is no broadening aspect of the claims that was surrendered during prosecution. As cited in the Office Action, the three step test for recapture is:

1. determine whether, and in what respect, the reissue claims are broader in scope than the original patent claims;
2. determine whether the broader aspects of the claims relate to the subject matter surrendered in the original prosecution; and
3. determine whether the reissue claims were materially narrowed in other respects, so that the claims may not have been enlarged.

Thus, the three step test first requires that the broader aspects of the claim be identified (step 1). The test then requires that it be identified whether any of those broader aspects are surrendered subject matter (step 2). Following this analysis, there are not any broader aspects (step 1) of claims 27-36 or 62-69 that are also surrendered subject matter (step 2).

For example, no aspects identified in the Office Action meet both step 1 and step 2 of the recapture test. The aspects identified in the Office Action for step 1 as broader aspects of claims 27-36 and 62-69 are the following:

> an anode separate from at a critical distance from a cathode, a nonconductive spacer maintaining the separation of the anode and the cathode, the nonconductive

> spacer having a spacer thickness between 0.005 to 0.50 inches such that the critical distance is less than 0.060 inches

None of these broader aspects, however, are surrendered subject matter under step 2. Thus, none of these broader aspects meet step 2 of the recapture test, and Applicant is allowed to remove these limitations from the claims.

For step 2, the Office Action identified the limitation:

> the oxygen emitter including three matched sets of anodes and cathodes mounted to stabilizing hardware such that each matched set resides at 120º angle to the adjacent matched sets

as being surrendered, and as being related to a broadening aspect of claims 27-36 and 62-64. For ease of reference, this limitation will be referred to as "the triangle limitation". The Office Action implied that the triangle limitation was related to the broadening aspects of claims 27-36 and 62-69, because both were to the "configuration of the emitter". Applicant respectfully asserts, however, that the entire claim is directed to the "configuration of the emitter". The broadening aspects identified in step 1, are much more specific, and relate to, for example, the spacer and the critical distance. The triangle limitation does not relate to the spacer, the critical distance, or any of the other broadening aspects of claims 27-36 and 62-64. Thus, the triangle limitation does not meet step 1 of the recapture test, and Applicant is likewise allowed to include claims without the triangle limitation.

To put it plainly, the purpose of the recapture doctrine is to prevent Applicant from claiming subject matter in a reissue application that the Applicant did not already have claims to, if that subject matter was intentionally given up during prosecution. If the Applicant already had claims to the subject matter, then the Applicant is allowed to again claim that subject matter in a reissue application regardless of whether it was surrendered during prosecution. If the Applicant did *not* have claims to the subject matter, however, *then* the Applicant may be forbidden from claiming the subject matter if that subject matter was surrendered during prosecution. Steps 1 and 2 of the recapture test accomplish this purpose by checking to see a) what subject matter the Applicant already had claims to (step 1) and b) what subject matter was surrendered during prosecution (step 2).

In this situation, the Applicant already had claims that covered subject matter broader than the triangle limitation. That is, none of the claims of the patent being reissued (the '495

patent) included the triangle limitation. Since none of the claims of the '495 patent included the triangle limitation, Applicant is allowed to include claims in this reissue application that are similarly not limited to the triangle limitation. In other words, the triangle limitation cannot be the basis of a recapture rejection, because it does not appear in any of the original claims of the '495 patent being reissued. Moreover, none of the aspects of claims 27-36 and 62-68 that *are* broadening, are subject matter that was surrendered during prosecution. Since the broadening aspects were not surrendered, Applicant is allowed to remove them without violating the recapture doctrine.

In addition to the above reason, Applicant respectfully asserts that, under *In re Clement*, the triangle limitation was not surrendered when considering the prosecution history of the entire family. During prosecution of the '441 patent the Applicant added the triangle limitation to the claims. The '495 patent, however, was filed as a continuing application off of the '441 patent and did *not* include the triangle limitation. In accordance with *In re Clement*, this indicates Applicant's desire *not* to surrender the subject matter. During the Examiner Interview, Specialist Jastrzab brought up the fact that the claims the '495 patent were not identical to the claims of the '441 patent before the addition of the triangle limitation. While this is true, the claims of the '495 patent were rejected as being patentably indistinct from the claims of the '441 patent. Thus, while not identical, the lack of inclusion of the triangle limitation in a claim considered by the patent office to be patentably indistinct *does* indicate Applicant's desire not to surrender the subject matter.

Finally, with regard to step 3 of the recapture analysis, claims 27-36 and 62-69 do present new limitations that materially narrow the claim. The claims include limitations on the configuration of the emitter, e.g., the limitations noted in the present Office Action as representing allowable subject matter, that do not appear in any of the '262, '441 or '495 patent claims and that sufficiently narrow the claim to aspects that are not included in the prior art. Accordingly, claims 27-36 and 62-69 do present limitations that materially narrow the claim under step 3 of the recapture analysis. Thus, step 3 of the recapture analysis would also preclude a finding that recapture applies to the present claims.

For at least these reasons, Applicant respectfully requests reconsideration and withdrawal of the rejection to claims 27-36 and 62-69 under the recapture doctrine.

35 U.S.C. § 112, first paragraph

Claims 13-69 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Five phrases were listed in the rejection. Applicant respectfully traverses the rejection for each of the five phrases.

Phrases 1-3 and 5 were identified during the Examiner Interview as likely being moot based on the proposed amendments discussed. The amendments presented herein include the same or similar to amendments for phrases 1-3 and 5 that were included in the proposed amendments. Thus, the rejections of each of phrases 1-3 and 5 should be moot based on the amendments made herein. The exact amendment for each phrase is indicated below.

Phrase 1: “at least portions of the first and second electrodes being positioned in the tubular housing”. Each instance of this phrase in the claims is amended herein to remove the language “at least portions of”. As a result, Applicant respectfully requests withdrawal of the rejection to this phrase under 35 U.S.C. § 112, first paragraph, written description.

The amendments to these phrases are for clarification only and do not further limit their corresponding claims. In the context of electrolysis, a conductive element outside the oxygenation chamber would not be considered part of the electrode. Thus, infringement of the claims with this phrase as amended herein cannot be avoided merely by including conductive elements outside the tubular housing or oxygenation chamber.

Phrase 2: “at least one of the first and second electrodes is positioned in the tubular housing closer to the inward-facing surface than said distance separating the electrodes”. Each instance of this phrase in the claims has been removed. As a result, Applicant respectfully requests withdrawal of the rejection to this phrase under 35 U.S.C. § 112, first paragraph, written description.

Phrase 3: "the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing”. Each instance of this phrase in the claims is amended herein to remove the language “that portion of one of”. As a result, Applicant

respectfully requests withdrawal of the rejection to this phrase under 35 U.S.C. § 112, first paragraph, written description.

Phrase 4:

> first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the house, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

The Office Action rejected this phrase under the assertion that "neither the drawings nor the specification depict or give guidance regarding first and second conductors coupled to the first and second electrodes".

Applicants respectfully disagree. Applicant asserts that one of ordinary skill in the art would understand that the inventor had possession of the concept of first and second conductors coupled to the first and second electrodes respectively based on FIGs. 7A, 7B, their corresponding description, and common knowledge regarding opposing electrodes. Nevertheless, in order to expedite prosecution, Applicant has amended each instance of this phrase to recite "at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing". As a result, Applicant respectfully requests withdrawal of the rejection to this phrase under 35 U.S.C. § 112, first paragraph, written description.

Phrase 5:

> a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, said portion being a portion that opposes the other of the first and second electrodes.

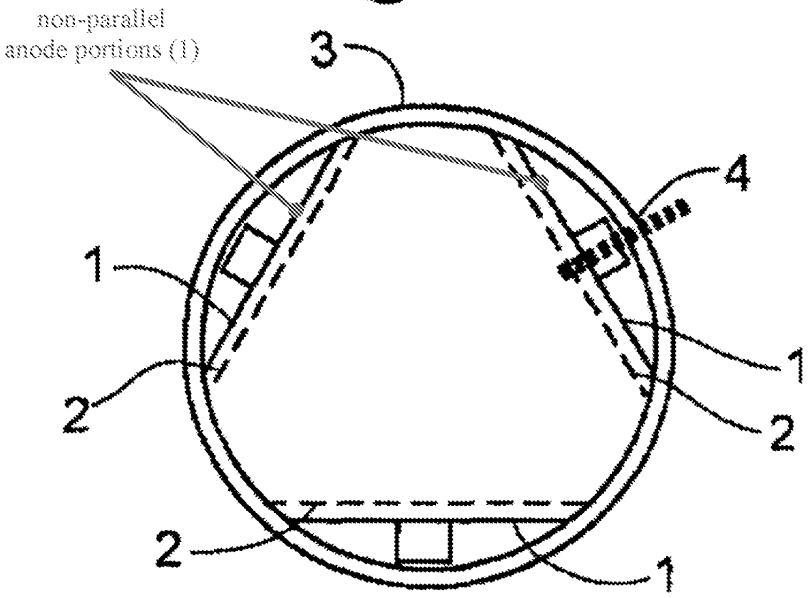
Each instance of this phrase is amended herein to remove the language "said portion being a portion that opposes the other of the first and second electrodes". As a result, Applicant respectfully requests withdrawal of the rejection to this phrase under 35 U.S.C. § 112, first paragraph, written description.

35 U.S.C. § 112, second paragraph

Claims 25, 27, 29, 30, 35, 48, 60, and 68 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicant respectfully traverses these rejections.

Claims 25, 35, 48, 60, and 68 were rejected under the assertion that "the structural relationship between the nonparallel anode portions and parallel, opposing cathode portions and the previously set forth electrodes is unclear." Each instance of this phrase is amended herein to recite: "wherein the emitter comprises non-parallel anode portions". Figure 7A, reproduced below, illustrates an example of such non-parallel anode portions. Accordingly, Applicant respectfully request withdrawal of this rejection.

Fig. 7A



Claim 27 was rejected under the assertion that:

It is unclear whether the portion in "at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface" is the same portion as the "at least portions of the outside and inside electrodes being positioned". Each instance of the phrase "at least portions of

the outside and inside electrodes being positioned" is amended herein to remove the phrase "at least portions of". Thus, Applicant respectfully requests withdrawal of this rejection.

Claims 29 and 30 were rejected under the assertion that: "the structural differentiation between these claims and that already set forth in claim 27 is unclear." Applicant respectfully asserts that claim 29 adds, among other things, that the electrodes are positioned away from the longitudinal center axis of the tubular housing. Independent claim 27 recites that the position and size of each electrode within the chamber defines a water flow area. Claim 27, however, does not require that the electrodes be positioned in any particular location with respect to the longitudinal center axis of the chamber. That is, claim 27 allows the electrodes to be positioned anywhere in the tubular housing as long as a water flow area meeting the requirements recited in claim 27 is defined. Claim 29 adds, among other things, the limitation that the electrodes are positioned away from the longitudinal center axis, thus, limiting the location of the electrodes in the tubular housing. Claim 29 also requires there to be an "unobstructed passageway". That is, no stabilizing hardware or other member can extend across the passageway to obstruct it. This is not required by independent claim 27. Thus, claim 29 adds a further structural limitation to claim 27.

Claim 30 adds, among other things, a further limitation on the size of the unobstructed passageway – that the unobstructed passageway is multiple times wider than the distance separating the opposing electrodes. Dependent claim 29 does not require such a limitation on the size of the unobstructed passageway. Thus, both claims 29 and 30 add further structural limitations. Accordingly, Applicant respectfully requests reconsideration and withdrawal of these rejections.

35 U.S.C. § 112, 4th paragraph

Claims 29-30, 33-34, 36, and 69 were rejected under 35 U.S.C. § 112, 4th paragraph, as being of improper dependent form for failing to further limit the subject matter of the claim upon which it depends. Applicant respectfully traverses these rejections.

Claims 29 and 30 recite further structural limitations as asserted above with respect to the indefiniteness rejections.

Claims 33, 36, and 69 are cancelled herein.

Claim 34 recites a further structural limitation by reciting a limitation on the configuration of the power source. Such a limitation on the power source is not dependent on a particular manner of operating the emitter. As such, claim 34 is a proper dependent on the apparatus claim 27.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejections to claims.

Double Patenting

Claims 13-69 were rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 and 13-27 of U.S. Patent No. RE 45,515. An electronic terminal disclaimer with respect to U.S. Patent No. RE 45,515 is submitted herewith. Accordingly, Applicant respectfully requests withdrawal of this rejection.

Claims 13-69 were provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over claims 13-69 of copending Application No. 14/601,340. Applicant notes this rejection and will wait to address at the point of allowance of either application.

Allowable Subject Matter

Applicant thanks Specialist Jastrzab for the indication that each of the independent claims include allowable subject matter. Applicant has included language similar to that indicated as being allowable, in both of the newly submitted independent claims (claims 70 and 80).

Support for New Claims 70-87

Applicant provides the following chart, which identifies support for the subject matter defined in each of new claims 70-87 with reference to the specification and to the drawings. Applicant submits that the citations to the specification and drawings are not intended to be exhaustive and that other support for the various claims may also be found throughout the specification and drawings. Citations in this section are to the specification of the present reissue application, which is U.S. Patent No. 7,670,495 (the ‘495 patent). Citations in the form: X:Y-Z, refer to lines Y-Z of column X of the ‘495 patent. Citations in the form: FIG. X – No. Y, refer to reference numeral Y of figure X of the ‘495 patent.

Claim 70	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16
providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B
a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;	3:26-32 9:7-12 FIG. 7A – No. 3
at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, said outside and inside electrodes extending in a direction that is parallel to the longitudinal axis,	3:25-30 FIG. 7A – No. 1, 2 FIG. 7B – No. 1, 2 9:7-18
the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber	FIG. 7A 3:11-14 4:54 5:4-11

the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:5-33 3:23-30 3:11-14
a power source in electrical communication with the outside and inside electrodes, the power source configured to deliver a voltage to the outside and inside electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the outside and inside electrodes, the current being less than or equal to 12.8 amps	9:35-45
passing water through the oxygenation chamber while electrical current is applied to the outside and inside electrodes within the chamber to produce oxygen in said water via electrolysis	3:27-35 2:63-67
Claim 71	
each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber	FIG. 7A 9:7-12
Claim 72	
the outside and inside electrodes of the emitter is positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the longitudinal center axis, the passageway running longitudinally for at least the length of the outside and inside electrodes within the chamber	FIG. 7A FIG. 7B 9:7-18

Claim 73	
the unobstructed passageway includes the longitudinal center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber	FIG. 7A
Claim 74	
the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway	FIG. 7A 9:7-18
Claim 75	
the emitter includes at least one conductors coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing	FIG. 7A – No. 4 FIG. 7B – No. 5, 6 9:11-17
Claim 76	
the oxygen produced comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28
Claim 77	
the power source delivers a current to the outside and inside electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode	9:35-45 (Table III)
Claim 78	
non-parallel anode portions	FIG. 7A – No. 1, 2 9:7-11 3:25-28

Claim 79	
the oxygen produced comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28

Claim 80	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16
providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B
a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet	3:26-32 9:7-12 FIG. 7A – No. 3
at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the outside and inside electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is,	3:25-28 FIG. 7A – No. 1, 2 9:7-18

the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
the at least two electrodes of the emitter being positioned away from the longitudinal center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the longitudinal center axis that runs for at least the length of the at least two electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length	FIG. 7A FIG. 7B 9:7-18
the at least two electrodes of the emitter being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:7-12 3:23-30 3:11-14
the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
passing water through the oxygenation chamber while applying electrical current to the outside and inside electrodes to produce oxygen in said water via electrolysis	3:27-35 2:63-67
Claim 81	
at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber	FIG. 7A
Claim 82	
the at least one electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing	FIG. 7A

Claim 83	
the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber	FIG. 7A
Claim 84	
said outer wall includes an inwardly-facing concave surface	FIG. 7A
Claim 85	
at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing	FIG. 7A – No. 4 FIG. 7B – No. 5, 6 9:11-17
Claim 86	
non-parallel anode portions	FIG. 7A – No. 1, 2 9:7-11 3:25-28
Claim 69	
the oxygen produced comprises nanobubbles of oxygen	2:63-67 3:11-14 4:10-11 4:27-28

CONCLUSION

Applicant requests a favorable examination of his continuation application for re-issue of U.S. Patent No. 7,670,495.

Respectfully submitted,

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Date October 9, 2017

By /Aaron W. Pederson/
Aaron Pederson
Reg. No. 58,607

Doc Code: DIST.E.FILE **Document Description: Electronic Terminal Disclaimer - Filed**	PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT**
Application Number	15085741
Filing Date	30-Mar-2016
First Named Inventor	James Senkiw
Attorney Docket Number	3406.005US3
Title of Invention	FLOW-THROUGH OXYGENATOR

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
Oxygenator Water Technologies, Inc.	100%

The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

RE45415

as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

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- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

○ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.	
Applicant claims the following fee status: ◉ Small Entity ○ Micro Entity ○ Regular Undiscounted I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.	
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES I certify, in accordance with 37 CFR 1.4(d)(4) that I am: ◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application Registration Number 58607 ○ A sole inventor ○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application ○ A joint inventor; all of whom are signing this request	
Signature	/Aaron W. Pederson/
Name	Aaron W. Pederson

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal	
Application Number:	15085741
Filing Date:	30-Mar-2016
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Filer:	Aaron Wesley Pederson
Attorney Docket Number:	3406.005US3
Filed as Small Entity	

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
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STATUTORY OR TERMINAL DISCLAIMER	2814	1	160	160
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Applicant/Patent under Reexamination: Senkiw

Electronic Terminal Disclaimer filed on October 9, 2017

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EFS ID:	30602074
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Aaron Wesley Pederson
Filer Authorized By:	
Attorney Docket Number:	3406.005US3
Receipt Date:	09-OCT-2017
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Payment was successfully received in RAM	$160
RAM confirmation Number	101017INTEFSW00014291502880
Deposit Account	502880
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.17 (Patent application and reexamination processing fees) 37 CFR 1.19 (Document supply fees)	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15085741
Filing Date	2016-03-30
First Named Inventor	James Andrew Senkiw
Art Unit	3991
Examiner Name	Jastrzab, Krisanne Marie
Attorney Docket Number	3406.005US3

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15085741
	Filing Date	2016-03-30
	First Named Inventor	James Andrew Senkiw
	Art Unit	3991
	Examiner Name	Jastrzab, Krisanne Marie
	Attorney Docket Number	3406.005US3

	1	Application Serial No. 14/601,340, Applicant's Appeal Brief, filed Nov. 21, 2017	

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Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15085741
	Filing Date	2016-03-30
	First Named Inventor	James Andrew Senkiw
	Art Unit	3991
	Examiner Name	Jastrzab, Krisanne Marie
	Attorney Docket Number	3406.005US3

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Aaron W. Pederson/	Date (YYYY-MM-DD)	2017-11-21
Name/Print	Aaron W. Pederson	Registration Number	58,607

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

EFS Web 2.1.17

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	31020599
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Aaron Wesley Pederson
Filer Authorized By:	
Attorney Docket Number:	3406.005US3
Receipt Date:	21-NOV-2017
Filing Date:	30-MAR-2016
Time Stamp:	18:40:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	15085741_IDS_dtd_11-21-2017.pdf	1035004 fb97d8cedc89484b5b7d3d0d1a51fccd73a44a4c	no	4

Warnings:

Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
2	Non Patent Literature	Appeal_Brief-11-21-2017_SIGNED.pdf	1901114 9ad7f1fffcc35047bdef2a9e7bc7c4eccb0f550c	no	68
Warnings:					
Information:					
			Total Files Size (in bytes):	2936118	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15085741
Filing Date	2016-03-30
First Named Inventor	James Andrew Senkiw
Art Unit	3991
Examiner Name	Jastrzab, Krisanne Marie
Attorney Docket Number	3406.005US3

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15085741
	Filing Date	2016-03-30
	First Named Inventor	James Andrew Senkiw
	Art Unit	3991
	Examiner Name	Jastrzab, Krisanne Marie
	Attorney Docket Number	3406.005US3

	1	Application Serial No. 14/601,340, Applicant's Reply Brief, filed Feb. 26, 2018, pp. 1-15	
	2	Application Serial No. 14/601,340, Examiner's Answer, mailed Feb. 13, 2018, pp. 1-35	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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	Attorney Docket Number	3406.005US3

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Aaron W. Pederson/	Date (YYYY-MM-DD)	2018-02-27
Name/Print	Aaron W. Pederson	Registration Number	58,607

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	31896747
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Aaron Wesley Pederson
Filer Authorized By:	
Attorney Docket Number:	3406.005US3
Receipt Date:	27-FEB-2018
Filing Date:	30-MAR-2016
Time Stamp:	11:02:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	15085741_IDS_dtd_2-27-2017.pdf	1035038 99658f3ba4198506b57204b1e713c3b81b8664a5	no	4

Warnings:

Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
2	Non Patent Literature	App_No_14601340-Examiners_Answer.pdf	1764060 d527b3e22078199a851a06f7b0ac6503916 76b82	no	35
Warnings:					
Information:					
3	Non Patent Literature	App_No_14601340-Reply_Brief.pdf	625583 0fb54c906983a19429e31a5044a7e539e2b 8a1c6	no	15
Warnings:					
Information:					
			Total Files Size (in bytes):	3424681	

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: DIST.E.FILE **Document Description: Electronic Terminal Disclaimer - Filed**	PTO/SB/25 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING REJECTION OVER A PENDING "REFERENCE" APPLICATION**
Application Number	15085741
Filing Date	30-Mar-2016
First Named Inventor	James Senkiw
Attorney Docket Number	3406.005US3
Title of Invention	FLOW-THROUGH OXYGENATOR

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
Oxygenator Water Technologies, Inc.	100%

The owner(s) of percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending reference Application Number(s)

14601340 filed on 01/21/2015

as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the reference application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term of any patent granted on said reference application, "as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application," in the event that any such patent granted on the pending reference application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

○ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.	
Applicant claims the following fee status: ◉ Small Entity ○ Micro Entity ○ Regular Undiscounted I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.	
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES I certify, in accordance with 37 CFR 1.4(d)(4) that I am: ◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application Registration Number 58607 ○ A sole inventor ○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application ○ A joint inventor; all of whom are signing this request	
Signature	/Aaron W. Pederson/
Name	Aaron W. Pederson

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal	
Application Number:	15085741
Filing Date:	30-Mar-2016
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Filer:	Aaron Wesley Pederson
Attorney Docket Number:	3406.005US3
Filed as Small Entity	

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	2814	1	160	160
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	160

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 15085741

Filing Date: 30-Mar-2016

Applicant/Patent under Reexamination: Senkiw

Electronic Terminal Disclaimer filed on June 29, 2018

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt	
EFS ID:	33050474
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Aaron Wesley Pederson
Filer Authorized By:	
Attorney Docket Number:	3406.005US3
Receipt Date:	29-JUN-2018
Filing Date:	30-MAR-2016
Time Stamp:	14:20:01
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$160
RAM confirmation Number	070218INTEFSW00000677502880
Deposit Account	502880
Authorized User	Aaron Pederson
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.19 (Document supply fees) 37 CFR 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	34088 f7c3d5d441ba7e3a98a3265b590c5c0e29eb5a5d	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30282 ac1c58aaf46ed8da2816167d57d1602181cede98	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	64370		

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION REISSUE APPLICATION

Applicant(s)	James Andrew Senkiw	Supplemental Response for Continuation Reissue Application of U.S. Patent No. 7,670,495 Pursuant to 37 C.F.R. §1.173(b)
Serial No.	15/085,741	
Filing Date	March 30, 2016	
Continuation Reissue of U.S. Patent No.	7,670,495	
Issued:	March 2, 2010	
Examiner Name	JASTRZAB, KRISANNE MARIE	
Group Art Unit	3991	
Attorney Docket No.	3406.005US3	
Customer Number:	38846	
Confirmation No.	9995	
Title:	FLOW-THROUGH OXYGENATOR	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Please consider the following:

Amendments to the Claims, beginning at page 2 of this paper; and

Remarks, beginning on page 18 of this paper.

IN THE CLAIMS

This listing of the claims will replace all prior listings of the claims.

1-12. (Cancelled)

13. (New-Amended) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet;

at least two electrodes comprising a first electrode and a second electrode, the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing;

each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the electrodes producing oxygen in said water via electrolysis.

14. (New-Amended) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein the first and second electrodes extend in a direction that is parallel to the longitudinal axis.

15. (New-Amended) The method of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis;

wherein the first and second electrodes extend in a direction parallel to the longitudinal axis; and

wherein each electrode of the emitter is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing.

16. (New) The method of claim 13 wherein at least one of the electrodes is a stainless steel mesh or screen.

17. (New-Amended) The method of claim 13 wherein the first and second electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of the first and second electrodes positioned within the tubular housing.

18. (New-Amended) The method of claim 17 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the tubular housing.

19. (New-Amended) The method of claim 17 wherein the first and second electrodes comprise an outside electrode and an inside electrode,

wherein the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing, the outside and inside electrodes being outside and inside electrodes respectively in that the first and second electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is,

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

20. (New-Amended) The method of claim 13 wherein the first and second electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of the first and second electrodes positioned within the housing;

wherein the first and second electrodes comprise an outside electrode and an inside electrode;

wherein the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing;

the outside and inside electrodes being outside and inside electrodes respectively in that the first and second electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway; and

wherein the tubular housing of the emitter is round.

21. (New) The method of claim 19 wherein said inward-facing surface is a concave surface.

22. (New-Amended) The method of claim 13 further including at least one conductor coupled to one of the first and second electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

23. (New) The method of claim 13 wherein the oxygen produced comprises microbubbles.

24. (New) The method of claim 13 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

25. (New-Twice Amended) The method of claim 13 wherein the first electrode includes a first anode element and the second electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element.

26. (New) The method of claim 13 wherein the oxygen produced comprises nanobubbles.

27. (New-Twice Amended) An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, said outside and inside electrodes extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches,

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than to a longitudinal center axis of the oxygenation chamber; and

a power source in electrical communication with the outside and inside electrodes, the power source configured to deliver a voltage to the outside and inside electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the outside and inside electrodes, the current being less than or equal to 12.8 amps.

28. (New-Amended) The emitter of claim 27 wherein each electrode is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

29. (New-Twice Amended) The emitter of claim 27 wherein the outside and inside electrodes are positioned away from the longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of the outside and inside electrodes positioned within the chamber.

30. (New-Amended) The emitter of claim 29 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

31. (New-Amended) The emitter of claim 30 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

32. (New-Twice Amended) The emitter of claim 27 comprising at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

33. (Cancelled)

34. (New-Twice Amended) The emitter of claim 27 wherein the power source is configured to deliver a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

35. (New-Thrice Amended) The emitter of claim 27 wherein the outer electrode includes a first anode element and the inner electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element.

36. (Cancelled)

37. (New-Amended) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;

at least two electrodes comprising a first electrode and a second electrode, the first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches, a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches;

a power source in electrical communication with the first and second electrodes, the power source configured to deliver a voltage to the first and second electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the first and second electrodes, the current being less than or equal to 12.8 amps;

passing water through the tubular housing while electrical current is applied to the first and second electrodes to produce oxygen in said water via electrolysis.

38. (New) The method of claim 37 wherein the tubular housing has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal center axis; and

wherein each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis.

39. (New-Amended) The method of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis,

wherein the first and second electrodes extend in a direction that is parallel to the longitudinal axis.

40. (New) The method of claim 39 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

41. (New-Amended) The method of claim 37 wherein the at least one electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

42. (New-Amended) The method of claim 37 wherein the outside and inside electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of the outside and inside electrodes positioned within the chamber.

43. (New) The method of claim 42 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the chamber.

44. (New-Amended) The method of claim 42 wherein the chamber has an inward-facing surface that runs parallel to the longitudinal axis;

wherein the first and second electrodes being outside and inside electrodes respectively in that the first and second electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is; and

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

45. (New-Amended) The method of claim 37 wherein the emitter includes at least one conductor coupled to one of the first and second electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to a longitudinal axis of the housing.

46. (New) The method of claim 37 wherein the oxygen produced comprises microbubbles.

47. (New) The method of claim 37 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

48. (New-Twice Amended) The method of claim 37 wherein the first electrode includes a first anode element and the second electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element.

49. (New) The method of claim 37 wherein the oxygen produced comprises nanobubbles.

50. (New-Amended) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing defining an oxygenation chamber, said housing having an inward-facing surface that defines at least in part the oxygenation chamber, the tubular housing having a water inlet, and a water outlet;

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, said outside and inside electrodes extending in a direction that runs parallel to the inward-facing surface, the outside and inside electrodes being outside and inside electrodes respectively in that the outside and inside electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber;

wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.

51. (New-Amended) The method of claim 50 wherein the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and wherein the unobstructed passageway includes the longitudinal center axis.

52. (New) The method of claim 50 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

53. (New-Amended) The method of claim 52 wherein the at least one electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

54. (New) The method of claim 50 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

55. (New) The method of claim 54 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

56. (New) The method of claim 55 wherein said inward-facing surface is a concave surface.

57. (New-Amended) The method of claim 50 wherein the emitter includes at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

58. (New) The method of claim 50 wherein the oxygen produced comprises microbubbles of oxygen.

59. (New) The method of claim 50 wherein the electrical current is applied to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

60. (New-Twice Amended) The method of claim 50 wherein the outside electrode includes a first anode element and the inside electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element.

61. (New) The method of claim 50 wherein the oxygen produced comprises nanobubbles of oxygen.

62. (New-Thrice Amended) An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular oxygenation chamber, said chamber having an outer wall that runs parallel to a longitudinal center axis of the chamber, said chamber having a water inlet and a water outlet,

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;

the at least two electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of the at least two electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, the at least two electrodes being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway.

63. (New-Twice Amended) The emitter of claim 62 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular oxygenation chamber.

64. (New-Thrice Amended) The emitter of claim 63 wherein the at least one electrode in contact with a wall of the tubular oxygenation chamber is in contact with the outer wall, and wherein the outer wall is a curved wall of the oxygenation chamber.

65. (New-Amended) The emitter of claim 62 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

66. (New-Amended) The emitter of claim 62 wherein said outer wall includes an inwardly-facing concave surface.

67. (New-Thrice Amended) The emitter of claim 62 comprising at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the chamber in a radial direction relative to the longitudinal center axis of the chamber.

68. (New-Thrice Amended) The emitter of claim 62 wherein the outside electrode includes a first anode element and the inside electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element.

69. (Cancelled)

70. (New) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, said outside and inside electrodes extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity

that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches; and

a power source in electrical communication with the outside and inside electrodes, the power source configured to deliver a voltage to the outside and inside electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the outside and inside electrodes, the current being less than or equal to 12.8 amps;

passing water through the oxygenation chamber while electrical current is applied to the outside and inside electrodes within the chamber to produce oxygen in said water via electrolysis.

71. (New) The method of claim 70 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber.

72. (New) The method of claim 70 wherein the outside and inside electrodes of the emitter is positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the longitudinal center axis, the passageway running longitudinally for at least the length of the outside and inside electrodes within the chamber.

73. (New) The method of claim 72 wherein the unobstructed passageway includes the longitudinal center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

74. (New) The method of claim 73 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

75. (New) The method of claim 70 wherein the emitter includes at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

76. (New) The method of claim 70 wherein the oxygen produced comprises nanobubbles.

77. (New) The method of claim 70 wherein the power source delivers a current to the outside and inside electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

78. (New-Amended) The method of claim 70 wherein the outside electrode includes a first anode element and the inside electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element.

79. (New) The method of claim 78 wherein the oxygen produced comprises nanobubbles.

80. (New-Amended) A method for treating water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen, the emitter including:

a tubular oxygenation chamber, said chamber having an outer wall that runs parallel to a longitudinal center axis of the chamber, said chamber having a water inlet and a water outlet;

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the outside and inside electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;

the at least two electrodes of the emitter being positioned away from the longitudinal center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the longitudinal center axis that runs for at least the length of the at least two electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, the at least two electrodes of the emitter being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway; and

passing water through the oxygenation chamber while applying electrical current to the outside and inside electrodes to produce oxygen in said water via electrolysis.

81. (New-Amended) The method of claim 80 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular oxygenation chamber.

82. (New-Amended) The method of claim 81 wherein the at least one electrode in contact with a wall of the tubular oxygenation chamber is in contact with the outer wall, and wherein the outer wall is a curved wall of the oxygenation chamber.

83. (New) The method of claim 80 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

84. (New) The method of claim 80 wherein said outer wall includes an inwardly-facing concave surface.

85. (New-Amended) The method of claim 80 wherein the emitter includes at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the chamber in a radial direction relative to the longitudinal center axis of the chamber.

86. (New-Amended) The method of claim 80 wherein the outside electrode includes a first anode element and the inside electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element.

87. (New) The method of claim 86 wherein the oxygen produced comprises nanobubbles of oxygen.

REMARKS

Applicant respectfully requests entry of this supplemental reply as it was requested by Specialist Jastrzab in order to address items raised during the examiner-initiated interview on June 13th.

The original claims 1-12 of U.S. Patent No. 7,670,495 have been cancelled and claims 13-32, 34, 35, 37-68, and 70-87 have been added. Claims 25, 35, 48, 60, 62-64, 67, 68, 78, 80-82, 85, and 86 are amended herein. As a result, 13-32, 34, 35, 37-68, and 70-87 are pending in this application. The claims are marked with respect to the claims of the original patent being reissued, U.S. Patent No. 7,670,495.

Examiner Interview Summary

Applicant's representative, Aaron Pederson (Reg. No. 58,607), thanks Specialist Krisanne Jastrzab for the opportunity to discuss aspects of this application during an examiner-initiated telephone interviews on June 13th and June 25th, 2018.

During the interview on June 13th three items were discussed. First, Specialist Jastrzab requested that Applicant file a terminal disclaimer to overcome the provisional nonstatutory double patenting rejection with respect to claims 13-69 of copending Application No. 14/601,340. Second, Specialist Jastrzab indicated that the language of claims 25, 35, 48, 60, 68, 78, and 86 presented in the Applicant's response dated October 9th, 2017 was not sufficiently tied to language of their corresponding independent claims. Third, Specialist Jastrzab indicated that claim 80 included unclear language reciting that an outer wall was both a part of a recited chamber and a part of a recited housing. Specialist Jastrzab also indicated that other than the three items discussed, all rejections to the claims in the Office Action dated August 17, 2017 were overcome by Applicant's previous response. Applicant's representative agreed to review the three items discussed and get back to Specialist Jastrzab.

During the interview on June 25th, Applicant's representative and Specialist Jastrzab again discussed the three items. Applicant's representative indicated that Applicant would submit a terminal disclaimer as requested to overcome the outstanding double patent rejection. Applicant's representative also indicated that Applicant had prepared proposed amendments to address items two and three discussed during the June 13th interview. Specialist Jastrzab

indicated she would review the proposed amendments and get back to the Applicant's representative.

On June 27th Specialist Jastrzab called Applicant's representative and indicated that the proposed amendments sufficiently addressed items two and three and requested submission of the amendments in a supplemental reply.

Applicant's representative believes the substance and scope of the telephone interviews is accurately captured in the summary above and requests notification from the Specialist if there is any discrepancy. Applicant's representative thanks Specialist Jastrzab for reaching out to discuss these items.

Double Patenting

Claims 13-69 were provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over claims 13-69 of copending Application No. 14/601,340. An electronic terminal disclaimer with respect to U.S. Application No. 14/601,340 is submitted herewith. Accordingly, Applicant respectfully requests withdrawal of this rejection.

Claim Amendments

Claim amendments identical to those proposed to Specialist Jastrzab in the interview of June 25th are submitted herewith. Applicant respectfully submits that these amendments address the items raised in the examiner-initiated interview and that claims 13-32, 34, 35, 37-68, and 70-87 are now in condition for allowance.

Support for Current Claims 13-32, 34, 35, 37-68, and 70-87

Applicant provides the following chart, which identifies support for the subject matter currently defined in each of pending claims 13-32, 34, 35, 37-68, and 70-87 with reference to the specification and to the drawings. Applicant submits that the citations to the specification and drawings are not intended to be exhaustive and that other support for the various claims may also be found throughout the specification and drawings. Citations in this section are to the specification of the present reissue application, which is U.S. Patent No. 7,670,495 (the '495

patent). Citations in the form: X:Y-Z, refer to lines Y-Z of column X of the '495 patent. Citations in the form: FIG. X – No. Y, refer to reference numeral Y of figure X of the '495 patent.

Claim Language	Location
Claim 13	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16
providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B
a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet	3:26-32 9:7-11 FIGS. 7A-No. 3 FIGS. 7B
at least two electrodes comprising a first electrode and a second electrode, the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing	FIG. 7A 3:11-14 4:54 5:4-11
each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing	FIG. 7A 9:5-33

and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:5-33 3:23-30 3:11-14
a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps	9:35-45 (Table III)
passing water through the tubular housing while electrical current is applied to the electrodes producing oxygen in said water via electrolysis	3:27-35 2:63-67 9:3-33 9:35-45 (Table III)
Claim 14	
the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis	FIG. 7A 9:7-12
the first and second electrodes extend in a direction that is parallel to the longitudinal axis	FIG. 7A FIG. 7B 9:7-12 3:25-30
Claim 15	
the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis	FIG. 7A 9:7-12
the first and second electrodes extend in a direction parallel to the longitudinal axis	FIG. 7A FIG. 7B 9:7-12 3:25-30

each electrode of the emitter is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing	FIG. 7A 9:7-12
Claim 16	
at least one of the electrodes is a stainless steel mesh or screen	3:6-8 4:63-64
Claim 17	
the first and second electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of the first and second electrodes positioned within the tubular housing	FIG. 7A FIG. 7B 9:7-18
Claim 18	
the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the tubular housing	FIG. 7A
Claim 19	
the first and second electrodes comprise an outside electrode and an inside electrode, the outside and inside electrodes being outside and inside electrodes respectively in that the first and second electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is	3:25-28 FIG 7A 9:7-18
the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing	FIGS. 7A-7B 9:7-12 3:25-30

the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 20	
the first and second electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of the first and second electrodes positioned within the housing	FIG. 7A FIG. 7B 9:7-18
the first and second electrodes comprise an outside electrode and an inside electrode, the outside and inside electrodes being outside and inside electrodes respectively in that the first and second electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is	3:25-28 FIG 7A 9:7-18
the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing	FIGS. 7A-7B 9:7-12 3:25-30
the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
the tubular housing of the emitter is round	FIG. 7A
Claim 21	
said inward-facing surface is a concave surface	FIG. 7A

Claim 22	
at least one conductor coupled to one of the first and second electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing	FIG. 7A – No. 4 FIG. 7B – No. 5, 6 9:11-17
Claim 23	
the oxygen produced comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 24	
the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode	9:35-45 (Table III)
Claim 25	
the first electrode includes a first anode element and the second electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element	FIG. 7A – No. 1, 2 9:7-11 3:25-28
Claim 26	
the oxygen produced comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28

Claim 27	
An emitter for electrolytic generation of bubbles of oxygen in water	Abstract 1:15-21 2:63-67 3:24-35 4:58 5:44-45 6:6 9:3-18 10:31-32
a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber	3:26-32 9:7-12 FIG. 7A – No. 3
at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, said outside and inside electrodes extending in a direction that is parallel to the longitudinal axis	3:25-30 FIG. 7A – No. 1, 2 FIG. 7B – No. 1, 2 9:7-18
the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber	FIG. 7A 3:11-14 4:54 5:4-11

the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:5-33 3:23-30 3:11-14
at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than to a longitudinal center axis of the oxygenation chamber	FIG. 7A 9:7-12
a power source in electrical communication with the outside and inside electrodes, the power source configured to deliver a voltage to the outside and inside electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the outside and inside electrodes, the current being less than or equal to 12.8 amps	9:35-45 (Table III)
Claim 28	
each electrode is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber	FIG. 7A 9:7-12
Claim 29	
the outside and inside electrodes are positioned away from the longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of the outside and inside electrodes positioned within the chamber	FIG. 7A FIG. 7B 9:7-18

Claim 30	
the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber	FIG. 7A
Claim 31	
the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway	FIG. 7A 9:7-18
Claim 32	
at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing	FIG. 7A – No. 4 FIG. 7B – No. 5, 6 9:11-17
Claim 34	
the power source is configured to deliver a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode	9:35-45 (Table III)
Claim 35	
the outer electrode includes a first anode element and the inner electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element	FIG. 7A – No. 1, 2 9:7-11 3:25-28
Claim 37	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B
a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet	3:26-32 9:7-12 FIG. 7A – No. 3
at least two electrodes comprising a first electrode and a second electrode, the first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches	FIG. 7A – No. 1, 2 3:11-14 4:54 5:4-11
a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber	FIG. 7A
each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches	FIG. 7A 9:5-33 3:11-14
a power source in electrical communication with the first and second electrodes, the power source configured to deliver a voltage to the first and second electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the first and second electrodes, the current being less than or equal to 12.8 amps	9:35-45

passing water through the tubular housing while electrical current is applied to the first and second electrodes to produce oxygen in said water via electrolysis	3:27-35 2:63-67 9:3-33 9:35-45 (Table III)
Claim 38	
the tubular housing has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal center axis	FIG. 7A 3:26-32 9:7-12
each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis	FIG. 7A
Claim 39	
the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis, wherein the first and second electrodes extend in a direction that is parallel to the longitudinal axis	3:26-32 9:7-12 FIG. 7A
Claim 40	
each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber	FIG. 7A 9:7-12
Claim 41	
the at least one electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing	FIG. 7A

Claim 42	
the outside and inside electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of the outside and inside electrodes positioned within the chamber	FIG. 7A FIG. 7B 9:7-18
Claim 43	
the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the chamber	FIG. 7A
Claim 44	
the chamber has an inward-facing surface that runs parallel to the longitudinal axis	FIG. 7A 3:26-32 9:7-12
the first and second electrodes being outside and inside electrodes respectively in that the first and second electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is	3:25-28 FIG 7A 9:7-18
the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 45	
the emitter includes at least one conductor coupled to one of the first and second electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to a longitudinal axis of the housing	FIG. 7A – No. 4 FIG. 7B – No. 5, 6 9:11-17

Claim 46	
the oxygen produced comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 47	
the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode	9:35-45 (Table III)
Claim 48	
the first electrode includes a first anode element and the second electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element	FIG. 7A – No. 1, 2 9:7-11 3:25-28
Claim 49	
the oxygen produced comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28
Claim 50	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16

providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B
a tubular housing defining an oxygenation chamber, said housing having an inward-facing surface that defines at least in part the oxygenation chamber, the tubular housing having a water inlet, and a water outlet	3:26-32 9:7-12 FIG. 7A-No. 3 FIG. 7B
at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, said outside and inside electrodes extending in a direction that runs parallel to the inward-facing surface, the outside and inside electrodes being outside and inside electrodes respectively in that the outside and inside electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is	3:25-28 FIG. 7A – No. 1, 2 FIG. 7B – No. 1, 2 9:7-18
the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber	3:11-14 4:54 5:4-11
each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches	FIGS. 7A-7B 9:7-11 3:23-30 3:11-14

passing water through the oxygenation chamber while applying electrical current to the electrodes to produce oxygen in said water via electrolysis.	3:27-35 2:63-67 9:3-33 9:35-45 (Table III)
Claim 51	
the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and wherein the unobstructed passageway includes the longitudinal center axis	FIG. 7A 9:7-11
Claim 52	
at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber	FIG. 7A
Claim 53	
the at least one electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing	FIG. 7A
Claim 54	
the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber	FIG. 7A
Claim 55	
the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway	FIG. 7A 9:7-18
Claim 56	
said inward-facing surface is a concave surface	FIG. 7A

Claim 57	
the emitter includes at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing	FIG. 7A – No. 4 FIG. 7B – No. 5, 6 9:11-17
Claim 58	
the oxygen produced comprises microbubbles of oxygen	2:63-67 3:11-14 4:10-11 4:27-28
Claim 59	
the electrical current is applied to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode	9:35-45 (Table III)
Claim 60	
the outside electrode includes a first anode element and the inside electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element	FIG. 7A – No. 1, 2 9:7-11 3:25-28
Claim 61	
the oxygen produced comprises nanobubbles of oxygen	2:63-67 3:11-14 4:12-15 4:27-28

Claim 62	
An emitter for electrolytic generation of bubbles of oxygen in water	Abstract 1:15-21 2:63-67 3:24-35 4:58 5:44-45 6:6 9:3-18 10:31-32
a tubular oxygenation chamber, said chamber having an outer wall that runs parallel to a longitudinal center axis of the chamber, said chamber having a water inlet and a water outlet,	3:26-32 9:7-12 FIG. 7A-No. 3 FIG. 7B
at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is	3:25-28 FIG. 7A – No. 1, 2 9:7-18
the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11

the at least two electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of the at least two electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length	FIG. 7A FIG. 7B 9:7-18
the at least two electrodes being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:7-12 3:23-30 3:11-14
the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 63	
at least one of the outside and inside electrodes is in contact with at least one wall of the tubular oxygenation chamber	FIG. 7A
Claim 64	
the at least one electrode in contact with a wall of the tubular oxygenation chamber is in contact with the outer wall, and wherein the outer wall is a curved wall of the oxygenation chamber	FIG. 7A
Claim 65	
the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber	FIG. 7A
Claim 66	
said outer wall includes an inwardly-facing concave surface	FIG. 7A

Claim 67	
at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the chamber in a radial direction relative to the longitudinal center axis of the chamber	FIG. 7A – No. 4 FIG. 7B – No. 5, 6 9:11-17
Claim 68	
the outside electrode includes a first anode element and the inside electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element	FIG. 7A – No. 1, 2 9:7-11 3:25-28
Claim 70	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16
providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B
a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;	3:26-32 9:7-12 FIG. 7A – No. 3 FIG. 7B

at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, said outside and inside electrodes extending in a direction that is parallel to the longitudinal axis,	3:25-30 FIG. 7A – No. 1, 2 FIG. 7B – No. 1, 2 9:7-18
the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber	FIG. 7A 3:11-14 4:54 5:4-11
the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:5-33 3:23-30 3:11-14
a power source in electrical communication with the outside and inside electrodes, the power source configured to deliver a voltage to the outside and inside electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the outside and inside electrodes, the current being less than or equal to 12.8 amps	9:35-45 (Table III)
passing water through the oxygenation chamber while electrical current is applied to the outside and inside electrodes within the chamber to produce oxygen in said water via electrolysis	3:27-35 2:63-67 9:3-33 9:35-45 (Table III)

Claim 71	
each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber	FIG. 7A 9:7-12
Claim 72	
the outside and inside electrodes of the emitter is positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the longitudinal center axis, the passageway running longitudinally for at least the length of the outside and inside electrodes within the chamber	FIG. 7A FIG. 7B 9:7-18
Claim 73	
the unobstructed passageway includes the longitudinal center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber	FIG. 7A
Claim 74	
the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway	FIG. 7A 9:7-18
Claim 75	
the emitter includes at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing	FIG. 7A – No. 4 FIG. 7B – No. 5, 6 9:11-17
Claim 76	
the oxygen produced comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28

Claim 77	
the power source delivers a current to the outside and inside electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode	9:35-45 (Table III)
Claim 78	
the outside electrode includes a first anode element and the inside electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element	FIG. 7A – No. 1, 2 9:7-11 3:25-28
Claim 79	
the oxygen produced comprises nanobubbles	2:63-67 3:11-14 4:12-15 4:27-28
Claim 80	
A method for treating water	Abstract 2:63-67 4:27-41 9:3-18 10:7-16
providing a flow-through oxygenator comprising an emitter for electrolytic generation of bubbles of oxygen	Abstract 1:15-21 2:63-67 4:27-28 9:3-33 FIGS. 7A-7B

a tubular oxygenation chamber, said chamber having an outer wall that runs parallel to a longitudinal center axis of the chamber, said chamber having a water inlet and a water outlet	3:26-32 9:7-12 FIG. 7A – No. 3 FIG. 7B
at least two electrodes comprising an outside electrode and an inside electrode, the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the outside and inside electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is,	3:25-28 FIG. 7A – No. 1, 2 9:7-18
the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
the at least two electrodes of the emitter being positioned away from the longitudinal center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the longitudinal center axis that runs for at least the length of the at least two electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length	FIG. 7A FIG. 7B 9:7-18
the at least two electrodes of the emitter being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:7-12 3:23-30 3:11-14

the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
passing water through the oxygenation chamber while applying electrical current to the outside and inside electrodes to produce oxygen in said water via electrolysis	3:27-35 2:63-67
Claim 81	
at least one of the outside and inside electrodes is in contact with at least one wall of the tubular oxygenation chamber	FIG. 7A
Claim 82	
the at least one electrode in contact with a wall of the tubular oxygenation chamber is in contact with the outer wall, and wherein the outer wall is a curved wall of the oxygenation chamber	FIG. 7A
Claim 83	
the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber	FIG. 7A
Claim 84	
said outer wall includes an inwardly-facing concave surface	FIG. 7A
Claim 85	
the emitter includes at least one conductor coupled to one of the outside and inside electrodes, the at least one conductor exiting a wall of the chamber in a radial direction relative to the longitudinal center axis of the chamber	FIG. 7A – No. 4 FIG. 7B – No. 5, 6 9:11-17

Claim 86	
the outside electrode includes a first anode element and the inside electrode includes a first cathode element, and wherein the emitter includes a second anode element non-parallel to the first anode element, and wherein the emitter includes a second cathode element non-parallel to the first cathode element	FIG. 7A – No. 1, 2 9:7-11 3:25-28
Claim 87	
the oxygen produced comprises nanobubbles of oxygen	2:63-67 3:11-14 4:10-11 4:27-28

CONCLUSION

Applicant requests a favorable examination of this continuation application for re-issue of U.S. Patent No. 7,670,495.

Respectfully submitted,

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1		App_No_15085741_Supplemental_Response.pdf	228442 e3abbc6286bd333b7a57d6dd166815906130118c	yes	44

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	Supplemental Response or Supplemental Amendment	1	1
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
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APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0.00	$0.00	$500	10/30/2018

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

38846 7590 07/30/2018
Carlson, Caspers, Vandenburgh, Lindquist & Schuman
225 South 6th Street
Suite 4200
Minneapolis, MINNESOTA 55402
UNITED STATES OF AMERICA

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3	9995

TITLE OF INVENTION: FLOW-THROUGH OXYGENATOR

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0.00	$0.00	$500	10/30/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
JASTRZAB, KRISANNE MARIE	3991	210-748100

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3	9995

38846 7590 07/30/2018

Carlson, Caspers, Vandenburgh, Lindquist & Schuman
225 South 6th Street
Suite 4200
Minneapolis, MINNESOTA 55402
UNITED STATES OF AMERICA

EXAMINER	
JASTRZAB, KRISANNE MARIE	

ART UNIT	PAPER NUMBER
3991	

DATE MAILED: 07/30/2018

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (**P.L. 93-579**) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	**Application No.** 15/085,741	**Applicant(s)** Senkiw, James Andrew	
	Examiner KRISANNE M JASTRZAB	**Art Unit** 3991	**AIA Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the amendment and terminal disclaimer filed 6/29/2018.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are See Continuation Sheet . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☑ Interview Summary (PTO-413), Paper No./Mail Date. 6/13/2018.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/KRISANNE M JASTRZAB/ Patent Reexamination Specialist CRU 3991	/JEAN C WITZ/ Supervisory Patent Examiner, Art Unit 3991

Continuation of 3. The allowed claim(s) is/are: 13-32,34-35,37-68 and 70-87

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

Reasons for Allowance

The following is an examiner's statement of reasons for allowance:

The previously pending recapture rejection has been overcome after a review of the recapture analysis. The three step test for recapture is as follows:

1. determine whether, and in what respect, the reissue claims are broader in scope than the original patent claims;

2. determine whether the broader aspects of the reissue claims relate to the subject matter surrendered in the original prosecution; and

3. determine whether the reissue claims were materially narrowed in other respects, so that the claims may not have been enlarged.

Upon review of the previous analysis it is determined that the surrendered subject matter related to the positioning of the electrodes of the emitter and it is held that the present claims add limitations directed to the positioning of the electrodes that are significantly narrower with respect to the surrendered subject matter. Thus avoiding recapture based on the third step in the analysis.

Further, the closest prior art of record fails to reasonably teach or suggest an emitter for the electrolytic generation of bubbles or treating water having at least two electrodes spaced from 0.005 to 0.14 inches apart and positioned within a tubular housing, in electrical communication with a power source configured to deliver a voltage of less than or equal to 28.3 volts and a current less than or equal to 12.8 amps. The

electrodes positioned in the tubular housing such that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing (claim 13) or positioned parallel to the longitudinal axis of the tubular housing and positioned to define a water flow area in a cross-section of an oxygenation chamber within the tubular housing greater than the cross-section area between electrodes of opposed polarity (claims 27 and 70), or positioned in contact with at least one wall in the tubular housing and so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes (claim 37) or positioned with an inside and outside electrode, the outside electrode being closer to an inward-facing surface and the inside electrode closer to the longitudinal center axis with both closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing (claims 50 and 80) or positioned away from the center axis and maintaining a longitudinal unobstructed passageway parallel to and including the center axis (claims 62 and 80).

As such, claims 13-32, 34-35, 37-68 and 70-87 are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KRISANNE M JASTRZAB whose telephone number is (571)272-1279. The examiner can normally be reached on 6:30-5pm (MT) Mon-Thurs.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jean Witz can be reached on 571-272-0927. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KRISANNE M JASTRZAB/
Patent Reexamination Specialist,
Central Reexamination Unit 3991

/Elizabeth L McKane/
Patent Reexamination Specialist
CRU 3991

/JEAN C WITZ/
Supervisory Patent Examiner, Art Unit 3991

Examiner-Initiated Interview Summary	Application No. 15/085,741	Applicant(s) Senkiw, James Andrew	
	Examiner KRISANNE M JASTRZAB	Art Unit 3991	AIA Status No

All participants (applicant, applicant's representative, PTO personnel):

(1) KRISANNE M. JASTRZAB. (3) _____.

(2) Atty. Aaron Pederson. (4) _____.

Date of Interview: 13 June 2018.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☑ No.
If Yes, brief description: _____.

Issues Discussed ☐ 101 ☑ 112 ☐ 102 ☐ 103 ☑ Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 25,35,48,60,68,78,80 and 86.

Identification of prior art discussed: NA.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

See Continuation Sheet.

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/JEAN C WITZ/ Supervisory Patent Examiner, Art Unit 3991	

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: The Specialist contacted Mr. Pederson to put the case in condition for allowance. She informed Mr. Pederson that the arguments presented 10/9/17 against recapture were persuasive and the rejection would be withdrawn. She also informed Mr. Pederson that the language of claims 25, 35, 48, 60, 68, 78 and 86 did not find proper support in the specification and that the language of claim 80 was unclear regarding the outer wall. She indicated that a terminal disclaimer for the outstanding obviousness double patenting was required to proceed to allowance. Mr. Pederson reviewed the claims in question and contacted the Specialist with a proposed amendment and indicated that a proper terminal disclaimer was being filed. After review of the proposed amendment, the Specialist notified Mr. Pederson on 6/27/2018 that such an amendment would overcome all outstanding rejections.

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/085,741	Senkiw, James Andrew
	Examiner	**Art Unit**
	KRISANNE M JASTRZAB	3991

CPC						
Symbol					**Type**	**Version**
A01G	/	31	/	02	F	2013-01-01
A01K	/	63	/	042	I	2013-01-01
C02F	/	1	/	46109	I	2013-01-01
C02F	/	1	/	727	I	2013-01-01
C02F	/	3	/	26	I	2013-01-01
A01G	/	31	/	00	I	2013-01-01
C02F	/	1	/	4672	A	2013-01-01
C02F	/	1	/	68	A	2013-01-01
Y02P	/	60	/	216	A	2015-11-01
C02F	/	2001	/	46133	A	2013-01-01
C02F	/	2001	/	46138	A	2013-01-01
C02F	/	2001	/	46157	A	2013-01-01
C02F	/	2201	/	4612	A	2013-01-01
C02F	/	2201	/	4615	A	2013-01-01
C02F	/	2209	/	02	A	2013-01-01
Y02E	/	60	/	366	A	2013-01-01
Y02W	/	10	/	15	A	2015-05-01
C02F	/	7	/	00	A	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	73	
/KRISANNE M JASTRZAB/ Primary Examiner, Art Unit 3991	17 July 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	13	7A

U.S. Patent and Trademark Office — Part of Paper No.: 20180717

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/085,741	Senkiw, James Andrew
	Examiner	**Art Unit**
	KRISANNE M JASTRZAB	3991

INTERNATIONAL CLASSIFICATION					
CLAIMED					
C02F1/48	/	C02F1/00	/	C25B1/02	
C25B1/04	/		/		
NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	73	
/KRISANNE M JASTRZAB/ Primary Examiner, Art Unit 3991	17 July 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	13	7A

U.S. Patent and Trademark Office — Part of Paper No.: 20180717

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/085,741	Senkiw, James Andrew
	Examiner	**Art Unit**
	KRISANNE M JASTRZAB	3991

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
13	13	13	23	-	33	41	43	51	53	61	63	70	73	80	83
14	14	24	24	33	34	42	44	52	54	62	64	71	74	81	84
15	15	25	25	34	35	43	45	53	55	63	65	72	75	82	85
16	16	26	26	-	36	44	46	54	56	64	66	73	76	83	86
17	17	27	27	35	37	45	47	55	57	65	67	74	77	84	87
18	18	28	28	36	38	46	48	56	58	66	68	75	78		
19	19	29	29	37	39	47	49	57	59	-	69	76	79		
20	20	30	30	38	40	48	50	58	60	67	70	77	80		
21	21	31	31	39	41	49	51	59	61	68	71	78	81		
22	22	32	32	40	42	50	52	60	62	69	72	79	82		

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	73	
/KRISANNE M JASTRZAB/ Primary Examiner, Art Unit 3991	17 July 2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	13	7A

U.S. Patent and Trademark Office — Part of Paper No.: 20180717

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/085,741	Senkiw, James Andrew
	Examiner	Art Unit
	KRISANNE M JASTRZAB	3991

CPC - Searched*		
Symbol	Date	Examiner
A01G31/00, A01G31/02, A01K63/042,C02F1/46109,C02F1/727,C02F3/26,C02F1/4672,C02F1/68,C02F7/00,C02F2001/46133,C02F2001/46138,C02F2001/46157,C02F2201/4612,C02F2201/4615,C02F2209/02,Y02E60/366,Y02W10/15,y	7/10/2017	KMJ
Y02P60/216		

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
reviewed the prosecution history for US 7,670,495 and family members US 7,396,441 and 6,689,262	7/10/2017	KMJ
text search, search notes attached		
updated search	07/02/2018	KMJ

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
Same as searched		07/03/2018	KMJ

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
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BIB DATA SHEET

CONFIRMATION NO. 9995

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
15/085,741	03/30/2016	210	3991	3406.005US3

APPLICANTS
Oxygenator Water Technologies, Inc., St. Louis Park, MN, Assignee (with 37 CFR 1.172 Interest);

INVENTORS
James Andrew Senkiw, Minneapolis, MN;

**** CONTINUING DATA ***************************
This application is a CON of 14/601,340 01/21/2015
which is a CON of 13/247,241 09/28/2011 PAT RE45415
which is a REI of 12/023,431 01/31/2008 PAT 7670495
which is a DIV of 10/732,326 12/10/2003 PAT 7396441
which is a CIP of 10/372,017 02/21/2003 PAT 6689262
which claims benefit of 60/358,534 02/22/2002

**** FOREIGN APPLICATIONS **************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **
03/31/2016

Foreign Priority claimed ❑ Yes ☑ No 35 USC 119(a-d) conditions met ❑ Yes ☑ No Verified and Acknowledged /KRISANNE MARIE JASTRZAB/ Examiner's Signature	❑ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		MN	7	57	5

ADDRESS
Carlson, Caspers, Vandenburgh, Lindquist & Schuman
225 South 6th Street
Suite 4200
Minneapolis, MN 55402
UNITED STATES

TITLE
FLOW-THROUGH OXYGENATOR

FILING FEE RECEIVED		
3490	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	❑ All Fees ❑ 1.16 Fees (Filing) ❑ 1.17 Fees (Processing Ext. of time) ❑ 1.18 Fees (Issue) ❑ Other _____ ❑ Credit

BIB (Rev. 05/07).

UNITED STATES PATENT AND TRADEMARK OFFICE

Reissue Terminal Disclaimer Review Form

Application No.	Art Unit:
15/085741	3991

Examiner: K Jastrzab

Original Patent Number of Patent to be Reissued is: 7670495

The Maintenance fee status is:

- (•) up to date.
- ( ) not up to date. (Consult with SPRS)

Is there a terminal disclaimer filed and accepted during the prosecution of (i) the current reissue application, (ii) the underlying patent, and/or (iii) reexamination proceeding(s) of the underlying patent?

- ( ) NO
- (•) YES (Complete the rest of the form)

This reissue patent is subject to Terminal Disclaimer(s) that was/were:

- [X] filed and accepted (DISQ or DISQ.E.FILE) during the prosecution of the current reissue application. (Enter terminal disclaimer(s) filing date(s) below).

1. 6/29/2018 2. 10/9/2017 3. _____

The underlying patent of the current reissue application is subject to Terminal Disclaimer(s) that was/were:

- [X] accepted (DISQ or DISQ.E.FILE) and of record in the prosecution of the underlying patent and/or reexamination proceeding(s) of the underlying patent. (Enter application/control no(s) and terminal disclaimer(s) filing date(s) below).

1. 12/023431 8/20/2009 2. _____ _____ 3. _____ _____

(**Examiner's note:** Assign Doc Code "REIS.REVFORM" to this form.)

U.S. Patent and Trademark Office Last revised: 12/2016

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

38846 7590 07/30/2018
Carlson, Caspers, Vandenburgh, Lindquist & Schuman
225 South 6th Street
Suite 4200
Minneapolis, MINNESOTA 55402
UNITED STATES OF AMERICA

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3	9995

TITLE OF INVENTION: FLOW-THROUGH OXYGENATOR

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0.00	$0.00	$500	10/30/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
JASTRZAB, KRISANNE MARIE	3991	210-748100

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 Carlson Caspers
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 502880 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Aaron W. Pederson/ Date August 2, 2018

Typed or printed name Aaron W. Pederson Registration No. 58,607

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

JA1687

Electronic Patent Application Fee Transmittal				
Application Number:	15085741			
Filing Date:	30-Mar-2016			
Title of Invention:	FLOW-THROUGH OXYGENATOR			
First Named Inventor/Applicant Name:	James Andrew Senkiw			
Filer:	Aaron Wesley Pederson			
Attorney Docket Number:	3406.005US3			
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	**Fee Code**	**Quantity**	**Amount**	**Sub-Total in USD($)**
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
REISSUE ISSUE FEE	2511	1	500	500

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		500

Electronic Acknowledgement Receipt	
EFS ID:	33359899
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Aaron Wesley Pederson
Filer Authorized By:	
Attorney Docket Number:	3406.005US3
Receipt Date:	02-AUG-2018
Filing Date:	30-MAR-2016
Time Stamp:	16:23:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$500
RAM confirmation Number	080318INTEFSW00003017502880
Deposit Account	502880
Authorized User	Aaron Pederson
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.17 (Patent application and reexamination processing fees) 37 CFR 1.19 (Document supply fees)	

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	15085741_PTOL-85_SIGNED.pdf	87758 a7c50ad281a5d001b7887b4a32b4cc4dc1a3e099	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	29990 08de4b57b898b247427695d6dca8713e508b3553	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	117748		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3	9995

38846 7590 09/06/2018

Carlson, Caspers, Vandenburgh, Lindquist & Schuman
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

EXAMINER	
JASTRZAB, KRISANNE MARIE	

ART UNIT	PAPER NUMBER
3991	

MAIL DATE	DELIVERY MODE
09/06/2018	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Patent and Trademark Office
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Alexandria, Virginia 22313-1450

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR/ PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
15/085,741	03/30/2016	Senkiw, James Andrew	3406.005US3

	EXAMINER	
Carlson, Caspers, Vandenburgh, Lindquist & Schuman 225 South 6th Street Suite 4200 Minneapolis, MN 55402	KRISANNE M JASTRZAB	
	ART UNIT	PAPER
	3991	20180905

DATE MAILED: _____

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner for Patents

Please find attached the IDS document filed 10/9/17, 11/21/17 and 2/27/18.

/JEAN C WITZ/ Supervisory Patent Examiner, Art Unit 3991	/Krisanne Jastrzab/ Patent Reexamination Specialist CRU 3991

PTO-90C (Rev.04-03)

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15085741
Filing Date	2016-03-30
First Named Inventor	James Andrew Senkiw
Art Unit	3991
Examiner Name	Jastrzab, Krisanne Marie
Attorney Docket Number	3406.005US3

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15085741
	Filing Date	2016-03-30
	First Named Inventor	James Andrew Senkiw
	Art Unit	3991
	Examiner Name	Jastrzab, Krisanne Marie
	Attorney Docket Number	3406.005US3

	1	Application Serial No. 14/601,340, Applicant's Reply Brief, filed Feb. 26, 2018, pp. 1-15	
	2	Application Serial No. 14/601,340, Examiner's Answer, mailed Feb. 13, 2018, pp. 1-35	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/KRISANNE M JASTRZAB/	Date Considered	06/13/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.M.J/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15085741
	Filing Date	2016-03-30
	First Named Inventor	James Andrew Senkiw
	Art Unit	3991
	Examiner Name	Jastrzab, Krisanne Marie
	Attorney Docket Number	3406.005US3

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Aaron W. Pederson/	Date (YYYY-MM-DD)	2018-02-27
Name/Print	Aaron W. Pederson	Registration Number	58,607

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15085741
Filing Date	2016-03-30
First Named Inventor	James Andrew Senkiw
Art Unit	3991
Examiner Name	Jastrzab, Krisanne Marie
Attorney Docket Number	3406.005US3

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.M.J/

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15085741
	Filing Date	2016-03-30
	First Named Inventor	James Andrew Senkiw
	Art Unit	3991
	Examiner Name	Jastrzab, Krisanne Marie
	Attorney Docket Number	3406.005US3

	1	Application Serial No. 14/601,340, Applicant's Appeal Brief, filed Nov. 21, 2017	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/KRISANNE M JASTRZAB/	Date Considered	06/13/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.M.J/

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	Art Unit	3991
	Examiner Name	Jastrzab, Krisanne Marie
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That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Aaron W. Pederson/	Date (YYYY-MM-DD)	2017-11-21
Name/Print	Aaron W. Pederson	Registration Number	58,607

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

EFS Web 2.1.17

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15085741
Filing Date	2016-03-30
First Named Inventor	Senkiw, James Andrew
Art Unit	3991
Examiner Name	Jastrzab, Krisanne Marie
Attorney Docket Number	3406.005US03

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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If you wish to add additional U.S. Published Application citation information please click the Add button. Add

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.M.J/

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15085741
	Filing Date	2016-03-30
	First Named Inventor	Senkiw, James Andrew
	Art Unit	3991
	Examiner Name	Jastrzab, Krisanne Marie
	Attorney Docket Number	3406.005US03

	1	Application Serial No. 14/601,340, Office Action, dated Oct. 5, 2017	
	2	Application Serial No. 14/601,340, Amendment and Response, filed Feb. 6, 2017	
	3	Application Serial No. 14/601,340, Applicant's Interview Summary, filed May 17, 2017	
	4	Application Serial No. 14/601,340, Examiner's Interview Summary, dated May 22, 2017	
	5	Application Serial No. 14/601,340, Final Office Action, dated June 5, 2017	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/KRISANNE M JASTRZAB/	Date Considered	06/13/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.M.J/

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15085741
	Filing Date	2016-03-30
	First Named Inventor	Senkiw, James Andrew
	Art Unit	3991
	Examiner Name	Jastrzab, Krisanne Marie
	Attorney Docket Number	3406.005US03

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

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A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Aaron W. Pederson/	Date (YYYY-MM-DD)	2017-10-09
Name/Print	Aaron W. Pederson	Registration Number	58,607

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/085,741	Senkiw, James Andrew
	Examiner	**Art Unit**
	KRISANNE M JASTRZAB	3991

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
13	13	~~43~~ 23	23	-	33	41	43	51	53	61	63	70	73	80	83
14	14	24	24	33	34	42	44	52	54	62	64	71	74	81	84
15	15	25	25	34	35	43	45	53	55	63	65	72	75	82	85
16	16	26	26	-	36	44	46	54	56	64	66	73	76	83	86
17	17	27	27	35	37	45	47	55	57	65	67	74	77	84	87
18	18	28	28	36	38	46	48	56	58	66	68	75	78		
19	19	29	29	37	39	47	49	57	59	-	69	76	79		
20	20	30	30	38	40	48	50	58	60	67	70	77	80		
21	21	31	31	39	41	49	51	59	61	68	71	78	81		
22	22	32	32	40	42	50	52	60	62	69	72	79	82		

Change(s) applied
to document,
/J.E.B./
8/28/2018

NONE		**Total Claims Allowed:**
(Assistant Examiner)	(Date)	73
/KRISANNE M JASTRZAB/ Primary Examiner, Art Unit 3991	17 July 2018	O.G. Print Claim(s): 13 / O.G. Print Figure: 7A
(Primary Examiner)	(Date)	

U.S. Patent and Trademark Office — Part of Paper No.: 20180717

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/085,741	10/23/2018	RE47092	3406.005US3	9995

38846 7590 10/03/2018

Carlson, Caspers, Vandenburgh, Lindquist & Schuman
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

James Andrew Senkiw, Minneapolis, MN;
Oxygenator Water Technologies, Inc., St. Louis Park, MN, Assignee (with 37 CFR 1.172 Interest);

IR103 (Rev. 10/09)

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☒ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 138517

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☒ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Oxygenator Water Technologies, Inc.

☐ Inventor or Joint Inventor (title not required below)
☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)
☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)
☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Mark A. Rolfes	Date (Optional)	06-05-2019
Name	Mark Rolfes		
Title	President - Oxygenator Water Technologies, Inc.		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt	
EFS ID:	36348931
Application Number:	15085741
International Application Number:	
Confirmation Number:	9995
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Aaron Wesley Pederson
Filer Authorized By:	
Attorney Docket Number:	3406.005US3
Receipt Date:	19-JUN-2019
Filing Date:	30-MAR-2016
Time Stamp:	16:01:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	1252_0003RE1_POA_Trans.pdf	173300 4581dca0b9c8d7377d85ff5d581b0cdf20663ffd	no	1
Warnings:					

Information:					
2	Power of Attorney	Gen_POA_SIGNED.pdf	112465 cba759f0164115316a239fac0537951b9b5a5db2	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	285765		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	15/085,741
Filing Date	2016-03-30
First Named Inventor	James Andrew Senkiw
Title	FLOW-THROUGH OXYGENATOR
Art Unit	3991
Examiner Name	Krisanne Marie JASTRZAB
Attorney Docket Number	1252.0003RE1

SIGNATURE of Applicant or Patent Practitioner

Signature	/Aaron W. Pederson/	Date (Optional)	2019-06-19
Name	Aaron Pederson	Registration Number	58607
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of _____ forms are submitted.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/085,741	03/30/2016	James Andrew Senkiw	3406.005US3

CONFIRMATION NO. 9995

38846
Carlson Caspers Vandenburgh & Lindquist, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

POWER OF ATTORNEY NOTICE

OC000000109126291

Date Mailed: 06/25/2019

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/19/2019.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/kpowell/

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/085,741	03/30/2016	James Andrew Senkiw	1252.0003RE1

CONFIRMATION NO. 9995

138517
Carlson, Caspers, Vandenburgh & Lindquist, P.A.
225 S. Sixth St.
Ste. 4200
Minneapolis, MN 55402

POA ACCEPTANCE LETTER

OC000000109126321

Date Mailed: 06/25/2019

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/19/2019.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/kpowell/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: James Andrew Senkiw
Title: FLOW-THROUGH OXYGENATOR Continuation-Re-issue of U.S. Patent No. 7,670,495
Attorney Docket No.: 3406.005US2
Customer No.: 21186

PATENT APPLICATION TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items and information (as indicated with an "X"):

X **Utility –CON- REIS comprising:**
- X Reissue Patent Application Transmittal (2 pgs)
- X Reissue Patent Application Fee Transmittal Form (2 pgs)
- X Consent by Assignee of Entire Ownership (2 pgs)
- X Statement Under 37 CFR 3.73 (c) (2 pgs).
- X Copy of Patent Assignment Details Retrieved from USPTO Assignments on the Web (3 pgs).
- X Consent by Assignee of Security Interest (2 pgs)
- X Statement Under 37 CFR 3.73 (c) (2 pgs).
- X Copy of Patent Assignment Details Retrieved from USPTO Assignments on the Web (4 pgs).
- X Statement of Right of Assignee to Act Pursuant to 37 C.F.R. 3.73(b) (1 pg).
- X Application Data Sheet (6 pgs).
- X Power of Attorney (1 pg).
- X Copy of Signed Declaration (3 pgs).
- X Preliminary Amendment for Continuation Reissue Application of US Patent No. 7,670,495 (28 pgs).
- X Copy of U.S. Patent No. 7,670,495 (17 Pages including Specification, Claims, Drawings and Certificate of Corrections)

- **X Applicant Claims Small Entity Status.**
- **X Authorization to charge Deposit Account 19-0743 in the amount of $3,340.00**

The filing fee has been calculated below as follows:

	No. Filed	No. Extra	Rate	Fee
TOTAL CLAIMS	55- 20	35	x $40.00 =	**$1,400.00**
INDEPENDENT CLAIMS	5 - 3	2	x $210.00 =	**$420.00**
[]MULTIPLE DEPENDENT CLAIMS PRESENTED				**$0.00**
BASIC FEE				**$140.00**
SEARCH FEE				**$300.00**
EXAMINATION FEE				**$1080.00**
	No. of pages (75% for e-filing)	**Extra sets of 50 pages**	**Rate**	
APPLICATION SIZE FEE	(19 - 100) / 50	0	$200.00	**$0.00**
TOTAL				**$3,340.00**

Please charge any additional required fees or credit overpayment to Deposit Account No. 19-0743. If applicable, any papers or fees supplied herewith are considered to be timely filed pursuant to 37 C.F.R. § 1.7(a).

SCHWEGMAN LUNDBERG & WOESSNER, P.A.
Customer Number: 21186

By: /Albin J. Nelson/
Albin J. Nelson
Reg. No. 28,650

Date of Deposit: January 21, 2015
This paper or fee is being filed on the date indicated above using the USPTO's electronic filing system EFS-Web, and is addressed to The Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

PTO/AIA/50 (09-14)
Approved for use through 10/31/2016. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

REISSUE PATENT APPLICATION TRANSMITTAL

Address to:

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attorney Docket No.	3406.005US2
First Named Inventor	James Andrew Senkiw
Original Patent Number	7,670,495
Original Patent Issue Date (Month/Day/Year)	03/02/2010
Express Mail Label No.	N/A

APPLICATION FOR REISSUE OF: (*Check applicable box*) ☑ Utility Patent ☐ Design Patent ☐ Plant Patent

APPLICATION ELEMENTS (37 CFR 1.173)

1. ☑ **Fee Transmittal Form** (PTO/SB/56)
2. ☑ **Applicant asserts small entity status.** See 37 CFR 1.27
3. ☐ **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. ☑ **Specification and Claims** in double column copy of patent format (*amended, if appropriate*)
5. ☑ **Drawing(s)** (*proposed amendments, if appropriate*)
6. ☑ **Reissue Oath/Declaration or Substitute Statement** (37 CFR 1.175) (PTO/AIA/05, 06, or 07)
7. ☑ **Application Data Sheet** **NOTE:** Benefit claims under 37 CFR 1.78 and foreign priority claims under 37 CFR 1.55 MUST be set forth in an Application Data Sheet (ADS).
8. ☑ **Original U.S. Patent currently assigned?** ☑ Yes ☐ No (*If Yes, check applicable box(es)*)
   - ☑ Written Consent of all Assignees (PTO/AIA/53)
   - ☑ 37 CFR 3.73(c) Statement (PTO/AIA/96)
9. ☐ **CD-ROM or CD-R** in duplicate, Computer Program (*Appendix*) or large table
   - ☐ Landscape Table on CD
10. **Nucleotide and/or Amino Acid Sequence Submission** (*if applicable, items a. – c. are required*)
    - a. ☐ Computer Readable Form (CRF)
    - b. ☐ Specification Sequence Listing on:
      - i. ☐ CD-ROM (2 copies) or CD-R (2 copies); **or**
      - ii. ☐ Paper
    - c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

11. ☑ **Statement of status and support for all changes to the claims.** See 37 CFR 1.173(c).
12. ☑ **Power of Attorney**
13. ☐ **Information Disclosure Statement (IDS)** PTOSB/08 or PTO-1449
    - ☐ Copies of citations attached
14. ☐ **English translation of Reissue Oath/Declaration** (*if applicable*)
15. ☐ **Return Receipt Postcard** (MPEP § 503) (Should be specifically itemized)
16. ☑ **Preliminary Amendment** (37 CFR 1.173; MPEP § 1453)
17. ☑ **Other:** Reissue Application Fee Transmittal Form
    Copy of Patent Assignment Details from the USPTO Assignment on the Web
    Statement of Right of Assignee to Act Pursuant to 37 CFR 3.73(b)

☑ This is a continuation reissue or divisional reissue application (*i.e.*, a second or subsequent reissue application for the same issued patent). (*Check box if applicable.*)

18. CORRESPONDENCE ADDRESS

☑ The address associated with Customer Number: 21186 **OR** ☐ Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone			
Email					

Signature	/Albin J. Nelson/	Date	Jan. 21, 2015
Name (Print/Type)	Albin J. Nelson	Registration No.	28,650

This collection of information is required by 37 CFR 1.173. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop Reissue, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974** (**P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/56 (03-13)
Approved for use through 08/31/2013. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

REISSUE APPLICATION FEE TRANSMITTAL FORM

Docket Number (Optional): 3406.005US2

Application as Filed – Part 1

	(1) Claims in Patent	(2) Claims Filed in Reissue Application	(3) Number Extra	Micro Entity Rate ($)	Micro Entity Fee ($)	Small Entity Rate ($)	Small Entity Fee ($)	Undiscounted Rate ($)	Undiscounted Fee ($)
Total Claims (37 CFR 1.16(i))	(A) 12	(B) 55	* 35 =	x =		x 40 =	1,400	x =	
Ind. Claims (37 CFR 1.16(h))	(C) 2	(D) 5	** 2 =	x =		x 210 =	420	x =	
Application Size Fee (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $400 ($200 for small entity, $100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
		Filing Fee (37 CFR 1.16(e))					140.00		
		Search Fee (37 CFR 1.16(n))					300.00		
		Examination Fee (37 CFR 1.16(r))					1,080.00		
		Total Filing Fee					3340.00		

Application as Amended – Part 2

	(1) Claims Remaining After Amendment	(2) Highest Number Previously Paid For	(3) Extra Claims Present	Micro Entity Rate ($)	Micro Entity Fee ($)	Small Entity Rate ($)	Small Entity Fee ($)	Undiscounted Rate ($)	Undiscounted Fee ($)
Total Claims (37 CFR 1.16(i))	*** -	****	=	x =		x =		x =	
Ind. Claims (37 CFR 1.16(h))	*** -	*****	=	x =		x =		x =	
Application Size Fee (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $400 ($200 for small entity, $100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
			Total Additional Fee						

* Enter (B) – 20, or enter "0" if (B) is less than 20.
** Enter (D) – minus 3, or enter "0" if (D) is less than 3.
*** After any cancellation of claims.
**** If the "Highest Number of Total Claims Previously Paid For" is less than 20, enter "20" in this space.
***** If the "Highest Number of Independent Claims Previously Paid For" is less than 3, enter "3" in this space.

☑ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☑ The Director is hereby authorized to charge any additional fees under 37 CFR 1.16 or 1.17 which may be required, or credit any overpayment to Deposit Account No. 19-0743.

☐ A check in the amount of $ _____ to cover the filing/additional fee is enclosed.

☑ Payment made via EFS-Web.

☐ Payment by credit card. Form PTO-2038 is attached. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

Signature — Date: Jan. 21, 2015

Albin J. Nelson — Typed or Printed Name

28,650 — Registration Number, if applicable

(612) 373-6939 — Telephone Number

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

S/N Unknown PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	James Andrew Senkiw	Examiner: Unknown	
Serial No.:	Unknown	Group Art Unit: Unknown	
Filed:	Herewith	Docket No.: 3406.005US2	
Customer No.: 21186		Confirmation No.: Unknown	
Title:	FLOW-THROUGH OXYGENATOR		

CONSENT BY ASSIGNEE OF ENTIRE OWNERSHIP INTEREST TO FILE A CONTINUATION REISSUE APPLICATION OF THE ORIGINAL REISSUE APPLICATION OF U.S. PATENT NO. 7,670,495 PURSUANT TO 37 C.F.R. §1.172

MS Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I, Mark Rolfes, declare that:

1. I am the president of Oxygenator Water Technologies, Inc D/B/A Water D.O.G Works identified on recorded assignment document reel and frame number 026079/0823 of the Patent Assignment, Abstract of Title recordation department of the U.S. Patent and Trademark Office as holding all right, title and interest in and to U.S. Patent No. 7,670,495 subject to the security interest held by Jeffery P. Brink as recorded at assignment document reel and frame number 026079/0823.

2. I state that Oxygenator Water Technologies, Inc, D/B/A Water D.O.G. Works received its assignment of all right, title and interest according to the chain of title transfer from the inventor, Mr. James Andrew Senkiw to Aqua Innovations, Inc. and hence from Aqua Innovations, Inc. to Oxygenator Water Technologies, Inc as shown by the assignment documents recorded respectively at reel and frame numbers 020546/0241 and 021354/0676 of the Patent Assignment, Abstract of Title recordation department of the U.S. Patent and Trademark Office.

3. As president and officer of Oxygenator Water Technologies, Inc., I have caused Oxygenator Water Technologies Inc. to request herewith a continuation of the original broadening reissue application Serial No. 13/247,241, which original reissue application was made relative to U.S. Patent No. 7,670,495. I understand that original reissue application Serial No. 13/247,241 has been allowed. I have directed that this original reissue application be passed to issuance as a reissue patent of U.S. Patent No. 7,670,495.

4. Pursuant to 37 C.F.R. §1.172 and as an Assignee of all right, title and interest in and to U.S. Patent No. 7,670,495, subject to the security interest to Jeffery P. Brink, I state on behalf of Oxygenator Water Technologies, Inc. that Oxygenator Water Technologies,

Inc. consents to the filing of the continuation re-issue application of original reissue application Serial No. 13/247,241 which in turn is a reissue application of U.S. Patent No. 7,670,495 and to the enlargement of the claimed subject matter as presented by the preliminary amendment filed herewith.

5. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

6. Further Declarant sayeth not.

Mark Rolfes — Date: 01-15-2015

Mark Rolfes
President, Oxygenator Water Technologies
DBA Water D.O.G. Works

Attorney Docket No. 3406.005US2

Amended PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Oxygenator Water Technologies, Inc. D/B/A Water D.O.G. Works

Application No./Patent No.: Unknown Filed/Issue Date: Herewith

Titled: FLOW-THROUGH OXYGENATOR Re-issue of U.S. Patent No. 7,670,495

Oxygenator Water Technologies, Inc. D/B/A Water D.O.G. Works a Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3 ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: James Andrew Senkiw To: Aqua Innovations, Inc.

   The document was recorded in the United States Patent and Trademark Office at

   Reel 020546, Frame 0241-0242, or for which a copy thereof is attached.

2. From: Aqua Innovations, Inc. To: Oxygenator Water Technologies, Inc. D/B/A Water D.O.G. Works

   The document was recorded in the United States Patent and Trademark Office at

   Reel 021354, Frame 0676-0681, or for which a copy thereof is attached.

Attorney Docket No. 3406.005US2

Amended PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(c)

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Albin J. Nelson/
Signature

Jan. 21, 2015
Date

Albin J. Nelson
Printed or Typed Name

USPTO Reg. No. 28,650
Title or Registration Number

[Page 2 of 2]

United States Patent and Trademark Office

Assignments on the Web > Patent Query

Patent Assignment Details

NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Reel/Frame: 020546/0241 **Pages:** 6

Recorded: 02/22/2008

Attorney Dkt #: 4056.02US02/03

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 2

1 **Patent #:** NONE **Issue Dt:** **Application #:** 12023416 **Filing Dt:** 01/31/2008
Publication #: US20080202995 **Pub Dt:** 08/28/2008
Title: FLOW-THROUGH OXYGENATOR

2 **Patent #:** 7670495 **Issue Dt:** 03/02/2010 **Application #:** 12023431 **Filing Dt:** 01/31/2008
Publication #: US20080179259 **Pub Dt:** 07/31/2008
Title: FLOW-THROUGH OXYGENATOR

Assignor

1 SENKIW, JAMES ANDREW **Exec Dt:** 05/25/2006

Assignee

1 AQUA INNOVATIONS, INC.
6101 BAKER ROAD
MINNETONKA, MINNESOTA 55345

Correspondence name and address

J. PAUL HAUN
4800 IDS CENTER, 80 SOUTH 8TH STREET
MINNEAPOLIS, MN 55402

Search Results as of: 09/27/2011 03:33 PM
If you have any comments or questions concerning the data displayed, contact PRD / Assignments at 571-272-3350. v.2.2
Web interface last modified: July 25, 2011 v.2.2

United States Patent and Trademark Office

Assignments on the Web > Patent Query

Patent Assignment Details

NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Reel/Frame: 021354/0676 **Pages:** 6

Recorded: 08/11/2008

Attorney Dkt #: 4056.00-00-01

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 7

1 **Patent #:** 6689262 **Issue Dt:** 02/10/2004 **Application #:** 10372017 **Filing Dt:** 02/21/2003
Publication #: US20030164306 **Pub Dt:** 09/04/2003
Title: MICROBUBBLES OF OXYGEN

2 **Patent #:** 7396441 **Issue Dt:** 07/08/2008 **Application #:** 10732326 **Filing Dt:** 12/10/2003
Publication #: US20040118701 **Pub Dt:** 06/24/2004
Title: FLOW-THROUGH OXYGENATOR

3 **Patent #:** NONE **Issue Dt:** **Application #:** 11367134 **Filing Dt:** 03/04/2006
Publication #: US20060150491 **Pub Dt:** 07/13/2006
Title: Flow-through oxygenator

4 **Patent #:** NONE **Issue Dt:** **Application #:** 11810540 **Filing Dt:** 06/06/2007
Publication #: US20070284245 **Pub Dt:** 12/13/2007
Title: Water treatment system

5 **Patent #:** NONE **Issue Dt:** **Application #:** 12023416 **Filing Dt:** 01/31/2008
Publication #: US20080202995 **Pub Dt:** 08/28/2008
Title: FLOW-THROUGH OXYGENATOR

6 **Patent #:** 7670495 **Issue Dt:** 03/02/2010 **Application #:** 12023431 **Filing Dt:** 01/31/2008
Publication #: US20080179259 **Pub Dt:** 07/31/2008
Title: FLOW-THROUGH OXYGENATOR

7 **Patent #:** NONE **Issue Dt:** **Application #:** 12055723 **Filing Dt:** 03/26/2008
Publication #: US20080237060 **Pub Dt:** 10/02/2008
Title: METHODS AND APPARATUS FOR ELECTROLYTIC TREATMENT OF WATER

Assignor

1 AQUA INNOVATIONS, INC. **Exec Dt:** 08/08/2008

Assignee

1 OXYGENATOR WATER TECHNOLOGIES, INC. D/B/A WATER D.O.G. WORKS
6101 BAKER ROAD, SUITE 206
MINNETONKA, MINNESOTA 55345

Correspondence name and address

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MINNEAPOLIS, MN 55402

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Web interface last modified: July 25, 2011 v.2.2

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Patent Assignment Details

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Reel/Frame: 026079/0823 **Pages:** 10

Recorded: 02/09/2011

Conveyance: PROMISSORY NOTES GRANTING SECURITY INT

Total properties: 3

1	**Patent #:** 6689262	**Issue Dt:** 02/10/2004	**Application #:** 10372017	**Filing Dt:** 02/21/2003	
	Publication #: US20030164306	**Pub Dt:** 09/04/2003			
	Title: MICROBUBBLES OF OXYGEN				
2	**Patent #:** 7396441	**Issue Dt:** 07/08/2008	**Application #:** 10732326	**Filing Dt:** 12/10/2003	
	Publication #: US20040118701	**Pub Dt:** 06/24/2004			
	Title: FLOW-THROUGH OXYGENATOR				
3	**Patent #:** 7670495	**Issue Dt:** 03/02/2010	**Application #:** 12023431	**Filing Dt:** 01/31/2008	
	Publication #: US20080179259	**Pub Dt:** 07/31/2008			
	Title: FLOW-THROUGH OXYGENATOR				

Assignors

1 OXYGENATOR WATER TECHNOLOGIES, INC. **Exec Dt:** 09/09/2008

2 WATER D.O.G. WORKS **Exec Dt:** 10/24/2008

Assignee

1 BRINK, JEFFREY P.
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Correspondence name and address

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Search Results as of: 09/27/2011 03:30 PM

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Web interface last modified: July 25, 2011 v.2.2

S/N Unknown PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors:	James Andrew Senkiw	Examiner: Unknown	
Serial No.:	Unknown	Group Art Unit: Unknown	
Filed:	Herewith	Docket No.: 3406.005US2	
Customer No.: 21186		Confirmation No.: Unknown	
Title:	FLOW-THROUGH OXYGENATOR		

CONSENT BY ASSIGNEE OF SECURITY INTEREST TO FILE A CONTINUATION REISSUE APPLICATION OF THE ORIGINAL REISSUE APPLICATION OF U.S. PATENT NO. 7,670,495 PURSUANT TO 37 C.F.R. §1.172

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria , VA 22313-1450

I, Jeffery P. Brink, declare that: Jeffrey JPB

1. I am the same Jeffery P. Brink identified on recorded assignment document reel and frame number 026079/0823 of the Patent Assignment, Abstract of Title recordation department of the U.S. Patent and Trademark Office as holding a promissory note security interest in and to U.S. Patent No. 7,670,495.

2. I further state that I received the above-described security interest from the Assignee of record of all right, title and interest, Oxygenator Water Technologies, Inc, D/B/A Water D.O.G. Works and that this Assignee received its assignment of all right, title and interest according to the chain of title transfer from the inventor, Mr. James Andrew Senkiw to Aqua Innovations, Inc. and hence from Aqua Innovations, Inc. to Oxygenator Water Technologies, Inc as shown by the assignment documents recorded respectively at reel and frame numbers 020546/0241 and 021354/0676 of the Patent Assignment, Abstract of Title recordation department of the U.S. Patent and Trademark Office.

3. I understand that the owner and assignee of U.S. Patent No. 7,670,495, Oxygenator Water Technologies, Inc., has requested herewith a continuation of the original broadening reissue application Serial No. 13/247,241 which original reissue application was made relative to U.S. Patent No. 7,670,495.

4. Pursuant to 37 C.F.R. §1.172 and as an Assignee of a security interest in and to this patent, I state that I consent to the filing of the continuation re-issue application of original re-issue application Serial No. 13/247,241 which in turn is a reissue application of U.S. Patent No. 7,670,495 and to the enlargement of the claimed subject matter as

presented by the preliminary amendment filed herewith.

5. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

6. Further Declarant sayeth not.

Jeffery P. Brink
Declarant
Jeffrey

1/15/15
Date

Attorney Docket No. 3406.005US2

Amended PTO/AIA/96 (08-12)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Oxygenator Water Technologies, Inc D/B/A Water D.O.G Works

Application No./Patent No.: Unknown Filed/Issue Date: Herewith

Titled: FLOW-THROUGH OXYGENATOR

Jeffrey P. Brink (Name of Assignee) a Security Interest (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of Security Interest of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3 ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: James Andrew Senkiw To: Aqua Innovations Inc.

   The document was recorded in the United States Patent and Trademark Office at

   Reel 020546, Frame 0241-0246, or for which a copy thereof is attached.

2. From: Aqua Innovations Inc. To: Oxygenator Water Technologies, Inc. D/B/A Water D.O.G. Works.

   The document was recorded in the United States Patent and Trademark Office at

   Reel 021354, Frame 0676-0681, or for which a copy thereof is attached.

[Page 1 of 2]

Attorney Docket No. 3406.005US2

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(c)

3. From: Oxygenator Water Technologies, Inc. and Water D.O.G. Works. To: Jeffrey P. Brink

The document was recorded in the United States Patent and Trademark Office at

Reel 026079, Frame 0823-0832, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Albin J. Nelson/
Signature

Jan. 21, 2015
Date

Albin J. Nelson
Printed or Typed Name

USPTO Reg. No. 28,650
Title or Registration Number

[Page 2 of 2]

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Patent Assignment Details

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Reel/Frame: 020546/0241 **Pages:** 6

Recorded: 02/22/2008

Attorney Dkt #: 4056.02US02/03

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 2

1 **Patent #:** NONE **Issue Dt:** **Application #:** 12023416 **Filing Dt:** 01/31/2008
Publication #: US20080202995 **Pub Dt:** 08/28/2008
Title: FLOW-THROUGH OXYGENATOR

2 **Patent #:** 7670495 **Issue Dt:** 03/02/2010 **Application #:** 12023431 **Filing Dt:** 01/31/2008
Publication #: US20080179259 **Pub Dt:** 07/31/2008
Title: FLOW-THROUGH OXYGENATOR

Assignor

1 SENKIW, JAMES ANDREW **Exec Dt:** 05/25/2006

Assignee

1 AQUA INNOVATIONS, INC.
6101 BAKER ROAD
MINNETONKA, MINNESOTA 55345

Correspondence name and address

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Patent Assignment Details

NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Reel/Frame: 021354/0676 **Pages:** 6

Recorded: 08/11/2008

Attorney Dkt #: 4056.00-00-01

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 7

1 **Patent #:** 6689262 **Issue Dt:** 02/10/2004 **Application #:** 10372017 **Filing Dt:** 02/21/2003
Publication #: US20030164306 **Pub Dt:** 09/04/2003
Title: MICROBUBBLES OF OXYGEN

2 **Patent #:** 7396441 **Issue Dt:** 07/08/2008 **Application #:** 10732326 **Filing Dt:** 12/10/2003
Publication #: US20040118701 **Pub Dt:** 06/24/2004
Title: FLOW-THROUGH OXYGENATOR

3 **Patent #:** NONE **Issue Dt:** **Application #:** 11367134 **Filing Dt:** 03/04/2006
Publication #: US20060150491 **Pub Dt:** 07/13/2006
Title: Flow-through oxygenator

4 **Patent #:** NONE **Issue Dt:** **Application #:** 11810540 **Filing Dt:** 06/06/2007
Publication #: US20070284245 **Pub Dt:** 12/13/2007
Title: Water treatment system

5 **Patent #:** NONE **Issue Dt:** **Application #:** 12023416 **Filing Dt:** 01/31/2008
Publication #: US20080202995 **Pub Dt:** 08/28/2008
Title: FLOW-THROUGH OXYGENATOR

6 **Patent #:** 7670495 **Issue Dt:** 03/02/2010 **Application #:** 12023431 **Filing Dt:** 01/31/2008
Publication #: US20080179259 **Pub Dt:** 07/31/2008
Title: FLOW-THROUGH OXYGENATOR

7 **Patent #:** NONE **Issue Dt:** **Application #:** 12055723 **Filing Dt:** 03/26/2008
Publication #: US20080237060 **Pub Dt:** 10/02/2008
Title: METHODS AND APPARATUS FOR ELECTROLYTIC TREATMENT OF WATER

Assignor

1 AQUA INNOVATIONS, INC. **Exec Dt:** 08/08/2008

Assignee

1 OXYGENATOR WATER TECHNOLOGIES, INC. D/B/A WATER D.O.G. WORKS
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Correspondence name and address

J. PAUL HAUN
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NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Reel/Frame: 026079/0823 **Pages:** 10

Recorded: 02/09/2011

Conveyance: PROMISSORY NOTES GRANTING SECURITY INT

Total properties: 3

1	**Patent #:** 6689262	**Issue Dt:** 02/10/2004	**Application #:** 10372017	**Filing Dt:** 02/21/2003	
	Publication #: US20030164306	**Pub Dt:** 09/04/2003			
	Title: MICROBUBBLES OF OXYGEN				
2	**Patent #:** 7396441	**Issue Dt:** 07/08/2008	**Application #:** 10732326	**Filing Dt:** 12/10/2003	
	Publication #: US20040118701	**Pub Dt:** 06/24/2004			
	Title: FLOW-THROUGH OXYGENATOR				
3	**Patent #:** 7670495	**Issue Dt:** 03/02/2010	**Application #:** 12023431	**Filing Dt:** 01/31/2008	
	Publication #: US20080179259	**Pub Dt:** 07/31/2008			
	Title: FLOW-THROUGH OXYGENATOR				

Assignors

1 OXYGENATOR WATER TECHNOLOGIES, INC. **Exec Dt:** 09/09/2008

2 WATER D.O.G. WORKS **Exec Dt:** 10/24/2008

Assignee

1 BRINK, JEFFREY P.
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Web interface last modified: July 25, 2011 v.2.2

S/N Filed Herewith **CONTINUATION REISSUE PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	James Andrew Senkiw	Examiner: Unknown
Serial No.:	Filed Herewith	Group Art Unit: Unknown
Filed:	Filed Herewith	Atty. Docket No.: 3406.005US2
Continuation Reissue of U.S. Patent No. 7,670,495		Issued March 2, 2010
Title: FLOW-THROUGH OXYGENATOR		Customer Number: 21186

STATEMENT OF RIGHT OF ASSIGNEE TO ACT PURSUANT TO 37 C.F.R. §3.73(b)

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

As a duly authorized representative of Oxygenator Water Technologies, I hereby state that Oxygenator Water Technologies has the right under 37 C.RF.R §3.73 to assert its status to transact all business before the U.S. Patent and Trademark Office in connection with the above identified continuation reissue application because Oxygenator Water Technologies is the sole assignee of U.S. Patent No. 7,670,495, the corresponding reissue patent application serial no. 13/247,241 and the present reissue patent application filed herewith which is a continuation of reissue application serial no. 13.247,241 as shown by the assignment records recorded at 017998/0954 showing the assignment of the sole inventor to Aqua Innovations Inc.; at 020480/0246 showing the assignment of Aqua Innovations Inc. to Oxygenator Water Technologies, Inc. D/B/A water D.O.G. Works. The security interest indicated by record 021354/0676 is not an assignment of ownership but rather is a security interest in and to the designated patent.

I further state that I am authorized to act on behalf of the assignee, Oxygenator Water Technologies, Inc.

Respectfully submitted,
Schwegman, Lundberg & Woessner, P.A.
P.O Box 2938
Minneapolis, MN 55402

Date Jan. 21, 2015 By /Albin J. Nelson/

Albin J. Nelson
Reg. No. 28650

Modified PTO/AIA/14 (12-13)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US2
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ **Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)**

Inventor Information:

Inventor 1: James Andrew Senkiw

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
Mr.	James	Andrew	Senkiw	

Residence Information (Select One) ☒ **US Residency** ☐ **Non US Residency** ☐ **Active US Military Service**

City	St. Louis Park	State/Province	MN	Country of Residence	United States of America

Mailing Address of Inventor:

Address 1	1660 Highway 100 South		
Address 2			
City	St. Louis Park	State/Province	MN
Postal Code	55416	Country	United States of America

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	21186
Email Address	request@slwip.com

Application Information:

Title of the Invention	FLOW-THROUGH OXYGENATOR		
Attorney Docket Number	3406.005US2	Small Entity Status Claimed	☒
Application Type	Non-Provisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	

Modified PTO/AIA/14 (12-13)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US2
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country Publication

Publication Information:

☐ **Request Early Publication (Fee required at time of Request 37 CFR 1.219)**

☐ **Request Not to Publish.** **I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.**

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Entereither Customer Number or complete the Representative Name section below. If bothsections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	21186		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US2
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending		
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**
This application is a	reissue continuation of	13/247,241	2011-09-28
Prior Application Status	Patented		
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**
13/247,241 is a	reissue of	12/023,431	2008-01-31
Prior Application Status	Patented		
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**
12/023,431 IS A	division of	10/732,326	2003-12-10
Prior Application Status	Patented		
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**
10/732,326 IS A	continuation-in-part of	10/372,017	2003-02-21
Prior Application Status	Expired		
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**
10/372,017	claims benefit of provisional	60/358,534	2002-02-22

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)i the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the POX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country	Parent Filing Date (YYYY-MM-DD)	Access Code (if applicable)

Modified PTO/AIA/14 (12-13)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US2
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Authorization to Permit Access:

☐ **Authorization to Permit Access to the Instant Application by the Participating Offices**

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Oxygenator Water Technologies, Inc.

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

☒ Assignee	☐ Legal Representative under 35 U.S.C. 117	☐ Joint Inventor
☐ Person to whom the inventor is obligated to assign	☐ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

☐ Deceased	☐ Legally incapacitated

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here: ☒

Organization Name: Oxygenator Water Technologies, Inc.

Prefix	Given Name	Middle Name	Family Name	Suffix

Modified PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	3406.005US2
	Application Number	Unknown
Title of Invention	FLOW-THROUGH OXYGENATOR	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Mailing Address Information:			
Address 1	1660 Highway 100 South		
Address 2			
City	St. Louis Park	State/Province	MN
Country	United States of America	Postal Code	55416
Phone Number			
Email Address			

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the"Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee:			
Address 1			
Address 2			
City		State/Province	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Modified PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications					
Signature	/Albin L. Nelson/			**Date (YYYY-MM-DD)**	2015-01-21
First Name	Albin	**Last Name**	Nelson	**Registration Number**	28,650

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-14**

SLW Docket NO. 3406.005US2

Amended PTO/AIA/82B(07-13)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date
Unknown	Herewith

☒ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 21186

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter to:

☒ The address associated with the above mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

OXYGENATOR WATER TECHNOLOGIES

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (*e.g.*, a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Mark Rolfes	Date (Optional)	01-15-2015
Name	Mark Rolfes		
Title	President of Oxygenator Water Technologies		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☒ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Attorney Docket No.3406.005USR

SCHWEGMAN ■ LUNDBERG ■ WOESSNER

United States Patent Application

REISSUE DECLARATION OF INVENTORSHIP

As a below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I believe I am the original, first and sole inventor of the subject matter which is described and claimed in U.S. Patent No. **7,670,495** which was issued on **March 2, 2010** and of the subject matter claimed in the broadening reissue patent application Filed Herewith, which reissue patent application corresponds to U.S. Patent No. **7,670,495** the specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by the preliminary amendment filed herewith.

I acknowledge the duty to disclose information which is material to the patentability of this reissue application in accordance with 37 C.F.R. § 1.56 (attached hereto).

I state pursuant to 37 C.F.R §1.175(a) that I, the Applicant, believe the original patent to be partly inoperative or invalid by reason of the patentee claiming less than the patentee had a right to claim in the patent. I believe that the errors to be relied upon as the basis for reissue are to be found in the text of the claims of the patent in that they do not encompass the full scope of Applicant's invention and unnecessarily limit that scope. For example, Applicant was entitled to claim but did not claim such aspects of the disclosed invention as the construction of the emitter as a flow though device with one or more sets of electrodes therein and an arrangement of the sets of electrodes that would provide a relative relationship of those sets at angles other than 120°. In addition, Applicant was entitled to claim but did not claim the full range of the separation distance between the electrodes of the emitter. Furthermore, Applicant was entitled to claim but did not claim additional aspects of the disclosed invention such as a tube shape for the emitter, a grid design for the electrodes, an arrangement of the electrodes within the tube shaped emitter which placed one kind of electrode inside the other kind, and methods for cleaning waste and filth. In addition, the original patent presents claims that are limited by features that Applicant was entitled to omit. Those features include the recitation in those original claims of the specific dimensions of the microbubbles of oxygen. Applicant was entitled to claim but did not claim microbubbles that would not break the surface tension of the water but without specifying the dimensions of those microbubbles. These and additional errors are addressed and corrected by the new independent and dependent claims presented by the preliminary amendment submitted herewith.

Applicant acknowledges that the full range for the separation distance is recited by some of the dependent claims of parent U.S. Patent No's. 7,396,441 and 6,689,262, that a flow through device as a flow through oxygenator is recited by the claims of parent U.S. Patent No. 7,396,441, and that the recitation of the dimensions of microbubbles is omitted from at least some of the independent claims of these parent patents. However, the claims of these parent patents do not recite the same subject matter and features set forth in either the original claims of U.S. Patent No. 7,670,495 or the subject matter Applicant was entitled to claim but did not claim as described in the foregoing paragraph. Therefore, the subject matter of the claims presented by the preliminary amendment submitted with this Declaration has not heretofore been examined by the U.S. Patent and Trademark Office, nor has it been claimed as such by U.S. Patent No. 7,670,495 or by the parent patents.

The examples provided herein are not intended to be exhaustive or exclusive, but are presented for stating at least one error being relied upon as the basis for reissue pursuant to 37 C.F.R. 1.175. Additional errors are addressed and corrected as presented by the preliminary amendment filed herewith.

I state that all errors present in the original patent and in the present reissue application up to the time of filing of this Reissue Declaration, and errors which are addressed and corrected by the preliminary amendment concurrently filed with this Reissue Declaration, which correction of errors I have reviewed, arose without any deceptive intention on the part of the Applicant.

I understand that pursuant to 37 C.F.R. §3.71, the assignee, Oxygenator Water Technologies, Inc., has granted the power of attorney, for prosecuting this reissue patent application and for transacting all related business, to attorneys and agents of the firm of Schwegman, Lundberg, & Woessner, P. A., **Customer Number 21186**. I confirm and agree with this appointment.

Please direct all correspondence and all communications to **Schwegman, Lundberg & Woessner, P.A.,** at the address provided by the following customer number.

Customer Number: 21186

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of James Andrew Senkiw
Citizenship: U.S.A
Residence: Minneapolis, MN
Post Office Address: 4750 Aldrich Ave N, Minneapolis MN 55430-3529

Signature: _____ Date: 22 Sept 2011
James Andrew Senkiw

§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application:

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

S/N Unknown **CONTINUATION REISSUE PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	James Andrew Senkiw.	Examiner: Unknown
Serial No.:	Filed Herewith	Group Art Unit: Unknown
Filed:	Filed Herewith	Atty. Docket No.: 3406.005US1
Continuation Reissue of U.S. Patent No. 7,670,495		Issued March 2, 2010
Title: FLOW-THROUGH OXYGENATOR		Customer Number: 21186

PRELIMINARY AMENDMENT FOR CONTINUATION REISSUE APPLICATION OF U.S. PATENT NO. 7,670,495 PURSUANT TO 37 C.F.R. §1.173(b)

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria , VA 22313-1450

Prior to examination of the above identified CONTINUATION reissue patent application, please enter the following preliminary amendment of the claims.

IN THE CLAIMS

Please cancel original claims 1-12.

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Cancelled)
7. (Cancelled)
8. (Cancelled)
9. (Cancelled)
10. (Cancelled)
11. (Cancelled)
12. (Cancelled)

Please add the following new claims.

13. (New) An electrolysis system for generating oxygenated water, the system comprising:
a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet;
at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing;
each electrode of the system is positioned so that substantially all points midway between opposing first and second electrodes are closer to a surface of the tubular housing than to a

center point within the tubular housing;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

14. (New) The system of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis; wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis; and wherein at least one of the first and second electrodes is positioned in the tubular housing closer to the inward-facing surface than said distance separating the electrodes.

15. (New) The system of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis; wherein said portions of electrodes extend in a direction parallel to the longitudinal axis; and wherein each electrode of the system is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing.

16. (New) The system of claim 13 wherein at least one of the electrodes is a stainless steel mesh or screen.

17. (New) The system of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing.

18. (New) The system of claim 17 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing first and second electrodes within the tubular housing.

19. (New) The system of claim 17 wherein the first and second electrodes comprise an outside electrode and an inside electrode, wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing,
the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is,
wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

20. (New) The system of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel

to and including the center axis, the passageway running for at least the length of that portion of one of the electrodes positioned within the housing;

wherein the first and second electrodes comprise an outside electrode and an inside electrode;

wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing;

the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway; and

wherein the tubular housing of the system is round.

21. (New) The system of claim 19 wherein said surface is an inward-facing concave surface.

22. (New) The system of claim 13 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

23. (New) The system of claim 13 wherein the oxygen comprises microbubbles.

24. (New) The system of claim 13 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

25. (New) The system of claim 13 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

26. (New) The system of claim 25 wherein the oxygen comprises microbubbles.

27. (New) An electrolysis system for generating oxygenated water, the system comprising:
a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis;
at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber, wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode; and
a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal

to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the chamber of the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

28. (New) The system of claim 27 wherein each electrode of the system is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber.

29. (New) The system of claim 27 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

30. (New) The system of claim 29 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

31. The system of claim 30 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

32. (New) The system of claim 27 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting

a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

33. (New) The system of claim 27 wherein the oxygen comprises microbubbles.

34. (New) The system of claim 27 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

35. (New) The system of claim 27 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

36. (New) The system of claim 35 wherein the oxygen comprises microbubbles.

37. (New) An electrolysis system for generating oxygenated water, the system comprising:
a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;
at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches, a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, said portion being a portion that opposes the other of the first and second electrodes,
a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power

source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

38. (New) The system of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis; and wherein each electrode of the system is positioned so that substantially all points midway between opposing first and second electrodes inside the chamber are closer to said inwardly-facing surface of the tubular housing than to a center point within the tubular housing.

39. (New) The system of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis, wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis, and wherein at least one of the first and second electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes.

40. (New) The system of claim 39 wherein each electrode of the system is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

41. (New) The system of claim 37 wherein the electrode in contact with a wall of the tubular

housing is in contact with a curved wall of the tubular housing.

42. (New) The system of claim 37 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

43. (New) The system of claim 42 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing first and second electrodes within the chamber.

44. (New) The system of claim 42 wherein the chamber has an inward-facing surface that runs parallel to the longitudinal axis; wherein the first and second electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is; and wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

45. (New) The system of claim 37 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

46. (New) The system of claim 37 wherein the oxygen comprises microbubbles.

47. (New) The system of claim 37 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

48. (New) The system of claim 37 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

49. (New) The system of claim 48 wherein the oxygen comprises microbubbles.

50. (New) An electrolysis cell comprising:
a tubular housing defining a oxygenation chamber, and having and an inward-facing surface that runs parallel to a longitudinal center axis, and a water inlet, a water outlet;
at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that is parallel to the longitudinal axis, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber;
wherein each electrode of the electrolysis cell is positioned closer to the inward-facing surface of

the chamber than to the longitudinal center axis of the chamber maintaining an unobstructed passageway that runs longitudinally parallel to and including the axis at the center of the chamber.

51. (New) The electrolysis cell of claim 50 wherein at least one of the first and second electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes.

52. (New) The electrolysis cell of claim 50 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

53. (New) The electrolysis cell of claim 52 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

54. (New) The electrolysis cell of claim 50 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

55. (New) The electrolysis cell of claim 54 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

56. (New) The electrolysis cell of claim 55 wherein said inward-facing surface is a concave

surface.

57. (New) The electrolysis cell of claim 50 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

58. (New) The electrolysis cell of claim 50 wherein the oxygen comprises microbubbles.

59. (New) The electrolysis cell of claim 50 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

60. (New) The electrolysis cell of claim 50 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

61. (New) The electrolysis cell of claim 50 wherein the oxygen comprises microbubbles.

62. (New) An electrolysis cell comprising:
a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis, said housing having a water inlet and a water outlet,

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;
the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length;
wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed water flow path.

63. (New) The electrolysis cell of claim 62 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

64. (New) The electrolysis cell of claim 62 wherein the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

65. (New) The electrolysis cell of claim 62 wherein the unobstructed passageway is multiple

times wider than the distance separating the opposing outside and inside electrodes within the chamber.

66. (New) The electrolysis cell of claim 62 wherein said outer wall includes an inwardly-facing concave surface.

67. (New) The electrolysis cell of claim 62 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

68. (New) The electrolysis cell of claim 62 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

69. (New) The electrolysis cell of claim 68 wherein the oxygen comprises microbubbles.

REMARKS

Applicant and Assignee present the continuation reissue application associated with this preliminary amendment pursuant to 35 U.S.C. §251; 37 C.F.R. §1.177 and M.P.E.P §1451. This reissue application is a continuation of allowed reissue application Serial No. 13/247,241. On January 13, 2015, the assignee paid the base issue fee for this allowed reissue application. The allowed reissue application is expected to issue within several weeks or months. Therefore, there is co-pendency of the original reissue application and the present continuation reissue application. Because the present reissue application is a continuation of original reissue application Serial No. 12/247,241 and has a priority date established by the original reissue application , Applicant and Assignee have satisfied the requirement of 35 U.S.C. §251 (d) concerning submission of a broadening reissue within two years of the issuance of the original patent to be reissues.

Applicant presents this preliminary amendment in connection with this continuation reissue application to correct errors of the claims of original U.S. Patent No. 7,670,495. As Applicant stated in in his response of May 13, 2014 for Serial No. 13/247,241and again in his Communication submitted with the payment of the base issue fee for Serial No. 13/247,241, Applicant and Assignee reserved the right to submit one or more reissue continuation applications to address the subject matter that was cancelled during the prosecution of reissue application Serial No. 13/247,241. This subject matter included but was not limited to the apparatus, device, emitter, system and suspension described in the original patent.

Applicant stated in his original Inventor's Reissue Declaration for Broadening Reissue that he had a right to claim the above-described subject matter but did not do so. Consequently

Applicant's original Reissue Declaration, submitted herewith, satisfies the requirements of 37 C.F.R §1.172; M.P.E.P §1410.01 and M.P.E.P §1451(II) with respect to this continuation reissue application and the corresponding preliminary amendment. As stated in Applicant's original Inventor's Reissue Declaration, the claims of original U.S. Patent No. 7,670,495 recite subject matter that is less in scope than Applicant was entitled to claim. As indicated in the original Inventor's Reissue Declaration, all errors that are addressed and corrected by this preliminary amendment arose without any deceptive intention on the part of Applicant.

The new claims presented by this preliminary amendment are directed to the same general invention as that disclosed by the original patent as required by 35 U.S.C. §251. Current new claims 13 – 49 generally are directed to an electrolysis system for generating oxygenated water. This subject matter was also presented as claims 30-39 (system) of the preliminary amendment submitted with the original reissue application Serial No. 13/247,241 on September 28, 2011. Current new claims 50 -69 are directed to an electrolysis cell. This subject matter was also presented in claims 13-29 (emitter) of the preliminary amendment submitted with the original reissue application Serial no. 13/247,241 on September 28, 2011.

Support in the specification for the new claims is provided in the following chart.

CHART SHOWING SPECIFICATION SUPPORT FOR THE NEW CLAIMS

Claim Language	Location
Claim 13	
an electrolysis system for generating oxygenated water	2:63-67 3:24-35
a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet	3:26-32 9:7-11 FIGS. 7A-7B
at least two opposing electrodes in the tubular housing separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14

	4:54 5:4-11
all points midway between opposing first and second electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing	FIG. 7A
power source of voltage and amperage	9:35-45
power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis	3:27-35 2:63-67
Claim 14	
an inward-facing surface that runs parallel to the longitudinal axis	FIG. 7A 9:7-12
electrodes extend in a direction that is parallel to the longitudinal axis	FIG. 7A FIG. 7B 9:7-12 3:25-30
an electrode positioned in the tubular housing closer to the inward-facing surface than the distance separating the electrodes	FIG. 7A 9:7-12
Claim 15	
an inward-facing surface that runs parallel to the longitudinal axis	FIG. 7A 9:7-12
electrodes extend in a direction parallel to the longitudinal axis	FIG. 7A FIG. 7B 9:7-12 3:25-30
each electrode of the system is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing	FIG. 7A 9:7-12
Claim 16	
an electrode is stainless steel mesh or screen	3:6-8 4:63-64
Claim 17	
the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing	FIG. 7A FIG. 7B 9:7-18

Claim 18	
the unobstructed passageway is multiple times wider than the distance separating the electrodes	FIG. 7A
Claim 19	
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
electrodes extend in a direction parallel to the longitudinal axis	FIGS. 7A-7B 9:7-12 3:25-30
an inward-facing surface of the tubular housing	FIG. 7A 9:7-12
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 20	
electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of that portion of one of the electrodes positioned within the housing	FIG. 7A FIG. 7B 9:7-18
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
electrodes extend in a direction parallel to the longitudinal axis	FIGS. 7A-7B 9:7-12 3:25-30
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
the tubular housing of the system is round	FIG. 7A
Claim 21	
inward-facing surface is concave	FIG. 7A
Claim 22	

conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 23	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 24	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 25	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 26	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 27	
an electrolysis system for generating oxygenated water	2:63-67 3:24-35
a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface parallel to the water flow axis	3:26-32 9:7-12 FIG. 7A
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis, electrodes extend in a direction that is parallel to the longitudinal axis	3:25-30 FIG. 7A FIG. 7B 9:7-18
electrodes separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
a portion of the outside electrode is closer to the inward-facing surface than the distance separating the inside and outside electrodes	FIG. 7A 3:25-28
power source of voltage and amperage	9:35-45
power source being operable to deliver electrical current to the	3:27-35

electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis	2:63-67
Claim 28	
each electrode of the system is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber	FIG. 7A 9:7-12
Claim 29	
electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber	FIG. 7A FIG. 7B 9:7-18
Claim 30	
the unobstructed passageway is multiple times wider than the distance separating the electrodes	FIG. 7A
Claim 31	
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 32	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 33	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 34	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 35	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28

Claim 36	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 37	
an electrolysis system for generating oxygenated water	2:63-67 3:24-35
a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;	3:26-32 9:7-12 FIG. 7A
electrodes separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, the portion being a portion that opposes the other of the first and second electrodes	FIG. 7A
power source of voltage and amperage	9:35-45
power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis	3:27-35 2:63-67
Claim 38	
an inward-facing surface that runs parallel to a longitudinal center axis of the chamber	FIG. 7A 3:26-32 9:7-12
electrodes extend in a direction that is parallel to the longitudinal axis	FIG. 7A FIG. 7B 9:7-12 3:25-30
each electrode of the system is positioned so that substantially all points midway between opposing first and second electrodes inside the chamber are closer to said inwardly-facing surface of the tubular housing than to a center point within the tubular housing	FIG. 7A
Claim 39	
the chamber has a longitudinal center axis and an inward-facing surface	3:26-32

that runs parallel to the longitudinal axis, wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis	9:7-12 FIG. 7A
an electrode is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes	FIG. 7A 9:7-12
Claim 40	
each electrode of the system is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber	FIG. 7A 9:7-12
Claim 41	
the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing	FIG. 7A
Claim 42	
the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber	FIG. 7A FIG. 7B 9:7-18
Claim 43	
the unobstructed passageway is multiple times wider than the distance separating the opposing first and second electrodes	FIG. 7A
Claim 44	
an inward-facing surface that runs parallel to a longitudinal center axis of the chamber	FIG. 7A 3:26-32 9:7-12
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 45	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17

Claim 46	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 47	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 48	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 49	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 50	
an electrolysis cell	2:63-67 3:24-35 Abstract
a tubular housing defining a oxygenation chamber, and having and an inward-facing surface that runs parallel to a longitudinal center axis, and a water inlet, a water outlet	3:26-32 9:7-12 FIGS. 7A-7B
inside and outside electrodes extending parallel to the longitudinal axis,	3:25-28 FIG 7A 9:7-18
electrodes separated by a distance of between 0.005 inches to 0.140 inches	3:11-14 4:54 5:4-11
each electrode of the electrolysis cell is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the chamber maintaining an unobstructed passageway that runs longitudinally parallel to and including the axis at the center of the chamber	FIGS. 7A-7B 9:7-11 3:23-30
Claim 51	
an electrode is closer to the inward-facing surface than said distance separating the electrodes	FIG. 7A 9:7-11
Claim 52	

electrodes is in contact with at least one wall of the tubular housing	FIG. 7A
Claim 53	
electrode in contact with a wall of the tubular housing is in contact with a curved wall	FIG. 7A
Claim 54	
the unobstructed passageway is multiple times wider than the distance separating the opposing electrodes	FIG. 7A
Claim 55	
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 56	
the inward-facing surface is a concave surface	FIG. 7A
Claim 57	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 58	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 59	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 60	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 61	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 62	
an electrolysis cell	2:63-67

	3:24-35 Abstract
a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis, said housing having a water inlet and a water outlet,	3:26-32 9:7-12 FIGS. 7A-7B
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
opposing electrodes separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length	FIG. 7A FIG. 7B 9:7-18
cross-sectional area between outside electrode and outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed water flow path	FIG. 7A 9:7-18
Claim 63	
an electrode is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber	FIG. 7A
Claim 64	
the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing	FIG. 7A
Claim 65	
the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes	FIG. 7A
Claim 66	
outer wall includes an inwardly-facing concave surface	FIG. 7A
Claim 67	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17

Claim 68	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 69	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28

Applicant submits that the new claims presented by this preliminary amendment are fully supported by the specification and that the new claims do not add new matter to the subject matter disclosed in that specification.

Applicant states that EXCEPT FOR COPENDING REISSUE APPLICATION SERIAL NO 13/247,241, WHICH HAS BEEN ALLOWED, there are no prior or concurrent proceedings in which U.S. Patent No. 7,670,495 is or was involved, including interferences, reissues, reexaminations, or litigations, or is or was the result of such proceedings.

Applicant requests a favorable examination of his continuation application for re-issue of U.S. Patent No. 7,670,495.

Respectfully Submitted,

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Date Jan. 21, 2015 By /Albin J. Nelson/

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Reg. No. 28,650

(12) **United States Patent**
Senkiw

(10) **Patent No.: US 7,670,495 B2**
(45) **Date of Patent: *Mar. 2, 2010**

(54) **FLOW-THROUGH OXYGENATOR**

(75) Inventor: **James Andrew Senkiw**, Minneapolis, MN (US)

(73) Assignee: **Oxygenator Water Technologies, Inc.**, Minnetonka, MN (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/023,431**

(22) Filed: **Jan. 31, 2008**

(65) **Prior Publication Data**

US 2008/0179259 A1 Jul. 31, 2008

Related U.S. Application Data

(60) Division of application No. 10/732,326, filed on Dec. 10, 2003, now Pat. No. 7,396,441, which is a continuation-in-part of application No. 10/372,017, filed on Feb. 21, 2003, now Pat. No. 6,689,262.

(60) Provisional application No. 60/358,534, filed on Feb. 22, 2002.

(51) **Int. Cl.**

C02F 1/48	(2006.01)
C02F 1/00	(2006.01)
C25B 1/02	(2006.01)
C25B 1/04	(2006.01)

(52) **U.S. Cl.** **210/748**; 210/600; 210/243; 204/245; 204/232; 205/628

(58) **Field of Classification Search** 210/748, 210/600, 243; 204/278, 242, 243, 275.1, 204/232, 286.1, 554, 660; 205/633–638

See application file for complete search history.

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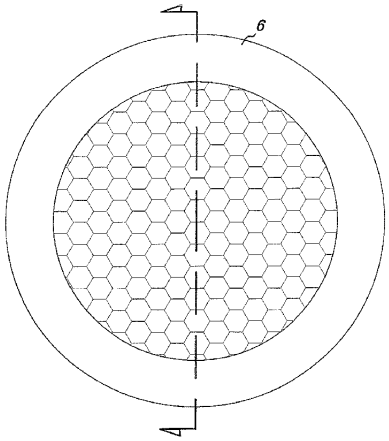
Primary Examiner—Walter D Griffin
Assistant Examiner—Cameron J Allen
(74) *Attorney, Agent, or Firm*—Patterson, Thuente, Skaar & Christensen, P.A.

(57) **ABSTRACT**

An oxygen emitter which is an electrolytic cell is disclosed. When the anode and cathode are separated by a critical distance, very small microbubbles and nanobubbles of oxygen are generated. The very small oxygen bubbles remain in suspension, forming a solution supersaturated in oxygen. A flow-through model for oxygenating flowing water is disclosed. The use of supersaturated water for enhancing the growth of plants is disclosed. Methods for applying supersaturated water to plants manually, by drip irrigation or in hydroponic culture are described. The treatment of waste water by raising the dissolved oxygen with the use of an oxygen emitter is disclosed.

12 Claims, 8 Drawing Sheets



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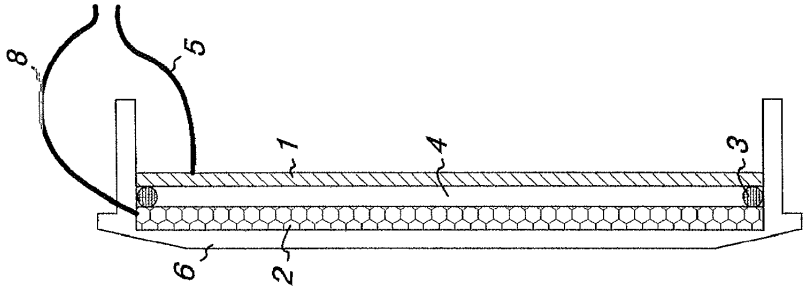


Fig. 1B

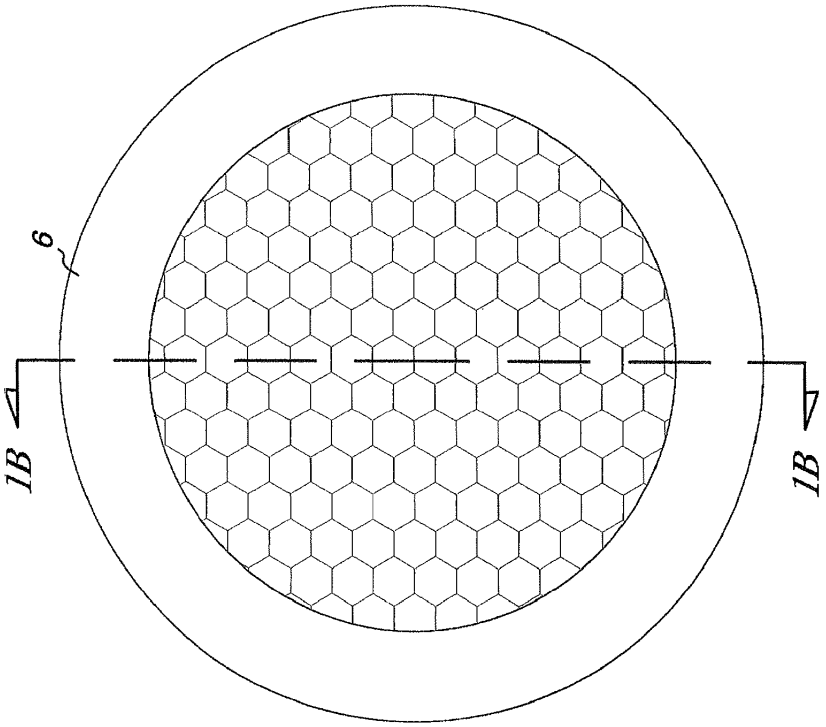


Fig. 1A

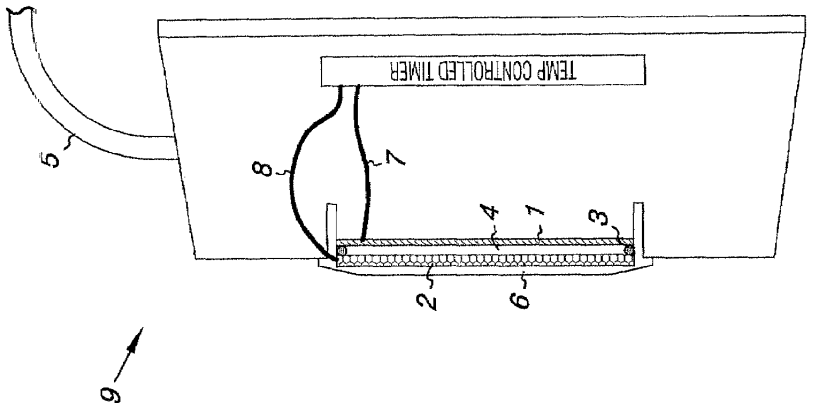


Fig. 2B

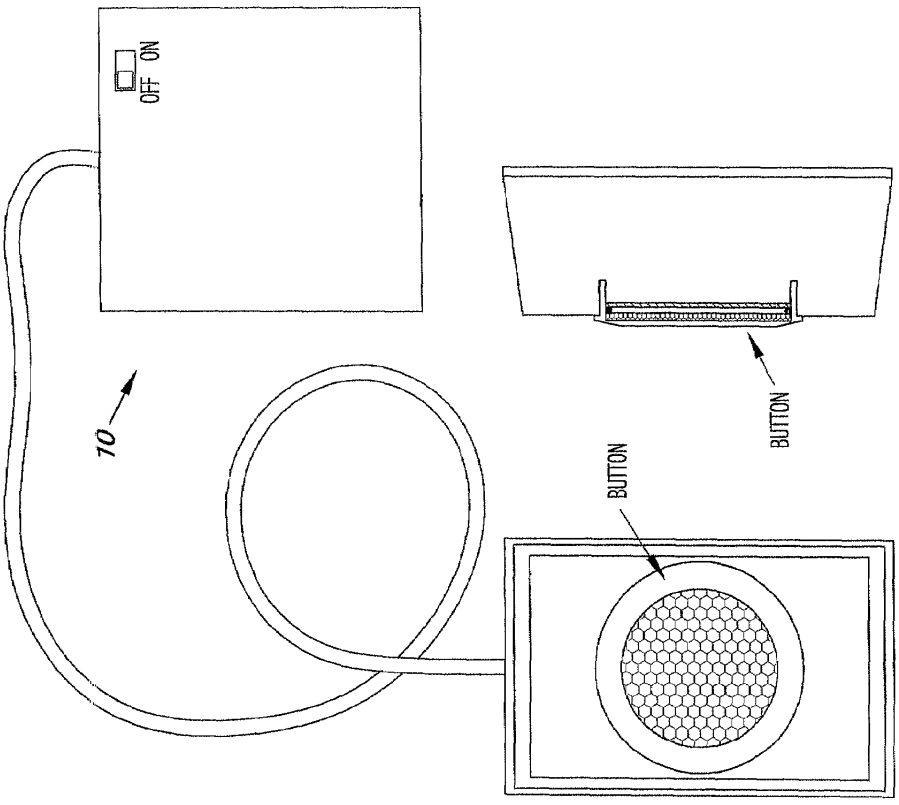


Fig. 2A

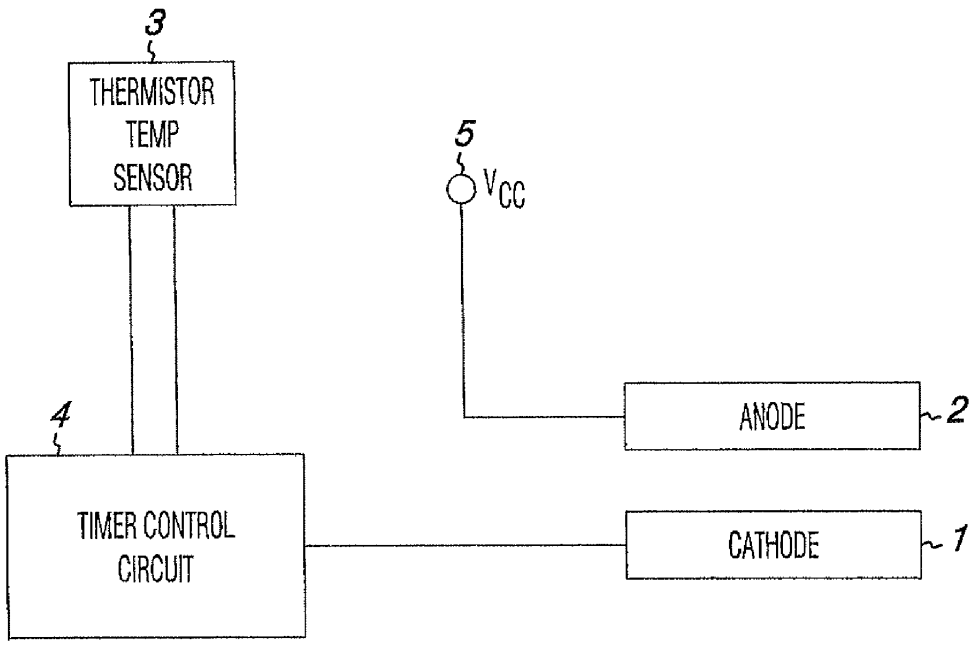

3
THERMISTOR TEMP SENSOR
5
V_{CC}
4
TIMER CONTROL CIRCUIT
ANODE
2
CATHODE
1

Fig. 3

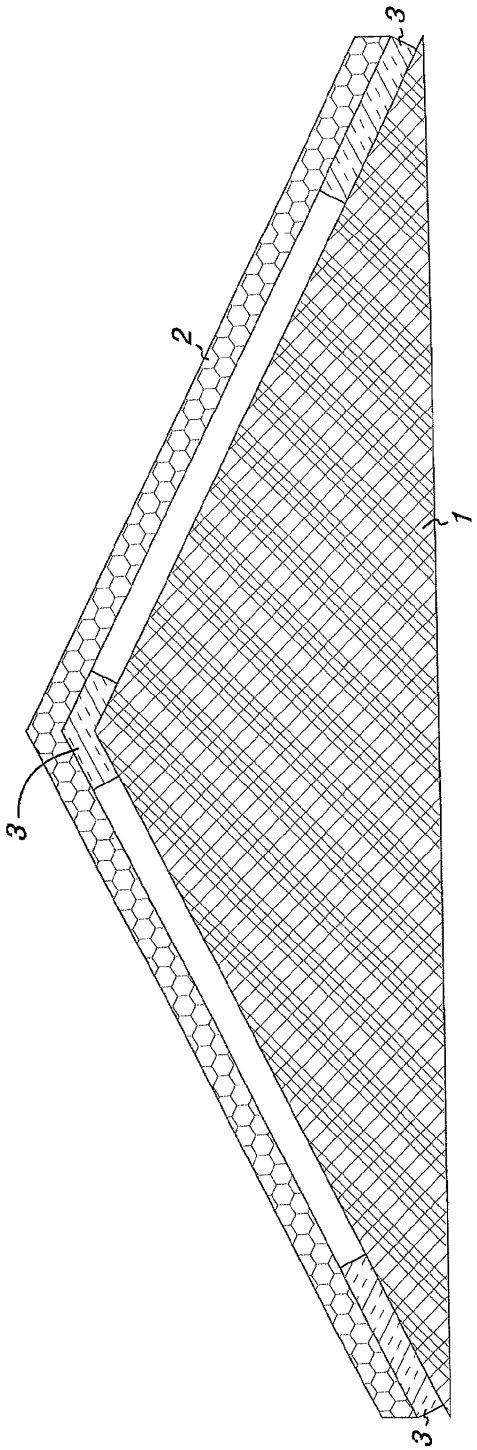


Fig. 4

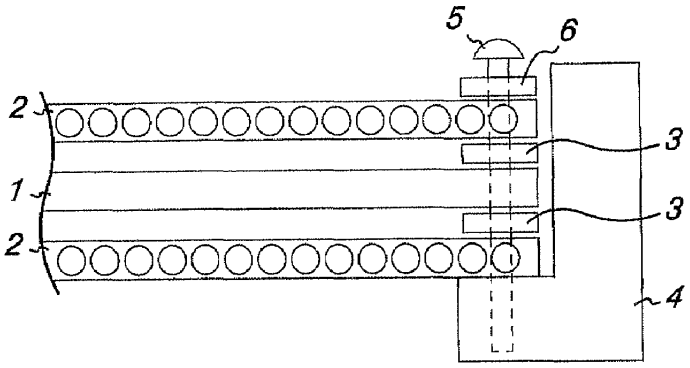


Fig. 5A

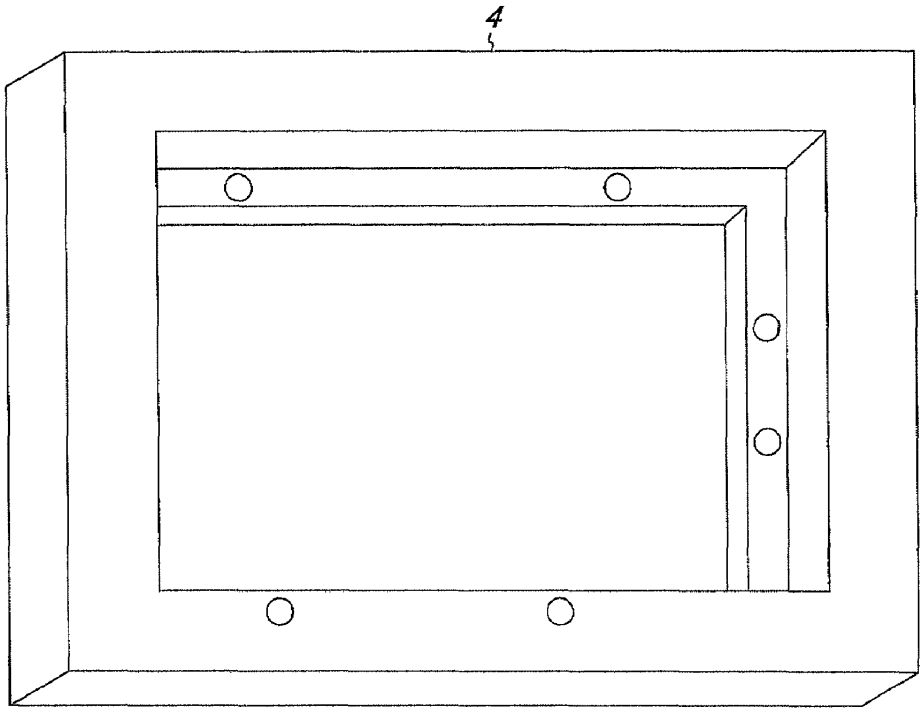


Fig. 5B

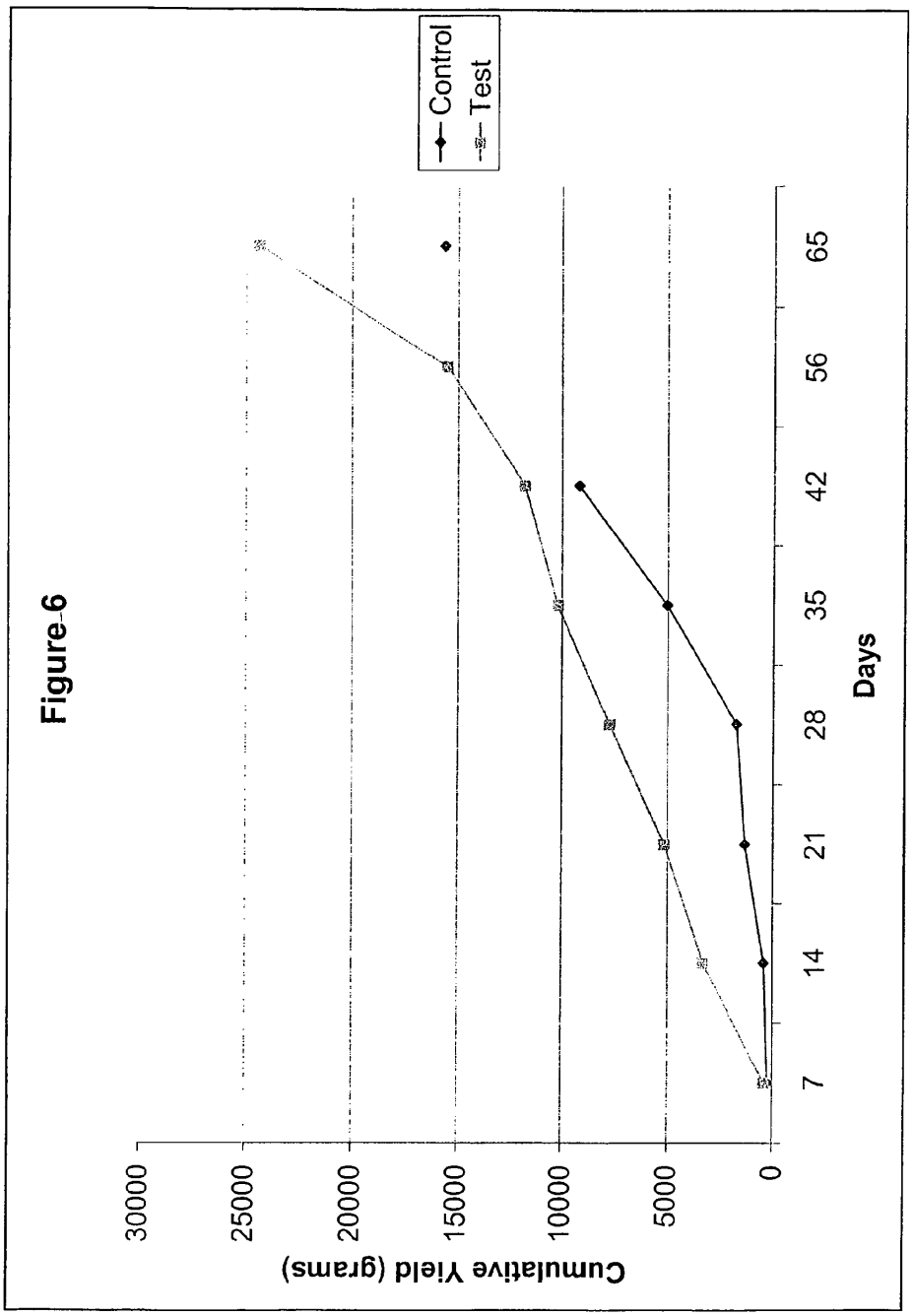

Control
Test
Cumulative Yield (grams)
30000
25000
20000
15000
10000
5000
0
Days
7
14
21
28
35
42
56
65

Figure 6

Fig. 7A

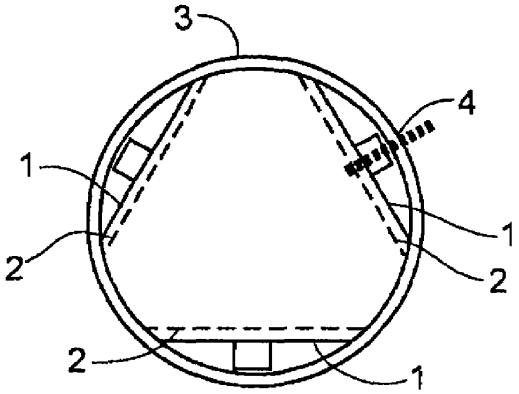
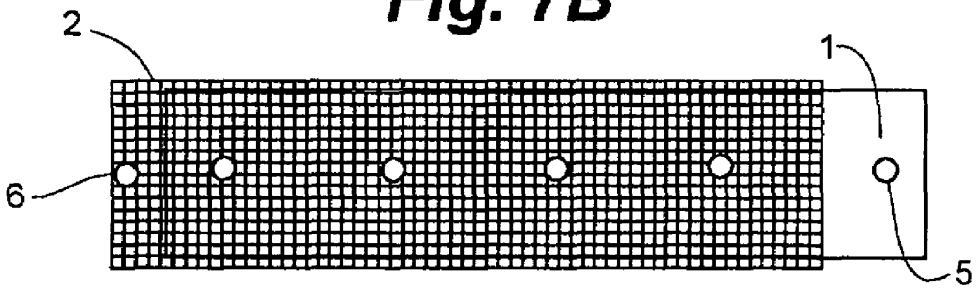


Fig. 7B



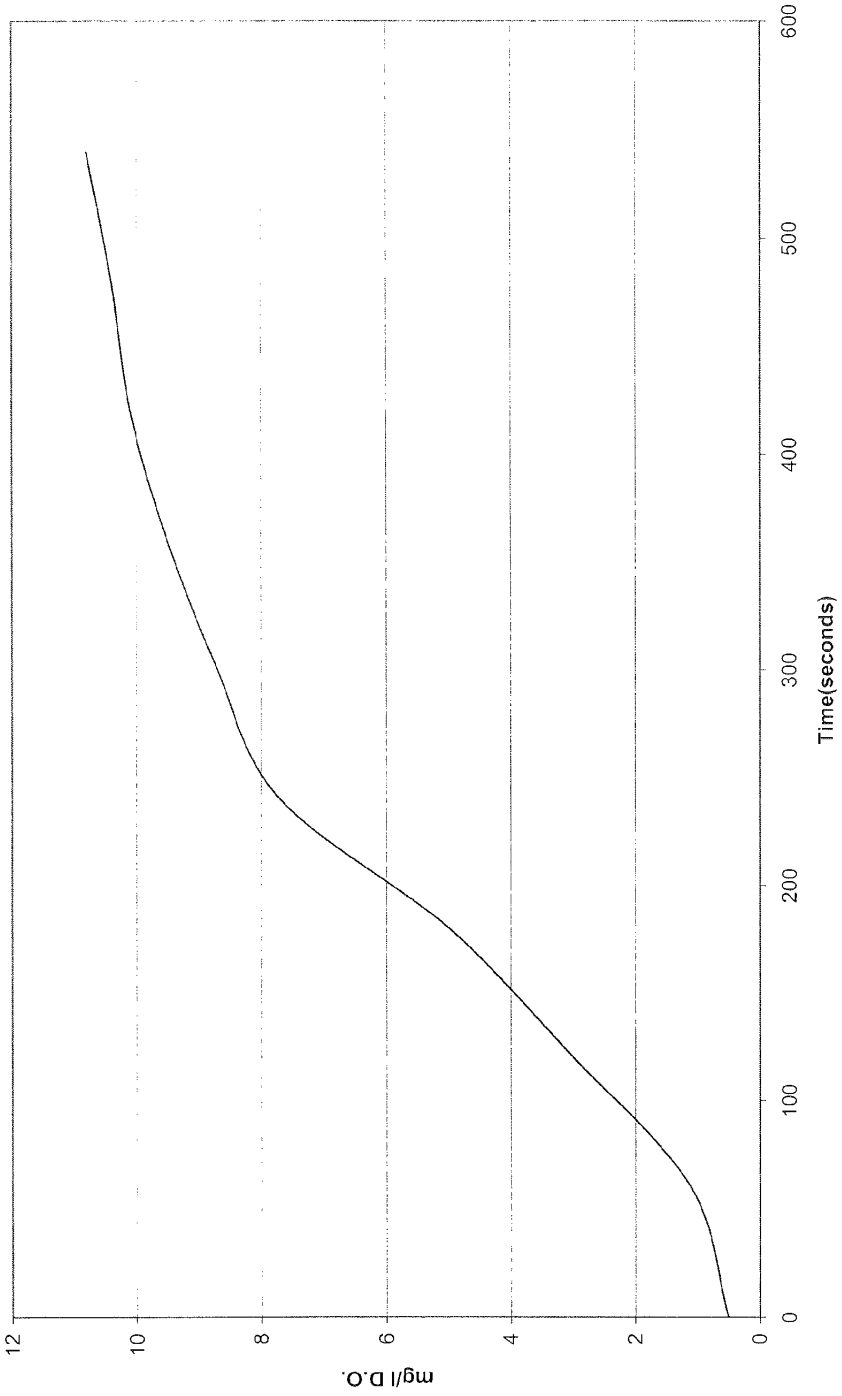


Fig. 8 Time vs D.O.

FLOW-THROUGH OXYGENATOR

RELATED APPLICATIONS

This application is a division of application Ser. No. 10/732,326 filed Dec. 10, 2003, which in turn is a continuation-in-part of application Ser. No. 10/372,017, filed Feb. 21, 2003, now U.S. Pat. No. 6,689,262, which claims the benefit of U.S. Provisional Application No. 60/358,534, filed Feb. 22, 2002, each of which is hereby fully incorporated herein by reference.

FIELD OF THE INVENTION

This invention relates to the electrolytic generation of microbubbles of oxygen for increasing the oxygen content of flowing water. This invention also relates to the use of super-oxygenated water to enhance the growth and yield of plants. The flow-through model is useful for oxygenating water for hydroponic plant culture, drip irrigation and waste water treatment.

BACKGROUND OF THE INVENTION

Many benefits may be obtained through raising the oxygen content of aqueous media. Efforts have been made to achieve higher saturated or supersaturated oxygen levels for applications such as the improvement of water quality in ponds, lakes, marshes and reservoirs, the detoxification of contaminated water, culture of fish, shrimp and other aquatic animals, biological culture and hydroponic culture. For example, fish held in a limited environment such as an aquarium, a bait bucket or a live hold tank may quickly use up the dissolved oxygen in the course of normal respiration and are then subject to hypoxic stress, which can lead to death. A similar effect is seen in cell cultures, where the respiring cells would benefit from higher oxygen content of the medium. Organic pollutants from agricultural, municipal and industrial facilities spread through the ground and surface water and adversely affect life forms. Many pollutants are toxic, carcinogenic or mutagenic. Decomposition of these pollutants is facilitated by oxygen, both by direct chemical detoxifying reactions or by stimulating the growth of detoxifying microflora. Contaminated water is described as having an increased biological oxygen demand (BOD) and water treatment is aimed at decreasing the BOD so as to make more oxygen available for fish and other life forms.

The most common method of increasing the oxygen content of a medium is by sparging with air or oxygen. While this is a simple method, the resulting large bubbles produced simply break the surface and are discharged into the atmosphere. Attempts have been made to reduce the size of the bubbles in order to facilitate oxygen transfer by increasing the total surface area of the oxygen bubbles. U.S. Pat. No. 5,534,143 discloses a microbubble generator that achieves a bubble size of about 0.10 millimeters to about 3 millimeters in diameter. U.S. Pat. No. 6,394,429 ("the '429 patent") discloses a device for producing microbubbles, ranging in size from 0.1 to 100 microns in diameter, by forcing air into the fluid at high pressure through a small orifice.

When the object of generating bubbles is to oxygenate the water, either air, with an oxygen content of about 21%, or pure oxygen may be used. The production of oxygen and hydrogen by the electrolysis of water is well known. A current is applied across an anode and a cathode which are immersed in an aqueous medium. The current may be a direct current from a battery or an AC/DC converter from a line. Hydrogen gas is produced at the cathode and oxygen gas is produced at the anode. The reactions are:

AT THE CATHODE:	$4H_2O + 4e^- \rightarrow 4OH^- + 2H_2$
AT THE ANODE:	$2H_2O \rightarrow O_2 + 4H^+ + 4e^-$
NET REACTION:	$6H_2O \rightarrow 4OH^- + 4H^+ ++ 2H_2 + O_2$

286 kilojoules of energy is required to generate one mole of oxygen.

The gasses form bubbles which rise to the surface of the fluid and may be collected. Either the oxygen or the hydrogen may be collected for various uses. The "electrolytic water" surrounding the anode becomes acidic while the electrolytic water surrounding the cathode becomes basic. Therefore, the electrodes tend to foul or pit and have a limited life in these corrosive environments.

Many cathodes and anodes are commercially available. U.S. Pat. No. 5,982,609 discloses cathodes comprising a metal or metallic oxide of at least one metal selected from the group consisting of ruthenium, iridium, nickel, iron, rhodium, rhenium, cobalt, tungsten, manganese, tantalum, molybdenum, lead, titanium, platinum, palladium and osmium. Anodes are formed from the same metallic oxides or metals as cathodes. Electrodes may also be formed from alloys of the above metals or metals and oxides co-deposited on a substrate. The cathode and anodes may be formed on any convenient support in any desired shape or size. It is possible to use the same materials or different materials for both electrodes. The choice is determined according to the uses. Platinum and iron alloys ("stainless steel") are often preferred materials due to their inherent resistance to the corrosive electrolytic water. An especially preferred anode disclosed in U.S. Pat. No. 4,252,856 comprises vacuum deposited iridium oxide.

Holding vessels for live animals generally have a high population of animals which use up the available oxygen rapidly. Pumps to supply oxygen have high power requirements and the noise and bubbling may further stress the animals. The available electrolytic generators likewise have high power requirements and additionally run at high voltages and produce acidic and basic water which are detrimental to live animals. Many of the uses of oxygenators, such as keeping bait or caught fish alive, would benefit from portable devices that did not require a source of high power. The need remains for quiet, portable, low voltage means to oxygenate water.

It has also been known that plant roots are healthier when oxygenated water is applied. It is thought that oxygen inhibits the growth of deleterious fungi. The water sparged with air as in the '429 patent was shown to increase the biomass of hydroponically grown cucumbers and tomatoes by about 15%.

The need remains for oxygenator models suitable to be placed in-line in water distribution devices so as to be applied to field as well as hydroponic culture.

SUMMARY OF THE INVENTION

This invention provides an oxygen emitter which is an electrolytic cell which generates very small microbubbles and nanobubbles of oxygen in an aqueous medium, which bubbles are too small to break the surface tension of the medium, resulting in a medium supersaturated with oxygen.

The electrodes may be a metal or oxide of at least one metal selected from the group consisting of ruthenium, iridium, nickel, iron, rhodium, rhenium, cobalt, tungsten, manganese, tantalum, molybdenum, lead, titanium, platinum, palladium and osmium or oxides thereof. The electrodes may be formed into open grids or may be closed surfaces. The most preferred cathode is a stainless steel mesh. The most preferred mesh is a {fraction (1/16)} inch grid. The most preferred anode is platinum and iridium oxide on a support. A preferred support is titanium.

In order to form microbubbles and nanobubbles, the anode and cathode are separated by a critical distance. The critical distance ranges from 0.005 inches to 0.140 inches. The preferred critical distance is from 0.045 to 0.060 inches.

Models of different size are provided to be applicable to various volumes of aqueous medium to be oxygenated. The public is directed to choose the applicable model based on volume and power requirements of projected use. Those models with low voltage requirements are especially suited to oxygenating water in which animals are to be held.

Controls are provided to regulate the current and timing of electrolysis.

A flow-through model is provided which may be connected in-line to a watering hose or to a hydroponic circulating system. The flow-through model can be formed into a tube with triangular cross-section. In this model, the anode is placed toward the outside of the tube and the cathode is placed on the inside, contacting the water flow. Alternatively, the anodes and cathodes may be in plates parallel to the long axis of the tube, or may be plates in a wafer stack. Alternately, the electrodes may be placed in a side tube ("T" model) out of the direct flow of water. Protocols are provided to produce superoxygenated water at the desired flow rate and at the desired power usage. Controls are inserted to activate electrolysis when water is flowing and deactivate electrolysis at rest.

This invention includes a method to promote growth and increase yield of plants by application of superoxygenated water. The water treated with the emitter of this invention is one example of superoxygenated water. Plants may be grown in hydroponic culture or in soil. The use of the flow-through model for drip irrigation of crops and waste water treatment is disclosed.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is the O_2 emitter of the invention.

FIG. **2** is an assembled device.

FIG. **3** is a diagram of the electronic controls of the O_2 emitter.

FIG. **4** shows a funnel or pyramid variation of the O_2 emitter.

FIG. **5** shows a multilayer sandwich O_2 emitter.

FIG. **6** shows the yield of tomato plants watered with superoxygenated water.

FIG. **7** shows an oxygenation chamber suitable for flow-through applications. FIG. **7**A is a cross section showing arrangement of three plate electrodes. FIG. **7**B is a longitudinal section showing the points of connection to the power source.

FIG. **8** is a graph showing the oxygenation of waste water.

DETAILED DESCRIPTION OF THE INVENTION

Definitions

For the purpose of describing the present invention, the following terms have these meanings:

"Critical distance" means the distance separating the anode and cathode at which evolved oxygen forms microbubbles and nanobubbles.

"Critical distance" means the distance separating the anode and cathode at which evolved oxygen forms microbubbles and nanobubbles.

"O_2 emitter" means a cell comprised of at least one anode and at least one cathode separated by the critical distance.

"Metal" means a metal or an alloy of one or more metals.

"Microbubble" means a bubble with a diameter less than 50 microns.

"Nanobubble" means a bubble with a diameter less than that necessary to break the surface tension of water. Nanobubbles remain suspended in the water, giving the water an opalescent or milky appearance.

"Supersaturated" means oxygen at a higher concentration than normal calculated oxygen solubility at a particular temperature and pressure.

"Superoxygenated water" means water with an oxygen content at least 120% of that calculated to be saturated at a temperature.

"Water" means any aqueous medium with resistance less than one ohm per square centimeter; that is, a medium that can support the electrolysis of water. In general, the lower limit of resistance for a medium that can support electrolysis is water containing more than 2000 ppm total dissolved solids.

The present invention produces microbubbles and nanobubbles of oxygen via the electrolysis of water. As molecular oxygen radical (atomic weight 8) is produced, it reacts to form molecular oxygen, O_2. In the special dimensions of the invention, as explained in more detail in the following examples, O_2 forms bubbles which are too small to break the surface tension of the fluid. These bubbles remain suspended indefinitely in the fluid and, when allowed to build up, make the fluid opalescent or milky. Only after several hours do the bubbles begin to coalesce on the sides of the container and the water clears. During that time, the water is supersaturated with oxygen. In contrast, the H_2 formed readily coalesces into larger bubbles which are discharged into the atmosphere, as can be seen by bubble formation at the cathode.

The first objective of this invention was to make an oxygen emitter with low power demands, low voltage and low current for use with live animals. For that reason, a small button emitter was devised. The anode and cathode were set at varying distances. It was found that electrolysis took place at very short distances before arcing of the current occurred. Surprisingly, at slightly larger distances, the water became milky and no bubbles formed at the anode, while hydrogen continued to be bubbled off the cathode. At distance of 0.140 inches between the anode and cathode, it was observed that the oxygen formed bubbles at the anode. Therefore, the critical distance for microbubble and nanobubble formation was determined to be between 0.005 inches and 0.140 inches.

EXAMPLE 1

Oxygen Emitter

As shown in FIG. **1**, the oxygen evolving anode **1** selected as the most efficient is an iridium oxide coated single sided sheet of platinum on a support of titanium (Eltech, Fairport Harbor, Ohio). The cathode **2** is a (fraction (1/16)} inch mesh (size 8 mesh) marine stainless steel screen. The anode and cathode are separated by a non-conducting spacer **3** containing a gap **4** for the passage of gas and mixing of anodic and cathodic water and connected to a power source through a

connection point **5**. FIG. **2** shows a plan view of the assembled device. The O_2 emitter **6** with the anode connecting wire **7** and the cathode connecting wire **8** is contained in an enclosure **9**, connected to the battery compartment **10**. The spacer thickness is critical as it sets the critical distance. It must be of sufficient thickness to prevent arcing of the current, but thin enough to separate the electrodes by no more than 0.140 inches. Above that thickness, the power needs are higher and the oxygen bubbles formed at higher voltage will coalesce and escape the fluid. Preferably, the spacer is from 0.005 to 0.075 inches thick. At the lower limits, the emitter tends to foul more quickly. Most preferably, the spacer is about 0.050 inches thick. The spacer may be any nonconductive material such as nylon, fiberglass, Teflon®, polymer or other plastic. Because of the criticality of the space distance, it is preferable to have a non-compressible spacer. It was found that Buna, with a durometer measure of 60 was not acceptable due to decomposition. Viton, a common fluoroelastomer, has a durometer measure of 90 and was found to hold its shape well.

In operation, a small device with an O_2 emitter 1.485 inches in diameter was driven by 4AA batteries. The critical distance was held at 0.050 inches with a Viton spacer. Five gallons of water became saturated in seven minutes. This size is suitable for raising oxygen levels in an aquarium or bait bucket.

It is convenient to attach a control circuit which comprises a timer that is thermostatically controlled by a temperature sensor which determines the off time for the cathode. When the temperature of the solution changes, the resistance of the thermistor changes, which causes an off time of a certain duration. In cool water, the duration is longer so in a given volume, the emitter generates less oxygen. When the water is warmer and therefore hold less oxygen, the duration of off time is shorter. Thus the device is self-controlled to use power most economically. FIG. **3** shows a block diagram of a timer control with anode **1**, cathode **2**, thermistor temperature sensor **3**, timer control circuit **4** and wire from a direct current power source **5**.

EXAMPLE 2

Measurement of O_2 Bubbles

Attempts were made to measure the diameter of the O_2 bubbles emitted by the device of Example 1. In the case of particles other than gasses, measurements can easily be made by scanning electron microscopy, but gasses do not survive electron microscopy. Large bubble may be measured by pore exclusion, for example, which is also not feasible when measuring a gas bubble. A black and white digital, high contrast, backlit photograph of treated water with a millimeter scale reference was shot of water produced hy the emitter of Example 1. About 125 bubbles were seen in the area selected for measurement. Seven bubbles ranging from the smallest clearly seen to the largest were measured. The area was enlarged, giving a scale multiplier of 0.029412.

Recorded bubble diameters at scale were 0.16, 0.22, 0.35, 0.51, 0.76, 0.88 and 1.09 millimeters. The last three were considered outliers by reverse analysis of variance and were assumed to be hydrogen bubbles. When multiplied by the scale multiplier, the assumed O_2 bubbles were found to range from 4.7 to 15 microns in diameter. This test was limited by the resolution of the camera and smaller bubbles in the nanometer range could not be resolved. It is known that white light cannot resolve features in the nanometer size range, so monochromatic laser light may give resolution sensitive enough to measure smaller bubbles. Efforts continue to increase the sensitivity of measurement so that sub-micron diameter bubbles can be measured.

EXAMPLE 3

Other Models of Oxygen Emitter

Depending on the volume of fluid to be oxygenated, the oxygen emitter of this invention may be shaped as a circle, rectangle, cone or other model. One or more may be set in a substrate that may be metal, glass, plastic or other material. The substrate is not critical as long as the current is isolated to the electrodes by the nonconductor spacer material of a thickness from 0.005 to 0.075 inches, preferably 0.050 inches. It has been noticed that the flow of water seems to be at the periphery of the emitter, while the evolved visible bubbles (H_2) arise at the center of the emitter. Therefore, a funnel or pyramidal shaped emitter was constructed to treat larger volumes of fluid. FIG. **4** is a cross sectional diagram of such an emitter. The anode **1** is formed as an open grid separated from a marine grade stainless steel screen cathode **2** by the critical distance by spacer **3** around the periphery of the emitter and at the apex. This flow-through embodiment is suitable for treating large volumes of water rapidly.

The size may be varied as required. A round emitter for oxygenating a bait bucket may be about 2 inches in diameter, while a 3-inch diameter emitter is adequate for oxygenating a 10 to 40 gallon tank. The live well of a fishing hoat will generally hold 40 to 80 gallons of water and require a 4-inch diameter emitter. It is within the scope of this invention to construct larger emitters or to use several in a series to oxygenate larger volumes. It is also within the scope of this invention to vary the model to provide for low voltage and amperage in cases where the need for oxygen is moderate and long lasting or conversely, to supersaturate water very quickly at higher voltage and amperage. In the special dimensions of the present invention, it has been found that a 6 volt battery supplying a current as low as 40 milliamperes is sufficient to generate oxygen. Such a model is especially useful with live plants or animals, while it is more convenient for industrial use to use a higher voltage and current. Table I shows a number of models suitable to various uses.

TABLE I

Emitter Model	Gallons	Volts	Amps Max.	Ave	Watts
Bait keeper	5	6	0.090	0.060	0.36
Livewell	32	12	0.180	0.120	1.44
OEM 2 inch	10	12	0.210	0.120	1.44
Bait store	70	12	0.180	0.180	2.16
Double cycle	2	12	0.180	0.180	2.16
OEM 3 inch	50	12	0.500	0.265	3.48
OEM 4 inch	80	12	0.980	0.410	4.92
Water pail	2	24	1.200	1.200	28.80
Plate	250	12	5.000	2.500	30.00

EXAMPLE 4

Multilayer Sandwich O_2 Emitter

An O_2 emitter was made in a multilayer sandwich embodiment. (FIG. **5**) An iridium oxide coated platinum anode **1** was formed into a grid to allow good water flow and sandwiched between two stainless steel screen cathodes **2**. Spacing was held at the critical distance by nylon spacers **3**. The embodiment illustrated is held in a cassette **4** which is secured by nylon bolt **5** with a nylon washer **6**. The dimensions selected were:

cathode screen	0.045 inches thick
nylon spacer	0.053 inches thick
anode grid	0.035 inches thick
nylon spacer	0.053 inches thick
cathode screen	0.045 inches thick,

for an overall emitter thickness of 0.231 inches thick inches.

If a more powerful emitter is desired, it is within the scope of this invention to repeat the sequence of stacking. For example, an embodiment may easily be constructed with this sequence: cathode, spacer, anode, spacer, cathode, spacer, anode, spacer, cathode, spacer, anode, spacer, cathode. The number of layers in the sandwich is limited only by the power requirements acceptable for an application.

EXAMPLE 5

Effect of Superoxygenated Water on the Growth of Plants

It is known that oxygen is important for the growth of plants. Although plants evolve oxygen during photosynthesis, they also have a requirement for oxygen for respiration. Oxygen is evolved in the leaves of the plants, while often the roots are in a hypoxic environment without enough oxygen to support optimum respiration, which can be reflected in less than optimum growth and nutrient utilization. Hydroponically grown plants are particularly susceptible to oxygen deficit in the root system. U.S. Pat. No. 5,887,383 describes a liquid supply pump unit for hydroponic cultures which attain oxygen enrichment by sparging with air. Such a method has high energy requirements and is noisy. Furthermore, while suitable for self-contained hydroponic culture, the apparatus is not usable for field irrigation. In a report available on the web, it was shown that hydroponically grown cucumbers and tomatoes supplied with water oxygenated with a device similar to that described in the '429 patent had increased biomass of about 12% and 17% respectively. It should be noted that when sparged with air, the water may become saturated with oxygen, but it is unlikely that the water is superoxygenated.

A. Superoxygenated Water in Hydroponic Culture.

Two small hydroponic systems were set up to grow two tomato plants. Circulation protocols were identical except that the 2 ½ gallon water reservoir for the Control plant was eroated with and aquarium bubbler and that for the Test plant was oxygenated with a five-inch strip emitter for two minutes prior to pumping. The cycle was set at four minutes of pumping, followed by four minutes of rest. The control water had an oxygen content of about 97% to 103% saturation, that is, it was saturated with oxygen. The test water had an oxygen content of about 153% to 165% saturation, that is, it was supersaturated. The test plant was at least four times the volume of the control plant and began to show what looked like fertilizer burn. At that point the fertilizer for the Test plant was reduced by half. Since the plants were not exposed to natural light but to continuous artificial light in an indoor environment without the natural means of fertilization (wind and/or insects), the experiment was discontinued after three months. At that time, the Test plant but not the Control plant had blossomed.

B. Superoxygenated Water in Field Culture.

A pilot study was designed to ascertain that plants outside the hydroponic culture facility would benefit from the application of oxygen. It was decided to use water treated with the emitter of Example 1 as the oxygen carrier. Since water so treated is supersaturated, it is an excellent carrier of oxygen.

Tomato seeds (Burpee "Big Boy") were planted in one-inch diameter peat and dirt plugs encased in cheese cloth and placed in a tray in a southwest window. Controls were watered once a day with tap water ("Control") or oxygenated water ("Test"). Both Controls and Test sprouted at one week. After five weeks, the Test plants were an average of 11 inches tall while the Controls were an average of nine inches tall. At this time, May 10, when the threat of frost in Minnesota was minimal, the plants were transplanted to 13 inch diameter pots with drainage holes. Four inches of top soil was added to each pot, topped off with four inches of Scott's Potting Soil. The pots were placed outside in a sunny area with at least eight hours a day of full sun. The plants were watered as needed with either plain tap water (Control) or oxygenated water (Test). The oxygenated water was produced by use of the emitter of Example 1 run for one-half hour in a five-gallon container of water. Previous experiments showed that water thus treated had an oxygen content from 160% to 260% saturation. The Test plants flowered on June 4, while the Controls did not flower until June 18. For both groups, every plant in the group first had flowers on the same day. All plants were fertilized on July 2 and a soaker hose provided because the plants were now so big that watering by hand was difficult. The soaker hose was run for one half to one hour each morning, depending on the weather, to a point at which the soil was saturated with water. One half hour after the soaker hose was turned off, about 750 ml of superoxygenated water was applied to each of the Test plants.

The Test plants were bushier than the Controls although the heights were similar. At this time, there were eight Control plants and seven Test plants because one of the Test plants broke in a storm. On July 2, the control plants averaged about 17 primary branches from the vine stem, while the control plants averaged about 13 primary branches from the vine stem. As the tomatoes matured, each was weighed on a kitchen scale at harvest. The yield history is shown in Table II.

TABLE II

Week of:	Control, grams tomatoes from eight plants/ cumulative total		Test, grams tomatoes from seven plants/ cumulative total	
July 27	240		400	
August 3	180	420	2910	3310
August 10	905	1325	1830	5140
August 17	410	1735	2590	7730
August 24	3300	5035	2470	10200
August 31	4150	9175	1580	11780
September 15	not weighed		3710	15490
Final Harvest September 24	6435	15620	8895	24385

The total yield for the eight Control plants was 15620 grams or 1952 grams of tomatoes per plant.

The total yield for the seven Test plants was 24385 grams or 3484 grams of tomatoes per plant, an increase in yield of about 79% over the Control plants.

FIG. **6** shows the cumulative total as plotted against time. Not only did the Test plants blossom and bear fruit earlier, but that the Control plants never caught up to the test plants in the short Minnesota growing season. It should be noted that the experiment was terminated because of predicted frost. All fruits, both green and red, were harvested and weighed at that point.

EXAMPLE 6

Flow-Through Emitter for Agricultural Use

In order to apply the findings of example 5 to agricultural uses, an emitter than can oxygenate running water efficiently was developed. In FIG. **7**(A), the oxygenation chamber is comprised of three anodes **1** and cathodes **2**, of appropriate size to fit inside a tube or hose and separated by the critical distance are placed within a tube or hose **3** at 120° angles to each other. The anodes and cathodes are positioned with stabilizing hardware **4**. The stabilizing hardware, which can be any configuration such as a screw, rod or washer, is preferably formed from stainless steel. FIG. **7**(B) shows a plan view of the oxygenation chamber with stabilizing hardware **4** serving as a connector to the power source and stabilizing hardware **5** serving as a connector to the power source. The active area is shown at **6**.

This invention is not limited to the design selected for this embodiment. Those skilled in the art can readily fabricate any of the emitters shown in FIG. **4** or **5**, or can design other embodiments that will oxygenate flowing water. One useful embodiment is the "T" model, wherein the emitter unit is set in a side arm. The emitted bubbles are swept into the water flow. The unit is detachable for easy servicing. Table III shows several models of flow through emitters. The voltage and flowrates were held constant and the current varied. The Dissolved oxygen (DO) from the source was 7.1 mg/liter. The starting temperature was 12.2° C. but the flowing water cooled slightly to 11 or 11.5° C. Without undue experimentation, anyone may easily select the embodiment that best suits desired characteristics from Table III or designed with the teachings of Table III.

TABLE III

MODEL	ACTIVE ELECTRODE AREA, SQ.IN.	VOLTAGE	CURRENT, AMPS.	FLOW RATE GAL/MINUTE	DO OF* SAMPLE AT ONE MINUTE
2-Inch "T"	2	28.3	0.72	12	N/A
3-inch "T"	3	28.3	1.75	12	N/A
2-plate Tube	20	28.3	9.1	12	8.4
3-Plate tube	30	28.3	12.8	12	9.6

*As the apparatus runs longer, the flowing water becomes milky, indicating supersaturation. The one-minute time point shows the rapid increase in oxygenation.

The following plants will be tested for response to superoxygenated water: grape vines, lettuce, and radishes in three different climate zones. The operators for these facilities will be supplied with units for drip irrigation. Drip irrigation is a technique wherein water is pumped through a pipe or hose with perforations at the site of each plant to be irrigated. The conduit may be underground or above ground. Since the water is applied directly to the plant rather than wetting the entire field, this technique is especially useful in arid climates or for plants requiring high fertilizer applications.

The superoxygenated water will be applied by drip irrigation per the usual protocol for the respective plants. Growth and yield will be compared to the same plants given only the usual irrigation water. Pest control and fertilization will be the same between test and control plants, except that the operators of the experiments will be cautioned to be aware of the possibility of fertilizer burn in the test plants and to adjust their protocols accordingly.

It is expected that the superoxygenated plants with drip irrigation will show more improved performance with more continuous application of oxygen than did the tomato plants of Example 5, which were given superoxygenated water only once a day.

EXAMPLE 7

Treatment of Waste Water

Waste water, with a high organic content, has a high BOD, due to the bacterial flora. It is desirable to raise the oxygen content of the waste water in order to cause the flora to flocculate. However, it is very difficult to effectively oxygenate such water. Using a 4 inch OEM (see Table I) with a 12 volt battery, four liters of waste water in a five gallon pail were oxygenated. As shown in FIG. **8**, the dissolved oxygen went from 0.5 mg/l to 10.8 mg/l in nine minutes.

Those skilled in the art will readily comprehend that variations, modifications and additions may in the embodiments described herein may be made. Therefore, such variations, modifications and additions are within the scope of the appended claims.

The invention claimed is:

1. A method for treating waste water comprising;

providing a flow-through oxygenator comprising an emitter for electrolytic generation of microbubbles of oxygen comprising an anode separated at a critical distance from a cathode and a power source all in electrical communication with each other,

placing the emitter within a conduit; and

passing waste water through the conduit.

2. An emitter for electrolytic generation of microbubbles of oxygen in an aqueous medium comprising: an anode separated at a critical distance from a cathode, a nonconductive spacer maintaining the separation of the anode and cathode, the nonconductive spacer having a spacer thickness between 0.005 to 0.050 inches such that the critical distance is less than 0.060 inches and a power source all in electrical communication with each other, wherein the critical distance results in the formation of oxygen bubbles having a bubble diameter less than 0.0006 inches, said oxygen bubbles being incapable of breaking the surface tension of the aqueous medium such that said aqueous medium is supersaturated with oxygen.

3. The emitter of claim **2**, wherein the anode is a metal or a metallic oxide or a combination of a metal and a metallic oxide.

4. The emitter of claim **2**, wherein the anode is platinum and iridium oxide on a support.

5. The emitter of claim **2**, wherein the cathode is a metal or metallic oxide or a combination of a metal and a metallic oxide.

6. The emitter of claim **2**, wherein the critical distance is 0.005 to 0.060 inches.

7. The emitter of claim 2, comprising a plurality of anodes separated at the critical distance from a plurality of cathodes.

8. A method for oxygenating a non-native habitat for temporarily keeping aquatic animals, comprising:

inserting the emitter of claim 2 into the aqueous medium, the non-native habitat comprising an aquarium, a bait bucket or a live well.

9. A method for lowering the biologic oxygen demand of polluted water comprising:

passing the polluted water through a vessel containing the emitter of claim 2.

10. A supersaturated aqueous product formed with the emitter of claim 2, the supersaturated aqueous product having an approximately neutral pH.

11. The emitter of claim 2, further comprising a timer control.

12. The emitter of claim 2, wherein the anode and cathode are arranged such that the emitter assumes a funnel or pyramidal shaped emitter.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,670,495 B2
APPLICATION NO. : 12/023431
DATED : March 2, 2010
INVENTOR(S) : Senkiw

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 10, Line 55:
Delete "breading" and insert --breaking--.

Signed and Sealed this

First Day of June, 2010

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office

Electronic Patent Application Fee Transmittal	
Application Number:	
Filing Date:	
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Filer:	Janet Elaine Embretson/Tara McMillen
Attorney Docket Number:	3406.005US2
Filed as Small Entity	

Filing Fees for Reissue (Utility)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility Reissue Basic	2014	1	140	140
Design and utility Reissue Basic	2114	1	300	300
Design and utility Reissue Basic	2314	1	1080	1080
Pages:				
Claims:				
Reissue claims in Excess of 20 for Small	2205	35	40	1400
Reissue- Independent Claims	2204	2	210	420
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		3340

Electronic Acknowledgement Receipt	
EFS ID:	21261880
Application Number:	14601340
International Application Number:	
Confirmation Number:	1069
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	21186
Filer:	Janet Elaine Embretson/Tara McMillen
Filer Authorized By:	Janet Elaine Embretson
Attorney Docket Number:	3406.005US2
Receipt Date:	21-JAN-2015
Filing Date:	
Time Stamp:	10:59:28
Application Type:	Reissue (Utility)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$3340
RAM confirmation Number	10236
Deposit Account	190743
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406005US1-ReissueAppln.pdf	6882845 13905f5c977370a69553b067132d31e6048ca3da	yes	76

Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal Reissue Application	1	1
Transmittal Reissue Application	2	3
Fee Worksheet (SB06)	4	5
Consent of Assignee accompanying the declaration	6	7
Assignee showing of ownership per 37 CFR 3.73.	8	12
Consent of Assignee accompanying the declaration	13	14
Assignee showing of ownership per 37 CFR 3.73.	15	20
Miscellaneous Incoming Letter	21	21
Application Data Sheet	22	27
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Reissue dec filed in accordance with MPEP 1414	29	31
Preliminary Amendment	32	32
Claims	33	46
Applicant Arguments/Remarks Made in an Amendment	47	59
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	Drawings-only black and white line drawings		62	69	
	Specification		70	76	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	38478 e714c1be33f018524580030f0b51e38436088e96	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	6921323		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/601,340	Filing Date 01/21/2015	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	01/21/2015	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 56	Minus	** 55	= 0	X $40 =	0
	Independent (37 CFR 1.16(h))	* 5	Minus	***5	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/JULIET MCMILLAN/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number
14/601,340

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	140		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	1080		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	55 minus 20 =	* 35	x 40 =	1400	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	5 minus 3 =	* 2	x 210 =	420			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	3340		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/601,340	01/21/2015	1797	3340	3406.005US2	55	5

CONFIRMATION NO. 1069

21186
SCHWEGMAN LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

FILING RECEIPT

OC000000073026391

Date Mailed: 01/26/2015

Receipt is acknowledged of this reissue patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)
James Andrew Senkiw, St. Louis Park, MONGOLIA;

Applicant(s)
Oxygenator Water Technologies, Inc., St. Louis Park, MN

Assignment For Published Patent Application
Oxygenator Water Technologies, Inc. D/B/A Water D.O.G. Works

Power of Attorney: The patent practitioners associated with Customer Number 21186

Domestic Priority data as claimed by applicant
This application is a CON of 13/247,241 09/28/2011
which is a REI of 12/023,431 01/31/2008 PAT 7670495
which is a DIV of 10/732,326 12/10/2003 PAT 7396441
which is a CIP of 10/372,017 02/21/2003 PAT 6689262
which claims benefit of 60/358,534 02/22/2002

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

If Required, Foreign Filing License Granted: 01/24/2015
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/601,340**
Projected Publication Date: None, application is not eligible for pre-grant publication
Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

FLOW-THROUGH OXYGENATOR

Preliminary Class

210

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

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Modified form PTO/SB/08A(04-07) OMB 651-0031
US Patent & Trademark Office: U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449A/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use as many sheets as necessary)	*Complete if Known*	
	Application Number	14/601,340
	Filing Date	January 21, 2015
	First Named Inventor	James Andrew Senkiw
	Group Art Unit	1797
	Examiner Name	Unknown
Sheet 1 of 4	Attorney Docket No: 3406.005US2	

US PATENT DOCUMENTS

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
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	US-20020074237A1	6/20/2002	Takesako, Kiyoyuki, et al.
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EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant is to place a check mark here if English language Translation is attached

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Substitute for form 1449A/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use as many sheets as necessary)	*Complete if Known*	
	Application Number	14/601,340
	Filing Date	January 21, 2015
	First Named Inventor	James Andrew Senkiw
	Group Art Unit	1797
	Examiner Name	Unknown
Sheet 2 of 4	Attorney Docket No: 3406.005US2	

US PATENT DOCUMENTS

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
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EXAMINER **DATE CONSIDERED**

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Modified form PTO/SB/08A(04-07) OMB 651-0031
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Substitute for form 1449A/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use as many sheets as necessary)	*Complete if Known*	
	Application Number	14/601,340
	Filing Date	January 21, 2015
	First Named Inventor	James Andrew Senkiw
	Group Art Unit	1797
	Examiner Name	Unknown
Sheet 3 of 4	Attorney Docket No: 3406.005US2	

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Examiner Initial *	Foreign Document Number	Publication Date	Name of Patentee or Applicant of cited Document	T 1
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Examiner Initial *	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 1
	"Application Serial No. 12/023,431, Non Final Office Action mailed 03-27-09", 5 pgs	
	"Application Serial No. 12/023,431, Notice of Allowance mailed 09-23-09", 6 pgs	
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EXAMINER **DATE CONSIDERED**

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Substitute for form 1449A/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use as many sheets as necessary)	*Complete if Known*	
	Application Number	14/601,340
	Filing Date	January 21, 2015
	First Named Inventor	James Andrew Senkiw
	Group Art Unit	1797
	Examiner Name	Unknown
Sheet 4 of 4	Attorney Docket No: 3406.005US2	

OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS		
Examiner Initial *	**Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.**	**T 1**
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Electronic Acknowledgement Receipt	
EFS ID:	22172547
Application Number:	14601340
International Application Number:	
Confirmation Number:	1069
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	21186
Filer:	Janet Elaine Embretson/Tara McMillen
Filer Authorized By:	Janet Elaine Embretson
Attorney Docket Number:	3406.005US2
Receipt Date:	27-APR-2015
Filing Date:	21-JAN-2015
Time Stamp:	12:06:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406005US2-AmendmentV2.pdf	435706 214bf4a0c5d8e63c53700ed3eba8a5f6fcbe4728	yes	22

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Miscellaneous Incoming Letter	1	1
	Supplemental Response or Supplemental Amendment	2	2
	Claims	3	15
	Applicant Arguments/Remarks Made in an Amendment	16	16
	Transmittal Letter	17	18
	Information Disclosure Statement (IDS) Form (SB08)	19	22

Warnings:					
Information:					
2	Foreign Reference	0001_ep0723936a2.pdf	959356 059ae78f05077f029709bec03aa8be5b5ed42fba	no	9
Warnings:					
Information:					
3	Foreign Reference	0002_ep0743924a1.pdf	6982791 addfcbf0b65eb007f250100482a0ac297777aa4e	no	58
Warnings:					
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4	Foreign Reference	0003_gb1522188a.pdf	3630702 72bac958f35817a379b5b44bae76027527081f0f	no	19
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Information:					
5	Foreign Reference	0004_kr940003935b1.pdf	78468 a2e1c53911b2c7d8c98699c9c3130dde80bd19ba	no	1
Warnings:					
Information:					
6	Foreign Reference	0005_wo0189997a2.pdf	1962882 bd64b41b8bd303a08ad7b5164036770a9fe5f9bb	no	15
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10	Other Reference-Patent/App/Search documents	0009_3406002us1_oarn_032709.pdf	496985 1a8351f092e3bcc2be8e531faebaa16f1c354b2c	no	5
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11	Other Reference-Patent/App/Search documents	0010_3406002us1_noar_092309.pdf	755325 4338c080ac3786852761690bdc4d2a3e3a7eb70a	no	6
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Information:					
14	Other Reference-Patent/App/Search documents	0013_3406005usr_exir_052313.pdf	392088 32a752002e932cc45809a086baf4146370f8a9bd	no	3
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15	Other Reference-Patent/App/Search documents	0014_3406005usr_foar_110513.pdf	1473383 7d63d205cde7fb130106cee456b47a59ee1a7793	no	16
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Information:					
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18	Other Reference-Patent/App/Search documents	0017_3406005usr_noar_111814.pdf	1317418 c3eeebe6293355f716d3ca036dee7b2ba9a7f17b	no	8
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Information:					
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20	Other Reference-Patent/App/Search documents	0019_3406005usr_aarf_012114.pdf	214142 576b8721617dbda7b4bbc3557912367517031987	no	18
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21	Other Reference-Patent/App/Search documents	0020_3406005usr_aarn_051314.pdf	494737 ad42ee7403e3dd4b5f2fea934ffc2ebfeb380f28	no	6
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Information:					
22	Other Reference-Patent/App/Search documents	0021_3406005usr_aarn_070813.pdf	211624 284e2b30ecca9f82d97d3e3ab49f8432e701f7b1	no	15
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Information:					
23	Other Reference-Patent/App/Search documents	0022_3406005usr_samd_071814.pdf	101949 2a00e7640685ddc3799005e69deab355de0fccac	no	5
Warnings:					
Information:					
24	Other Reference-Patent/App/Search documents	0023_3406005usr_samd_091714.pdf	109018 34e1e514fc1a198f3d3525b6206826861631ffab	no	7
Warnings:					
Information:					
25	Other Reference-Patent/App/Search documents	0024_3406005usr_samd_102014.pdf	117347 a60583a3617752bae1649deda5f7e990ba8a3185	no	6

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26	Other Reference-Patent/App/Search documents	0025_drmirzareport.pdf	2657086 1295a283e8648d4a136272f5088030f7460fd93e	no	5
Warnings:					
Information:					
27	Other Reference-Patent/App/Search documents	0026_dasilva_p699_2003.pdf	231568 1bf977ef59c517306e6b8e9075a94af430168042	no	11
Warnings:					
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28	Other Reference-Patent/App/Search documents	0027_dasilva_p880_2003.pdf	392280 246b58daf4478905bbaed77567678913583 56a80	no	9
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29	Other Reference-Patent/App/Search documents	0028_foller_p506_1982.pdf	2671912 ed5a0f54eead3a5b8a0fc0ead91b171d848 774f7	no	10
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Warnings:					
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		Total Files Size (in bytes):	57486032		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: James Andrew Senkiw
Title: FLOW-THROUGH OXYGENATOR
Continuation Re-issue of U.S. Patent No. 7,670,495

Docket No.:	3406.005US2	Serial No.:	14/601,340
Filed:	January 21, 2015	Due Date:	N/A
Examiner:	Unknown	Group Art Unit:	1797
Customer No.:	21186	Confirmation No.:	1069

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

X Supplemental Preliminary Amendment (15 pgs.)
X Information Disclosure Statement (2 pgs.), Form 1449 (4 pgs.) Copies of Cited References (30).

If not provided for in a separate paper filed herewith, please consider this a PETITION FOR EXTENSION OF TIME for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743. If applicable, any papers or fees supplied herewith are considered to be timely filed pursuant to 37 C.F.R. § 1.7(a), the response period falling on a Federal Holiday, Saturday or Sunday being extended to the next succeeding business day.

SCHWEGMAN LUNDBERG & WOESSNER, P.A.
Customer No.: 21186

By: /Albin J. Nelson/
Albin J. Nelson
Reg. No. 28,650

S/N 14/601,340 **CONTINUATION REISSUE PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	James Andrew Senkiw	Examiner: Unknown
Serial No.:	14/601,340	Group Art Unit: Unknown
Filed:	January 21, 2015	Atty. Docket No.: 3406.005US2
Continuation Reissue of U.S. Patent No. 7,670,495		Issued March 2, 2010
Title: FLOW-THROUGH OXYGENATOR		Customer Number: 21186

SUPPLEMENTAL PRELIMINARY AMENDMENT

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria , VA 22313-1450

In supplement of the preliminary amendment submitted with the filing of this CONINUATION reissue patent application on January 21, 2015, please enter the following amendments of pending claims 13-69.

IN THE CLAIMS

Claims 1-12 were cancelled by the preliminary amendment.

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Cancelled)
7. (Cancelled)
8. (Cancelled)
9. (Cancelled)
10. (Cancelled)
11. (Cancelled)
12. (Cancelled)

Please enter the following amendments of claims 13-69.

13. (Currently Amended) An electrolysis system for generating oxygenated water, the system comprising:

a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet;

at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing;

each electrode of the system is positioned so that substantially all points midway between all opposing [first and second] electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to

deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

14. (Previously Presented) The system of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis; wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis; and wherein at least one of the first and second electrodes is positioned in the tubular housing closer to the inward-facing surface than said distance separating the electrodes.

15. (Previously Presented) The system of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis; wherein said portions of electrodes extend in a direction parallel to the longitudinal axis; and wherein each electrode of the system is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing.

16. (Previously Presented) The system of claim 13 wherein at least one of the electrodes is a stainless steel mesh or screen.

17. (Currently Amended) The system of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to [and including] the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing.

18. (Currently Amended) The system of claim 17 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing

first and second electrodes within the tubular housing.

19. (Previously Presented) The system of claim 17 wherein the first and second electrodes comprise an outside electrode and an inside electrode, wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing,
the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is,
wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

20. (Previously Presented) The system of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of that portion of one of the electrodes positioned within the housing;
wherein the first and second electrodes comprise an outside electrode and an inside electrode;
wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing;
the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is;
wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway; and
wherein the tubular housing of the system is round.

21. (Previously Presented) The system of claim 19 wherein said surface is an inward-facing concave surface.

22. (Previously Presented) The system of claim 13 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

23. (Previously Presented) The system of claim 13 wherein the oxygen comprises microbubbles.

24. (Previously Presented) The system of claim 13 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

25. (Previously Presented) The system of claim 13 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

26. (Previously Presented) The system of claim 25 wherein the oxygen comprises microbubbles.

27. (Currently Amended) An electrolysis system for generating oxygenated water, the system comprising:
a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;
at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing

and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section that has a water flow area through which at least some water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches,

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode; and

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the chamber of the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

28. (Previously Presented) The system of claim 27 wherein each electrode of the system is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber.

29. (Currently Amended) The system of claim 27 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to [and including] the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

30. (Currently Amended) The system of claim 29 wherein the unobstructed passageway includes

the center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

31. (Previously Presented) The system of claim 30 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

32. (Previously Presented) The system of claim 27 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

33. (Previously Presented) The system of claim 27 wherein the oxygen comprises microbubbles.

34. (Previously Presented) The system of claim 27 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

35. (Previously Presented) The system of claim 27 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

36. (Previously Presented) The system of claim 35 wherein the oxygen comprises microbubbles.

37. (Currently Amended) An electrolysis system for generating oxygenated water, the system comprising:
a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;
at least two electrodes comprising a first electrode and a second electrode, at least portions of the

first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches, a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, said portion being a portion that opposes the other of the first and second electrodes, wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows at least some water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

38. (Currently Amended) The system of claim 37 wherein the tubular housing [chamber] has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal center axis; and wherein each electrode of the system is positioned so that substantially all points midway between all opposing [first and second] electrodes inside the chamber are closer to said inwardly-facing surface [of the tubular housing] than to the longitudinal [a] center axis [point within the tubular housing].

39. (Previously Presented) The system of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis, wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis, and wherein at least one of the first and second electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes.

40. (Previously Presented) The system of claim 39 wherein each electrode of the system is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

41. (Previously Presented) The system of claim 37 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

42. (Currently Amended) The system of claim 37 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to [and including] the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

43. (Currently Amended) The system of claim 42 wherein the unobstructed passageway <u>includes the center axis and</u> is multiple times wider than the distance separating the opposing first and second electrodes within the chamber.

44. (Previously Presented) The system of claim 42 wherein the chamber has an inward-facing surface that runs parallel to the longitudinal axis; wherein the first and second electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is; and wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

45. (Previously Presented) The system of claim 37 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

46. (Previously Presented) The system of claim 37 wherein the oxygen comprises microbubbles.

47. (Previously Presented) The system of claim 37 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

48. (Previously Presented) The system of claim 37 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

49. (Previously Presented) The system of claim 48 wherein the oxygen comprises microbubbles.

50. (Currently Amended) An electrolysis cell comprising:
a tubular housing defining [a] an oxygenation chamber, and having [and] an inward-facing surface that defines at least in part the oxygenation chamber [runs parallel to a longitudinal center axis], [and] a water inlet, and a water outlet;
at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that[is] runs parallel to the inward-facing surface [longitudinal axis], the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber;
wherein each electrode of the electrolysis cell is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing

through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches [the longitudinal center axis of the chamber maintaining an unobstructed passageway that runs longitudinally parallel to and including the axis at the center of the chamber].

51. (Currently Amended) The electrolysis cell of claim 50 wherein at least one of the [first and second] inside and outside electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes, and wherein the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and wherein the unobstructed passageway includes the longitudinal center axis.

52. (Previously Presented) The electrolysis cell of claim 50 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

53. (Previously Presented) The electrolysis cell of claim 52 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

54. (Previously Presented) The electrolysis cell of claim 50 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

55. (Previously Presented) The electrolysis cell of claim 54 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

56. (Previously Presented) The electrolysis cell of claim 55 wherein said inward-facing surface is a concave surface.

57. (Previously Presented) The electrolysis cell of claim 50 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

58. (Currently Amended) The electrolysis cell of claim 50 wherein the electrolysis cell is operable when connected to a power source to create microbubbles of oxygen in water flowing through the electrolysis cell [the oxygen comprises microbubbles].

59. (Currently Amended) The electrolysis cell of claim 50 coupled to a power source wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

60. (Previously Presented) The electrolysis cell of claim 50 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

61. (Currently Amended) The electrolysis cell of claim [50] 60 wherein the electrolysis cell is operable when connected to a power source to create microbubbles of oxygen in water flowing through the electrolysis cell [the oxygen comprises microbubbles].

62. (Currently Amended) An electrolysis cell comprising:
a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,
at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, the outside and

inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;
the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, the electrodes being positioned so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;
wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway. [water flow path]

63. (Previously Presented) The electrolysis cell of claim 62 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

64. (Currently Amended) The electrolysis cell of claim [62] 63 wherein the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

65. (Previously Presented) The electrolysis cell of claim 62 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

66. (Previously Presented) The electrolysis cell of claim 62 wherein said outer wall includes an

inwardly-facing concave surface.

67. (Previously Presented) The electrolysis cell of claim 62 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

68. (Previously Presented) The electrolysis cell of claim 62 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

69. (Currently Amended) The electrolysis cell of claim 68 wherein the electrolysis cell is operable when connected to a power source to create microbubbles of oxygen in water flowing through the electrolysis cell [the oxygen comprises microbubbles].

REMARKS

These amendments of the pending claims 13-69 appropriately adjust the claim language to be internally consistent. Support for the amendments is provided by Figure 7A and col 9:5-33 of the specification.

Applicant submits that the pending claims are fully supported by the specification and that these claims do not add new matter to the subject matter disclosed in that specification.

Applicant states that EXCEPT FOR COPENDING REISSUE APPLICATION SERIAL NO 13/247,241, WHICH HAS BEEN RE- ISSUED as Re 45,415, there are no prior or concurrent proceedings in which U.S. Patent Re-issue Re 45,415 is or was involved, including interferences, reissues, reexaminations, or litigations, or is or was the result of such proceedings.

Applicant requests a favorable examination of his continuation application SN 14/601,340.

Respectfully Submitted,

SCHWEGMAN LUNDBERG & WOESSNER, P.A.

P.O. Box 2938
Minneapolis, MN 55402--0938
(612) 373-6939

Date April 27, 2015 By: /Albin J. Nelson/

Albin J. Nelson
Reg. No. 28,650

S/N 14/601,340 **CONTINUATION REISSUE PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	James Andrew Senkiw	Examiner:	Unknown
Serial No.:	14/601,340	Group Art Unit:	1797
Filed:	January 21, 2015	Docket:	3406.005US2
Customer No.:	21186	Confirmation No.:	1069

Continuation Re-issue of U.S. Patent No. 7,670,495

Title: FLOW-THROUGH OXYGENATOR

INFORMATION DISCLOSURE STATEMENT

MS Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq*., the enclosed materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicant respectfully requests that this Information Disclosure Statement be entered and the documents listed on the attached PTO 1449 Form be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicant requests that a copy of the PTO 1449 Form, initialed as being considered by the Examiner, be returned to the Applicant with the next official communication.

Pursuant to 37 C.F.R. § 1.97(b), it is believed that no fee or statement is required with the Information Disclosure Statement. However, if an Office Action on the merits has been mailed after filing of the application or after the filing of the most recent RCE, the Commissioner is hereby authorized to charge the required fees to Deposit Account No. 19-0743 in order to have this Information Disclosure Statement considered.

Pursuant to 37 C.F.R. § 1.98(a)(2), copies of cited U.S. Patents and Published Applications, and Non-Published Applications identifiable by USPTO Serial Number, are no longer required to be provided to the Office. Applicant acknowledges the requirement to submit copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R § 1.98(a)(2).

The Examiner is invited to contact the undersigned at the telephone number indicated if there are any questions regarding this communication.

Respectfully submitted,

SCHWEGMAN LUNDBERG & WOESSNER, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(612) 373-6939

Date April 27, 2015 By /Albin J. Nelson/
Albin J. Nelson
Reg. No. 28,650

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/601,340	Filing Date 01/21/2015	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	04/27/2015	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 62	Minus	** 56	= 6	X $40 =	240
	Independent (37 CFR 1.16(h))	* 5	Minus	***5	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**240**

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/MONICA FRANCIS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/601,340	01/21/2015	James Andrew Senkiw	3406.005US2	1069

21186 7590 05/13/2015

SCHWEGMAN LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER
JOHNSON, JERRY D

ART UNIT	PAPER NUMBER
3991	

NOTIFICATION DATE	DELIVERY MODE
05/13/2015	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@slwip.com
SLW@blackhillsip.com

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 14/601,340	Applicant(s) SENKIW, JAMES ANDREW	
	Examiner JERRY D. JOHNSON	Art Unit 3991	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) 13-69 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) 13-69 is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

Reissue Applications

For reissue applications filed on or after September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the current provisions.

This is a continuation reissue application of U.S. Patent No. 7,670,495 (the '495 patent) which issued from U.S. Patent Application No. 12/023,431 (the '431 application) with claims 1-12 on March 2, 2010. The '495 patent was previously reissued as U.S. RE45,415 on March 17, 2015, based on U.S. Application No. 13/247,241 (the '241 reissue application) filed September 28, 2011. The '495 patent is a division of U.S. Patent No. 7,396,441, (the '441 patent) which is a continuation-in-part of U.S. Patent No. 6,689,262 (the '262 patent).

Reissue Declaration

The reissue oath/declaration filed with this application is defective (see 37 CFR 1.175 and MPEP § 1414) because of the following:

The declaration does not identify the alleged error to be corrected by this continuation reissue application. Additionally, for reissue applications filed on or after September 16, 2012, a claim that the application seeks to broaden must be identified. See 37 CFR 1.175 and MPEP § 1414. Furthermore, the '241 reissue application was a reissue of the '495 patent. The present continuation reissue application cannot broaden the claims of the parent '441 (which issued July 8, 2008) or '262 patents (which issued February 10, 2004). Nor can the present continuation

reissue application recapture subject matter that was surrendered during the prosecution of the parent '441 and '262 patents.

Claims 13-69 are rejected as being based upon a defective reissue declaration under 35 U.S.C. 251 as set forth above. See 37 CFR 1.175.

The nature of the defect(s) in the declaration is set forth in the discussion above in this Office action.

Amendment

The amendment filed April 27, 2015 is improper. The amendment does not comply with 37 CFR 1.173(b), which sets forth the manner of making amendments in reissue applications. A supplemental paper correctly amending the reissue application is required.

Specifically, all bracketing and underlining is made in comparison to the original patent, not in comparison to any prior amendment in the reissue application. 37 CFR 1.173(b)(2) relates to the manner of making amendments to the claims in reissue applications. 37 CFR 1.173(b)(2) requires that for each new claimed added to the reissue application, the entire text of the added claim must be presented completely underlined.

Also pursuant to 37 CFR 1.173(c), each claim amendment must be accompanied by an explanation of the support in the disclosure of the patent for the amendment (i.e., support for all changes made in the claim(s), whether insertions or deletions). The general statement in the Remarks filed with the April 27, 2015 preliminary amendment "[s]upport for the amendments is provided by Figure 7A and col 9:5-33 of the specification" does not satisfy the requirements of 37 CFR 1.173(c). The failure to submit an explanation will generally result in a notification to

applicant that the amendment *before final rejection* is not completely responsive (see 37 CFR 1.135(c)). Such an amendment *after final rejection* will not be entered.

Notice

If the patent reissue application issues without any cross reference to the continuation reissue application, amendment to the parent reissue application to include a cross-reference to the continuation reissue application must be done at the time of allowance of the continuation reissue application by Certificate of Correction. See MPEP 1451(II)(March 2014).

Duty to Disclose

Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which Patent No. 7,670,495 is or was involved. These proceedings would include interferences, reissues, reexaminations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP §§ 1404, 1442.01 and 1442.04.

Correspondence

Any inquiry concerning this communication or earlier communications from the specialist should be directed to Jerry D. Johnson whose telephone number is (571) 272-1448. The specialist can normally be reached on 5:30-3:00, M-F, alternate Fridays off.

If attempts to reach the specialist by telephone are unsuccessful, the specialist's supervisor, Stephen Stein can be reached on (571) 272-1544.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Telephone Numbers for reexamination inquiries:
Central Reexam Unit (CRU) (571) 272-7705

Please mail any communications to:
Attn: Mail Stop "Ex Parte Reexam"
Central Reexamination Unit
Commissioner for Patents
P. O. Box 1450
Alexandria VA 22313-1450

Please hand-deliver any communications to:
Customer Service Window
Attn: Central Reexamination Unit
Randolph Building, Lobby Level
401 Dulany Street
Alexandria, VA 22314

By EFS: Registered users may submit via the electronic filing system EFS-Web at
https://efs.uspto.gov/efile/myportal/efs-registered

Signed:

/Jerry D. Johnson/
Patent Reexamination Specialist
Central Reexamination Unit 3991

/Alan Diamond/
Patent Reexamination Specialist
Central Reexamination Unit 3991

/Stephen Stein/
Patent Reexamination Specialist
Central Reexamination Unit 3991

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14601340	SENKIW, JAMES ANDREW
	Examiner	Art Unit
	JERRY D JOHNSON	3991

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Reviewed prosecution history in 6,689,262; 7,396,441; 7,670,495; RE45,415	05/06/15	JDJ

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14601340	SENKIW, JAMES ANDREW
	Examiner	**Art Unit**
	JERRY D JOHNSON	3991

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/06/2015								
	1	-								
	2	-								
	3	-								
	4	-								
	5	-								
	6	-								
	7	-								
	8	-								
	9	-								
	10	-								
	11	-								
	12	-								
	13	✓								
	14	✓								
	15	✓								
	16	✓								
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	34	✓								
	35	✓								
	36	✓								

U.S. Patent and Trademark Office Part of Paper No. : 20150430

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14601340	SENKIW, JAMES ANDREW
	Examiner	**Art Unit**
	JERRY D JOHNSON	3991

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/06/2015								
	37	✓								
	38	✓								
	39	✓								
	40	✓								
	41	✓								
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	69	✓								

S/N 14/601,340 **CONTINUATION REISSUE PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	James Andrew Senkiw	Examiner: Jerry D. Johnson
Serial No.:	14/601,340	Group Art Unit: 3991
Filed:	January 21, 2015	Atty. Docket No.: 3406.005US2
Continuation Reissue of U.S. Patent No. 7,670,495		Issued March 2, 2010
Title: FLOW-THROUGH OXYGENATOR		Customer Number: 21186

AMENDMENT UNDER 37 C.F.R. §1.173

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria , VA 22313-1450

This amendment responds to the PTO action of May 13, 2015 for Application Serial No. 14/601,340.

Applicant makes this amendment of the original claims and presentation of new claims relative to the issued claims of U.S. Patent No. 7,670,495. The claims but not the remarks of the preliminary amendment submitted with the filing of this reissue continuation application on January 21, 2015 and the claims but not the remarks of the supplemental preliminary amendment submitted April 27, 2015 are superseded by the claims of this amendment. Although this present amendment presents the same claim language presented by the supplemental preliminary amendment of April 27th, this amendment addresses claims relative to the original claims of the '495 patent instead of as an ongoing prosecution matter as instructed by the PTO Examiner. This action is taken pursuant to 37 C.F.R. §1.173.

IN THE CLAIMS

Please cancel original Claims 1-12.

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Cancelled)
7. (Cancelled)
8. (Cancelled)
9. (Cancelled)
10. (Cancelled)
11. (Cancelled)
12. (Cancelled)

Please add the following new claims 13-69.

13. (New) An electrolysis system for generating oxygenated water, the system comprising:
a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet;
at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing;
each electrode of the system is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power

source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

14. (New) The system of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis; wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis; and wherein at least one of the first and second electrodes is positioned in the tubular housing closer to the inward-facing surface than said distance separating the electrodes.

15. (New) The system of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis; wherein said portions of electrodes extend in a direction parallel to the longitudinal axis; and wherein each electrode of the system is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing.

16. (New) The system of claim 13 wherein at least one of the electrodes is a stainless steel mesh or screen.

17. (New) The system of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing.

18. (New) The system of claim 17 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the tubular housing.

19. (New) The system of claim 17 wherein the first and second electrodes comprise an outside electrode and an inside electrode, wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing,
the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is,
wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

20. (New) The system of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of that portion of one of the electrodes positioned within the housing;
wherein the first and second electrodes comprise an outside electrode and an inside electrode;
wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing;
the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is;
wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway; and
wherein the tubular housing of the system is round.

21. (New) The system of claim 19 wherein said surface is an inward-facing concave surface.

22. (New) The system of claim 13 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

23. (New) The system of claim 13 wherein the oxygen comprises microbubbles.

24. (New) The system of claim 13 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

25. (New) The system of claim 13 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

26. (New) The system of claim 25 wherein the oxygen comprises microbubbles.

27. (New) An electrolysis system for generating oxygenated water, the system comprising:
a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;
at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,
wherein the position and size of each electrode within the chamber defines a cross-section that has a water flow area through which at least some water may flow without passing between

electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches,

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode; and

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the chamber of the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

28. (New) The system of claim 27 wherein each electrode of the system is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber.

29. (New) The system of claim 27 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

30. (New) The system of claim 29 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

31. (New) The system of claim 30 wherein the outside electrode defines a cross-sectional area

between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

32. (New) The system of claim 27 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

33. (New) The system of claim 27 wherein the oxygen comprises microbubbles.

34. (New) The system of claim 27 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

35. (New) The system of claim 27 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

36. (New) The system of claim 35 wherein the oxygen comprises microbubbles.

37. (New) An electrolysis system for generating oxygenated water, the system comprising:
a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;
at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches, a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, said portion being a portion that opposes the other of the first and second electrodes, wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows at least some water to avoid passing between

electrodes separated by 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

38. (New) The system of claim 37 wherein the tubular housing has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal center axis; and wherein each electrode of the system is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis.

39. (New) The system of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis, wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis, and wherein at least one of the first and second electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes.

40. (New) The system of claim 39 wherein each electrode of the system is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

41. (New) The system of claim 37 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

42. (New) The system of claim 37 wherein the electrodes are positioned away from a

longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

43. (New) The system of claim 42 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the chamber.

44. (New) The system of claim 42 wherein the chamber has an inward-facing surface that runs parallel to the longitudinal axis; wherein the first and second electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is; and wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

45. (New) The system of claim 37 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

46. (New) The system of claim 37 wherein the oxygen comprises microbubbles.

47. (New) The system of claim 37 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

48. (New) The system of claim 37 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second

anode electrode portions each being parallel to respective opposing cathode electrode portions.

49. (New) The system of claim 48 wherein the oxygen comprises microbubbles.

50. (New) An electrolysis cell comprising:
a tubular housing defining an oxygenation chamber, and having an inward-facing surface that defines at least in part the oxygenation chamber, a water inlet, and a water outlet;
at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that runs parallel to the inward-facing surface, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber;
wherein each electrode of the electrolysis cell is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches.

51. (New) The electrolysis cell of claim 50 wherein at least one of the inside and outside electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes, and wherein the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and wherein the unobstructed passageway includes the longitudinal center axis.

52. (New) The electrolysis cell of claim 50 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in

part the oxygenation chamber.

53. (New) The electrolysis cell of claim 52 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

54. (New) The electrolysis cell of claim 50 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

55. (New) The electrolysis cell of claim 54 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

56. (New) The electrolysis cell of claim 55 wherein said inward-facing surface is a concave surface.

57. (New) The electrolysis cell of claim 50 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

58. (New) The electrolysis cell of claim 50 wherein the electrolysis cell is operable when connected to a power source to create microbubbles of oxygen in water flowing through the electrolysis cell.

59. (New) The electrolysis cell of claim 50 coupled to a power source wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

60. (New) The electrolysis cell of claim 50 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

61. (New) The electrolysis cell of claim 60 wherein the electrolysis cell is operable when connected to a power source to create microbubbles of oxygen in water flowing through the electrolysis cell.

62. (New) An electrolysis cell comprising:
a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,
at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;
the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, the electrodes being positioned so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;
wherein the outside electrode defines a cross-sectional area between the outside electrode and

the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway.

63. (New) The electrolysis cell of claim 62 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

64. (New) The electrolysis cell of claim 63 wherein the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

65. (New) The electrolysis cell of claim 62 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

66. (New) The electrolysis cell of claim 62 wherein said outer wall includes an inwardly-facing concave surface.

67. (New) The electrolysis cell of claim 62 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

68. (New) The electrolysis cell of claim 62 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

69. (New) The electrolysis cell of claim 68 wherein the electrolysis cell is operable when

connected to a power source to create microbubbles of oxygen in water flowing through the electrolysis cell.

REMARKS

Applicant and Assignee presented on January 21, 2015 the continuation reissue application associated with this amendment pursuant to 35 U.S.C. §251; 37 C.F.R. §1.177 and M.P.E.P §1451. This reissue application is a continuation reissue application of U.S. Patent No. 7,670,495.

In the preliminary amendment co-filed with this continuation reissue application on January 21, 2015, Applicant addressed the co-pendency of this continuation reissue application with U.S patent No. 7,670,495 and his prior reissue patent, U.S. Patent RE45 415. In the action of May 13, 2015, the PTO correctly stated the relationship among this continuation reissue application, Reissue patent RE45,415; U.S. Patent No. 7,670,495 on which this continuation reissue application is based; and grandparent patents U.S. Patent No's. 7,396,441 and 6,689,262.

As agreed by the PTO, because the present reissue application is a continuation of original reissue application Serial No. 12/247,241 and U.S. Patent No. 7,670,495 and has a priority date established by the original reissue application, Applicant and Assignee have satisfied the requirement of 35 U.S.C. §251(d) concerning submission of a broadening reissue within two years of the issuance of the original patent to be reissued, namely U.S. Patent No. 7,670,495.

Applicant presents this amendment in connection with this continuation reissue application to correct errors of the claims of original U.S. Patent No. 7,670,495. As Applicant stated in in his response of May 13, 2014 for Serial No. 13/247,241 and again in his Communication submitted with the payment of the base issue fee for Serial No. 13/247,241, Applicant and Assignee reserved the right to submit one or more reissue continuation applications to address the subject matter that was cancelled during the prosecution of reissue application Serial No. 13/247,241. This subject matter included but was not limited to the apparatus, device, emitter, system and suspension described in the original patent.

Applicant stated in his original Inventor's Reissue Declaration for Broadening Reissue filed with his original reissue application, Serial No. 13/247,241 that he had a right to claim the above-described subject matter but did not do so. Consequently, Applicant's original Reissue

satisfied the requirements of 37 C.F.R §1.172; M.P.E.P §1410.01 and M.P.E.P §1451(II). In particular, Applicant stated in his original Declaration that he was entitled to claim but did not claim "the construction of the emitter as a flow through device with one or more sets of electrodes therein…and further was entitled to claim but did not claim additional aspects of the disclosed invention such as a tube shape for the emitter, a grid design for the electrodes, an arrangement of the electrodes within the tube shaped emitter which placed one kind of electrode inside the other kind…" Comparison of this statement with the original claims of the '495 patent shows that the emitter claims 2-7, 11 and 12 are the claims inferentially identified as those to be broadened. However, Applicant's original reissue Declaration did not explicitly identify these claims as required by 37 CFR 1.175b. Consequently, Applicant submits herewith this revised reissue Declaration in which he recites the claims to be broadened in any respect pursuant to this rule.

Applicant further states that his original independent claim 2 of the '495 patent does not recite structural features of the emitter except for the spacer thickness separating the anode and cathode. Consequently, this claim relates to any structural configuration of the emitter. Applicant's new claims presented in this amendment may be regarded as providing explicit structural configurations and to this extent may be regarded as adding structure to the emitter of claim 2. Under the rules, guidelines and case law relating to reissue, these amendments are considered broadening because they broaden the original claims in any respect even though the change from unstated structural configurations to recitation of certain structural configurations may be regarded on the whole as other than generally broadening.

As stated in Applicant's original Inventor's Reissue Declaration, and the Inventor's Reissue Declaration submitted with this amendment, the claims of original U.S. Patent No. 7,670,495 recite subject matter that is less in scope than Applicant was entitled to claim. As indicated in the original Inventor's Reissue Declaration and the Inventor's Reissue Declaration submitted herewith, all errors that are addressed and corrected by this amendment arose without any deceptive intention on the part of Applicant.

The new claims presented by this preliminary amendment are directed to the same general invention as that disclosed by the original patent as required by 35 U.S.C. §251. Current

new claims 13 – 49 generally are directed to an electrolysis system for generating oxygenated water. This subject matter was also presented as claims 30-39 (system) of the preliminary amendment submitted with the original reissue application Serial No. 13/247,241 on September 28, 2011. Current new claims 50 -69 are directed to an electrolysis cell. This subject matter was also presented in claims 13-29 (emitter) of the preliminary amendment submitted with the original reissue application Serial no. 13/247,241 on September 28, 2011.

Support in the patent disclosure for each element of claims 13-69 presented by this amendment is provided by the following chart.

CHART SHOWING SPECIFICATION SUPPORT FOR THE NEW CLAIMS

Claim Language	Location[1]
Claim 13	
an electrolysis system for generating oxygenated water	2:63-67 3:24-35
a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet	3:26-32 9:7-11 FIGS. 7A-7B
at least two opposing electrodes in the tubular housing separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing	FIG. 7A 9:5-33
and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a	FIG. 7A 9:5-33 3:23-30

1 The citation (eg., 2:63-67) means column 2, lines 63-67 of the '495 patent specification.

distance of between 0.005 inches to 0.140 inches	3:11-14
power source of voltage and amperage	9:35-45
power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis	3:27-35 2:63-67
Claim 14	
an inward-facing surface that runs parallel to the longitudinal axis	FIG. 7A 9:7-12
electrodes extend in a direction that is parallel to the longitudinal axis	FIG. 7A FIG. 7B 9:7-12 3:25-30
an electrode positioned in the tubular housing closer to the inward-facing surface than the distance separating the electrodes	FIG. 7A 9:7-12
Claim 15	
an inward-facing surface that runs parallel to the longitudinal axis	FIG. 7A 9:7-12
electrodes extend in a direction parallel to the longitudinal axis	FIG. 7A FIG. 7B 9:7-12 3:25-30

each electrode of the system is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing	FIG. 7A 9:7-12
Claim 16	
an electrode is stainless steel mesh or screen	3:6-8 4:63-64
Claim 17	
the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing	FIG. 7A FIG. 7B 9:7-18
Claim 18	
the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the electrodes	FIG. 7A
Claim 19	
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
electrodes extend in a direction parallel to the longitudinal axis	FIGS. 7A-7B 9:7-12 3:25-30
an inward-facing surface of the tubular housing	FIG. 7A 9:7-12

cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 20	
electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of that portion of one of the electrodes positioned within the housing	FIG. 7A FIG. 7B 9:7-18
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
electrodes extend in a direction parallel to the longitudinal axis	FIGS. 7A-7B 9:7-12 3:25-30
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
the tubular housing of the system is round	FIG. 7A
Claim 21	
inward-facing surface is concave	FIG. 7A
Claim 22	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17

Claim 23	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 24	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 25	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 26	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 27	
an electrolysis system for generating oxygenated water	2:63-67 3:24-35
a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface parallel to the water flow axis and defines at least in part the oxygenation chamber	3:26-32 9:7-12 FIG. 7A
an outside electrode closer to an outer wall and an inside	3:25-30

electrode closer to the longitudinal axis, electrodes extend in a direction that is parallel to the longitudinal axis	FIG. 7A FIG. 7B 9:7-18
electrodes separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
the position and size of each electrode within the chamber defines a cross-section that has a water flow area through which at least some water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0. 005 inches to 0 .140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:5-33 3:23-30 3:11-14
a portion of the outside electrode is closer to the inward-facing surface than the distance separating the inside and outside electrodes	FIG. 7A 3:25-28
power source of voltage and amperage	9:35-45
power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis	3:27-35 2:63-67
Claim 28	
each electrode of the system is positioned closer to the	FIG. 7A

inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber	9:7-12
Claim 29	
electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber	FIG. 7A FIG. 7B 9:7-18
Claim 30	
the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the electrodes	FIG. 7A
Claim 31	
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 32	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 33	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28

Claim 34	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 35	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 36	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 37	
an electrolysis system for generating oxygenated water	2:63-67 3:24-35
a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;	3:26-32 9:7-12 FIG. 7A
electrodes separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11
a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, the portion being a portion that opposes the other of the first and second electrodes	FIG. 7A
each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes	FIG. 7A 9:5-33

a water flow area that allows at least some water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches	3:11-14
power source of voltage and amperage	9:35-45
power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis	3:27-35 2:63-67
Claim 38	
an inward-facing surface that runs parallel to a longitudinal center axis of the tubular housing	FIG. 7A 3:26-32 9:7-12
each electrode of the system is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis	FIG. 7A
Claim 39	
the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis, wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis	3:26-32 9:7-12 FIG. 7A
an electrode is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes	FIG. 7A 9:7-12

Claim 40	
each electrode of the system is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber	FIG. 7A 9:7-12
Claim 41	
the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing	FIG. 7A
Claim 42	
the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber	FIG. 7A FIG. 7B 9:7-18
Claim 43	
the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes	FIG. 7A
Claim 44	
an inward-facing surface that runs parallel to a longitudinal center axis of the chamber	FIG. 7A 3:26-32 9:7-12
an outside electrode closer to an outer wall and an inside	3:25-28

electrode closer to the longitudinal axis	FIG 7A 9:7-18
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 45	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 46	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 47	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 48	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 49	
the oxygen comprises microbubbles	2:63-67 3:11-14 4:10-11 4:27-28
Claim 50	

an electrolysis cell	2:63-67 3:24-35 Abstract
a tubular housing defining an oxygenation chamber, and having and an inward-facing surface that defines at least in part the oxygenation chamber, a water inlet, and a water outlet	3:26-32 9:7-12 FIGS. 7A-7B
inside and outside electrodes extending parallel to the inward facing surface,	3:25-28 FIG 7A 9:7-18
electrodes separated by a distance of between 0.005 inches to 0.140 inches	3:11-14 4:54 5:4-11
each electrode of the electrolysis cell is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches	FIGS. 7A-7B 9:7-11 3:23-30 3:11-14
Claim 51	
an electrode is closer to the inward-facing surface than said distance separating the electrodes	FIG. 7A 9:7-11
the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and the unobstructed passageway includes the longitudinal center axis	FIG. 7A 9:7-11

Claim 52	
electrodes is in contact with at least one wall of the tubular housing	FIG. 7A
Claim 53	
electrode in contact with a wall of the tubular housing is in contact with a curved wall	FIG. 7A
Claim 54	
the unobstructed passageway is multiple times wider than the distance separating the opposing electrodes	FIG. 7A
Claim 55	
cross-sectional area between outside electrode and inward facing surface of housing is substantially less than a cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 56	
the inward-facing surface is a concave surface	FIG. 7A
Claim 57	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 58	
cell is operable to produce microbubbles of oxygen in water flowing through the electrolysis cell	2:63-67 3:11-14 4:10-11

	4:27-28
Claim 59	
ratio of current to active electrode area	9:35-45 (Table III)
Claim 60	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 61	
cell is operable to produce microbubbles of oxygen in water flowing through the electrolysis cell	2:63-67 3:11-14 4:10-11 4:27-28
Claim 62	
an electrolysis cell	2:63-67 3:24-35 Abstract
a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,	3:26-32 9:7-12 FIGS. 7A-7B
an outside electrode closer to an outer wall and an inside electrode closer to the longitudinal axis	3:25-28 FIG 7A 9:7-18
opposing electrodes separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 3:11-14 4:54 5:4-11

the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length	FIG. 7A FIG. 7B 9:7-18
the electrodes being positioned so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches	FIG. 7A 9:7-12 3:23-30 3:11-14
cross-sectional area between outside electrode and outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway	FIG. 7A 9:7-18
Claim 63	
an electrode is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber	FIG. 7A
Claim 64	
the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing	FIG. 7A
Claim 65	
the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes	FIG. 7A

Claim 66	
outer wall includes an inwardly-facing concave surface	FIG. 7A
Claim 67	
conductors are coupled to electrodes and exit a wall of the housing in a radial direction	FIG 7A 9:11-17
Claim 68	
non-parallel anode portions	FIG. 7A 9:7-11 3:25-28
Claim 69	
cell is operable to produce microbubbles of oxygen in water flowing through the electrolysis cell	2:63-67 3:11-14 4:10-11 4:27-28

Applicant submits that the new claims presented by this amendment are fully supported by the specification, the new claims do not add new matter to the subject matter disclosed in that specification, and the new claims do not recapture subject matter surrendered during the prosecution of the original '495 patent.

Applicant states that EXCEPT FOR COPENDING REISSUE APPLICATION SERIAL NO 13/247,241, WHICH HAS ISSUED AS U.S. PATENT NO. RE 45,415, there are no prior or concurrent proceedings in which U.S. Patent No. 7,670,495 is or was involved, including interferences, reissues, reexaminations, or litigations, or is or was the result of such proceedings.

Consents by Mark Rolfes, the president of the Assignee, Oxygenator Water Technologies, and the holder of a security interest, Jeffrey Brink, were signed on January 15, 2015 and filed with the filing of the continuation reissue application serial no. 14/601,340.

Applicant requests a favorable examination of his reissue continuation application SN 14/601,340.

Applicant's attorney also requests an in-person pre-examination interview with the Examiner. An August date such as August 10, 11, 20, 21 or 24-26 would be convenient.

Respectfully Submitted,

SCHWEGMAN LUNDBERG & WOESSNER, P.A.

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(612) 373-6939

Date July 6,2015 By: /Albin J. Nelson/

Albin J. Nelson
Reg. No. 28,650

SCHWEGMAN ■ LUNDBERG ■ WOESSNER

United States Patent Application

REISSUE DECLARATION OF INVENTORSHIP

As a below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I believe I am the original, first and sole inventor of the subject matter which is described and claimed in U.S. Patent No. 7,670,495 which was issued on March 2, 2010, and of the subject matter claimed in the broadening reissue patent application Serial No. 13/247,241 which was filed January 31, 2008 and which issued as U.S. Patent No. RE45,415 on March 17, 2015, and of the subject matter claimed in the present broadening reissue patent application Serial No. 14/601,340 filed January 21, 2015, which reissue patent application Serial No. 14/601,340 is a continuation of reissue patent application Serial No. 13/247,241/Reissue U.S. Patent No. RE45,415 and thus is a continuation reissue application of U.S. Patent No. 7,670,495.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by the amendment that is submitted with this declaration. A copy of this amendment is attached hereto as Exhibit A.

I acknowledge the duty to disclose information which is material to the patentability of this reissue application in accordance with 37 C.F.R. § 1.56 (attached hereto). I state that the present application is a broadening reissue application of U.S Patent No. 7,670,495 and a continuation reissue application of U.S. Patent No. RE45,415. Because of the continuation relationship with U.S. Patent No. RE45,145, this present application has an original filing date within two years of the issuance of the '495 patent.

I state pursuant to 37 C.F.R § 1.175(a) that I, the Applicant, believe the original patent to be partly inoperative or invalid by reason of the patentee claiming less than the patentee had a right to claim in the patent. I believe that the errors to be relied upon as the basis for reissue are to be found in the text of the claims of Patent No. 7,670,495 in that they do not encompass the full scope of my invention and unnecessarily limit that scope.

I identify claims 2-7, 11 and 12 of U.S. Patent No. 7,670,495 as claims that the application seeks to broaden. For example, claim 2 of the '495 patent does not recite certain features of the disclosed tubular embodiment of the electrolysis cell corresponding to FIGS. 7A and 7B which I was entitled to claim but did not claim. In this embodiment, for example: the electrodes are positioned in the outer perimeter of the oxygenation chamber; this positioning of the electrodes provides an unobstructed passageway for water to flow; in that unobstructed passageway, water may flow from the water inlet to the water outlet without passing through a space between the electrodes of opposite polarity; and a portion of at least one of the first and second electrodes is in contact with a wall of the tubular housing. Varying combinations of these exemplary features are presented in the claims of the amendment submitted with this Declaration, a copy of which is appended hereto as Exhibit A, using claim language of varying scope shown below.

Claim 13 now recites:

> each electrode of the system is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and

so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches ... .

Claim 27 now recites:

the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area through which at least some water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, …

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode … .

Claim 37 now recites:

a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, …

wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows at least some water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches … .

Claim 50 now recites:

wherein each electrode of the electrolysis cell is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and

so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches.

Claim 62 now recites:

the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis …

the electrodes being positioned so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway.

I further state that I identified errors of the subject matter of claim 2 of the '495 patent when I submitted my original Inventor Declaration for the parent reissue application, now US RE45,415, but at least some of these errors

were not corrected by the parent reissue. In the parent reissue application, I identified the following additional errors in the claims:

> Applicant was entitled to claim but did not claim such aspects of the disclosed invention as the construction of the emitter as a flow though device with one or more sets of electrodes therein and an arrangement of the sets of electrodes that would provide a relative relationship of those sets at angles other than 120°. In addition, Applicant was entitled to claim but did not claim the full range of the separation distance between the electrodes of the emitter. Furthermore, Applicant was entitled to claim but did not claim additional aspects of the disclosed invention such as a tube shape for the emitter, a grid design for the electrodes, an arrangement of the electrodes within the tube shaped emitter which placed one kind of electrode inside the other kind, and methods for cleaning waste and filth. In addition, the original patent presents claims that are limited by features that Applicant was entitled to omit. Those features include the recitation in those original claims of the specific dimensions of the microbubbles of oxygen. Applicant was entitled to claim but did not claim micro bubbles that would not break the surface tension of the water but without specifying the dimensions of those microbubbles.

I acknowledge that the claims of grandparent U.S. Patent Nos. 7,396,441 and 6,689,262 recite a flow through device. However, the claims of these parent patents do not recite the same subject matter and features set forth in either the original claims of U.S. Patent No. 7,670,495 or the subject matter I am entitled to claim but did not claim as set forth herein and in the amendment submitted herewith. The examples provided herein are not intended to be exhaustive or exclusive, but are presented for stating at least one error being relied upon as the basis for reissue pursuant to 37 C.F.R. 1.175. These and additional errors are addressed and corrected by the independent and dependent claims presented by the amendment filed herewith.

I state that all errors present in the original patent and in the present reissue application up to the time of filing of this Reissue Declaration, and errors which are addressed and corrected by the amendment concurrently filed with this Reissue Declaration, which correction of errors I have reviewed, arose without any deceptive intention on the part of the Applicant.

I understand that pursuant to 37 C.F.R. §3.71, the assignee, Oxygenator Water Technologies, Inc., has granted the power of attorney, for prosecuting this reissue patent application and for transacting all related business, to attorneys and agents of the firm of Schwegman, Lundberg, & Woessner, P.A., **Customer Number 21186.** I confirm and agree with this appointment.

Please direct all correspondence and all communications to **Schwegman, Lundberg & Woessner, P.A.,** at the address provided by the following customer number.

Customer Number: 21186

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of James Andrew Senkiw
Citizenship: U.S.A
Residence: Minneapolis, MN
Post Office Address: 4750 Aldrich Ave N, Minneapolis MN 55430-3529

Signature: _____ Date: 18 June 2015
James Andrew Senkiw

§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application:

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

Electronic Acknowledgement Receipt	
EFS ID:	22833109
Application Number:	14601340
International Application Number:	
Confirmation Number:	1069
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	21186
Filer:	Janet Elaine Embretson/Tara McMillen
Filer Authorized By:	Janet Elaine Embretson
Attorney Docket Number:	3406.005US2
Receipt Date:	06-JUL-2015
Filing Date:	21-JAN-2015
Time Stamp:	16:36:30
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406005US2-AARN-signed.pdf	1128887 a10ce6c808f621b29df8f0820e5df949597adc3b	yes	39

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Miscellaneous Incoming Letter	1	1
	Amendment/Req. Reconsideration-After Non-Final Reject	2	2
	Claims	3	15
	Applicant Arguments/Remarks Made in an Amendment	16	34
	Oath or Declaration filed	35	39
Warnings:			
Information:			
	Total Files Size (in bytes):	1128887	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors: James Andrew Senkiw
Title: FLOW-THROUGH OXYGENATOR
Continuation Re-issue of U.S. Patent No. 7,670,495

Docket No.:	3406.005US2	Serial No.:	14/601,340
Filed:	January 21, 2015	Due Date:	August 13, 2015
Examiner:	Jerry Johnson	Group Art Unit:	3991
Customer No.:	21186	Confirmation No.:	1069

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

X Amendment Under 37 C.F.R. §1.173 and Response to Non-Final Office Action (33 pgs.)
X Signed Reissue Declaration (5 pgs)

If not provided for in a separate paper filed herewith, please consider this a PETITION FOR EXTENSION OF TIME for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743. If applicable, any papers or fees supplied herewith are considered to be timely filed pursuant to 37 C.F.R. § 1.7(a), the response period falling on a Federal Holiday, Saturday or Sunday being extended to the next succeeding business day.

SCHWEGMAN LUNDBERG & WOESSNER, P.A.
Customer No.: 21186

By: /Albin J. Nelson/
Albin J. Nelson
Reg. No. 28,650

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/601,340	Filing Date 01/21/2015	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	07/06/2015	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 57	Minus	** 62	= 0	X $40 =	0
	Independent (37 CFR 1.16(h))	* 5	Minus	***5	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/CAROLYN COFER/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Best Available Copy

Sep Sep. 28. 2015 1:09PM srud RECEIVED CENTRAL FAX CENTER 952-224-3606 No. 0748 pP. 2

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PTO/AIA/80 (07-12)
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

■ Practitioners associated with Customer Number: 38846

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

■ The address associated with Customer Number: 38846

OR

☐

Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address: Oxygenator Water Technologies Inc. D/B/A Water D.O.G Works
6101 Baker Road, Suite 206
Minnetonka, Minnesota 55345

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Mark Rolfes	Date	09-28-2015
Name	Mark Rolfes	Telephone	612-209-7886
Title	President of Oxygenator Technologies		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PAGE 2/7 * RCVD AT 9/28/2015 2:10:56 PM [Eastern Daylight Time] * SVR:W-PTOFAX-002/41 * DNIS:2738300 * CSID: * DURATION (mm-ss):02-30

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PTO/AIA/96 (08-12)
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Oxygenator Water Technologies Inc., D/B/A Water D.O.G. Works

Application No./Patent No.: 14/601,340 Filed/Issue Date: Jan 21, 2015

Titled: Flow-Through Oxygenator (reissue)

Oxygenator Water Technologies Inc. D/B/A Water D.O.G. Works, a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose one of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: James Andrew Senkiw To: Aqua Innovations, Inc

The document was recorded in the United States Patent and Trademark Office at
Reel 020546, Frame 0241-0242, or for which a copy thereof is attached.

2. From: Aqua Innovations, Inc. To: Oxygenator Water Technologies D/B/A Water D.O.G. Works

The document was recorded in the United States Patent and Trademark Office at
Reel 021354, Frame 0676-0681, or for which a copy thereof is attached.

[Page 1 of 2]

PAGE 3/7 * RCVD AT 9/28/2015 2:10:56 PM [Eastern Daylight Time] * SVR:W-PTOFAX-002/41 * DNIS:2738300 * CSID: * DURATION (mm-ss):02-30

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Sep. 28. 2015 1:10PM No. 0748 P. 4

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STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
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6. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature	Date: Sept 28, 2015
Iain A. McIntyre	40,337
Printed or Typed Name	Title or Registration Number

[Page 2 of 2]

United States Patent and Trademark Office

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Patent Assignment Details

NOTE:Results display only for issued patents and published applications. For pending or abandoned applications please consult USPTO staff.

Reel/Frame: 020546/0241 **Pages:** 6

Recorded: 02/22/2008

Attorney Dkt #: 4056.02US02/03

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 2

1 **Patent #:** NONE **Issue Dt:** **Application #:** 12023416 **Filing Dt:** 01/31/2008
Publication #: US20080202995 **Pub Dt:** 08/28/2008
Title: FLOW-THROUGH OXYGENATOR

2 **Patent #:** 7670495 **Issue Dt:** 03/02/2010 **Application #:** 12023431 **Filing Dt:** 01/31/2008
Publication #: US20080176258 **Pub Dt:** 07/31/2008
Title: FLOW-THROUGH OXYGENATOR

Assignor

1 SENKIW, JAMES ANDREW **Exec Dt:** 05/25/2006

Assignee

1 AQUA INNOVATIONS, INC.
6101 BAKER ROAD
MINNETONKA, MINNESOTA 55345

Correspondence name and address

J. PAUL HAUN
4800 IDS CENTER, 80 SOUTH 8TH STREET
MINNEAPOLIS, MN 55402

Search Results as of: 09/27/2011 03:33 PM
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Web interface last modified: July 25, 2011 v.2.2

United States Patent and Trademark Office

Assignments on the Web > Patent Query

Patent Assignment Details

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Reel/Frame: 021354/0676 **Pages:** 6

Recorded: 08/11/2008

Attorney Dkt #: 4056.00-00-01

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Total properties: 7

1 **Patent #:** 6689262 **Issue Dt:** 02/10/2004 **Application #:** 10372017 **Filing Dt:** 02/21/2003
Publication #: US20030164306 **Pub Dt:** 09/04/2003
Title: MICROBUBBLES OF OXYGEN

2 **Patent #:** 7396441 **Issue Dt:** 07/08/2008 **Application #:** 10732326 **Filing Dt:** 12/10/2003
Publication #: US20040118701 **Pub Dt:** 06/24/2004
Title: FLOW-THROUGH OXYGENATOR

3 **Patent #:** NONE **Issue Dt:** **Application #:** 11367134 **Filing Dt:** 03/04/2006
Publication #: US20060150491 **Pub Dt:** 07/13/2006
Title: Flow-through oxygenator

4 **Patent #:** NONE **Issue Dt:** **Application #:** 11810540 **Filing Dt:** 06/06/2007
Publication #: US20070284245 **Pub Dt:** 12/13/2007
Title: Water treatment system

5 **Patent #:** NONE **Issue Dt:** **Application #:** 12023416 **Filing Dt:** 01/31/2008
Publication #: US20080202995 **Pub Dt:** 08/28/2008
Title: FLOW-THROUGH OXYGENATOR

6 **Patent #:** 7670495 **Issue Dt:** 03/02/2010 **Application #:** 12023431 **Filing Dt:** 01/31/2008
Publication #: US20080179259 **Pub Dt:** 07/31/2008
Title: FLOW-THROUGH OXYGENATOR

7 **Patent #:** NONE **Issue Dt:** **Application #:** 12055723 **Filing Dt:** 03/26/2008
Publication #: US20080237060 **Pub Dt:** 10/02/2008
Title: METHODS AND APPARATUS FOR ELECTROLYTIC TREATMENT OF WATER

Assignor

1 AQUA INNOVATIONS, INC. **Exec Dt:** 08/08/2008

Assignee

1 OXYGENATOR WATER TECHNOLOGIES, INC. D/B/A WATER D.O.G. WORKS
6101 BAKER ROAD, SUITE 206
MINNETONKA, MINNESOTA 55345

Correspondence name and address

J. PAUL HAUN
4800 IDS CENTER, 80 SOUTH 8TH STREET
MINNEAPOLIS, MN 55402

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Assignments on the Web > Patent Query

Patent Assignment Details

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Reel/Frame: 026079/0823 **Pages:** 10

Recorded: 02/09/2011

Conveyance: PROMISSORY NOTES GRANTING SECURITY INT

Total properties: 3

1 **Patent #:** 6689262 **Issue Dt:** 02/10/2004 **Application #:** 10372017 **Filing Dt:** 02/21/2003
Publication #: US20020164306 **Pub Dt:** 09/04/2003
Title: MICROBUBBLES OF OXYGEN

2 **Patent #:** 7396441 **Issue Dt:** 07/08/2008 **Application #:** 10732326 **Filing Dt:** 12/10/2003
Publication #: US20040118701 **Pub Dt:** 06/24/2004
Title: FLOW-THROUGH OXYGENATOR

3 **Patent #:** 7670485 **Issue Dt:** 03/02/2010 **Application #:** 12023431 **Filing Dt:** 01/31/2008
Publication #: US20080179259 **Pub Dt:** 07/31/2008
Title: FLOW-THROUGH OXYGENATOR

Assignors

1 OXYGENATOR WATER TECHNOLOGIES, INC. **Exec Dt:** 09/09/2008

2 WATER D.O.G. WORKS **Exec Dt:** 10/24/2008

Assignee

1 BRINK, JEFFREY P.
2003 SUGAR WOODS DRIVE
ORONO, MINNESOTA USA 55356

Correspondence name and address

WILLIAM J. O'BRIEN
1400 AT&T TOWER
901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402

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Web interface last modified: July 25, 2011 v.2.2

Sep. 28. 2015 1:08PM RECEIVED CENTRAL FAX CENTER No. 0748 P. 1

SEP 2 8 2015

S/N 14/601,340 **CONTINUATION REISSUE PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: James Andrew Senkiw	Examiner: Jerry D. Johnson
Serial No.: 14/601,340	Group Art Unit: 3991
Filed: January 21, 2015	Atty. Docket No.: 1252.0002AA
Continuation Reissue of U.S. Patent No. 7,670,495	Issued March 2, 2010
Title: FLOW_THROUGH OXYGENATOR	Customer Number: 38846

FAX COVER SHEET

FROM:

I.A. McIntyre
Carlson, Caspers, Vandenburgh,
Lindquist & Schuman, P.A
Phone: 612-436-9610
Fax: 612-436-9605

TO:

USPTO Central Fax
571-273-8300

DOCUMENTS ATTACHED:

1. Power of Attorney (1 Page)
2. Statement Under 37. C.F.R. 3.73 (c) (2 Pages)
3. Patent Assignment Details (3 Pages)

Total No. of Pages (including cover): 7

CERTIFICATION UNDER 37. C.F.R. § 1.8

I hereby certify that this submission is being submitted to the U.S. Patent and Trademark Office by facsimile, USPTO central fax no. 571-273-8300, on Monday, September 28, 2015.

Date: September 28, 2015

Laura Lewis

Laura Lewis

PAGE 1/7 * RCVD AT 9/28/2015 2:10:56 PM [Eastern Daylight Time] * SVR:W-PTOFAX-002/41 * DNIS:2738300 * CSID: * DURATION (mm-ss):02-30

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/601,340	01/21/2015	James Andrew Senkiw	3406.005US2

CONFIRMATION NO. 1069

38846
Carlson, Caspers, Vandenburgh, Lindquist &
Schuman, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

POA ACCEPTANCE LETTER

OC000000078259989

Date Mailed: 10/23/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/28/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/resydnor-mcpherson/

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/601,340	01/21/2015	James Andrew Senkiw	3406.005US2

CONFIRMATION NO. 1069

21186
SCHWEGMAN LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

POWER OF ATTORNEY NOTICE

OC000000078259893

Date Mailed: 10/23/2015

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/28/2015.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/resydnor-mcpherson/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/601,340	01/21/2015	James Andrew Senkiw	3406.005US2	1069

38846 7590 10/27/2015

Carlson, Caspers, Vandenburgh, Lindquist & Schuman, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

EXAMINER	
JOHNSON, JERRY D	

ART UNIT	PAPER NUMBER
3991	

MAIL DATE	DELIVERY MODE
10/27/2015	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 14/601,340	Applicant(s) SENKIW, JAMES ANDREW	
	Examiner JERRY D. JOHNSON	Art Unit 3991	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *July 6, 2015*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *13-69* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *13-69* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

Reissue Applications

For reissue applications filed on or after September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the current provisions.

This is a continuation reissue application, Serial No. 14/601,340 (the '340 application), of U.S. Patent No. 7,670,495 (the '495 patent) which issued from U.S. Patent Application No. 12/023,431 (the '431 application) with claims 1-12 on March 2, 2010. The '495 patent was previously reissued as U.S. RE45,415 on March 17, 2015, based on U.S. Application No. 13/247,241 (the '241 reissue application) filed September 28, 2011. The '495 patent is a division of U.S. Patent No. 7,396,441, (the '441 patent) which is a continuation-in-part of U.S. Patent No. 6,689,262 (the '262 patent).

The '340 Application

A non-final Office Action rejecting claims 13-69 (all pending claims) was mailed May 13, 2015. Applicant filed a response on July 6, 2015 which included a Reissue Declaration and an amendment which complies with 37 CFR 1.173(b).

Reissue Declaration

The reissue oath/declaration filed July 6, 2015 is defective (see 37 CFR 1.175 and MPEP § 1414) because of the following:

The declaration states:

> I identify claims 2-7, 11 and 12 of U.S. Patent No. 7,670,495 as claims that the application seeks to broaden. For example, claim 2 of the '495 patent does not recite certain features of the disclosed tubular embodiment of the electrolysis cell corresponding to FIGS 7A and 7B which I was entitled to claim but did not claim. In this embodiment, for example: the electrodes are positioned in the outer perimeter of the oxygenation chamber; this positioning of the electrodes provides an unobstructed passageway for water to flow; in that unobstructed passageway, water may flow from the water inlet to the water outlet without passing through a space between the electrodes of opposite polarity; and a portion of at least one of the first and second electrodes is in contact with a wall of the tubular housing. Varying combinations of these exemplary features are presented in the claims of the amendment submitted with this Declaration.

Claim 2 is independent while claims 3-7, 11 and 12 depend from claim 2. Claim 2 of the '495 patent recites:

> 2. An emitter for electrolytic generation of microbubbles of oxygen in an aqueous medium comprising: an anode separated at a critical distance from a cathode, a nonconductive spacer maintaining the separation of the anode and cathode, the nonconductive spacer having a spacer thickness between 0.005 to 0.050 inches such that the critical distance is less than 0.060 inches and a power source all in electrical communication with each other, wherein the critical distance results in the formation of oxygen bubbles having a bubble diameter less than 0.0006 inches, said oxygen bubbles being incapable of breaking the surface tension of the aqueous medium such that said aqueous medium is supersaturated with oxygen.

The "features of the disclosed tubular embodiment of the electrolysis cell corresponding to FIGS 7A and 7B" applicant identifies in the declaration as broadening claims 2-7, 11 and 12 further limit, not broaden, claims 2-7, 11 and 12. Furthermore, the newly added claims are directed to a different and patentably distinct invention than the claims of the '495 patent, i.e., the newly added claims are directed to a flow-through oxygenator comprising an oxygen emitter within a conduit as claimed in the grandparent '411 patent.

The '495 patent is a division of the '441 patent. During prosecution of the '441 patent, the examiner restricted the claims of the '326 application as follows:

I. Claims 1-4, drawn to a flow-through oxygenator.

II. Claim 5, drawn to an oxygen supersaturated water product.

III. Claims 6-7, drawn to a method for enhancing growth of plants.

IV. Claim 8, drawn to a method of treating waste water.

Applicant provisionally elected without traverse the invention of group I, i.e., claims 1-4 drawn to a flow-through oxygenator. Elected claim 1, as originally filed in the '326 application, read as follows:

> 1. A flow-through oxygenator comprising an emitter for electrolytic generation of microbubbles of oxygen comprising an anode separated at a critical distance from a cathode and a power source all in electrical communication with each other, wherein the emitter is placed within or adjacent to a conduit for flowing water.

In a Response filed August 17, 2007, applicant amended claim 1 to recite:

> 1. A flow through oxygenator comprising:
> a fluid conduit having a fluid inlet and a fluid outlet fluidly connected with a conduit lumen;
> an oxygen emitter for electrolytic generation of microbubbles of oxygen from an aqueous medium, the oxygen emitter including a plurality of matched sets of anodes and cathodes wherein the matched sets of anodes and cathodes are mounted to stabilizing hardware such that the oxygen emitter is positioned within the conduit lumen; and
> a power source in electrical communication with the oxygen emitter.

In the August 17, 2007 Remarks accompanying the amendment, applicant argued "Applicant respectfully asserts that the need for a Terminal Disclaimer to overcome a nonstatutory obviousness-type double patenting rejection has been overcome through the present amendment to independent claim 1 and the addition of new independent claims 25 and 26. As claims 1, 25 and 26 are patently distinct from claims 1-6 of U.S. Patent No. 6,689,262, Applicant

respectfully requests said rejections be withdrawn." The ‘441 patent later issued with claims 1-17 to a flow through oxygenator comprising an oxygen emitter positioned within a conduit.

Claims 1-6 of the ‘262 patent, like the instant ‘495 patent claims applicant now seeks to broaden, are directed to “an emitter for electrolytic generation of microbubbles of oxygen”. The '495 patent claims, as applicant argued with respect to the ‘262 patent claims, are also "patently distinct" from the claims of the ‘441 patent.

The ‘431 divisional application, which became the ‘495 patent, was originally filed with a single claim to a method for treating waste water. Claims directed to an emitter (claims 2-7, 11 and 12), a method for oxygenating a non-native habitat (claim 8), a method for lowering the biologic oxygen demand of polluted water (claim 10), and a supersaturated aqueous product (claim 10) were added by preliminary amendment. The ‘495 patent issued from the ‘431 divisional application without any further amendments.

The '495 divisional patent does not claim the same invention as the ‘441 patent, i.e., there are no claims in the ‘495 divisional application directed to a flow through oxygenator comprising an oxygen emitter positioned with a conduit as claimed in the ‘441 patent. Accordingly, the ‘495 patent claims do not provide basis for claims directed to a system comprising an oxygen emitter positioned within a conduit as recited in the newly submitted claims 13-69.

Where a restriction (or an election of species) requirement was made in an application and applicant permitted the elected invention to issue as a patent without filing a divisional application on the non-elected invention(s), the non-elected invention(s) cannot be recovered by filing a reissue application. A reissue applicant’s failure to timely file a divisional application covering the non-elected invention(s) in response to a restriction (or an election of species)

requirement is not considered to be error causing a patent granted on the elected claims to be partially inoperative by reason of claiming less than the applicant had a right to claim. Accordingly, this is not correctable by reissue of the original patent under 35 U.S.C. 251. (MPEP 1412.01 (I) March 2014)

In the instant case, applicant's failure to further purse the elected invention of the '441 patent through a continuing application of the '441 patent or a divisional of the '495 patent is not correctable by reissue of the '495 patent. Nor can the present continuation reissue application broaden the claims of the parent '441 (which issued July 8, 2008) or '262 patents (which issued February 10, 2004). Nor can the present continuation reissue application recapture subject matter that was surrendered during the prosecution of the parent '441 and '262 patents.

Claims 13-69 are rejected as being based upon a defective reissue declaration under 35 U.S.C. 251 as set forth above. See 37 CFR 1.175

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Notice

If the parent reissue application issues without any cross reference to the continuation reissue application, amendment to the parent reissue application to include a cross-reference to the continuation reissue application must be done at the time of allowance of the continuation reissue application by Certificate of Correction. See MPEP 1451(II)(March 2014).

Duty to Disclose

Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which Patent No. 7,670,495 is or was involved. These proceedings would include interferences, reissues, reexaminations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP §§ 1404, 1442.01 and 1442.04.

Correspondence

Any inquiry concerning this communication or earlier communications from the specialist should be directed to Jerry D. Johnson whose telephone number is (571) 272-1448. The specialist can normally be reached on 5:30-3:00, M-F, alternate Fridays off.

If attempts to reach the specialist by telephone are unsuccessful, the specialist's supervisor, Stephen Stein can be reached on (571) 272-1544.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Telephone Numbers for reexamination inquiries:
Central Reexam Unit (CRU) (571) 272-7705

Please mail any communications to:
Attn: Mail Stop "Ex Parte Reexam"
Central Reexamination Unit
Commissioner for Patents
P. O. Box 1450
Alexandria VA 22313-1450

Please hand-deliver any communications to:
Customer Service Window
Attn: Central Reexamination Unit
Randolph Building, Lobby Level
401 Dulany Street
Alexandria, VA 22314

By EFS: Registered users may submit via the electronic filing system EFS-Web at
https://efs.uspto.gov/efile/myportal/efs-registered

Signed:

/Jerry D. Johnson/
Patent Reexamination Specialist
Central Reexamination Unit 3991

/Alan Diamond/
Patent Reexamination Specialist
Central Reexamination Unit 3991

/Jean C. Witz/
Supervisory Patent Reexamination Specialist
Central Reexamination Unit 3991

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14601340	SENKIW, JAMES ANDREW
	Examiner	**Art Unit**
	JERRY D JOHNSON	3991

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/06/2015	10/21/2015							
	1	-	-							
	2	-	-							
	3	-	-							
	4	-	-							
	5	-	-							
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	11	-	-							
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	13	✓	✓							
	14	✓	✓							
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	16	✓	✓							
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	32	✓	✓							
	33	✓	✓							
	34	✓	✓							
	35	✓	✓							
	36	✓	✓							

U.S. Patent and Trademark Office Part of Paper No. : 20151019

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14601340	SENKIW, JAMES ANDREW
	Examiner	**Art Unit**
	JERRY D JOHNSON	3991

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CLAIM		DATE								
Final	Original	05/06/2015	10/21/2015							
	37	✓	✓							
	38	✓	✓							
	39	✓	✓							
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	68	✓	✓							
	69	✓	✓							

S/N 14/601,340 **CONTINUATION REISSUE PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	James Andrew Senkiw	Examiner: Jerry D. Johnson
Serial No.:	14/601,340	Group Art Unit: 3991
Filed:	January 21, 2015	Atty. Docket No.: 3406.005US2
Continuation Reissue of U.S. Patent No. 7,670,495		Issued March 2, 2010
Title: FLOW-THROUGH OXYGENATOR		Customer Number: 38846

RESPONSE TO FINAL ACTION

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria , VA 22313-1450

This paper responds to the PTO action of October 27, 2015. No amendment or additions are made in this response. Claims 13-69 are currently pending in this application.

Please grant any extension of time necessary for entry, and charge any fee due to Deposit Account No. 502880.

We thank Examiner Johnson for the brief telephone call on November 10, 2015. On the call for Applicant were Phil Caspers and Sam Hamer. The purpose of the call was to request an interview with all three examiners. We discussed briefly that a restriction requirement had not been issued in the '495 patent prosecution. We agreed to revisit the interview request, if necessary, after the examiners have had the opportunity to consider a written response to the current rejection.

REMARKS

A. The Rejection of the Reissue Declaration

The office action rejected all claims as being based upon a defective reissue declaration under 35 U.S.C. §251. The action characterized the instant case as an attempt to correct a failure to file a continuation or divisional application after a restriction or an election of species requirement. The action noted that a decision not to file a continuation or divisional application is not an error causing a patent granted on the elected claims to be partially inoperative by reason of claiming less than the applicant had a right to claim and, accordingly, is not correctable by reissue of the original patent.

B. Summary of Response to Rejection

Applicant respectfully traverses the rejection. Applicant seeks to reissue the '495 patent, not the prior '441 patent. The original '495 patent claims include method and apparatus claims and span multiple groups of the prior restriction requirement made in the '441 patent. In the '495 patent prosecution, no restriction requirement was made, repeated or referred to. Applicant thus made no election. Instead, all of the original '495 patent claims were acted on and issued without amendment. Keeping in mind that Applicant seeks to reissue the '495 patent, there is no factual basis to find that Applicant is attempting to correct a failure to file a continuation after a restriction was made during the '495 prosecution. There was no restriction issued in the '495 patent. The rejection should be withdrawn.

Restriction requirements from prior related patent applications (such as the restriction made in the prior '441 patent) do not carry forward to new applications unless they are specifically repeated or referred to during prosecution of the new application, which did not happen during the '495 patent prosecution. The exact opposite happened -- the '495 apparatus claims (directed to an oxygen emitter) were rejected for double-patenting based on the prior '441 apparatus claims (directed a flow-through oxygenator). In other words, the '495 oxygen emitter claims were found not to be patentably distinct from the '441 flow-through oxygenator claims. To overcome that rejection, a terminal disclaimer was filed. In short, there is no reason why the claims of the present reissue application could not have been filed in the application that resulted in the '495 patent. Because the present claims could have been filed in the '495 patent with the claims that issued in that case, the oath is not defective, and the rejection should be

withdrawn.

It is also worth noting that in those cases where a restriction requirement does carry over to a later filed continuation (which clearly did not happen here), the office action would need to make and support a finding that the present reissue claims are "identical or substantially identical" to any claims that were restricted. See *Ex parte Belliveau*, Appeal No. 2010-007121, Application No. 10/801,177 (B.P.A.I. Aug. 30, 2010) (reversing examiner's *Orita* rejection for failure to make any finding that the claims were identical or substantially identical as the claims subject to the restriction requirement). Here, the present reissue claims are not identical or substantially identical to the claims in the '441 patent that were subject to the restriction requirement at least because of the very features and limitations noted in the reissue oath relating to FIGS. 7A and 7B. The office action makes no finding that these claims are "identical or substantially identical" to the claims that were subject to the '441 restriction requirement. The rejection should be withdrawn.

C. Detailed Response to Rejection of the Reissue Declaration

1. Federal Circuit guidance on the *Orita* doctrine

The rule being applied to reject the present claims is sometimes referred to as the *Orita* doctrine because it was enunciated in the case of *In re Orita*, 550 F.2d 1277, 1280, 193 USPQ 145, 148 (CCPA 1977); see also MPEP 1412.01 (citing *In re Orita*). The *Orita* rule states that if a restriction was made in the application that became the patent and the non-elected claims in the application were not re-filed in a divisional, those claims cannot be recovered via reissue.

The Federal Circuit has clarified two important points relevant to this analysis. The first is that restriction requirements from related applications do not carry over into subsequent continuing applications unless the examiner specifically refers to or repeats the restriction in the new application prosecution. Bristol-Myers Squibb Co. v. Pharmachemie B.V., 361 F.3d 1343, 1348-49 (Fed. Cir. 2004). See also MPEP 819:

> A restriction requirement (and election thereto) made in a parent application does not carry over to a continuation, CIP, or divisional application. See *Bristol-Myers Squibb Co. v. Pharmachemie BV,* 361 F.3d 1343, 1348, 70 USPQ2d 1097, 1100 (Fed. Cir. 2004) (An original restriction requirement in an earlier filed application does not carry over to claims of a continuation application in which the examiner does not reinstate or refer to the restriction

> requirement in the parent application.).

See also G.D. Searle LLC v. Lupin Pharmaceuticals, Inc., 790 F.3d 1349, 1356 (Fed. Cir. 2015):

> When separate restriction requirements are imposed on separate applications and the record does not show that any of the various restriction requirements carried forward from one application to the next, the earlier restriction requirement cannot be viewed as having continued in effect with respect to the later-filed application.

This treatment is very different from the recapture rule which looks to the entire prosecution history including related applications to determine whether the applicant is attempting to recapture subject matter that was surrendered anywhere during prosecution.[1] *MBO Laboratories, Inc. v. Becton, Dickinson & Co.*, 602 F.3d 1306, 1316 (2010) (clarifying that the term "original patent" in 35 U.S.C. §251, which defines the two-year limitation for broadening reissue applications, refers to the actual patent corrected by the reissue, but emphasizing that this does not limit the universe of patents and prosecution histories that can be the basis for recapture analysis.)

Secondly, the Federal Circuit has made clear that the *Orita* rule applies only where the claims sought in reissue are identical to or substantially identical to the claims identified in an examiner's restriction requirement and only when such claims could not have been prosecuted in the application being reissued. *In re Doyle*, 293 F.3d 1355, 1359-60 (Fed. Cir. 2002). The relevant analysis, therefore, is whether or not there was a restriction or non-election of claims **during prosecution of the application that matured into the '495 patent (not the '441 patent)** that are substantially identical to the present reissue claims, such that the Applicant would have been precluded from prosecuting the present reissue claims in the application that issued as the '495 patent.

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[1] The present office action does not reject the claims for recapture, nor would a recapture rejection be appropriate here. The present claims were never the subject of any rejection or amendment during any of the previous related prosecutions and are substantially narrower in significant respects than any previously presented claims.

2. The *Orita* doctrine does not apply here

a. No restriction was made in the '495 patent prosecution, and the present claims could have been filed in the '495 patent

In light of these principles, the present rejection should be withdrawn.

First, there is no factual basis to find that the Applicant, here, is trying to correct a failure to file a divisional to pursue non-elected claims after a restriction during prosecution of the application that issued as the '495 patent. Applicant seeks to reissue the '495 patent, not the prior '441 patent. The original '495 patent claims included both method and apparatus claims. In the '495 patent prosecution, no restriction requirement was made, repeated or referred to. Applicant thus made no election. Instead, all of the original '495 patent claims (which included apparatus and method claims) were acted on and issued without amendment.

Second, there is no reason why the present reissue application claims could not have been prosecuted with the claims of the '495 patent. Significantly, there was no restriction requirement issued in the '495 prosecution. The restriction requirement identified by the examiner was made in a related parent application (during prosecution of the '441 patent), not in the prosecution of the '495 patent. The restriction requirement issued in the '441 patent prosecution did not carry forward to the continuing '495 patent file because it was not specifically repeated or referred to by the examiner during prosecution of the '495 patent. See MPEP 819; *Bristol-Myers Squibb,* 361 F.3d 1343, 1348-49.

The record of the '495 prosecution demonstrates that neither the examiner nor the Applicant were incorporating the restriction requirement from the earlier case into the prosecution of the '495 patent. The examiner in the '495 issued a double patenting rejection of the apparatus claims of the '495 patent over the already issued apparatus claims in the '441 patent:

> Claims 2-12 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 7,396,441 B2. Although the claims are not identical, they are not patentably distinct from each other…

March 27, 2009 Office Action, pp. 2-3, Patent Application No. 12/023,431. The apparatus claims of the '441 patent were directed to elected group I from the '441 restriction requirement. That the examiner in the '495 patent prosecution issued a double patenting rejection of the

apparatus claims in the '495 patent prosecution based on the elected group I claims in the '441 patent is substantial and dispositive evidence that the examiner in the '495 case was not enforcing any restriction from the prior '441 patent prosecution that would have precluded adding claims falling within group I of that restriction.

Even if the restriction requirement did carry over to the child application (which it did not), all claims submitted prior to a first office action, including all of the claims filed with the continuing application and all claims added by preliminary amendment must be considered "original claims" for purposes of determining the invention constructively elected by the applicant. MPEP 818.02(a). The original claims of the '495 patent, therefore, include application claims 1-12, not just claim 1. These claims include both method claims (application claims 1, 8, 9) and apparatus claims (application claims 2-7, 11-12) and even include a claim directed to an aqueous product (application claim 9). The original claims of the '495 patent span multiple groups of the prior restriction requirement. The applicant, therefore, was not constructively restricted to only method claims or only apparatus claims in the '495 patent.

The use in the present claims of the phrase "flow-through" would not have barred the prosecution of these claims along with the claims of the '495 patent. Claims directed to a "flow-through" oxygenator or emitter were never restricted or cancelled from the '495 patent prosecution. The opposite is true. The claims of the '495 patent application were rejected for double patenting based on claims 1-17 of the '441 patent, and the Applicant responded by filing a terminal disclaimer. Claims 1-17 of the '441 patent are all directed to "a flow through oxygenator" with various different limitations relating to the structure of the device. That the examiner in the '495 patent prosecution issued a double patenting rejection of the apparatus claims in the '495 patent prosecution based on the issued "flow through" oxygenator apparatus claims in the '441 patent is substantial and dispositive evidence that the presence or use of the phrase "flow through" in the present claims would not have prevented the prosecution of the these claims together with the claims of the '495 patent. If further evidence were desired, it is noted that both the title of the application and, more importantly, claim 1 of the '495 patent specifically refer to "flow through" oxygenator devices. Claim 1 of the '495 patent recites providing "a flow-through oxygenator comprising an emitter for electrolytic generation of microbubbles of oxygen comprising…." Therefore, use of "flow through" in the present claims

would not have barred these claims from being prosecuted in the '495 patent.

The office action makes reference to arguments, not made during prosecution of the '495 patent, in which different claims, that were being prosecuted in the '441 patent, were asserted to be patentably distinct from issued claims of the '262 patent. Discussing these statements misses the relevant inquiry. This is not a reissue of the '411 patent. It is a reissue of the '495 patent, and the relevant issue is whether the present claims could have been prosecuted in the '495 patent. There was no restriction requirement in the '495 prosecution, and based on the diversity of the claims actually presented, prosecuted, and allowed in the '495 patent and the double patenting rejection made in the '495 patent prosecution, there was never any restriction or election made in the prosecution of the '495 patent that would provide any basis for excluding the present reissue claims from that case. [2]

In addition, the statements referred to during prosecution of the '441 patent never stated that any claims were patentably distinct from the '262 patent claims or the '495 patent claims on account of their inclusion of the phrase "a flow-through oxygenator". The argument referred to at the bottom of page 4 of the current office action was made after the claims had been amended to add other limitations including, for example, specific limitations relating to stabilizing hardware. It is also worth noting that in response to this argument the examiner again rejected the claims for double patenting over the '262 claims. The Applicant then amended the claims adding further limitations (e.g., requiring a 120 degree orientation among the matched sets of electrodes). Only after this further limitation did the examiner withdraw the double patenting rejection. The record does not support that the examiner or the Applicant made any statements or arguments that the use of the phrase "a flow-through oxygenator" causes a claim to be patentably distinct from the '262 or '495 patent claims. More importantly, however, as discussed above, it does not matter whether the present claims are patentably distinct from any prior claims, because there was no restriction requirement issued in the '495 patent prosecution

[2] If the examiners believe the claims that issued in the '495 patent should have been restricted from one another based on the prior restriction in the '441 patent, it is too late for that. It is improper to require restriction in a reissue application between already issued claims. MPEP 1450; 37 C.F.R. 1.176(b).

or any narrow constructive election which would have prevented the present reissue claims from being prosecuted in the '495 patent.

b. The present claims are not identical or substantially similar to any restricted claims

The present claims are not identical or substantially identical to the claims that were subject to the restriction requirement in the parent '441 patent prosecution. See *Ex parte Belliveau*, decision of the Board of Patent Appeals and Interferences, Appeal No. 2010-007121, Application No. 10/801,177, Patent No. RE43,017 (Aug. 30, 2010) (reversing examiner's *Orita* rejection for failure to make any finding that the claims were identical or substantially identical to claims subject to the restriction requirement).[3] The present claims are not identical or substantially identical to the claims in the '441 patent that were subject to the restriction requirement at least because of the very features and limitations noted in the reissue oath relating to FIGS. 7A and 7B. The office action makes no finding that these claims are identical or substantially identical to the claims that were subject to the '441 restriction requirement.

3. These claims are directed to the same general invention as the '495 patent

The office action states that the present reissue claims are directed to a "different" invention than the claims of the '495 patent. (See p. 3) This is not the test for satisfying the requirement in 35 U.S.C. §251 that a reissue patent be "for the invention disclosed in the original patent." MPEP §1412.01 makes clear that the new claims need only be for the same general invention as measured against the specification disclosure, not the prior claims. If there is support under §112 for the newly added claims and there is no other indication in the specification of an intent not to claim the invention, then the newly added claims satisfy the requirement of 35 U.S.C. §251 that the reissue patent be issued for the "same invention." Therefore, the office action's assertion that the newly added claims are directed to a "different" invention *as compared to the claims* of the '495 patent is improper and provides no basis for rejecting these claims.

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[3] In addition to being accessible via PAIR, this case is also published on LEXIS at *Ex parte Belliveau*, 2010 Pat. App. LEXIS 17175 (B.P.A.I. Aug. 30, 2010).

4. The two-year term for broadening reissue is measured from the patent actually being reissued, not from the oldest patent claims in the family.

The claims of this reissue application are permitted to be broader in some respects than the issued claims of the related '441 and '262 patents, which are parent and grandparent patents of the '495 patent respectively. The broadening reissue deadline is not measured from the date a first patent in the family issues. Where a broadening reissue application is filed within two years of the issuance of a continuing divisional patent and the claims sought in reissue could have been filed in the continuing divisional patent, it does not matter that the broadening reissue application was not filed within two years of issuance of the prior parent patents. As set out in 35 U.S.C. §251, the period is measured from the issue date of the "original patent" which the Federal Circuit has construed to be the actual patent being reissued. *MBO Laboratories, Inc. v. Becton, Dickinson & Co.*, 602 F.3d 1306, 1316 (2010). Effectively, then, the window for filing a broadening reissue is two years from the issue date of the latest patent containing the error and in which the reissue claims could have been brought. Here, the '241 broadening reissue application was filed within two years of the issuance of the '495 patent, the patent being reissued here, and there is no reason why the claims currently sought in this reissue application could not have been filed with and prosecuted along with the claims of the '495 patent. Therefore, that a related patent or patents that are not being reissued here happen to have issued more than two years prior to the filing of the first broadening reissue application (13/247,241) cannot be a basis for finding the reissue declaration to be defective under 35 U.S.C. §251.

D. Conclusion

For the foregoing reasons the Applicant respectfully requests reconsideration and withdrawal of the rejection based on the reissue oath and allowance of the pending claims.

Respectfully Submitted,

CARLSON, CASPERS, VANDENBURGH,
LINDUIST & SCHUMAN, P.A.

Suite 4200
225 S. Sixth Street
Minneapolis, MN 55402
(612) 436-9617

Date _____

By: /Philip Caspers/
Philip P. Caspers
Reg. No. 33,227

Electronic Acknowledgement Receipt	
EFS ID:	24085366
Application Number:	14601340
International Application Number:	
Confirmation Number:	1069
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Philip Peter Caspers
Filer Authorized By:	
Attorney Docket Number:	3406.005US2
Receipt Date:	15-NOV-2015
Filing Date:	21-JAN-2015
Time Stamp:	15:50:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response After Final Action	Response_to_Final_Action_2015_11_15.pdf	161059 f0eeaf1c3a202435e57266d0c1ef285088f459b0	no	10

Warnings:
Information:

Total Files Size (in bytes):	161059

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/601,340	01/21/2015	James Andrew Senkiw	3406.005US2	1069

38846 7590 11/25/2015

Carlson, Caspers, Vandenburgh, Lindquist & Schuman, PA
225 South 6th Street
Suite 4200
Minneapolis, MN 55402

EXAMINER	
JOHNSON, JERRY D	

ART UNIT	PAPER NUMBER
3991	

MAIL DATE	DELIVERY MODE
11/25/2015	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Advisory Action Before the Filing of an Appeal Brief	**Application No.** *14/601,340*	**Applicant(s)** SENKIW, JAMES ANDREW	
	Examiner JERRY D. JOHNSON	**Art Unit** 3991	**AIA (First Inventor to File) Status** No

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 15 November 2015 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☒ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance;
(2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☒ The period for reply expires *3* months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☐ For purposes of appeal, the proposed amendment(s): (a) ☐ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: See Continuation Sheet.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☐ Other: _____.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
Claim(s) allowed: .
Claim(s) objected to: .
Claim(s) rejected: 13-69.
Claim(s) withdrawn from consideration: .

/Jerry D. Johnson/ Patent Reexamination Specialist Central Reexamination Unit 3991 /Alan Diamond/ Patent Reexamination Specialist Central Reexamination Unit 3991	/Timothy M. Speer/ Patent Reexamination Specialist Central Reexamination Unit 3991

Continuation of 12. does NOT place the application in condition for allowance because: The '495 patent application was filed as a divisional application of the '441 patent application. A divisional application is "a later application for an independent or distinct invention". MPEP 201.06. In an amendment filed 8/17/10, patent owner amended the '441 patent claims to require that the emitter be positioned within a conduit and argued that the amended claims are patentably distinct from claims directed to the emitter (i.e., the '262 patent claims). Claims 2-7, 11 and 12 of the '495 patent claim an emitter, which, like the '262 patent claims applicant argued were patentably distinct from claims to an emitter positioned within a conduit (i.e., the '441 patent claims), are patentably distinct from the newly submitted reissue claims directed to an emitter positioned within a conduit. Therefore, the '495 patent emitters claims do not provide basis for claims directed to a system comprising an oxygen emitter positioned within a conduit as recited in reissue claims 13-69.

Applicant's argument that "the '495 oxygen emitter claims were found not to be patentably distinct from the '441 flow-through oxygenator claims" (Remarks, page 2) is unavailing. If the '495 oxygen emitter claims are not patentably distinct from the '441 flow-through oxygenator claims, then the instant reissue claims to an emitter positioned within a conduit are also not patentably distinct from the '441 claims. Because the '441 patent issued more than 2 years before the filing of the instant reissue application, the claims of the '441 patent cannot be broadened.

Accordingly, applicant's failure to further pursue the elected invention of the '441 patent through a continuing application of the '441 patent or a divisional of the '495 patent is not correctable by reissue of the '495 patent.

Doc Code: M865 or FAI.REQ.INTV

PTOL-413A (08-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Applicant Initiated Interview Request Form

Application No.: 14/601,340 First Named Applicant: James Andrew Senkiw
Examiner: Jerry D. Johnson Art Unit: 3991 Status of Application: Final Rejection

Tentative Participants:
(1) Philip P. Caspers (applicant att'y.) (2) Samuel A. Hamer (applicant att'y.)
(3) Ex. Jerry D. Johnson (4) Ex. Alan Diamond (5) Ex. Jean Witz

Proposed Date of Interview: December 9, 2015 at 2 pm, or on alternative date and time that is convenient for all of the examiners.

Type of Interview Requested:
(1) [ ] Telephonic (2) [✓] Personal (3) [ ] Video Conference

Exhibit To Be Shown or Demonstrated: [ ] YES [✓] NO
If yes, provide brief description:

Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) Rejection of Oath	13-69	n/a	[ ]	[ ]	[ ]
(2)			[ ]	[ ]	[ ]
(3)			[ ]	[ ]	[ ]
(4)			[ ]	[ ]	[ ]

[✓] Continuation Sheet Attached [ ] Proposed Amendment or Arguments Attached

Brief Description of Arguments to be Presented: See Attached Continuation Sheet.

An interview was conducted on the above-identified application on

NOTE: This form should be completed and filed by applicant in advance of the interview (see MPEP § 713.01). If this form is signed by a registered practitioner not of record, the Office will accept this as an indication that he or she is authorized to conduct an interview on behalf of the principal (37 CFR 1.32(a)(3)) pursuant to 37 CFR 1.34. This is not a power of attorney to any above named practitioner. See the Instruction Sheet for this form, which is incorporated by reference. By signing this form, applicant or practitioner is certifying that he or she has read the Instruction Sheet. After the interview is conducted, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible. This application will not be delayed from issue because of applicant's failure to submit a written record of this interview.

/Philip Caspers/
Applicant/Applicant's Representative Signature

Examiner/SPE Signature

Philip P. Caspers
Typed/Printed Name of Applicant or Representative

33,227
Registration Number, if applicable

This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 24 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Continuation of Applicant Initiated Interview Request Form

Brief description of arguments to be presented:

A. The mere fact of identifying a continuing application as a "divisional", by itself, does not limit or restrict the scope of claims that may be filed or prosecuted in that application.

It is common that applicants, by adding or amending claims, end up with claims in an application filed **as a divisional** that are not patentably distinct from claims prosecuted in the parent application. Such claim sets are said to be **not consonant** with the prior restriction, and the only consequence is that the patent will lose the benefit of Section 121's safe harbor protection against double patenting findings. The case law is full of examples where applicants filed and were issued claims in divisional applications that later were argued to be not consonant with prior restricted claim sets. Symbol Techs., Inc. v. Opticon, Inc., 935 F.2d 1569 (Fed. Cir. 1991); Gerber Garment Tech., Inc. v. Lectra Sys., Inc., 916 F.2d 683 (Fed. Cir. 1990); St. Jude Med., Inc. v. Access Closure, Inc., 729 F.3d 1369, 1377 (Fed. Cir. 2013); Lerner v. Ladd, 216 F. Supp. 81 (D.D.C. 1962).

This is exactly what happened in the prosecution of the '495 patent. By preliminary amendment, Applicant presented claims of varying scope, and in the first office action, the examiner found that the '495 claims were not patentably distinct from the '441 claims. Applicant thus filed a terminal disclaimer. By this double patenting rejection, the examiner in the '495 patent necessarily found the "positioned within a conduit" limitation is not a basis to conclude the '441 claims are patentably distinct from the '495 claims. In addition, the examiner in the '441 patent, by issuing a similar double patenting rejection with respect to the '262 patent's emitter claims, also found that "positioned within a conduit" did not make the '441 claims patentably distinct from the '262 claims. To conclude, as is done in the advisory action, that because the '495 case was filed as a divisional, it necessarily follows that the '495 patent claims are patentably distinct from the '441 patent is in direct conflict with the case law, and the findings of both examiners in the '495 and '441 patent prosecutions.

B. Applicant never argued that "positioned within a conduit" made claims patentably distinct

Nowhere during prosecution of the '495 or '441 patents did Applicant argue that inclusion of the limitation "positioned within a conduit" made claims patentably distinct from any other claims. The advisory action refers to a specific amendment that was filed 8/17/07 in the '441 patent prosecution in which the generic statement was made "Applicant respectfully asserts that the need for a Terminal Disclaimer to overcome a nonstatutory obviousness-type double patenting rejection has been overcome through the present amendment to independent claim 1 and the addition of new independent claims 25 and 26." (It is believed the examiner's identification of the amendment as being filed in on 8/17/10 was an inadvertent typo as there was no amendment filed on that date.) First, the phrase "placed within or adjacent to a conduit" was already included in claim 1 prior to the amendment. Second, and more importantly, there were significant amendments to the claim made by that amendment that the advisory action ignores. Specifically, the claim was amended to recite new structures including, for example, "stabilizing hardware" that had not previously been included in the claim. Third, even after entering this amendment, the examiner repeated the double patenting rejection. Therefore, the

examiner disagreed that any amendment or argument presented by the Applicant made the claims patentably distinct.

C. There being no restriction issued in the '495 patent prosecution, Applicant should be permitted to pursue the pending claims in a reissue of the '495 patent

The examiner in the '495 patent had the discretion to limit the scope of claims presented by issuing a restriction requirement. But that did not happen; he did not make, repeat or refer to the prior restriction. MPEP 819 ("A restriction requirement (and election thereto) made in a parent application does not carry over to a continuation, CIP, or divisional application.") (emphasis added). There being no restriction or narrow constructive election in the '495 patent (and instead a double patenting rejection), Applicant should be permitted to pursue the pending claims in a reissue of the '495 patent.

D. The two-year period is measured from the issue date of the '495 patent

By statute, the two year period is measured from the issue date of the "original patent" which the Federal Circuit has construed to be the actual patent being reissued. *MBO Laboratories, Inc. v. Becton, Dickinson & Co.*, 602 F.3d 1306, 1316 (2010). The second-to-last paragraph of the advisory action suggests a contrary rule, i.e., that a reissue application cannot broaden the claims of an issued patent unless it is brought not only within two years of the issuance of that patent, but also within two years of each and every patent to which that patent claims priority and which include claims that are not patentably distinct from the claims sought in reissue. We would like to discuss this at an interview to understand how the examiner is interpreting and applying the statutory two-year requirement.

Electronic Acknowledgement Receipt	
EFS ID:	24238302
Application Number:	14601340
International Application Number:	
Confirmation Number:	1069
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Philip Peter Caspers
Filer Authorized By:	
Attorney Docket Number:	3406.005US2
Receipt Date:	02-DEC-2015
Filing Date:	21-JAN-2015
Time Stamp:	12:30:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Letter Requesting Interview with Examiner	2015_12_02_Request_for_Interview.pdf	920302 76f1633ed89c9ad1dd149e05bab5b792c7b02030	no	3
Warnings:					
Information:					

Total Files Size (in bytes):	920302

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-14)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	14/601,340	Filing Date	2015-01-15	Docket Number (if applicable)	3406.005US2	Art Unit	3991
First Named Inventor	James Andrew Senkiw			Examiner Name	J. Johnson		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, to any international application that does not comply with the requirements of 35 U.S.C. 371, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV.

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

☒ Enclosed

☒ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☒ Affidavit(s)/ Declaration(s)

☒ Other Please also fully consider the Response to Final Action filed Nov. 15, 2015 and the points raised in the Interview Request filed Dec. 2, 2015

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 502880

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

EFS - Web 2.1.15

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-14)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Signature of Registered U.S. Patent Practitioner			
Signature	/Philip Caspers/	Date (YYYY-MM-DD)	2016-01-26
Name	Philip P. Caspers	Registration Number	33227

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

EFS - Web 2.1.15

IN THE UNITED STATES PATENT AND TRADEMARK

S/N 14/601,340 **CONTINUATION REISSUE PATENT**

Applicant(s)	James Andrew Senkiw	**Amendment And Response Filed With Request For Continued Examination**
Serial No.	14/601,340	
Filing Date	January 21, 2015	
Continuation Reissue of U.S. Patent No.	7,670,495	
Issued:	March 2, 2010	
Examiner Name	Jerry D. Johnson	
Group Art Unit	3991	
Attorney Docket No.	3406.005US2	
Customer Number:	38846	
Confirmation No.	1069	
Title:	FLOW-THROUGH OXYGENATOR	

Mail Stop Reissue
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

The Final Office Action mailed on October 27, 2015 along with the Advisory Action mailed November 25, 2015 have been reviewed. Applicants have filed a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114 to have a new reissue declaration along with the following amendments and remarks entered and considered. Please also fully consider the Response to Final Action filed Nov. 15, 2015 and the points raised in the Interview Request filed Dec. 2, 2015.

The Applicant petitions the Director of the United States Patent and Trademark Office to extend the time for reply to the Office action dated October 27, 2015 for any periods necessary for entry of this amendment. Please grant any extension of time necessary for entry, and charge any fee due to Deposit Account No. 502880.

Telephone Interview Summary

We thank Examiner Johnson for the telephone call on December 21, 2015. On the call for Applicant were patent attorneys, Phil Caspers and Sam Hamer. The purpose of the call was to discuss the points raised in the interview request filed December 2, 2015 and the Applicant's

desire to schedule an in person interview with all three examiners that are assigned to this application.

During the call, we discussed our position that the two year period for filing a broadening reissue application is measured from the issue date of the patent being reissued (the '495 patent), not from any prior parent patent (the '441 patent). We also pointed out that there was no restriction requirement issued during prosecution of the '495 patent being reissued that would have prevented the current claims from being filed in the '495 patent application. We also noted that the apparatus claims of the patent being reissued which do not recite that the electrodes or emitter are positioned "within a conduit" were rejected for double-patenting based on claims in the parent patent (the '441 patent) that do include such a limitation.

As further support for our positions, we faxed to examiner's attention a copy of the Federal Circuit decision in *MBO Labs., Inc. v. Becton Dickenson & Co.*, 602 F.3d 1306 (Fed. Cir. 2010)(9 pages) and a copy of the PTAB's recent decision in *Ex Parte Taylor*, 2015 Pat. App. LEXIS 953 (PTAB Feb. 12, 2015)(App. No. 13/067,574)(7 pages). As an aid to understanding the relevance of the *Taylor* decision, we also faxed excerpts from the file history of the '574 application and a chart of the claims at issue in that case (5 pages). To be sure that these documents are copied into the present file, copies are included at the end of this submission.

No agreement was reached during the telephone call, and no in person interview was scheduled, although the examiner did invite Applicant to request a pre-examination interview with any RCE filed to address the outstanding rejection.

Pre-examination Interview Request

The Applicant respectfully requests a pre-examination in person interview with Examiners J. Johnson, A. Diamond, and J. Witz. Applicant proposes February 2, 2016 at 2 pm or an alternative date and time that is convenient for all of the examiners and Applicant's attorneys, P. Caspers and S. Hamer. Please contact Phil Caspers at 612.436.9617 to confirm or if an alternate date is preferred. The Applicants would like to discuss the rejection of claims 13-69 based on the reissue declaration and to understand how the examiners are interpreting the two year rule for broadening reissue as applied to the facts of the present reissue application. Applicant respectfully submits that the requested interview would be the most efficient and productive way to reach a common understanding of the issues.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of claims

1. (Canceled)
2. (Canceled)
3. (Canceled)
4. (Canceled)
5. (Canceled)
6. (Canceled)
7. (Canceled)
8. (Canceled)
9. (Canceled)
10. (Canceled)
11. (Canceled)
12. (Canceled)

13. (New) An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet;

at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing;

each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power

source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

14. (New) The emitter of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis; wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis; and wherein at least one of the first and second electrodes is positioned in the tubular housing closer to the inward-facing surface than said distance separating the electrodes.

15. (New) The emitter of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis; wherein said portions of electrodes extend in a direction parallel to the longitudinal axis; and wherein each electrode of the emitter is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing.

16. (New) The emitter of claim 13 wherein at least one of the electrodes is a stainless steel mesh or screen.

17. (New) The emitter of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing.

18. (New) The emitter of claim 17 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the tubular housing.

19. (New) The emitter of claim 17 wherein the first and second electrodes comprise an outside electrode and an inside electrode, wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing.

the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is,

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

20. (New) The emitter of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of that portion of one of the electrodes positioned within the housing;

wherein the first and second electrodes comprise an outside electrode and an inside electrode;

wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing;

the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway; and

wherein the tubular housing of the emitter is round.

21. (New) The emitter of claim 19 wherein said inward-facing surface is a concave surface.

22. (New) The emitter of claim 13 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

23. (New) The emitter of claim 13 wherein the oxygen produced comprises microbubbles.

24. (New) The emitter of claim 13 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

25. (New) The emitter of claim 13 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

26. (New) The emitter of claim 13 wherein the oxygen produced comprises nanobubbles.

27. (New) An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches,

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode; and

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the chamber of the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

28. (New) The emitter of claim 27 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber.

29. (New) The emitter of claim 27 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

30. (New) The emitter of claim 29 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

31. (New) The emitter of claim 30 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

32. (New) The emitter of claim 27 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

33. (New) The emitter of claim 27 wherein the oxygen produced comprises nanobubbles.

34. (New) The emitter of claim 27 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

35. (New) The emitter of claim 27 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

36. (New) The emitter of claim 35 wherein the oxygen produced comprises nanobubbles.

37. (New) An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;

at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches, a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, said portion being a portion that opposes the other of the first and second electrodes, wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

38. (New) The emitter of claim 37 wherein the tubular housing has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal center axis; and wherein each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis.

39. (New) The emitter of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis, wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis, and wherein at least one of the first and second electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes.

40. (New) The emitter of claim 39 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

41. (New) The emitter of claim 37 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

42. (New) The emitter of claim 37 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

43. (New) The emitter of claim 42 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the chamber.

44. (New) The emitter of claim 42 wherein the chamber has an inward-facing surface that runs parallel to the longitudinal axis; wherein the first and second electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is; and wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

45. (New) The emitter of claim 37 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a

radial direction relative to a longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

46. (New) The emitter of claim 37 wherein the oxygen comprises microbubbles.

47. (New) The emitter of claim 37 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

48. (New) The emitter of claim 37 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

49. (New) The emitter of claim 37 wherein the oxygen produced comprises nanobubbles.

50. (New) An emitter for electrolytic generation of bubbles of oxygen in an aqueous medium comprising:

a tubular housing defining an oxygenation chamber, and having an inward-facing surface that defines at least in part the oxygenation chamber, a water inlet, and a water outlet;

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that runs parallel to the inward-facing surface, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber;

wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches.

51. (New) The emitter of claim 50 wherein at least one of the inside and outside electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes, and wherein the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and wherein the unobstructed passageway includes the longitudinal center axis.

52. (New) The emitter of claim 50 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

53. (New) The emitter of claim 52 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

54. (New) The emitter of claim 50 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

55. (New) The emitter of claim 54 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

56. (New) The emitter of claim 55 wherein said inward-facing surface is a concave surface.

57. (New) The emitter of claim 50 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

58. (New) The emitter of claim 50 wherein the emitter is operable when connected to a power source to create microbubbles of oxygen in water flowing through the oxygenation chamber.

59. (New) The emitter of claim 50 coupled to a power source wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

60. (New) The emitter of claim 50 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

61. (New) The emitter of claim 50 wherein the electrolysis cell is operable when connected to a power source to create nanobubbles of oxygen in water flowing through the oxygenation chamber.

62. (New) An emitter for electrolytic generation of bubbles of oxygen in an aqueous medium comprising:

a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;

the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, the electrodes being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway.

63. (New) The emitter of claim 62 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

64. (New) The emitter of claim 63 wherein the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

65. (New) The emitter of claim 62 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

66. (New) The emitter of claim 62 wherein said outer wall includes an inwardly-facing concave surface.

67. (New) The emitter of claim 62 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

68. (New) The emitter of claim 62 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

69. (New) The emitter of claim 68 wherein the emitter is operable when connected to a power source to create nanobubbles of oxygen in water flowing through the oxygenation chamber.

REMARKS

Claims 13-69 are pending in this application. Claims 1-12 were previously canceled. Although the claims are marked with respect to the claims of the original patent being reissued (7,670,495), when compared to the claims previously considered by the examiner, the preamble of the present claims have been amended to use the alternate phrasing of an "emitter for electrolytic generation of bubbles of oxygen" instead of an "electrolysis system for generating oxygenated water" or an "electrolysis cell." This amendment and conforming amendments to the body of the claims, for example, to refer back to "the emitter" instead of to "the system," brings the presently pending claims into even closer conformance to the form of claim 2 of the '495 patent. The substantive limitations discussed previously by the examiner remain the same. Also, dependent claims 26, 33, 36, 49, 61, and 69 have been amended to call out nanobubbles instead of microbubbles. Support for this amended language can be found, for example, at column 2, lines 63-65 ("This invention provides an oxygen emitter which is an electrolytic cell which generates very small microbubbles and nanobubbles of oxygen in an aqueous medium…"). No new matter has been entered by this amendment.

A new reissue declaration executed by the inventor is submitted herewith. Reconsideration of claims 13-69 is respectfully requested in light of the following remarks.

Clarifications in New Reissue Declaration

The new reissue declaration submitted herewith addresses several points raised by the examiner in the final rejection. The declaration clarifies how the present claims both narrow claim 2 of the '495 patent in some respects and broaden claim 2 in other respects. See Senkiw Decl. at ¶¶ 6-9. As explained by the inventor, FIG. 7A shows an arrangement of the electrodes toward the outer perimeter of the oxygenation chamber so that an unobstructed passageway allows water to flow through the device without passing between opposing electrodes. Senkiw Decl. at ¶ 7. The inventor identifies that it was an error in claim 2 of the '495 patent not to include limitations describing this type of arrangement. Senkiw Decl. at ¶¶ 7-8. The specific claim language describing this arrangement is identified in paragraph 8 of the declaration. Senkiw Decl. at ¶¶ 8. These limitations narrow claim 2 of the '495 patent. Claim 2 of the '495 patent is at least partly inoperative because it does not recite these features which the inventor

was entitled to claim. These limitations were not included in claim 2 of the '495 patent or in any other claim presented or allowed in any related patent application.

The declaration also clarifies how the present claims are broader in some respects than claim 2 of the '495 patent. See Senkiw Decl. at ¶¶ 6, 9. The present claims do not include the spacer limitation or the supersaturated limitation that are recited in claim 2. Therefore, because the present claims remove these limitations from claim 2, they are broader than claim 2 at least in these respects.

Rejection of the Claims Based on Defective Reissue Declaration

The prior claims were rejected in the final office action for being based on a defective reissue declaration. The office action stated:

> The '495 divisional patent does not claim the same invention as the '441 patent, i.e., there are no claims in the '495 divisional application directed to a flow through oxygenator comprising an oxygen emitter positioned within a conduit as claimed in the '411 patent. Accordingly, the '495 patent claims do not provide a basis for claims directed to a system comprising an oxygen emitter positioned within a conduit as recited in the newly submitted claims 13-69.
>
> Where a restriction (or an election of species) requirement was made in an application and applicant permitted the elected invention to issue as a patent without filing a divisional application on the non-elected invention(s), the non-elected invention(s) cannot be recovered by filing a reissue application. A reissue applicant's failure to timely file a divisional application covering the non-elected invention(s) in response to a restriction (or an election of species) requirement is not considered to be error causing a patent granted on the elected claims to be partially inoperative by reason of claiming less than the applicant had a right to claim. Accordingly, this is not correctable by reissue of the original patent under 35 U.S.C. 251. (MPEP 1412.01 (I) March 2014)
>
> In the instant case, applicant's failure to further pursue the elected invention of the '441 patent through a continuing application of the '441 patent or a divisional of the '495 patent is not correctable by reissue of the '495 patent. …

> Claims 13-69 are rejected as being based upon a defective reissue declaration under 35 U.S.C. 251 as set forth above. See 37 CFR 1.175.

For the reasons provided below and in light of the new reissue declaration, Applicants respectfully request that the rejection be withdrawn.

A. There was no restriction requirement in the '495 patent prosecution that would have precluded the present claims from being prosecuted in the '495 patent.

The *Orita* doctrine and the Federal Circuit's guidance with respect to its application were noted at length in Applicant's prior response to the final office action. Without repeating the entire discussion here, Applicant notes the following points: (1) restriction requirements from prior related applications do not carry over into continuing applications unless the restriction is specifically repeated or referred to in the continuing application, (2) the *Orita* doctrine is only applied to reject reissue claims that could not have been prosecuted in the patent being reissued, and (3) reissue claims can only be rejected based on the *Orita* doctrine where the reissue claims are identical or substantially identical to claims that were subject to a prior restriction.

The rejection in the final office action is premised on there being a restriction requirement in the '495 patent prosecution that would prevent the present claims from being prosecuted in the '495 case. That premise is false, however, because there was no restriction made in the '495 patent prosecution. The examiner did not make, repeat or refer to the prior restriction from the '441 patent. MPEP 819 ("A restriction requirement (and election thereto) made in a parent application does not carry over to a continuation, CIP, or divisional application.") (emphasis added). There being no restriction or narrow constructive election in the '495 patent, *Orita* doctrine does not apply and the Applicant should be permitted to pursue the pending claims in a reissue of the '495 patent.

Not only did the examiner of the '495 patent not make a restriction, but he also rejected the claims of the '495 patent for double patenting based on the claims of the '441 patent. The claims of the '441 patent included the "within a conduit" limitation. In effect, the examiner of the '495 patent found that the apparatus claims of the '495 patent, including claim 2, were essentially the same invention and should have been prosecuted together with the claims of the '441 patent that included the "within a conduit" limitation. See Senkiw Decl. ¶¶ 13-14, 17

(showing table of claims for comparison). As a result, the Applicant was required to file a terminal disclaimer, forfeiting a portion of the term of the '495 patent and to commit the two patents to common ownership to overcome the double patenting rejection. The prosecution record is clear that the examiner of the '495 patent did not believe the claims in the '495 patent were patentably distinct from claims that included this particular limitation and, in fact, found the '495 claims to be essentially the same invention as claims that included this limitation.

That the present rejection ignores the double-patenting rejection made during the '495 patent prosecution is a significant red flag. The present rejection's finding is clearly inconsistent with the prosecution record. The Patent Office cannot assert that the claims of the '495 patent are not patentably distinct from claims that include the "within a conduit" limitation during original prosecution of the '495 patent, and then take the opposite position that the same claims are patentably distinct during reissue of the '495 patent.

The mere fact of identifying a continuing application as a "divisional," by itself, does not limit or restrict the scope of claims that may be filed or prosecuted in that application. It is common that applicants, by adding or amending claims, end up with claims in an application filed **as a divisional** that are not patentably distinct from claims prosecuted in the parent application. Such claim sets are said to be **not consonant** with the prior restriction, and the only consequence is that the patent will lose the benefit of Section 121's safe harbor protection against double patenting findings. The case law is full of examples where applicants filed and were issued claims in divisional applications that later were said to be not consonant with prior restricted claim sets. Symbol Techs., Inc. v. Opticon, Inc., 935 F.2d 1569 (Fed. Cir. 1991); Gerber Garment Tech., Inc. v. Lectra Sys., Inc., 916 F.2d 683 (Fed. Cir. 1990); St. Jude Med., Inc. v. Access Closure, Inc., 729 F.3d 1369, 1377 (Fed. Cir. 2013); Lerner v. Ladd, 216 F. Supp. 81 (D.D.C. 1962).

Significantly, the examiner of the '495 patent even had the opportunity to issue a restriction requirement between claims in the '495 patent itself on this basis because there were claims in the '495 patent application that included the "within a conduit" limitation. To be clear, there were claims in the '495 patent both with and without the "within a conduit" limitation. Despite this, the examiner issued no restriction requirement. Claim 1 of the '495 patent included the limitation, "providing a flow through oxygenator comprising an emitter…placing the emitter

within a conduit…" (emphasis added). By contrast, claim 2 of the '495 patent did not include a limitation that the emitter was "within a conduit". The examiner of the '495 patent was squarely presented with the opportunity to restrict claim 1 from claim 2 based on this limitation, but did not do so. Instead, he rejected claim 2 for double patenting based on claims in the '441 patent that included the "within a conduit" limitation. The record cannot be more clear that the examiner of the '495 patent did not restrict out or prevent or bar claims in the '495 patent based on the presence or absence of the limitation that the emitter be positioned "within a conduit".

In all three prosecutions ('262, '441, and '495), the Applicant consistently pursued claims to an emitter for electrolytic generation of bubbles of oxygen. See Senkiw Decl. ¶¶ 13-14. There is no basis for asserting that the present claims which are similarly directed to an emitter for the electrolytic generation of bubbles of oxygen could not have been prosecuted with the claims of the '495 patent. There being no restriction or narrow constructive election in the '495 patent (and instead a double patenting rejection), Applicant should be permitted to pursue the pending claims in a reissue of the '495 patent to correct the error in claim 2 of the '495 patent identified in paragraphs 7 and 8 of the Senkiw declaration.

B. When claiming an emitter for generating oxygen bubbles in water, reciting that the electrodes are "within a conduit" does not make the claims patentably distinct from claims that do not recite that limitation.

It makes sense that the phrase "within a conduit" would not make claims to an emitter for generating oxygen bubbles in water patentably distinct from claims that do not. As explained in the reissue declaration, to generate oxygen bubbles in water, of course, some type of water container or vessel is needed to bring the electrodes into contact with the water. Senkiw Decl. ¶ 15. Therefore, simply adding "within a conduit" is not a patentable step, as it does not add any significant feature that wouldn't already inherently be needed to make an emitter create bubbles in water. Senkiw Decl. ¶ 16.

C. Applicant never argued that the limitation "within a conduit" made claims patentably distinct.

The final office action also suggested that an argument had been made during prosecution of the '441 patent that placing the electrodes "within a conduit" was a patentably distinct limitation. No such argument was made. See Senkiw Decl. ¶¶ 18-21. In an office action dated May 25, 2007, claim 1 of Application No. 10/732,326 was rejected for double patenting based on

claims in the '262 patent. In response, in an amendment dated August 17, 2007, multiple changes were made to the claim, and the Applicant stated that the double patenting rejection no longer applied. The following chart shows the claim both before and after the amendment.

Claim discussed in '441 prosecution **prior to** amendment	Claim discussed in '441 prosecution **after** amendment (with and without markings to show changes)
1. A flow through oxygenator consisting of an emitter for electrolytic generation of microbubbles of oxygen from an aqueous medium, comprising an anode separated at a critical distance from a cathode both within an aqueous medium and in aqueous communication with each other, and a power source all in electrical communication with each other, wherein the emitter is placed within or adjacent to a conduit for flowing water.	1. A flow through oxygenator ~~consisting of~~ comprising: a fluid conduit having a fluid inlet and a fluid outlet fluidly connected with a conduit lumen; an oxygen emitter for electrolytic generation of microbubbles of oxygen from an aqueous medium, the oxygen emitter including a plurality of matched sets of anodes and cathodes wherein the matched sets of anodes and cathodes are mounted to stabilizing hardware such that the oxygen emitter is positioned within the conduit lumen ~~comprising an anode separated at a critical distance from a cathode both within an aqueous medium and in aqueous communication with each other,~~ and a power source ~~all~~ in electrical communication with ~~each other wherein~~ the oxygen emitter ~~is placed within or adjacent to a conduit for flowing water~~. Clean version (without markings) 1. A flow through oxygenator comprising: a fluid conduit having a fluid inlet and a fluid outlet fluidly connected with a conduit lumen; an oxygen emitter for electrolytic generation of microbubbles of oxygen from an aqueous medium, the oxygen emitter including a plurality of matched sets of anodes and cathodes wherein the matched sets of anodes and cathodes are mounted to stabilizing hardware such that the oxygen emitter is positioned within the conduit lumen; and a power source in electrical communication with the oxygen emitter.

The remarks section filed with the amendment included the generic statement:

> "Applicant respectfully asserts that the need for a Terminal Disclaimer to overcome a non-statutory obviousness-type double patenting rejection has been overcome through the present amendment to independent claim 1… As claims 1 [and others] are patentably distinct from claims 1-6 of U.S. Patent No. 6,689,262, Applicant respectfully requests said rejection be withdrawn."

From the marked changes it is clear that multiple changes were made to the claim. The amendments to the claim included: changing the preamble from "consisting of" to "comprising"; removing any reference to a critical distance between electrodes; adding a limitation that there be a plurality of anodes and a plurality of cathodes; adding a limitation that the electrodes now be arranged in a plurality of "matched sets"; adding features of a fluid conduit; and adding completely new structure, "stabilizing hardware", that was not previously recited. The limitation that the electrodes be "positioned within the conduit lumen" was never called out as being the basis for making the claims patentably distinct. In fact, no one limitation was specifically identified as the basis for making the claim patentably distinct, and there is no more reason in the prosecution history to pin the distinction on the "within a conduit" limitation than there is to pin the distinction on the new "stabilizing hardware" limitation, for example, or the "plurality of matched sets" limitation. In fact, the language that the electrodes be "placed within or adjacent to a conduit" had already been in the claim prior to the amendment which suggests that the "positioned within the conduit" limitation was not the basis for arguing the claim was now patentably distinct.

In addition, in the very next office action, the examiner disagreed that even all of these amendments combined made the claims patentably distinct. The examiner maintained the double patenting rejection. Only after several more later amendments that did not relate to the electrodes being positioned "within a conduit" did the examiner finally withdraw the double patenting rejection. Therefore, the prosecution history of the '441 patent does not support any finding that either the Applicant or the examiner ever argued or asserted that the "positioned within a conduit" limitation made claims patentably distinct from claims that did not recite that limitation.

D. The present claims are not identical or substantially identical to any restricted claims

Since there was no restriction requirement made in the '495 patent application, the *Orita* doctrine does not apply. Further, even assuming that the restriction in the '441 application was referred to and imposed by the examiner in the '495 prosecution (which did not happen), any attempt to apply the *Orita* doctrine by the examiner must include a finding, supported by an articulation of the reasoning therefore, that the claims are identical or substantially identical to claims that were subject to a prior restriction requirement. See *Ex parte Belliveau*, decision of the Board of Patent Appeals and Interferences, Appeal No. 2010-007121, Application No. 10/801,177, Patent No. RE43,017 (Aug. 30, 2010) (the Board reversing examiner's *Orita* rejection for failure to make any finding that the claims were identical or substantially identical to claims subject to the restriction requirement).[1] The office action makes no finding that these claims are identical or substantially identical to the claims that were subject to the '441 restriction requirement. The present claims, while directed to an emitter for electrolytic generation of bubbles of oxygen, are, in fact, not identical or substantially identical to the claims in the '441 patent that were subject to the restriction requirement at least because of the very features and limitations noted in the reissue oath relating to FIGS. 7A and 7B. See Senkiw Decl. ¶¶ 7-8 and 24-25.

E. The two-year period for filing a broadening reissue is measured from the issue date of the '495 patent, not the prior '441 patent.

In the advisory action dated Nov. 25, 2015, the examiner suggests an alternative argument that, if the claims of the '495 patent are not patentably distinct from the earlier-issued '441 patent, then the two year rule for a broadening reissue on the '495 patent is measured from the issue date of the '441 patent.[2] Since the first broadening reissue on the '495 patent was filed

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[1] In addition to being accessible via PAIR, this case is also published on LEXIS at *Ex parte Belliveau*, 2010 Pat. App. LEXIS 17175 (B.P.A.I. Aug. 30, 2010).

[2] While unrelated to the discussion of the two-year rule, the advisory action makes a statement characterizing the present reissue claims, stating: "If the '495 oxygen emitter claims are not patentably distinct from the '441 flow-through oxygenator claims, then the instant reissue claims to an emitter positioned within a conduit are also not patentably distinct from the '441 claims."

more than two years after the '441 parent patent issue date, the rejection suggests the two-year rule would bar the claims. With respect, that is not the law.

As set out in 35 U.S.C. §251, the two year period is measured from the issue date of the "original patent." The Federal Circuit has construed "original patent" to be the actual patent being reissued. *MBO Laboratories, Inc. v. Becton, Dickinson & Co.*, 602 F.3d 1306, 1316 (2010). As explained in the *MBO Labs.*, the patent office may look to other related applications to determine if there has been any recapture, but the two year date runs from the actual patent being reissued. *MBO Laboratories, Inc. v. Becton, Dickinson & Co.*, 602 F.3d 1306, 1316 (2010). Here, that is the issue date of the '495 patent, not the '441 or '262 patent. The error being corrected occurs in the '495 patent, and it is the '495 patent that is being reissued.

The Applicants have provided a copy of the decision in *Ex Parte Taylor*, 2015 Pat. App. LEXIS 953 (PTAB Feb. 12, 2015)(App. No. 13/067,574) as an example that contradicts the position stated in the advisory action. In *Ex Parte Taylor*, the PTAB expressly found the broadening reissue application to be timely filed, even though the reissue claims were clearly broader than and filed more than two years after the issuance of an earlier related patent. The PTAB expressly finds that "Taylor timely seeks broadening reissue under 35 U.S.C. § 251 n5 of U.S. Patent No. 7,582,597 B1 *Products, methods and equipment for removing stains from fabrics*. n6." In footnote six, the Board's opinion points out that the '597 patent was a

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That statement goes too far. It is true that each of the applications (the '441 case, '495 case, and the present reissue) include claims directed to an emitter for electrolytic generation of bubbles of oxygen. It is also true adding "within a conduit" **alone** does not render a claim patentably distinct from an emitter claim without that limitation. It does not follow, however that the present reissue claims are not patentably distinct from the claims in the '441 patent. Nor has the Applicant argued that the present reissue claims are not patentably distinct from the claims in the '441 patent. Applicant's position is simply that (1) there was no restriction made or referred to in the '495 prosecution and (2) that absence of restriction is confirmed by the double patenting rejection, finding that claim 2 of the '495 claims that does not recite that the electrodes or emitter are positioned "within a conduit" is not patentably distinct from the '441 claims that do include "within a conduit". In other words, the present reissue claims clearly could have been prosecuted in the '495 patent, which is sufficient to satisfy the *Orita* doctrine.

continuation claiming priority back to a prior '157 patent which had issued (Sept. 2006) almost five years prior to the filing date of the reissue application (June 2011). Despite this fact, the Board found the broadening reissue application to be timely filed because it was filed within two years of the patent actually being reissued. It is significant to note that the reissue claims were clearly broader than not only the claims of the patent being reissued, but also broader than the claims of the related patent that had issued nearly five years prior to the filing of the reissue.

The finding in *Ex Parte Taylor*, therefore, contradicts the position taken in the advisory action. A broadening reissue application is timely if filed within two years of the patent being corrected, regardless whether the reissue claims would be broader than other claims in related cases.

As mentioned in *MBO Labs* the prohibition on recapture, of course, may look to other related applications. The recapture doctrine, however, does not alter how the two year term for broadening is measured. Indeed, if there were a blanket rule prohibiting reissue claims that are broader than claims more than two years old in earlier-issued, related patents, then there would be no need to apply the recapture doctrine in such cases. In other words, that the recapture doctrine is applied in such cases contradicts the legal theory asserted by the examiner.

F. The present reissue claims are directed to the invention disclosed in the '495 patent.

The final office action stated that the reissue claims are directed to a "different" invention than the *claims* of the '495 patent. (See p. 3) This is not the test for satisfying the requirement in 35 U.S.C. §251 that a reissue patent be "for the invention disclosed in the original patent." MPEP § 1412.01 makes clear that the new claims need only be for the same general invention as measured against the specification disclosure, not the prior claims. If there is support under § 112 for the newly added claims and there is no other indication in the specification of an intent not to claim the invention, then the newly added claims satisfy the requirement of 35 U.S.C. §251 that the reissue patent be issued for the "same invention." Therefore, the prior office action's assertion that the newly added claims are directed to a "different" invention as compared to the claims of the '495 patent is improper and provides no basis for rejecting the claims.

G. The Present Reissue Claims Do Not Recapture Surrendered Subject Matter

The final office action made a passing reference to the doctrine of recapture stating, "Nor can the present reissue application recapture subject matter that was surrendered during the prosecution of the parent '441 and '262 patents." According to MPEP 706 "The goal of examination is to clearly articulate any rejection early in the prosecution process so that the Applicant has the opportunity to provide evidence of patentability and otherwise reply completely at the earliest opportunity." Here, the office action does not include any recapture analysis, nor does the action identify any specific subject matter that has been recaptured. It is not clear whether the examiner was making a recapture rejection or merely including a reminder of the proscription against recapture.

Regardless, the present reissue claims do not recapture surrendered subject matter. The present reissue claims were never previously submitted, cancelled, or withdrawn during prior prosecution, and the original claims of the '495 application were never amended. See Senkiw Decl. ¶¶ 24-25. Further, the present reissue claims are significantly narrower than all previously presented claims in all related cases particularly with regard to the limitations discussed in the reissue oath that relate to the embodiment shown in FIG. 7A. Therefore, recapture does not apply here. Applicants respectfully request that if it was the examiner's intent to make a recapture rejection, that such a rejection be clearly articulated so that a more detailed response can be provided.

Conclusion

For the foregoing reasons the Applicant respectfully requests reconsideration and withdrawal of the pending rejection.

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Date January 26, 2016

By: /Philip Caspers/
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MBO LABORATORIES, INC., Plaintiff-Appellant, v. BECTON, DICKINSON & COMPANY, Defendant-Appellee.

2008-1288

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

602 F.3d 1306; 2010 U.S. App. LEXIS 7424; 94 U.S.P.Q.2D (BNA) 1598

April 12, 2010, Decided

SUBSEQUENT HISTORY: On remand at, Summary judgment granted by *MBO Labs., Inc. v. Becton, Dickinson & Co., 783 F. Supp. 2d 216, 2011 U.S. Dist. LEXIS 49455 (D. Mass., May 6, 2011)*

PRIOR HISTORY: [**1]

Appeal from the United States District Court for the District of Massachusetts in case no. 03-CV-10038, Judge Joseph L. Tauro.

MBO Labs., Inc. v. Becton, Dickinson & Co., 368 Fed. Appx. 108, 2009 U.S. App. LEXIS 24857 (Fed. Cir., 2009)

DISPOSITION: AFFIRMED IN PART, REVERSED IN PART and REMANDED.

COUNSEL: For Becton, Dickinson and Company, Defendant-Appellee: ZUBLER, TODD C., PRINCIPAL ATTORNEY, Wilmer Cutler Pickering Hale, Washington, DC.

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For MBO Laboratories, Inc., Plaintiff-Appellant: LUSSIER, JOLYNN M., OF COUNSEL ATTORNEY, Fish & Richardson, P.C., Boston, MA.

JUDGES: Before GAJARSA, CLEVENGER, and DYK, Circuit Judges.

OPINION BY: GAJARSA

OPINION

[***1599] [*1308] GAJARSA, *Circuit Judge*.

MBO Laboratories, Inc. ("MBO") [**2] appeals from the U.S. District Court for the District of Massachusetts' judgment in favor of Becton, Dickinson & Co. ("Becton"), invalidating MBO's *U.S. Reissue Patent*

No. 36,885 (the "RE *'885 patent*") in its entirety based on the rule against recapture. Because we hold that MBO violated the rule against recapture, we affirm the district court's holding that RE *'885 patent* claims 27, 28, 32, and 33 are invalid, but we reverse the district court's invalidation of all other claims. We remand to the district court to address Becton's motion for summary judgment of non-infringement on original claims 13, 19, and 20.

BACKGROUND

MBO is the assignee of the RE *'885 patent*, which is a reissue of *U.S. Patent No. 5,755,699* (the "*'699 patent*"). In our previous opinion, we summarized the RE *'885 patent*'s technology and prosecution history at length. *See MBO Labs., Inc. v. Becton, Dickinson & Co., 474 F.3d 1323, 1326-28 (Fed. Cir. 2007)*. We only recount the facts relevant to this appeal below.

I. The Technology

The RE *'885 patent* discloses a design for a hypodermic safety syringe. "The patented invention, the accused device, and relevant prior art syringes all include features intended to protect health [**3] care workers and bystanders from inadvertent needle sticks following an injection or drawing of fluid." *Id. at 1326*. In general, these syringes protect against needle-stick injuries by covering a contaminated cannula or needle "after removal from the patient." *Id.* The RE *'885 patent* teaches a syringe that protects against needle-stick injuries by sheathing a contaminated needle in a flange-covered guard. Specifically, the patent discloses a needle mounted inside a "guard body" wherein the needle can slide relative to the guard. *See* RE *'885 patent* figs.4, 6B, col.2 ll.65-67, col.3 ll.1-3. "The needle's sharp end protrudes through a hole in the front of the guard, permitting it to be inserted into the patient. When the needle is removed from the patient, the health care worker slides the needle backwards relative to the guard." *MBO, 474 F.3d at 1326*. As soon as the health care worker slides the needle passed a "blocking flange," which is mounted to the guard body, the flange snaps over the needle tip and sheaths it inside the guard body. RE *'885 patent* at [57]. The figures below from the RE *'885 patent* display how the needle, guard body, and flange appear before and after a health care [**4] worker uses a syringe on a patient.

[*1309] [SEE FIGURES 4 AND 6B FROM THE RE *'885 PATENT* IN ORIGINAL]

II. Prosecution History

The RE *'885 patent* issued from the fifth application in a patent family that relates back to November 8, 1990. Those patents and applications include (1) *U.S. Patent No. 5,176,655* [***1600] (the "*'655 patent*"); (2) a continuation-in-part of the *'655 patent*, issued as *U.S. Patent No. 5,395,347* (the "*'347 patent*"); (3) an abandoned continuation of the *'347 patent*, Application No. 08/398,772 (the "'772 application"); (4) a continuation of the '772 application, issued as the *'699 patent*; and (5) a reissue of the *'699 patent*, issued as the RE *'885 patent*. The *'347 patent*, the '772 application, the *'699 patent*, and the RE *'885 patent* share the same specification in substantial part. But the prosecution histories for only the *'655* and *'347 patents* and the '772 application are relevant to the issue on appeal. Those prosecution histories contain the following exchanges with the U.S. Patent and Trademark Office (the "Patent Office").

On November 8, 1990, MBO filed its first patent application covering a hypodermic safety syringe, [1] resulting in the *'655 patent*. *MBO, 474 F.3d at 1326*. Prosecution [**5] claim 18 of this first application covered a "disposable medical assembly" comprising, among other things, a "guide means and manipulating means being *relatively movable*." The examiner rejected all prosecution claims, including claim 18, as anticipated by or obvious over *U.S. Patent No. 4,923,281* ("Kothe"). *Id.* In response, MBO amended prosecution [*1310] claim 18 by adding limitations, including a means-plus-function limitation that described the needle retracting into the guide means. In its amendment, MBO described the limitation as a "means preventing distal emergence of the needle from said guide means after retraction thereof into said guide means." Referring to this amendment, MBO explained to the examiner that "[a] chief feature of applicants' invention, inter alia, is not only the *safe retraction* of the needle or cannula . . . into the tubular member . . . , but also precluding the inadvertent reemergence thereof to present a physical and contamination hazard." After a series of amendments not relevant here, the examiner allowed the claims and the application issued as the *'655 patent* with prosecution claim 18 issuing as claim 14. *Id. at 1327*; *'655 patent* col.11 ll. 59-60.

1 Individuals, [**6] not corporations, create inventions, *see Beech Aircraft Corp. v. EDO Corp*

., *990 F.2d 1237, 1248 (Fed. Cir. 1993)*, but for simplicity we will use "MBO" as shorthand for "the inventors who assigned their patents to MBO" throughout the opinion.

On November 6, 1992, MBO filed its continuation-in-part of the *'655 patent* application with claims for a hypodermic safety needle for blood collection, resulting in the *'347 patent*. But the examiner rejected all claims in this application as obvious over *U.S. Patent No. 5,026,356* ("Smith"). *MBO, 474 F.3d at 1327*. "The Smith patent discloses a safety syringe with a side-mounted guard that snaps down and over the tip of the needle." *Id.* MBO distinguished Smith by explaining that Smith "discloses a usual needle . . . *fixed* to and extending from a conventional syringe barrel . . . . The needle is not *slidably received* in the barrel." According to MBO, "It is *intended* in Smith that as the needle is withdrawn from the flesh that the slidable member . . . is bodily moved forward . . ., whereupon after the needle is withdrawn, the *point only* of the needle lies behind [the] leg [of the side-mounted guard] . . . ." In MBO's view, this structure raised safety [**7] concerns because the needle could not retract and an operator could only manually cover the needle tip. MBO explained that "the needle [in Smith] . . . *may* be fully withdrawn from the patient's flesh by an inattentive or rushed operator . . . with the needle point and needle end portion fully exposed and hazardous for needlestick and contamination!" "MBO [thus] amended its claims to distinguish from Smith on the basis that its needle guard fully surrounded the needle as opposed to only covering the 'tip of the point' . . . ." *Id.* The examiner, however, again rejected some terms as unpatentable over prior art. But the examiner eventually allowed the claims to issue as the *'347 patent* after MBO distinguished the prior art "on the grounds that [MBO's] blocking flange moved into 'adjacent relation' to the front of the guard, unlike any of the cited art." *Id.*

On March 6, 1995, MBO filed the '772 application as continuation of the *'347 patent*. As before, the examiner rejected the application's claims as anticipated by *U.S. Patent No. 4,850,977* ("Bayless"), "or as obvious in view of Bayless and Smith." Id. "Bayless discloses a safety needle with a spring-loaded sheath that, when manually triggered, [**8] extends out and then closes over the exposed needle tip." *Id.*

In response to the rejection, MBO explained that Bayless disclosed a "needle [that] is *fixed* to [the] body 'support chamber.'" "The needle thus never moves and is immovable in the syringe." Instead of a needle moving into a guard, MBO argued that "Bayless provides a separate hollow needle sheath . . . which is axially movable on [the] chamber . . . , which is propelled forwardly by a compression spring." MBO proceeded to distinguish Bayless from its invention on five [***1601] grounds, two of which are relevant to this appeal. First, [*1311] MBO explained that its "needle . . . is recited as *slidable* in the [guard] body . . . between the Fig. 3 and Fig. 6B positions." Second, MBO explained that "the [guard] body . . . has a *front surface* . . . through which the needle . . . is initially extended (Fig. 3) and subsequently slidably retracted (Fig. 6B) with the needle . . . no longer extending forwardly through the [guard] body's front surface."

Despite MBO's response, the examiner again rejected the claims as obvious over Bayless in combination with *U.S. Patent No. 5,125,908* ("Cohen"). Cohen discloses a safety syringe with a needle that retracts [**9] into a syringe holder. The examiner, however, accepted MBO's argument that Bayless only disclosed a fixed needle. According to the examiner, "Bayless does not disclose a retractable needle." But the examiner found that Cohen provided the missing component, rendering MBO's syringe obvious: "Cohen discloses a retractable needle . . . in the same field of endeavor for the purpose of safely disposing of a needle." After this second rejection, MBO distinguished its invention from Bayless and Cohen on three grounds. MBO argued that unlike the prior art, its invention required (1) "a [guard] body . . . for slidably receiving a needle," (2) a safety flange that engages "when the needle is slidably retracted" into the guard body, and (3) a mount for the safety flange's spring that prevents the flange from sliding up or down the guard body. *See id. at 1328*. Noting that Cohen had no flange and no spring mount, MBO argued that no combination of Bayless and Cohen could provide the three points listed above. Based on these arguments, the examiner allowed the claims. But MBO abandoned the '772 application to pursue another application with additional claims, resulting in the *'699 patent*. *Id.*

Finally, [**10] MBO sought a reissue patent on July 1, 1999, arguing that it had a right to broader claims than those contained in the *'699 patent*. "Specifically, [MBO] noted that it was entitled to claim a system having 'any

relative movement between the needle and the body,' not just a 'system wherein the needle must be bodily moved toward the safety device.'" *Id.* In MBO's reissue application, claims 1-20 represented the original patent claims from the cancelled *'699 patent* and claims 21-36 represented the reissue claims. The Patent Office granted MBO's reissue application without objection, resulting in the RE *'885 patent*.

III. Court Proceedings

On January 7, 2003, MBO filed a patent infringement suit against Becton in district court, asserting that Becton's SafetyGlide TM hypodermic safety syringes infringed RE '885 claims 13, 19, 20, 27, 28, 32, and 33. *See MBO Labs., Inc. v. Becton, Dickinson & Co., 385 F. Supp. 2d 88, 91 (D. Mass. 2005)*. After holding a *Markman* hearing, the district court construed several claim terms, *id. at 106-11*, including the term "'slidably receiving' (as well as terms 'relative movement' and 'relatively moved' found in other claims) . . . to refer to a stationary body [**11] into which the movable needle retracts," *id. at 108*.

This court reversed all of the district court's claim constructions except for one not relevant to this appeal. *MBO, 474 F.3d at 1330-34*. We held that the district court improperly construed the terms in light of the rule against recapture instead of relying on the terms' ordinary meanings, contrary to *Phillips v. AWH Corp., 415 F.3d 1303 (Fed. Cir. 2005)* (en banc). *MBO, 474 F.3d at 1332*. In reversing, we interpreted the terms "slidably receiving," [*1312] "relatively moved," and their cognates to refer "to the physical relationship between the guard body and the needle, such that the guard body is capable of sliding relative to the needle." *Id. at 1333* (internal quotation marks omitted). We held that "the terms 'relatively moved,' 'slidably receiving,' and their cognates permit the needle and guard to slide in any manner." *Id.* We then remanded the case to the district court to conduct further proceedings consistent with the proper claim construction. *Id. at 1334*.

On remand, the parties entered into a stipulation agreement, narrowing the issues before the district court. MBO limited its infringement contentions to RE '885 claims 13, 19-20, [**12] 27-28, and 32-33, and Becton admitted infringement of claims 32 and 33 if they were valid. Becton then filed a motion for summary judgment of invalidity and a motion for summary judgment of non-infringement. In support of its invalidity claim, Becton argued that RE *'885 patent* claims 27, 28, 32, and 33 were invalid because MBO had recaptured subject matter it surrendered during patent prosecution. Becton did not, however, argue that original claims 13, 19, and 20 were invalid because of recapture. In support of its non-infringement claim, Becton argued that claims 13, 19, and 20 did not cover its syringes. [***1602]

Even though Becton limited its recapture argument to the reissue claims, the district court held that the entire RE *'885 patent* was invalid because claims 27, 28, 32, and 33 recaptured surrendered subject matter. The district court consequently denied Becton's motion for summary judgment of non-infringement as moot and entered final judgment in Becton's favor. Shortly thereafter, MBO timely filed a notice of appeal. Seeking to clarify its position, Becton also filed a motion to reconsider and amend the judgment with the district court, explaining that its "motion based on the recapture [**13] rule . . . was only directed to the claims added by reissue--claims 27, 28, 32 and 33." While Becton's motion was pending, this court suspended the appeal until the district court ruled on the motion. The district court, however, denied Becton's motion for reconsideration without explanation, prompting this court to reactivate the appeal. This court has jurisdiction over MBO's timely filed appeal under *28 U.S.C. § 1295(a)(1)*. [2]

2 On October 8, 2009, we dismissed Becton's cross-appeal for lack of standing, ordering Becton to file a corrected opposition brief and MBO to file a corrected reply brief. *MBO Labs., Inc. v. Becton, Dickinson & Co., No. 2008-1288, 368 Fed. Appx. 108, 2009 U.S. App. LEXIS 24857, 2009 WL 5948845, at *1 (Fed. Cir. Oct. 8, 2009)*.

DISCUSSION

On appeal, MBO argues that the district court erred in holding that RE *'885 patent* claims 27, 28, 32, and 33 violate the rule against recapture. MBO asserts that it never surrendered a guard body that could move relative to the syringe's fixed needle in its correspondence with the Patent Office. MBO further argues that the district court erred by invalidating the RE *'885 patent* in its entirety, including original patent claims 13, 19, and 20.

We review a district court's legal [**14] determination that a reissue patent violates the rule against recapture without deference. *Pannu v. Storz Instruments, Inc., 258 F.3d 1366, 1370 (Fed. Cir. 2001)*.

However, we review the district court's underlying factual findings in support of its recapture holding for substantial evidence. [*1313] *Id.* As explained below, we affirm the district court in holding that MBO violated the rule against recapture and in invalidating reissue claims 27, 28, 32, and 33. Accordingly, we need not address Becton's arguments that claims 32 and 33 are invalid on alternative grounds. However, we reverse the district court's erroneous invalidation of all other claims and remand to the district court to address Becton's motion for summary judgment of non-infringement on original claims 13, 19, and 20.

I. The Rule Against Recapture

Under the reissue statute, a patentee may surrender a patent and seek reissue "enlarging the scope of the [original patent's] claims" if "through error without any deceptive intent" he claimed "less than he had a right to claim in the [original] patent" and he applies for reissue "within two years from the grant of the original patent." *35 U.S.C. § 251 (2006)*. We have explained that [**15] this statute "is remedial in nature, based on fundamental principles of equity and fairness, and should be construed liberally." *In re Weiler, 790 F.2d 1576, 1579 (Fed. Cir. 1986)*.

Notwithstanding its remedial nature, the reissue statute has limits. "The reissue statute was not enacted as a panacea for all patent prosecution problems, nor as a grant to the patentee of a second opportunity to prosecute *de novo* his original application." *Id. at 1582*. Under the rule against recapture, a patentee's reissue claims are invalid when the patentee broadens the scope of a claim in reissue to cover subject matter that he surrendered during prosecution of the original claims. *See Hester Indus., Inc. v. Stein, Inc., 142 F.3d 1472, 1480 (Fed. Cir. 1998)* ("The recapture rule 'prevents a patentee from regaining through reissue . . . subject matter that he surrendered in an effort to obtain allowance of the original claims.'" (quoting *In re Clement, 131 F.3d 1464, 1468 (Fed. Cir. 1997)*)).

This court bars recapture because a patentee is only entitled to a reissue patent for broader claims when the patentee claimed "less than he had a right to claim in the patent" through "error [**16] without any deceptive intent[]," not through deliberate amendments or arguments designed to convince an examiner to allow the claims. *35 U.S.C. § 251*; *see also Medtronic, Inc. v. Guidant Corp., 465 F.3d 1360, 1372-73 (Fed. Cir. 2006)* ("[T]he deliberate surrender of a claim to certain subject matter during the original prosecution of the application for a patent 'made in an effort to overcome a prior art rejection' is not such 'error' as will allow the patentee to recapture that subject matter in a reissue." (quoting *Clement, 131 F.3d at 1468-69*)); *Haliczer v. United States, 356 F.2d 541, 545, 174 Ct. Cl. 507 (Ct. Cl. 1966)* ("[D]eliberate withdrawal or amendment of [***1603] claims . . . to obtain a patent cannot be said to involve the inadvertence or mistake contemplated by *35 U.S.C. § 251*, and is not an error of the kind which will justify the granting of a reissue patent which includes the matter withdrawn."). Moreover, the court prohibits recapture based on principles of equity. An applicant's surrender of subject matter places "competitors and the public . . . on notice . . . and may have [caused them] to rely on the consequent limitations on claim scope." *MBO, 474 F.3d at 1331*; *see also Vectra Fitness, Inc. v. TNWK Corp., 162 F.3d 1379, 1384 (Fed. Cir. 1998)* [**17] ("[T]he 'recapture rule' . . . ensur[es] the ability of the public to rely on a patent's public record."); *Mentor Corp. v. Coloplast, Inc., 998 F.2d 992, 993 (Fed. Cir. 1993)* ("[T]he [*1314] reissue statute cannot be construed in such a way that competitors, properly relying on prosecution history, become patent infringers when they do so."). Without a rule against recapture, an unscrupulous attorney could feign error and redraft claims in a reissue patent to cover a competing product, thereafter filing an infringement suit. *See Hester, 142 F.3d at 1484* ("[H]ere, the second attorney draft[ed] the [reissue] claims nearly a decade later and with the distinct advantage of having before him the exact product offered by the now accused infringer.").

In applying the rule against recapture, we follow a three-step test. *N. Am. Container, Inc. v. Plastipak Packaging, Inc., 415 F.3d 1335, 1349 (Fed. Cir. 2005)* (explaining the three-step recapture test); *Pannu, 258 F.3d at 1371* (same). First, the court construes the reissued claims to "determine whether and in what 'aspect' the reissue claims are broader than the [original] patent claims." *Clement, 131 F.3d at 1468*. Second, if the reissue claims are broader, [**18] the court determines whether the patentee surrendered subject matter and "whether the broader aspects of the reissued claim relate to [the] surrendered subject matter." *Id. at 1468-69*; *see also id. at 1469-70*. To determine whether a patentee surrendered subject matter, we ask "whether an objective observer viewing the prosecution history would conclude that the purpose of the patentee's amendment or argument

was to overcome prior art and secure the patent." *Kim v. ConAgra Foods, Inc., 465 F.3d 1312, 1323 (Fed. Cir. 2006)*. If the patentee surrendered by argument, he must clearly and unmistakably argue that his invention does not cover certain subject matter to overcome an examiner's rejection based on prior art. *Medtronic, 465 F.3d at 1376* (holding that a patent attorney's argument did not "clearly and unmistakably surrender" the subject matter); *Hester, 142 F.3d at 1482* (explaining that "unmistakable assertions made to the Patent Office in support of patentability" "can give rise to a surrender for purposes of the recapture rule"). Third, a court must "determine whether the reissued claims were materially narrowed in other respects to avoid the recapture rule." *Pannu, 258 F.3d at 1371*.

In [**19] this case, the parties do not dispute the first and third steps of the recapture analysis. In the last appeal, this court addressed the first step. We held that "the terms 'relatively moved,' 'slidably receiving,' and their cognates permit the needle and guard to slide in any manner." *MBO, 474 F.3d at 1333*. In this appeal, MBO concedes that "[t]he first [step] is not in dispute here, as the broadening nature of the reissue claims was clearly explained to the Patent Office in the reissue application." MBO likewise concedes that the third step is not at issue because it did not narrow its reissue claims in any way. Accordingly, this court need only address the second step to determine whether MBO surrendered subject matter and "whether the broader aspects of [MBO's] reissued claim relate to [the] surrendered subject matter." *Clement, 131 F.3d at 1468-69*.

We agree with the district court that MBO violated the rule against recapture by claiming relative movement between the guard body and needle in the RE *'885 patent*. Substantial evidence supports the district court's finding that MBO clearly and unmistakably surrendered claiming a guard body that moved relative to a fixed needle. MBO twice [**20] overcame the examiner's rejections by emphasizing that the prior art disclosed a type of guard [*1315] that moved relative to a fixed needle. In contrast, MBO stressed that its needle moved relative to the guard by "slidably retracting." The following exchanges demonstrate MBO's surrender.

First, MBO distinguished its needle from Smith while prosecuting the *'347 patent* by arguing that Smith disclosed a fixed needle with a slidable member that moved forward to cover the needle. In its response to the examiner's rejection, MBO argued that Smith "discloses a usual needle . . . *fixed* to and extending from a conventional syringe barrel." MBO further explained that when a health care worker withdrew the needle in Smith, "the [***1604] slidable member . . . is bodily moved forward . . . , whereupon after the needle is withdrawn, the *point only* of the needle lies behind [the] leg [of the side-mounted guard]." In other words, a health care worker in Smith would move the slidable member forward to cover the needle's tip. MBO asserted that in contrast to its invention, "[t]he needle [in Smith] is not *slidably received* in the barrel." The examiner "agree[d] with applicants' arguments regarding Smith," recognizing [**21] that MBO was limiting its invention to a needle that slidably retracted into the guard. MBO's exchange with the examiner about Smith thus demonstrates that MBO disclaimed a guard that moved forward to cover the fixed needle to persuade the examiner to allow its claims.

Second, MBO distinguished its needle from Bayless while prosecuting the '772 application by arguing that Bayless disclosed a fixed needle with a sheath that sprang forward to cover the needle. After the examiner rejected MBO's claims as obvious over Bayless, MBO argued that Bayless disclosed a "needle [that] is *fixed* to [the] body 'support chamber.'" According to *MBO*, "Bayless provides a separate hollow needle sheath . . . which is axially movable on [the] chamber . . ., which is propelled forwardly by a compression spring." In other words, the chamber in Bayless would spring forward to cover a fixed needle. In contrast to Bayless, MBO asserted that its application disclosed a needle that was "slidable in the [guard] body" and a guard body "through which the needle . . . is initially extended (Fig. 3) and subsequently slidably retracted (Fig. 6B)." The examiner agreed, stating that "Bayless does not disclose a retractable [**22] needle." As in the exchange about Smith, MBO's correspondence with the examiner about Bayless demonstrates that MBO disclaimed a guard that moved forward to cover the fixed needle to persuade the examiner to allow its claims.

MBO's deliberate surrender of a guard body moving forward to cover a fixed needle proves fatal to its reissue claims. The surrender is directly related to the broader claims it sought in reissue. MBO's prosecuting attorney stated in his reissue declaration that the original claims "claim less tha[n] we had a right to claim in that they fail to claim clearly that any relative movement . . . will . . . prevent[] needlestick hazard, whether or not the needle

moves toward the body and connected safety device, or whether the body and connected safety device advance over the needle." "MBO [thus] clearly sought in reissue to broaden the scope of its patent coverage by rewriting its claims to cover all relative movement, not just retraction." *MBO, 474 F.3d at 1332*. MBO's failure to claim relative movement was not "error without any deceptive intent." *35 U.S.C. § 251*. MBO knew exactly how to claim relative movement. When prosecuting the *'655 patent*, MBO claimed a "disposable [**23] medical assembly" comprising, among other [*1316] things, a "guide means and manipulating means being *relatively movable*." Because MBO surrendered a guard body that moved forward to cover a fixed needle and sought to reclaim relative movement in its reissue claims, MBO violated the rule against recapture.

MBO argues on appeal that its references to a retractable needle were not an attempt to overcome prior art. According to MBO, it was not trying to persuade the examiner to allow its claims based on retraction, but merely conceding that the prior art disclosed a retractable needle. MBO further argues that instead of distinguishing its invention from the prior art based on a retractable needle, it distinguished its invention based on its unique safety flange. But the record refutes MBO's argument that it referred to retraction in mere recognition of the prior art. MBO clearly relied on a retractable needle to distinguish its invention from syringes with guards that moved to cover a needle.

Moreover, MBO misunderstands the rationale behind the rule against recapture. The fact that some of the prior art may have disclosed a retractable needle cannot save MBO's reliance on its retractable needle [**24] to distinguish other prior art. "The public's reliance interest provides a justification for the recapture rule that is *independent of the likelihood that the surrendered territory was already covered by prior art* or otherwise unpatentable." *MBO, 474 F.3d at 1332* (emphasis added). MBO also misunderstands how arguments as to one subject matter affect another. MBO's arguments distinguishing the prior art based on its safety flange do not affect its surrender of another subject matter; a patentee's arguments that emphasize one feature cannot cure arguments that clearly surrender another.

II. Surrendering Subject Matter in a Parent Application

In holding that MBO violated the rule against recapture, we seek to clarify that a patentee may violate the rule against recapture by claiming subject matter in a reissue patent that the patentee surrendered while prosecuting a related patent application. We are aware of [***1605] courts that have held that patentees may only violate the rule against recapture by surrendering subject matter while prosecuting "the patent that is corrected by the reissue patent." *U.S. Filter Corp. v. Ionics, Inc., 68 F. Supp. 2d 48, 72 (D. Mass. 1999)*; *see also* 4A Donald S. Chisum, [**25] *Chisum on Patents § 15.03[2][e][vi]*, at 15-107 to -108 (2004) (citing to no Federal Circuit opinions addressing recapture of subject matter surrendered in a related patent). Under this erroneous theory, the rule against recapture does not contemplate surrenders made while prosecuting the original application or any precedent divisional, continuation, or continuation-in-part applications. *U.S. Filter Corp., 68 F. Supp. 2d at 72*. This error stems from a misunderstanding of the term "original patent" in *35 U.S.C. § 251*. *See id. at 69-72*. The term "original patent" refers to the patent corrected by reissue; it does not limit the universe of patents and their prosecution histories that can be the basis for surrendered subject matter. We have never limited our review of recapture only to the prosecution history for the patent corrected by reissue.

In *North American Container*, we held that a patentee's reissue claims were invalid for recapturing subject matter that the patentee surrendered in arguments and amendments while prosecuting a parent application. *415 F.3d at 1349-50*. Even though the reissue patent corrected a patent [*1317] that issued from a continuation application--not from the original [**26] application--we found that the patentee's surrender of subject matter during the original application carried through to the continuation application. *Id. at 1339-40, 1349-50*; *cf. Kim, 465 F.3d at 1321-24* (rejecting an alleged infringer's argument that the patentee surrendered subject matter from an abandoned parent application to overcome the examiner's rejection based on obviousness); *Clement, 131 F.3d at 1471-72* (rejecting a patent applicant's argument that the rule against recapture should not apply because the reissue claim was narrower than the original claim from an abandoned patent application in some respects). To be sure, most of our precedents involving recapture address simpler prosecution histories, such as alleged surrenders during the prosecution of the patent corrected by reissue. [3] But neither the reissue statute nor the rule against recapture's rationale limits surrender to the prosecution history for the patent corrected by reissue.

3 *See, e.g., Revolution Eyewear, Inc. v. Aspex Eyewear, Inc., 563 F.3d 1358, 1364-65, 1367-68 (Fed. Cir. 2009)*; *Medtronic, 465 F.3d at 1366-69, 1372-79*; *In re Doyle, 293 F.3d 1355, 1356-57 (Fed. Cir. 2002)*; *Pannu, 258 F.3d at 1368-70*; *Hester, 142 F.3d at 1474-77*; [**27] *Clement, 131 F.3d at 1471-72*; *Mentor, 998 F.2d at 995-96*; *Whittaker Corp. v. UNR Indus., Inc., 911 F.2d 709, 710-11 (Fed. Cir. 1990)*; *Weiler, 790 F.2d at 1579*; *Seattle Box Co. v. Indus. Crating & Packing, Inc., 731 F.2d 818, 821-22, 826 (Fed. Cir. 1984)*; *Ball Corp. v. United States, 729 F.2d 1429, 1432-33 (Fed. Cir. 1984)*; *In re Mead, 581 F.2d 251, 252-54, 257 (CCPA 1978)*; *In re Orita, 550 F.2d 1277, 1278-79 (CCPA 1977)*; *In re Wadlinger, 496 F.2d 1200, 1201-03, 1207 (CCPA 1974)*; *In re Richman, 409 F.2d 269, 270, 273-75, 56 C.C.P.A. 1083 (CCPA 1969)*; *In re Wesseler, 367 F.2d 838, 842-44, 54 C.C.P.A. 735 (CCPA 1966)*; *In re Willingham, 282 F.2d 353, 353-54, 357, 48 C.C.P.A. 727, 1961 Dec. Comm'r Pat. 137 (CCPA 1960)*; *In re Dejarlais, 233 F.2d 323, 325-26, 43 C.C.P.A. 900, 1956 Dec. Comm'r Pat. 280 (CCPA 1956)*; *In re Byers, 230 F.2d 451, 454-56, 43 C.C.P.A. 803, 1956 Dec. Comm'r Pat. 183 (CCPA 1956)*; *Haliczer, 356 F.2d at 543-45*.

Congress has never limited the reissue statute's error requirement to errors made while prosecuting the patent corrected by reissue. Starting in 1832, Congress granted the Secretary of State the authority to reissue a patent for an invention when the patentee surrendered the claims of his original patent that were "invalid or inoperative" because the patentee failed to provide an adequate written description of the invention [**28] and how to make and use it through "inadvertence, accident, or mistake, and without any fraudulent or deceptive intent." Act of July 3, 1832, ch. 162, § 3, 4 Stat. 559, 559. Congress has since made several substantive changes to the reissue statute, but has never limited the "error without any deceptive intention" requirement to errors made during the prosecution of only the patent corrected by reissue. *35 U.S.C. § 251*; *see also 35 U.S.C. § 64 (1946)*; Revised Statutes § 4916 (1878); Act of July 4, 1836, ch. 357, § 13, 5 Stat. 117, 122; Act of July 3, 1832, ch. 162, § 3, 4 Stat. 559, 559.

Neither this court nor the U.S. Supreme Court has ever applied the rule against recapture in a way that only considers the prosecution history for the patent corrected by reissue. Rather, both courts have long applied the rule against recapture to safeguard the reissue statute's error requirement and to protect the public's reliance interest on the patentee's prosecution history. As early as 1879, the Court opined that reissue claims would be invalid if a patentee obtained "claims [that he] once formally abandoned . . . , in order to get his letters-patent through." *Leggett v. Avery, 101 U.S. 256,* [***1606] *259, 25 L. Ed. 865, 1880 Dec. Comm'r Pat. 283 (1879)*. [**29] According to the Court, a patentee could not obtain a reissue patent through [*1318] "[t]he pretence that an 'error had arisen by inadvertence, accident, or mistake,'" when the reissue covered claims that the patentee had "express[ly] disclaime[d]." *Id.* (quoting Act of July 3, 1832, ch. 162, § 3, 4 Stat. 559, 559). Such pretence was "the occasion of immense frauds against the public." *Id.* The Court would later explain that Legget established a defense to patent infringement that rendered "the reissued patent . . . void." *Mahn v. Harwood, 112 U.S. 354, 359, 5 S. Ct. 174, 28 L. Ed. 665 (1884)*. According to the Court, the patent was void because the patentee obtained the reissue patent without satisfying the reissue statute's error requirement. Consequently, the Court held that when "the reissued patent embraced a claim which had been presented on the application for the original patent and rejected," "the omission of that claim in the original was not, and could not have been, the result of inadvertence, accident, or mistake." *Id.*

This court has followed the same rationale in applying the rule against recapture. As noted above, we apply the rule to ensure that patents are only reissued to correct a legitimate error and to [**30] protect the public against patentees who would reclaim subject matter surrendered during prosecution. *See, e.g., MBO, 474 F.3d at 1331*; *Medtronic, 465 F.3d at 1372-73*; *Mentor, 998 F.2d at 995-96*. If we limited our recapture review to the prosecution history for the patent corrected by reissue, we would severely undercut the rule against recapture's public-reliance rationale: a patentee could deliberately surrender subject matter during prosecution of an earlier patent, obtain a continuation patent without mentioning the surrendered subject matter, and then seek a reissue patent based on the continuation so as to recapture the subject matter. Such a myopic review would facilitate "immense frauds against the public." *Leggett, 101 U.S. at 259*.

In contrast to such limited review, this court reviews

a patent family's entire prosecution history when applying both the rule against recapture and prosecution history estoppel. "The recapture rule . . . serves the same policy as does the doctrine of prosecution history estoppel: both operate . . . to prevent a patentee from encroaching back into territory that had previously been committed to the public." *MBO, 474 F.3d at 1332*. Unsurprisingly, [**31] this court's prosecution-history-estoppel cases recognize that "prosecution disclaimer may arise from disavowals made during the prosecution of ancestor patent applications." *Omega Eng'g, Inc. v. Raytek Corp., 334 F.3d 1314, 1333 (Fed. Cir. 2003)*; *see also Advanced Cardiovascular Sys., Inc. v. Medtronic, Inc., 265 F.3d 1294, 1305 (Fed. Cir. 2001)* ("The prosecution history of a related patent can be relevant if, for example, it addresses a limitation in common with the patent in suit."); *Elkay Mfg. Co. v. Ebco Mfg. Co., 192 F.3d 973, 980 (Fed. Cir. 1999)* ("When multiple patents derive from the same initial application, the prosecution history regarding a claim limitation in any patent that has issued applies with equal force to subsequently issued patents that contain the same claim limitation."). Because the rule against recapture and prosecution history estoppel both protect the public's interest in relying on a patent's prosecution history, we think equity requires a review of a patent family's prosecution history to protect against recapture in a reissue patent.

III. Invalidating Reissue Claims

Finally, the district court erroneously invalidated the entire RE *'885 patent* [*1319] based solely [**32] on its holding that reissue claims 27, 28, 32, and 33 were invalid under the rule against recapture. Neither party disputes that the district court erred in this regard. When a reissue patent contains the unmodified original patent claims and the reissue claims, a court can only invalidate the reissue claims under the rule against recapture. *See, e.g., N. Am. Container, 415 F.3d at 1349-50* (affirming summary judgment of non-infringement of original claims 1-28 and summary judgment of invalidity of reissue claims 29-42 under the rule against recapture); *Clement, 131 F.3d at 1472* (explaining that a defective reissue declaration that erroneously claims that the applicants mistakenly claimed less than they had the right to claim could not invalidate the original patent claims). Original patent claims will always survive a recapture challenge under the first step of our rule-against-recapture analysis. Under the first step, we construe the reissued claims to "determine whether and in what 'aspect' the reissue claims are broader than the [original] patent claims." *Clement, 131 F.3d at 1468*. The original claims cannot be broader than themselves.

Because the district court erroneously held [**33] the entire RE *'885 patent* invalid, it did not address Becton's motion for summary judgment of non-infringement on claims 13, 19, and 20. [***1607] We decline Becton's invitation to address its non-infringement arguments for the first time on appeal when the district court has yet to address them below. *See TypeRight Keyboard Corp. v. Microsoft Corp., 374 F.3d 1151, 1160 (Fed. Cir. 2004)* (declining to address infringement when the district court did not address the issue below). On remand, the district court must consider Becton's motion for summary judgment of non-infringement.

CONCLUSION

For the foregoing reasons, we affirm the district court's holding that the RE *'885 patent* claims 27, 28, 32, and 33 are invalid, but we reverse the district court's invalidation of all other claims. We remand to the district court to address Becton's motion for summary judgment of non-infringement on original claims 13, 19, and 20. *AFFIRMED IN PART, REVERSED IN PART* and *REMANDED*

COSTS

Each party shall bear its own costs.

1 of 23 DOCUMENTS

Ex parte LAWNIE H. TAYLOR n1

n1 The real party in interest is listed as Lawnie H. Taylor, President, L.H. Taylor Associates Inc. (Appeal Brief, filed 21 March 2014, ("Br."), 3.)

Appeal 2014-008885 n2, n3

n2 Heard 7 January 2015. The transcript is cited as "Tr."
n3 At the Oral Argument, Taylor was represented by Andrea H. Evans, Esq. The record indicates that Taylor previously had proceeded pro se.

Application 13/067,574

Technology Center 1700

Patent Trial and Appeal Board

2015 Pat. App. LEXIS 953

February 12, 2015, Decided

NOTICE:
[*1]

ROUTINE OPINION. Pursuant to the Patent Trial and Appeal Board Standard Operating Procedure 2, the opinion below has been designated a routine opinion.

Before CATHERINE Q. TIMM, MARK NAGUMO, and GEORGE C. BEST, Administrative Patent Judges.

OPINIONBY: MARK NAGUMO

OPINION:

NAGUMO, *Administrative Patent Judge*.

DECISION ON APPEAL

Lawnie H. Taylor ("Taylor") timely appeals under 35 U.S.C. § 134(a) from the final rejection n4 of claims 1, 3-29, 62, and 63, which are all of the pending claims. We have jurisdiction under 35 U.S.C. § 6. We affirm.

n4 Office Action mailed 4 December 2013 ("Final Rejection"; cited as "FR").

OPINION

A. Introduction

Taylor timely seeks broadening reissue under 35 U.S.C. § 251 n5 of U.S. Patent No. 7,582,597 B1, *Products, methods and equipment for removing stains from fabrics*. n6 The error to be corrected is, in Taylor's words, that "[f]our (4) independent claims are constructed incorrectly as 'consisting [*2] of' claims. These claims are broadened by amending them from 'consisting of' claims to 'comprising' claims." n7

n5 When Taylor filed his reissue application, the most relevant parts of 35 U.S.C. § 251 read:

> Whenever any patent is, through error without any deceptive intention, deemed wholly or partly inoperative or invalid, by reason of a defective specification or drawing, or by reason of the patentee claiming more or less than he had a right to claim in the patent, the Director shall, on the surrender of such patent and the payment of the fee required by law, reissue the patent for the invention disclosed in the original patent, and in accordance with a new and amended application, for the unexpired part of the term of the original patent. No new matter shall be introduced into the application for reissue.
> * * * *
>
> No reissued patent shall be granted enlarging the scope of the claims of the original patent unless applied for within two years from the grant of the original patent.

35 U.S.C. § 251 (2011) (subsequently amended, effective 16 September 2011).

[*3]

n6 U.S. Patent No. 7,582,597 issued 1 September 2009 (the "'597 patent"), based on application 12/382,136, filed 9 March 2009, a continuation of 11/505,445, filed 17 August 2006 (*see In re Taylor, 445 Fed. Appx. 343 (Fed. Cir. 2011)* (non-precedential), affirming *2011 WL 126907* (BPAI)), now abandoned, which is a continuation of 10/612,016, filed 3 July 2003, now U.S. Patent No. 7,109,157, which is a continuation-in-part of 10/373,787, filed 27 February 2003, now U.S. Patent No. 6,946,435, which claims benefit of 60/423,978 filed 6 November 2002.

n7 Reissue Application Declaration by the Inventor (PTO/SB/51), 1, (9 June 2011).

The subject matter on appeal relates to aqueous bleach products (claims 19-29 and 63) and processes for making them (claims 1, 3-18, and 62). More particularly, Taylor seeks to perfect patent protection related to the discovery that the damaging effects of hypochlorite-containing solutions (hereinafter, [*4] "bleach," or "NaOCl" n8) on soft fabrics such as cotton may be reduced by adding an alkali metal hydroxide solution ("NaOH" n9) in a relative "weight concentration ratio" ("WCR") of NaOCl to NaOH ranging between 30:1 and 1:1.

n8 We use this abbreviation for the preferred embodiment (Spec. 2, ll. 13-15) purely as a convenient reference

for the chemically oriented reader, although only dependent claim 10 and the corresponding subordinate claims are so limited.
n9 *See* n.8.

Claim 19 is representative of the dispositive issues and reads:

An aqueous hypochlorite salt bleach product for cleaning a soft fabric article,

the solution of said product formulated with a *weight concentration ratio of alkali-metal hydroxide over alkali-metal hypochlorite-salt*,

said weight concentration ratio correlating to the quality of fabric safety of the product solution selected within the range of damaging to abated damage to cotton-safe,

wherein the product solution comprises,

(a) an effective amount of [*5] hypochlorite salt, for cleaning a soft fabric article[,]

(b) a quantity of an alkali-metal hydroxide as determined by (a) and (c),

(c) *the weight concentration ratio 1:30 to 1:1*[.]

(Claims App., Br. 21; some indentation, paragraphing, and emphasis added.)

The Examiner maintains the following grounds of rejection: n10, n11

A. Claims 1, 3-29, 62, and 63 stand rejected under 35 U.S.C. § 102(b) in view of Scialla. n12

B. Claims 1, 3-29, 62, and 63 stand rejected under 35 U.S.C. § 102(a) in view of Agostini. n13

C. Claims 1, 3-29, 62, and 63 stand rejected under 35 U.S.C. § 102(a) in view of Grande. n14

Briefly, the Examiner finds that each reference discloses specific examples of aqueous fabric-treating compositions comprising sodium hydroxide and sodium hypochlorite that meet all limitations recited in the claims.

n10 Examiner's Answer mailed 9 July 2014 ("Ans.").
n11 In the Final Rejection, the Examiner maintained numerous (19 by Appellant's count; Br. 8, l. 3) rejections for anticipation over prior art. In each rejection, the Examiner found that a specific composition in the reference met the limitations of all of the claims. (FR 12-21.) The Examiner explains that the withdrawn rejections are considered "cumulative to, or less pertinent than the references above." (Ans. 4, ll. 16-17.)
[*6]

n12 Stefano Scialla and Giuseppe Trigiante, *Hypochlorite bleaching compositions*, U.S. Patent No. 6,120,555 (2000).
n13 Andrea Agostini and Oreste Todini, *Bleaching compositions*, U.S. Patent No. 6,416,687 B1 (9 July 2002), based on an international application accorded a § 371(c)(1), (2), (4) date of 22 February 1999.
n14 Giovanni Grande and Oreste Todini, *Stable colored thickened bleaching compositions*, U.S. Patent No.

6,448,215 B1 (10 September 2002), based on an application accorded a § 371(c) date of 14 July 2000.

B. Discussion

Findings of fact throughout this Opinion are supported by a preponderance of the evidence of record.

Initially, we find that Taylor has not raised arguments for the patentability of any claim separate from any other. We find further that Taylor has not raised arguments against the Examiner's specific findings of fact regarding any of the applied references, including the three references over which rejections have been maintained. Rather, in both the principal [*7] Brief and in the Reply, n15 Taylor raises generalized arguments relating to the weight concentration ratio, abbreviated as "WCR," and whether the prior art recognized the existence or significance of the WCR. (Br. 10-17; Reply 2-7.) "In summary," Taylor argues, "the WCR . . . is not anticipated because it is not found described, either expressly or inherently, in the examiner's cited prior art references." (Reply 7, ll. 2-5 (citation omitted).) Accordingly, all of Taylor's arguments may be addressed by considering the limitations recited in claim 19, with which all other claims stand or fall.

n15 Reply Brief, filed 6 August 2013 ("Reply").

At the heart of the present dispute are the meaning of the term "WCR," and the meaning and weight to be given to the "correlating" recitation in claim 19, "said weight concentration ratio correlating to the quality of fabric safety of the product solution selected within the range of damaging to abated damage to cotton-safe" (Claims App., Br. 21; emphasis added). n16

n16 The corresponding recitation in claim 1, which is drawn to a process of making such a composition, reads, "the weight concentration ratio value correlating to a fabric effect selected in the range of damaging-to-abated damage-to-cotton safe." (Claims App., Br. 19.)

[*8]

We begin with the legal issue of claim interpretation, "the logical starting point of the analysis." *Titanium Metals Corp. v. Banner, 778 F.2d 775, 782 (Fed. Cir. 1985).*

The plain language of claim 19 requires an aqueous solution of alkali-metal hydroxide and alkali-metal hypochlorite salt in a weight concentration ratio of metal hydroxide to hypochlorite between 1:30 and 1:1. Although a formal definition of the term "weight concentration ratio" appears to be absent from the Specification, the ordinary meaning of the words is consistent with the definition provided by Taylor, n17 namely,

n17 Amended After-Final Response filed 16 January 2014; we have inverted the ratio defined in this Response to follow the ratio of components recited in the claim.

WCR = Wt % sodium hydroxide over Wt % sodium hypochlorite, which may be rendered as

WCR = [NaOH]/[NaOCl],

where the square brackets indicate concentration by weight.

The Examiner finds that Scialla, in Example 5 (Scialla, col. 8, Table at [*9] ll. 15-24), and Agostini, in Examples V and XII (Agostini, col. 10, Table at ll. 19-43), describe aqueous solutions useful for bleaching fabrics comprising 1.4 wt% sodium hydroxide and 2.5 wt% sodium hypochlorite. (FR 14, ll. 10-15, and 17, ll. 1-11.) Similarly, the Examiner finds that Grande (Grande, Table at col 19, ll. 40-67) describes aqueous fabric bleaching compositions comprising 1.2 wt% sodium hydroxide and 3.5 wt% sodium hypochlorite. (*Id.* at 19, ll. 40-44.) The Examiner summarizes these findings in the following words, "[e]ach and every reference contains amounts of sodium hydroxide and sodium hypochlorite that overlap [more precisely, fall within] the ratio range claimed by applicant." (FR 11, ll. 2-3; Ans. 6, ll. 9-10.)

At oral argument, Mr. Taylor urged that the ratios of weight concentrations calculated by the Examiner are not the same as the weight concentration ratio defined by the claims (Tr. 24, ll. 20-23), because the ratio recited in the claims is based on the protective effect provided by the WCR to the fabric during the treatment (*id.* at 25, ll. 2-11). Taylor urges that this protective effect is an "additional property" of the composition that "go[es] [*10] hand[-]in[-]hand" with the relative amounts of hypochlorite and hydroxide. (*Id.* at 26, ll. 5-9.) This discovery that forms the basis of the claims, Taylor argues, is one that changes the fabric-damaging characteristics of bleach. The claimed composition, according to Taylor, is distinguished from the prior art because no other ingredients (such as the buffering agents present in each reference) are required.

The roles of recitations of properties and functional limitations in claims to compositions of matter have been raised repeatedly throughout the history of utility patents in this country. The predecessor to our reviewing court explained that "every limitation positively recited in a claim must be given effect in order to determine what subject matter that claim defines." *In re Wilder, 429 F.2d 447, 450 (CCPA 1970).* "However," the court continued, "recitation, in a claim to a composition, of a particular property said to be possessed by the recited composition, be that property newly-discovered or not, does not necessarily change the scope of the subject matter otherwise defined by that claim." (*Id.*) On the facts of that case, the court held [*11] that Wilder's claims "define nothing other than rubber compositions containing particular rubbers combined with particular antidegradant compounds." (*Id.*)

In this case, reading the claim as a whole, in light of the supporting disclosure, we hold that the correlation recitation is merely the definition of a property of the composition, and that the composition is defined by the weight concentration ratio of sodium hydroxide to sodium hypochlorite. First, the composition is bounded by the transitional phrase, "comprising," which "permits the *inclusion* of other steps, elements, or materials." *In re Baxter, 656 F.2d 679, 686 (CCPA 1981).* Second, the intended use, "for cleaning a soft fabric article," recited in the preamble, has the effect of excluding compositions that can be shown to be unsuitable for that use. But all of the applied references describe compositions for treating fabrics, and Taylor has not come forward with evidence and argument that these references are not suited for such use. Third, the reasons a formulator selects components and relative amounts of components of a composition of matter are generally immaterial to the critical [*12] question, i.e., do the appealed claims "read on or encompass" a fabric cleaning composition "already known by reason of the disclosure" of the prior art references? *Titanium Metals, 778 F.2d at 781.* In other words, it doesn't matter why a prior artisan made a solution comprising 1.4 wt% sodium hydroxide and 2.4 wt% sodium hydroxide: if that composition otherwise meets all the limitations that define the claimed composition, it anticipates. Taylor has not come forward with credible evidence or a plausible explanation of why the reasons for selecting the relative amounts of NaOH and NaOCl would make a difference regarding the identity of the ultimate composition.

Taylor's other arguments are not persuasive of harmful error in the appealed rejections.

Taylor's arguments based on inherency and overlapping ranges (Br. 11, l. 1 to 14, l. 2) are inapposite to the present case, as the Examiner relies on particular examples having a ratio of weight percent concentrations of NaOH and NaOCl

that falls within the range of 1:30 to 1:1, not on the prior art disclosure of a range of such concentrations, as evidence of anticipation. As the Federal Circuit explained, [*13] "[i]t is . . . an elementary principle of patent law that when, as by a recitation of ranges or otherwise, a claim covers several compositions, the claim is 'anticipated' if *one* of them is in the prior art." *Titanium Metals, 778 F.2d at 782.*

Taylor does not dispute the accuracy of the Examiner's findings. Rather, Taylor urges that the Examiner "elects to cherry pick values from the references to 'calculate' ratios on behalf of the prior art." (*Id.* at 14, ll. 9-10.) We do not find this an accurate or fair characterization of the Examiner's analysis, which relies on particular examples of bleaching solutions reported in these patent references. Moreover, the other examples in these references all fall in the WCR range of 1:30 to 1:1 weight concentration ratios of [NaOH]/[NaOCl]. n18 Similarly, Taylor's arguments that the Examiner erred by calculating the WCR of NaOH and NaOCl because this amounted to using his discovery against him are without merit. As the Examiner explained (FR 11, ll. 17-19; Ans. 6, ll. 15-17), that calculation amounts to no more than determining whether the prior art solutions have relative amounts of NaOH and NaOCl within [*14] the scope of the claims.

n18 A cursory review of the now-withdrawn rejections indicates that all but a couple--presumably those the Examiner characterized as "less pertinent"--are clearly cumulative in this regard.

Taylor argues further that the references, unlike the invention, rely on additives other than sodium hydroxide and sodium hypochlorite to lessen fabric damage by the bleaching solution. (Br. 14, ll. 10-13.) This argument is not persuasive of harmful error for several reasons. First, as already discussed, the claims for which reissue is sought are open to additional, non-recited components, by virtue of the transitional term "comprises," in contrast to the claims of the '597 patent. Second, the claims require that the WCR "correlat[e] to the quality of fabric safety" within certain bounds. Standard definitions of the verb "correlate" require a relation, but not necessarily a causal relation, between the things correlated. Thus, this phrase does not serve as a functional limitation [*15] that excludes the presence of materials that are not inconsistent with the "bleach product for cleaning a soft fabric article" recited in the preamble to claim 19. In this regard, Taylor has not come forward with evidence that the prior art compositions do not meet the properties required by claim 19.

Finally, Taylor argues that "[t]he examiner has not addressed what is meant by his calculated ratio to be inherently present as a claim limitation in the references and required to define a natural fabric effect property unknown to and in conflict with teachings of the references." (*Id.* at ll. 17-20; 18, ll. 22-24.) We understand Taylor to mean that because the references did not recognize the particular WCR recited in the claims, the references cannot meet this limitation. However, in the absence of positive limitations on the composition of the claim, the reason for choosing amounts of various components is irrelevant to the patentability of the claim over an otherwise anticipatory prior art reference. As the predecessor to the Federal Circuit explained over thirty years ago, the "recitation of a newly discovered function or property, inherently possessed by things in the prior [*16] art, does not distinguish a claim drawn to those things from the prior art." *In re Oelrich, 666 F.2d 578, 581 (CCPA 1981).*

In conclusion, Taylor has not demonstrated harmful error in the rejections maintained by the Examiner.

C. Order

We affirm the rejection of claims 1, 3-29, 62, and 63.

No time period for taking any subsequent action in connection with this appeal may be extended under *37 C.F.R. § 1.136(a).*

AFFIRMED

Reissue of 7,582,597 Application 13/067,574 (not issued) Filed: June 9, 2011	**Original patent 7,582,597[1] Application 12/382,136 Issued: September 1, 2009**	**Grandparent patent 7,109,157[1] Application 10/612,016 Issued: September 19, 2006**
1. A method for formulating an aqueous hypochlorite salt containing composition for cleaning a stain from a soft fabric article with an effect on the soft fabric article, said effect selected in the range of damaging-to-abated damage-to-cotton safe according to the value of the weight concentration ratio of alkali-metal hydroxide to alkali-metal hypochlorite-salt, the method comprising, adding an alkali metal hydroxide to a hypochlorite salt-containing solution to formulate a composition, wherein the required amount of alkali metal hydroxide in the composition is determined by the amount of hypochlorite salt in said composition and the weight concentration ratio value correlating to a fabric effect selected in the range of damaging-to-abated damage-to-cotton safe, whereby the cleaning composition **comprises**, (a) an effective amount of a hypochlorite salt for cleaning a soft fabric article, (b) a quantity of an alkali metal hydroxide as determined by (a) and (c), (c) the weight concentration ratio **1:30 to 1:1**, wherein the pH of said cleaning composition is at least 11 and the soft fabric article is contacted directly with the cleaning composition for a period of time compatible with the selected fabric effect.	1. A method for reducing the damaging effect of a hypochlorite salt-containing solution on a soft fabric article, comprising: modifying a hypochlorite salt-containing solution by adding an alkali metal hydroxide to the solution, forming a cleaning composition for use in cleaning a stain from a soft fabric article, wherein said hypochlorite salt-containing solution consists of a hypochlorite salt or an admixture of hypochlorite salt and an alkali metal hydroxide solution, and wherein the weight concentration ratio of the alkali metal hydroxide over the hypochlorite salt in the cleaning composition is **no less than 1:12.5**, whereby the cleaning composition **consists of** hypochlorite salt, alkali metal hydroxide, and water.	1. A method for reducing the damaging effect of a hypochlorite salt-containing solution on a soft fabric article, comprising the steps of: (a) modifying the solution by adding an alkali metal hydroxide to the solution, such that the weight concentration ratio of the alkali metal hydroxide over the hypochlorite salt in the modified solution is **no less than 1:12.5**, wherein the modified solution **consists of** the hypochlorite salt, the alkali metal hydroxide, and water; and (b) contacting the modified solution with a stain on the soft fabric article for at least one minute to remove the stain.

[1] U.S. Patent 7,582,597 states: "This application is a **continuation of** U.S. patent application Ser. No. 11/505,445, filed Aug. 17, 2006, **which is a continuation** of U.S. patent application Ser. No. 10/612,016, filed Jul. 3, 2003, **now U.S. Pat. No. 7,109,157**, which, in turn, is a continuation-in-part of U.S. patent application Ser. No. 10/373,787, filed Feb. 27, 2003, now U.S. Pat. No. 6,946,435, which claims the benefit of U.S. Provisional Application No. 60/423,978, filed Nov. 6, 2002, all of which are incorporated herein by reference in their entireties."

CLAIMS

Claims 1, 3-30, 32-46, 62-64, and 72 rejected in Office Action.

1. (Currently Amended):

[A method for reducing the damaging effect of a hypochlorite salt-containing solution on a soft fabric article, comprising:

modifying a hypochlorite salt-containing solution by adding an alkali metal hydroxide to the solution, forming a cleaning composition for use in cleaning a stain from a soft fabric article,

wherein said hypochlorite salt-containing solution consists of a hypochlorite salt or an admixture of hypochlorite salt and an alkali metal hydroxide solution, and

wherein the weight concentration ratio of the alkali metal hydroxide over the hypochlorite salt in the cleaning composition is no less than 1:12.5,

whereby the cleaning composition consists of hypochlorite salt, alkali metal hydroxide, and water]

A method for formulating an aqueous hypochlorite salt-containing composition for cleaning a stain from a soft fabric article with an effect on the soft fabric article, said effect selected in the range of damaging-to-abated damage-to-cotton safe according to the value of the weight concentration ratio of alkali-metal hydroxide to alkali-metal hypochlorite-salt, the method comprising,

adding an alkali metal hydroxide to a hypochlorite salt-containing solution to formulate a composition,

wherein the required amount of alkali metal hydroxide in the composition is determined by the amount of hypochlorite salt in said composition and the weight concentration ratio value correlating to a fabric effect selected in the range of damaging-to-abated damage-to-cotton safe,

whereby the cleaning composition comprises,

(a) an effective amount of a hypochlorite salt for cleaning a soft fabric article,

(b) a quantity of an alkali metal hydroxide as determined by (a) and (c),

(c) the weight concentration ratio 1:30 to 1:1,

wherein the pH of said cleaning composition is at least 11 and the soft fabric article is contacted directly with the cleaning composition for a period of time compatible with the selected fabric effect..

2-7. (Original)

8. (Amended)

The method according to claim 1, wherein the stain is a [menstrual fluid stain or an underarm perspiration stain] body fluid stain.

9–18 (Original)

19. (Currently Amended).

[A bleach product consisting of: a cleaning composition which consists of water and an effective amount of a hypochlorite salt and an alkali metal hydroxide,

wherein the weight concentration ratio of the alkali metal hydroxide over the hypochlorite salt is no less than 1:12.5.]

An aqueous hypochlorite salt bleach product for cleaning a soft fabric article, the solution of said product formulated with a weight concentration ratio of alkali-metal hydroxide over alkali-metal hypochlorite-salt , said weight concentration ratio correlating to the quality of fabric safety of the product solution selected within the range of damaging to abated damage to cotton-safe ,

wherein the product solution comprises,

(a) `an effective amount of hypochlorite salt, for cleaning a soft fabric `article

(b) a quantity of an alkali-metal hydroxide as determined by (a) and (c),

(c) the weight concentration ratio 1:30 to 1:1

20-29 (Original)

30-61 (Cancelled)

62 (Amended)

The method according to claim 10, wherein said cleaning composition includes at least [5] 0.5 weight percent of sodium hypochlorite...

63. (Amended)

The bleach product according to claim 19, wherein said hypochlorite-salt is at least [5] 0.5 weight percent and said alkali metal hydroxide is at least 0.2 weight percent.

64-72 (Cancelled)

EXAMPLE II

Comparison of Clorox Bleach to a Cleaning Composition Comprising 2.4 wt % Sodium Hypochlorite and 1.25% Sodium Hydroxide

Two similar patches (approximately 2.5×2.5 cm^2) of 100% cotton fabric were cut from the crotch of a new panty. The first patch was immersed in a diluted Clorox Bleach solution. The diluted Clorox Bleach solution contained about 2.4 wt % sodium hypochlorite. After six hours of soaking, the first patch showed signs of shredding. After ten hours of soaking, the first patch shredded completely. In comparison, the second patch was immersed in a solution which contains about 2.4 wt % sodium hypochlorite and 1.25 wt % sodium hydroxide. After ten hours of soaking, no effect of shredding was observed.

A test similar to those described in EXAMPLE I was conducted for the solution that contains 2.4 wt % sodium hypochlorite and 1.25 wt % sodium hydroxide. The solution was placed in an opaque spray container and used in exactly the same manner for cleaning panties of menstrual fluid stain as the commercial mildew removers were used in EXAMPLE I. The solution had essentially the same results and effectiveness in removing menstrual fluid stains, as compared to the commercial mildew removers used in EXAMPLE I.

EXAMPLE III

The Damage Effects of Hypochlorite Solutions to Cotton Patches and the Reduction Thereof

Cotton patches which were resistant to hand-tearing were soaked in different bleach solutions until damages have begun to occur as evidenced by weakening of the fabric such that it can be torn by hands with moderate forces. For each bleach solution to be tested, multiple cotton patches were used. Each patch was inserted into a vial containing the bleaching solution. The patch was removed periodically from the vial to determine the extent of damage by manually administering a tearing action. $T_c(D)$ was the cumulative time of soaking before the patch became hand-tearable.

The bleach solutions were modified from Ultra Clorox Bleach which contains about 6% NaOCl and less than 0.2% NaOH. Additional NaOH in dry form was added to Ultra Clorox Bleach to increase the concentration of NaOH. As Table I shows, Ultra Clorox Bleach damages cotton fabrics in an accumulated time of approximately one hour. Decreasing the ratio of NaOCl/NaOH progressively increases the accumulated times for which the bleach solution is cotton-safe. This Example indicates that NaOH, added to Ultra Clorox Bleach, can abate the damage of cotton fabrics, thereby rendering the bleach solution cotton-safe.

TABLE 1

Comparison of the Damage Effects of Bleaching Solutions

Cleaning Solution	NaOH (weight percentage)	NaOCl/NaOH (weight percentage ratio)	$T_c(D)$ (hours)
Ultra Clorox Bleach	0–0.2	over 30:1	1
Solution #1	0.4–0.6	12:1	4
Solution #2	1.0–1.2	5.5:1	6
Solution #3	2.0–2.2	3:1	6
Solution #4	3.0–3.2	2:1	9.5
Solution #5	4.0–4.2	1.5:1	9.5
Solution #6	6.0–6.2	1:1	9.5

The foregoing description of the present invention provides illustration and description, but is not intended to be exhaustive or to limit the invention to the precise one disclosed. Modifications and variations are possible consistent with the above teachings or may be acquired from practice of the invention. Thus, it is noted that the scope of the invention is defined by the claims and their equivalents.

What is claimed is:

1. A method for reducing the damaging effect of a hypochlorite salt-containing solution on a soft fabric article, comprising the steps of:

(a) modifying the solution by adding an alkali metal hydroxide to the solution, such that the weight concentration ratio of the alkali metal hydroxide over the hypochlorite salt in the modified solution is no less than 1:12.5,

wherein the modified solution consists of the hypochlorite salt, the alkali metal hydroxide, and water; and

(b) contacting the modified solution with a stain on the soft fabric article for at least one minute to remove the stain.

2. The method according to claim **1**, wherein the alkali metal hydroxide is sodium hydroxide, and the hypochlorite salt is sodium hypochlorite.

3. The method according to claim **2**, wherein the weight concentration ratio of sodium hydroxide over sodium hypochlorite in the modified solution is no less than 1:10.

4. The method according to claim **2**, wherein the weight concentration ratio of sodium hydroxide over sodium hypochlorite in the modified solution is no less than 1:5.

5. The method according to claim **2**, wherein the weight concentration ratio of sodium hydroxide over sodium hypochlorite in the modified solution is no less than 1:2.5.

6. The method according to claim **2**, wherein the weight concentration ratio of sodium hydroxide over sodium hypochlorite in the modified solution is no less than 1:1.

7. The method according to claim **2**, wherein the modified solution includes at least 0.2 weight percent of sodium hydroxide.

8. The method according to claim **2**, wherein the modified solution includes at least 0.3 weight percent of sodium hydroxide.

9. The method according to claim **2**, wherein the modified solution includes from about 0.5 to about 3 weight percent of sodium hydroxide.

10. The method according to claim **1**, comprising the step of contacting the modified solution with the stain on the soft fabric article for at least five minutes to remove the stain.

11. The method according to claim **1**, comprising the step of contacting the modified solution with the stain on the soft fabric article for at least fifteen minutes to remove the stain.

12. The method according to claim **1**, wherein the stain is a menstrual fluid stain or an underarm perspiration stain.

13. The method according to claim **1**, wherein the soft fabric article comprises cotton.

United States Patent Application

REISSUE DECLARATION OF INVENTORSHIP

As a below named inventor I hereby declare as follows.

1. My residence, post office address and citizenship are as stated below next to my name.

2. I believe I am the original, first and sole inventor of: (a) the subject matter which is described and claimed in U.S. Patent No. 7,670,495 (the '495 patent) which was issued on March 2, 2010; (b) the subject matter claimed in the broadening reissue patent application Serial No. 13/247,241 which was filed January 31, 2008 and which issued as U.S. Patent No. RE45,415 on March 17, 2015; and (c) the subject matter claimed in the present broadening reissue patent application Serial No. 14/601,340 filed January 21, 2015. Reissue patent application Serial No. 14/601,340 is a continuation of reissue patent application Serial No. 13/247,241 and thus is a continuation reissue application of the '495 patent. The '495 patent is related to U.S. Patent No. 6,689,262 which issued on February 10, 2004 (the '262 patent) and U.S. Patent No 7,396,441 which issued on July 8, 2008 (the '441 patent).

3. I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by the amendment that is being filed with this declaration. A copy of the amended claims is attached hereto as Exhibit A.

4. I acknowledge the duty to disclose information which is material to the patentability of this reissue application in accordance with 37 C.F.R. § 1.56 (attached hereto). I state that the present application is a broadening reissue application of U.S. Patent No. 7,670,495 and a continuation reissue application of U.S. Patent No. RE45,415. Because of the continuation relationship with U.S. Patent No. RE45,415, this present application has an original filing date within two years of the issuance of the '495 patent.

ERRORS CORRECTED

5. I state pursuant to 37 C.F.R. § 1.175(a) that I, the Applicant, believe the original patent to be partly inoperative or invalid by reason of the patentee claiming less than the patentee had a right to claim in the patent. I believe that the errors to be relied upon as the basis for reissue are to be found in the text of the claims of Patent No. 7,670,495 in that they do not encompass the full scope of my invention and unnecessarily limit that scope. The errors that are being addressed occur in the apparatus claims of the '495 patent, specifically claims 2-7, 11 and 12, each of which is directed to an emitter for electrolytic generation of microbubbles of oxygen ("the '495 emitter claims").

6. In paragraphs 7 and 8 below I discuss examples of how the '495 emitter claims are too broad in some respects, and that it was an error not to include emitter claims that include varying combinations of the features disclosed in the emitter embodiment corresponding to FIGS. 7A and 7B of the '495 patent. In paragraph 9 below I discuss examples of how the '495 emitter claims are too narrow in some respects, and that it was an error not to include emitter claims without certain limitations of the '495 emitter claims.

7. The '495 emitter claim 2, for example, is too broad in that it does not recite certain features of the disclosed emitter embodiment corresponding to FIGS. 7A and 7B which I was entitled to claim but did not claim. These features are shown in the embodiment of FIGS 7A and 7B and include, for example: the electrodes are positioned in the outer perimeter of the oxygenation chamber; this positioning of the electrodes provides an unobstructed passageway for water to flow; in that unobstructed passageway, water may flow from the water inlet to the water outlet without passing through a space between the electrodes of opposite polarity; and a portion of at least one of the first and second electrodes is in contact with a wall of the tubular housing.

8. It was an error in the '495 patent not to include apparatus claims that recite the features discussed in paragraph 7 that relate to a specific arrangement of the electrodes. To correct that error, varying combinations of those exemplary features are presented in the emitter claims of the present application, using claim language of varying scope shown below. The emitter claims presented by the present application are narrower than the emitter claim 2 of the '495 patent at least in these respects.

Claim 13 now recites:

> each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and
>
> so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches... .

Claim 27 now recites:

> the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,
>
> wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, ...
>
> wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode... .

Claim 37 now recites:

> a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, ...
>
> wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches... .

Claim 50 now recites:

> wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and
>
> so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches.

Claim 62 now recites:

> the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis ...
>
> the electrodes being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;
>
> wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway.

9. The '495 emitter claim 2 is too narrow, for example, in that it requires a spacer separating the electrodes and requires that water be "supersaturated." Therefore, I identify claims 2-7, 11 and 12 of U.S. Patent No. 7,760,495 as claims that the application seeks to broaden in the present claims at least with respect to the removal of the spacer and supersaturated limitations. It was an error in the '495 patent, not to include apparatus claims to the features discussed in paragraph 7 that relate to a specific arrangement of the electrodes and without all of the limitations of claim 2 of the '495 patent such as the "spacer" limitation and the "supersaturated" limitation.

10. The examples of errors provided herein are not intended to be exhaustive or exclusive, but are presented for stating at least one error being relied upon as the basis for reissue pursuant to 37

C.F.R. 1.175. These and additional errors are addressed and corrected by the independent and dependent claims presented by the amendment filed herewith.

THE REJECTION BASED ON DEFECTIVE REISSUE OATH

11. In an office action dated October 27, 2015, my previously filed oath was found to be defective because the pending claims were found to be correcting errors that patentee is barred from correcting. I understand the office action to rely on a number of factual findings, including:

> A. That for claims to emitters for electrolytic generation of bubbles of oxygen, adding a limitation that the emitter is "positioned within a conduit" alone would render a claim patentably distinct from an emitter claim without that limitation.
>
> B. That patentee argued during the prosecution of the earlier '441 patent that amending an emitter claim to say that the emitter is "positioned within a conduit" rendered the claim patentably distinct from a claim that did not recite that limitation.
>
> C. That patentee was barred or restricted from pursuing such emitter claims (i.e., in which the emitter or electrodes are positioned "within a conduit") in the '495 patent prosecution.
>
> D. The office action made a passing reference (without explanation or a formal rejection) to the prohibition on recapturing previously surrendered subject matter.

As I discuss below, none of these findings is true.

A. Adding that the emitter or the electrodes be positioned "within a conduit" would not render an emitter claim patentably distinct from one that did not recite this limitation.

12. The October 27, 2015 office action stated:

> The '495 divisional patent does not claim the same invention as the '441 patent, i.e., there are no claims in the '495 divisional application directed to a flow through oxygenator comprising an oxygen emitter positioned within a conduit as claimed in the '411 patent. Accordingly, the '495 patent claims do not provide a basis for claims directed to a system comprising an oxygen emitter positioned within a conduit as recited in the newly submitted claims 13-69.

The office action then reasoned that "applicants failure to further pursue the elected invention of the '441 patent in a continuing application of the '441 patent or a divisional of the '495 patent is not correctable by reissue of the '495 patent." All claims were, therefore, rejected as being based on a defective reissue declaration that failed to state an error correctable by reissue.

13. What stands out to me in the Patent Office's October 27, 2015 rejection is the statement that the '495 patent "does not claim the same invention as the '441 patent." This statement is not accurate. It is also particularly unfair because the stated finding is the exact opposite of the finding made by the Patent Office during prosecution of the '495 patent. As explained below, all the apparatus

claims of the '495 patent were rejected for double patenting based on the claims of the '441 patent that included the limitation regarding the electrodes being positioned within a conduit.

14. The '262, '441, and '495 patents have overlapping specifications directed to the field of emitters for electrolytic generation of small bubbles of oxygen such as microbubbles or nanobubbles. In each of the '262, '441, and '495 patents, I filed and consistently pursued claims directed **emitters for electrolytic generation of bubbles of oxygen**. The table below shows example emitter claims as originally filed and as issued in each of the '262, '441, and '495 patents.

The '262 patent	The '441 patent	The '495 patent
(as originally filed, emphasis added) 1. **An emitter for electrolytic generation of microbubbles of oxygen** comprising an anode separated at a critical distance from a cathode and a power source all in electrical communication with each other.	(as originally filed emphasis added) 1. A flow-through oxygenator comprising **an emitter for electrolytic generation of microbubbles of oxygen** comprising an anode separated at a critical distance from a cathode and a power source all in electrical communication with each other, wherein the emitter is placed within or adjacent to a conduit for flowing water.	(as originally filed emphasis added) 2. **An emitter for electrolytic generation of microbubbles of oxygen** in an aqueous medium comprising: an anode separated at a critical distance from a cathode, a nonconductive spacer maintaining the separation of the anode and cathode, the nonconductive spacer having a spacer thickness between 0.005 to 0.050 inches such that the critical distance is less than 0.060 inches and a power source all in electrical communication with each other, wherein the critical distance results in the formation of oxygen bubbles having a bubble diameter less than 0.0006 inches, said oxygen bubbles being incapable of breading the surface tension of the aqueous medium such that said aqueous medium is supersaturated with oxygen.
(as issued, emphasis added) 1. **An emitter for electrolytic generation of microbubbles of oxygen** comprising an anode separated at a critical distance from a cathode and a power source all in electrical communication with each other.	(as issued, emphasis added) 1. A flow through oxygenator comprising: a fluid conduit having a fluid inlet and a fluid outlet fluidly connected with a conduit lumen; **an oxygen emitter for electrolytic generation of microbubbles of oxygen** from an aqueous medium, the oxygen emitter including three matched sets of anodes and cathodes wherein the matched sets	(as issued, emphasis added) 2. **An emitter for electrolytic generation of microbubbles of oxygen** in an aqueous medium comprising: an anode separated at a critical distance from a cathode, a nonconductive spacer maintaining the separation of the anode and cathode, the nonconductive spacer having a

	of anodes and cathodes are mounted to stabilizing hardware such that the oxygen emitter is positioned within the conduit lumen and each matched set resides at a 120° angle to the adjacent matched sets; and a power source in electrical communication with the oxygen emitter.	spacer thickness between 0.005 to 0.050 inches such that the critical distance is less than 0.060 inches and a power source all in electrical communication with each other, wherein the critical distance results in the formation of oxygen bubbles having a bubble diameter less than 0.0006 inches, said oxygen bubbles being incapable of breaking the surface tension of the aqueous medium such that said aqueous medium is supersaturated with oxygen.

15. To generate the oxygen bubbles in water through electrolysis, the disclosed emitters include pairs of strategically-spaced electrodes and, of course, some water container to bring the electrodes into contact with the water. The water containers are variously described as being, for example, a vessel, container, enclosure, tube, pipe, hose, tank, bucket, or conduit.

16. Since one skilled in this art would understand that generating oxygen bubbles through electrolysis would require some water container to bring the electrodes into contact with water, it is not reasonable to conclude that the emitter becomes patentably distinct by merely reciting that the electrodes are "positioned within" some type of container. The Patent Office made the same determination during prosecution of the '495 patent.

17. As can be seen in the chart above, claim 1 of the '441 patent as issued recites that the "oxygen emitter is positioned within the conduit." Claim 2 of the '495 patent (also shown above) does not recite that the emitter is positioned within a conduit. Despite this difference, the examiner in the '495 prosecution rejected claim 2 (and other claims) for double patenting based on claim 1 of the '441 patent. I am not a patent lawyer, but my understanding is that in order to make this rejection, the examiner was saying that claim 2 of the '495 patent was so similar to claim 1 of the '441 patent that there was no patentable difference between them. In response to the rejection, we had to forfeit part of the lifetime of the '495 patent by filing a terminal disclaimer with respect to the '441 patent so that the '495 patent would not survive any longer than the '441 patent.

B. Patentee never argued that amending an emitter claim to require that the emitter or electrodes be positioned "within a conduit" rendered the claim patentably distinct from a claim without that limitation.

18. The October 27, 2015 office action also suggested that an argument had been made during prosecution of the '441 patent that placing the electrodes "within a conduit" was a patentably distinct limitation. No such argument was made. Nor would it be reasonable to make such an argument as discussed in paragraphs 15 and 16 above. Here is what actually happened. In an office action dated May 25, 2007, claim 1 of application no. 10/732,326 was rejected for double patenting based on claims in the '262 patent. In response, in an amendment dated August 17, 2007, multiple amendments were

made to the claim, and the applicant argued that the double patenting rejection no longer applied. The following chart shows the claim both before and after the amendment.

Claim discussed in '441 prosecution **prior to** amendment	Claim discussed in '441 prosecution **after** amendment (with and without markings to show changes)
1. A flow through oxygenator consisting of an emitter for electrolytic generation of microbubbles of oxygen from an aqueous medium, comprising an anode separated at a critical distance from a cathode both within an aqueous medium and in aqueous communication with each other, and a power source all in electrical communication with each other, wherein the emitter is placed within or adjacent to a conduit for flowing water.	1. A flow through oxygenator ~~consisting of~~ comprising: a fluid conduit having a fluid inlet and a fluid outlet fluidly connected with a conduit lumen; an oxygen emitter for electrolytic generation of microbubbles of oxygen from an aqueous medium, the oxygen emitter including a plurality of matched sets of anodes and cathodes wherein the matched sets of anodes and cathodes are mounted to stabilizing hardware such that the oxygen emitter is positioned within the conduit lumen ~~comprising an anode separated at a critical distance from a cathode both within an aqueous medium and in aqueous communication with each other,~~ and a power source ~~all~~ in electrical communication with ~~each other wherein~~ the oxygen emitter ~~is placed within or adjacent to a conduit for flowing water~~. Clean version (without markings) 1. A flow through oxygenator comprising: a fluid conduit having a fluid inlet and a fluid outlet fluidly connected with a conduit lumen; an oxygen emitter for electrolytic generation of microbubbles of oxygen from an aqueous medium, the oxygen emitter including a plurality of matched sets of anodes and cathodes wherein the matched sets of anodes and cathodes are mounted to stabilizing hardware such that the oxygen emitter is positioned within the conduit lumen; and a power source in electrical communication with the oxygen emitter.

19. The remarks section filed with the amendment included the generic statement:

> "Applicant respectfully asserts that the need for a Terminal Disclaimer to overcome a non-statutory obviousness-type double patenting rejection has been overcome through the present amendment to independent claim 1... As claims 1 [and others] are patentably distinct from claims 1-6 of U.S. Patent No. 6,689,262, Applicant respectfully requests said rejection be withdrawn."

20. From the marked changes it is clear that multiple changes were made to the claim. The amendments to the claim included: changing the preamble from "consisting of" to "comprising"; removing any reference to a critical distance between electrodes; adding a limitation that there be a plurality of anodes and a plurality of cathodes; adding a limitation that the electrodes now be arranged in a plurality of "matched sets"; adding features of a fluid conduit; and adding completely new structure, "stabilizing hardware", that was not previously recited. The limitation that the electrodes be "positioned within the conduit lumen" was never called out as being the basis for making the claims patentably distinct. In fact, no one limitation was specifically identified as the basis for making the claim patentably distinct, and there is no more reason to pin the distinction on the "within a conduit" limitation than there is to pin the distinction on the new "stabilizing hardware" limitation, for example, or the "plurality of matched sets" limitation. In fact, the language that the electrodes be "placed within or adjacent to a conduit" had already been in the claim prior to the amendment which suggests that the "positioned within the conduit" limitation was not the basis for arguing the claim was now patentably distinct.

21. From the examiner's following office action, it is clear that the examiner disagreed that even all of these amendments combined made the claims patentably distinct. The examiner maintained the double patenting rejection. Only after several more later amendments that did not relate to the electrodes being positioned "within a conduit" did the examiner finally withdraw the double patenting rejection. Therefore, the prosecution history of the '441 patent does not support any finding that either the applicant or the examiner ever argued or asserted that "positioned within a conduit" limitation made claims patentably distinct from claims that did not recite that limitation.

C. There was no bar or restriction requirement applied during prosecution of the '495 patent, but instead, it was found that patentee was claiming effectively the same invention that was granted in the '441 patent.

22. In the '495 application, I filed and pursued various independent claims, both apparatus and method claims, that were not limited to any single category from any prior restriction requirement in the '441 patent. I included claims directed to emitters for electrolytic generation of bubbles of oxygen. I was never under the impression that certain categories or groups of claims were off limits or barred or restricted when filing the claims of the '495 application. No restriction requirement was ever made in the '495 prosecution, and none of the previous restriction requirements made in the '441 case were ever repeated, made, or applied during prosecution of the '495 patent.

23. Instead, what was communicated to me by the actions taken by the Patent Office was that, according to the Patent Office, by filing claim 2 of the '495 patent I was attempting to claim an invention that was so similar to the claims that I had been granted in the '441 patent that the '495 claims were rejected for double patenting. In response to that finding, I forfeited part of the lifetime of the '495 patent by a terminal disclaimer. Now to my surprise the Patent Office wants to make the opposite

finding to argue that I am barred in a reissue of the '495 patent from pursing emitter claims that recite the emitter or electrodes be positioned within a conduit or similar language. That seems particularly wrong and unfair.

D. Patentee is not seeking to recapture subject matter previously surrendered.

24. The October 27, 2015 office action also makes a passing reference to "recapture" stating, "Nor can the present continuation reissue application recapture subject matter that was surrendered during the prosecution of the parent '441 and '262 patents." I have only a layman's understanding of this legal principle, but I cannot see how it could apply here. I discuss in paragraphs 7 and 8 how the emitter claims presented in this reissue application are narrower in significant respects than emitter claim 2 of the '495 patent, and the combination of narrowing limitations to each of the presently pending independent claims result in a claim scope that is not the same as any claim previously presented, amended, or issued during the prosecutions of the '262, '441, and '495 patents. Stated simply, at no time were the presently pending claims or any claims with the limitations discussed above in paragraphs 7 and 8 presented to the Patent Office or surrendered during any of the earlier prosecutions.

25. If such combinations of limitations to an emitter claim were never presented, I do not understand how it can be said that any decision was made to forfeit my right to pursue such claims. The '495 patent claims themselves, which do not include all the limitations of the '441 patent claims, also show that no surrender of subject matter had been made because the '495 patent included emitter claims that did not recite many of the limitations recited in the emitter claims of the '441 patent.

NO DECEPTIVE INTENT

26. I state that all errors present in the original patent and in the present reissue application up to the time of filing of this Reissue Declaration, and errors which are addressed and corrected by any amendment concurrently filed with this Reissue Declaration, which correction of errors I have reviewed, arose without any deceptive intention on the part of the Applicant.

27. I understand that pursuant to 37 C.F.R. §3.71, the assignee, Oxygenator Water Technologies, Inc., has granted the power of attorney, for prosecuting this reissue patent application and for transacting all related business, to attorneys and agents of the firm of Carlson, Caspers, Vandenburgh, Lindquist & Schuman, **Customer Number 38846.** I confirm and agree with this appointment.

28. Please direct all correspondence and all communications to **Carlson, Caspers, Vandenburgh, Lindquist & Schuman,** at the address provided by the following customer number.

Customer Number: 38846

[Intentionally Left Blank]

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of James Andrew Senkiw
Citizenship: U.S.A
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Signature: _____ Date: 11 JAN 2016
James Andrew Senkiw

§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

Exhibit A to Oath of James Senkiw

Amended claims to be filed with Oath:

13. An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing having a water inlet, a water outlet, and a longitudinal water flow axis from the inlet to the outlet;

at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the tubular housing, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches within the tubular housing;

each electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing and so that at least some water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

14. The emitter of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis; wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis; and wherein at least one of the first and second electrodes is positioned in the tubular housing closer to the inward-facing surface than said distance separating the electrodes.

15. The emitter of claim 13 wherein the tubular housing includes an inward-facing surface that runs parallel to the longitudinal axis; wherein said portions of electrodes extend in a direction parallel to the longitudinal axis; and wherein each electrode of the emitter is positioned closer to the inward-facing surface than to the longitudinal axis at the center of the tubular housing.

16. The emitter of claim 13 wherein at least one of the electrodes is a stainless steel mesh or screen.

17. The emitter of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the tubular housing.

18. The emitter of claim 17 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the tubular housing.

19. The emitter of claim 17 wherein the first and second electrodes comprise an outside electrode and an inside electrode, wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing,

the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is,

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

20. The emitter of claim 13 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to and including the center axis, the passageway running for at least the length of that portion of one of the electrodes positioned within the housing;

wherein the first and second electrodes comprise an outside electrode and an inside electrode;

wherein said portions of the first and second electrodes extend in a longitudinal direction parallel to the longitudinal axis and an inward-facing surface of the tubular housing;

the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway; and

wherein the tubular housing of the emitter is round.

21. The emitter of claim 19 wherein said inward-facing surface is a concave surface.

22. The emitter of claim 13 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

23. The emitter of claim 13 wherein the oxygen produced comprises microbubbles.

24. The emitter of claim 13 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

25. The emitter of claim 13 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

26. The emitter of claim 13 wherein the oxygen produced comprises nanobubbles.

27. An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing defining an oxygenation chamber and having a water inlet, a water outlet, a longitudinal water flow axis from the inlet to the outlet, and an inward-facing surface that runs parallel to the water flow axis and defines at least in part the oxygenation chamber;

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that is parallel to the longitudinal axis, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber,

wherein the position and size of each electrode within the chamber defines a cross-section of the chamber that has a water flow area within the oxygenation chamber through which water may flow without passing between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches, wherein the water flow area is greater than an area at the cross-section equal to the total area between electrodes of opposite polarity that are separated by a distance of between 0.005 inches to 0.140 inches,

wherein at least a portion of the outside electrode positioned in the chamber is closer to the inward-facing surface of the oxygenation chamber than said distance separating the inside electrode from the outside electrode; and

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the chamber of the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

28. The emitter of claim 27 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a longitudinal center axis of the oxygenation chamber.

29. The emitter of claim 27 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

30. The emitter of claim 29 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

31. The emitter of claim 30 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

32. The emitter of claim 27 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing.

33. The emitter of claim 27 wherein the oxygen produced comprises nanobubbles.

34. The emitter of claim 27 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

35. The emitter of claim 27 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

36. The emitter of claim 35 wherein the oxygen produced comprises nanobubbles.

37. An emitter for electrolytic generation of bubbles of oxygen in water, the emitter comprising:

a tubular housing defining an oxygenation chamber and having a water inlet, and a water outlet;

at least two electrodes comprising a first electrode and a second electrode, at least portions of the first and second electrodes being positioned in the oxygenation chamber, the first electrode opposing and separated from the second electrode by a distance of between 0.005 inches to 0.140 inches, a portion of at least one of the first and second electrodes being in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber, said portion being a portion that opposes the other of the first and second electrodes, wherein each electrode is positioned within the oxygenation chamber so that a cross section of the oxygenation chamber includes a water flow area that allows water to avoid passing between electrodes separated by 0.005 inches to 0.140 inches;

a power source in electrical communication with the electrodes, the power source configured to deliver a voltage to the electrodes, the voltage being less than or equal to 28.3 volts, the power source being configured to deliver a current to the electrodes, the current being less than or equal to 12.8 amps;

the power source being operable to deliver electrical current to the electrodes while water flows through the tubular housing and is in contact with the electrodes to produce oxygen in said water via electrolysis.

38. The emitter of claim 37 wherein the tubular housing has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal center axis; and wherein each

electrode of the emitter is positioned so that substantially all points midway between all opposing electrodes inside the chamber are closer to said inwardly-facing surface than to the longitudinal center axis.

39. The emitter of claim 37 wherein the chamber has a longitudinal center axis and an inward-facing surface that runs parallel to the longitudinal axis, wherein said portions of the electrodes extend in a direction that is parallel to the longitudinal axis, and wherein at least one of the first and second electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes.

40. The emitter of claim 39 wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to the longitudinal center axis of the oxygenation chamber.

41. The emitter of claim 37 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

42. The emitter of claim 37 wherein the electrodes are positioned away from a longitudinal center axis of the tubular housing and maintain an unobstructed passageway parallel to the center axis, the passageway running longitudinally for at least the length of that portion of one of the electrodes positioned within the chamber.

43. The emitter of claim 42 wherein the unobstructed passageway includes the center axis and is multiple times wider than the distance separating the opposing first and second electrodes within the chamber.

44. The emitter of claim 42 wherein the chamber has an inward-facing surface that runs parallel to the longitudinal axis; wherein the first and second electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to an outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal axis at the center of the tubular housing than the outside electrode is; and wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward facing surface of the tubular housing that is substantially less than a cross-sectional area of the unobstructed passageway.

45. The emitter of claim 37 further including first and second conductors coupled to the first and second electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal axis of the housing.

46. The emitter of claim 37 wherein the oxygen comprises microbubbles.

47. The emitter of claim 37 wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

48. The emitter of claim 37 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

49. The emitter of claim 37wherein the oxygen produced comprises nanobubbles.

50. An emitter for electrolytic generation of bubbles of oxygen in an aqueous medium comprising:

a tubular housing defining an oxygenation chamber, and having an inward-facing surface that defines at least in part the oxygenation chamber, a water inlet, and a water outlet;

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, said portions extending in a direction that runs parallel to the inward-facing surface, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the inward-facing surface of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches within the chamber;

wherein each electrode of the emitter is positioned closer to the inward-facing surface of the chamber than to a midpoint of the tubular housing and so that at least some water may flow through an unobstructed passageway from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches.

51. The emitter of claim 50 wherein at least one of the inside and outside electrodes is positioned in the chamber closer to the inward-facing surface than said distance separating the electrodes, and wherein the tubular housing defines a longitudinal center axis that lies in the oxygenation chamber and wherein the unobstructed passageway includes the longitudinal center axis.

52. The emitter of claim 50 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

53. The emitter of claim 52 wherein the electrode in contact with a wall of the tubular housing is in contact with a curved wall of the tubular housing.

54. The emitter of claim 50 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing inner and outer electrodes within the chamber.

55. The emitter of claim 54 wherein the outside electrode defines a cross-sectional area between the outside electrode and the inward-facing surface of the chamber that is substantially less than a cross-sectional area of said unobstructed passageway.

56. The emitter of claim 55 wherein said inward-facing surface is a concave surface.

57. The emitter of claim 50 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to a longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

58. The emitter of claim 50 wherein the emitter is operable when connected to a power source to create microbubbles of oxygen in water flowing through the oxygenation chamber.

59. The emitter of claim 50 coupled to a power source wherein the power source delivers a current to the electrodes at a ratio of 1.75 amps or less per 3 square inches of active electrode.

60. The emitter of claim 50 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

61. The emitter of claim 50 wherein the electrolysis cell is operable when connected to a power source to create nanobubbles of oxygen in water flowing through the oxygenation chamber.

62. An emitter for electrolytic generation of bubbles of oxygen in an aqueous medium comprising:

a tubular housing defining an oxygenation chamber, said housing having an outer wall that runs parallel to a longitudinal center axis of the housing, said housing having a water inlet and a water outlet,

at least two electrodes comprising an outside electrode and an inside electrode, at least portions of the outside and inside electrodes being positioned in the oxygenation chamber, the outside and inside electrodes being outside and inside electrodes respectively in that the electrodes are positioned relative to each other so that the outside electrode is closer to the outer wall of the chamber than the inside electrode is and so that the inside electrode is closer to the longitudinal center axis than the outside electrode is, the outside electrode opposing and separated from the inside electrode by a distance of between 0.005 inches to 0.140 inches;

the electrodes being positioned away from the center axis and maintaining a longitudinal, unobstructed passageway parallel to and including the center axis that runs for at least the length of that portion of one of the electrodes positioned within the chamber, the unobstructed passageway having a substantially uniform cross-sectional area along that length, the electrodes being positioned so that water may flow from the water inlet to the water outlet without passing through a space between electrodes of opposite polarity separated by a distance of between 0.005 inches to 0.140 inches;

wherein the outside electrode defines a cross-sectional area between the outside electrode and the outer wall of the chamber that is substantially less than said cross-sectional area of the unobstructed passageway.

63. The emitter of claim 62 wherein at least one of the outside and inside electrodes is in contact with at least one wall of the tubular housing, said wall defining at least in part the oxygenation chamber.

64. The emitter of claim 63 wherein the electrode in contact with a wall of the tubular housing is in contact with the outer wall which is a curved wall of the tubular housing.

65. The emitter of claim 62 wherein the unobstructed passageway is multiple times wider than the distance separating the opposing outside and inside electrodes within the chamber.

66. The emitter of claim 62 wherein said outer wall includes an inwardly-facing concave surface.

67. The emitter of claim 62 further including first and second conductors coupled to the outside and inside electrodes respectively, the first conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing, the second conductor exiting a wall of the housing in a radial direction relative to the longitudinal center axis of the housing.

68. The emitter of claim 62 wherein the at least two electrodes includes a first anode electrode portion that is nonparallel to a second anode electrode portion, the first and second anode electrode portions each being parallel to respective opposing cathode electrode portions.

69. The emitter of claim 68 wherein the emitter is operable when connected to a power source to create nanobubbles of oxygen in water flowing through the oxygenation chamber.

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Confirmation Number:	1069
Title of Invention:	FLOW-THROUGH OXYGENATOR
First Named Inventor/Applicant Name:	James Andrew Senkiw
Customer Number:	38846
Filer:	Philip Peter Caspers/Samuel Hamer
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2016_01_26_RCE_with_Amendment_.pdf	23405040 fa994f3572da05b306c6e82e6bfa66e3a5f5ec34	yes	49

	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Request for Continued Examination (RCE)		1	3	
	Amendment Submitted/Entered with Filing of CPA/RCE		4	49	
Warnings:					
Information:					
2	Reissue dec filed in accordance with MPEP 1414	2016_01_26_Reissue_Declaration_.pdf	5291363 7d776022e85295322de4b92919dacb9e3fa9d45b	no	19
Warnings:					
Information:					
		Total Files Size (in bytes):	28696403		

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
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