

# PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT3803298

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	LIEN
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
OXYGENATOR WATER TECHNOLOGIES, INC.	03/13/2016
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
<b>Street Address:</b>	1600 TCF TOWER
<b>Internal Address:</b>	121 SOUTH 8TH STREET
<b>City:</b>	MINNEAPOLIS
<b>State/Country:</b>	MINNESOTA
<b>Postal Code:</b>	55402
<b>PROPERTY NUMBERS Total: 4</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	12023431
<b>Application Number:</b>	14601340
<b>Application Number:</b>	13247241
<b>Application Number:</b>	13657311
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	(612)642-8407
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>	
<b>Phone:</b>	612-672-8200
<b>Email:</b>	debra.dix@maslon.com
<b>Correspondent Name:</b>	AMY SWEDBERG
<b>Address Line 1:</b>	90 SOUTH 7TH STREET STE 3300
<b>Address Line 2:</b>	MASLON LLP
<b>Address Line 4:</b>	MINNEAPOLIS, MINNESOTA 55402
<b>ATTORNEY DOCKET NUMBER:</b>	2010-0164
<b>NAME OF SUBMITTER:</b>	STEVEN W. LUNDBERG
<b>SIGNATURE:</b>	/Steven W. Lundberg/
<b>DATE SIGNED:</b>	03/28/2016
This document serves as an Oath/Declaration (37 CFR 1.63).	

Tennant Company  
 Exhibit 1002

Exhibit 1002\_0001

**Total Attachments: 2**

source=OWT Lien#page1.tif

source=Oxygenator - Ex. A list of patents#page1.tif

**NOTICE OF ATTORNEYS' LIEN IN PATENTS**

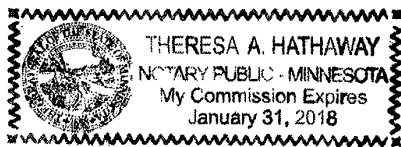
NOTICE IS HEREBY GIVEN that the law firm of Schwegman, Lundberg & Woessner, P.A. ("Law Firm"), with its principal place of business at 1600 TCF Tower, 121 South Eighth Street, Minneapolis, Minnesota, duly authorized to practice as such in the State of Minnesota, claims and holds a lien in and to all of the patents listed on Exhibit A, and all of the applications and registrations associated therewith, together with all proceeds thereof, of Oxygenator Water Technologies, Inc., a Minnesota corporation ("Client"), with its registered address at 1660 S Hwy 100 #598, St Louis Park, MN 55416. Said lien is claimed for legal services rendered by Law Firm to Client for representation of Client in proceedings involving and affecting the ownership and title to the property upon which this lien is claimed for the reasonable and agreed upon value of \$257,609.80 of which the sum of \$43,977.30 remains unpaid.

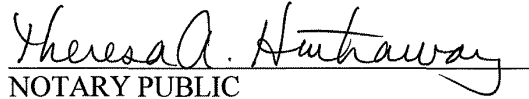
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.

  
\_\_\_\_\_  
Steven W. Lundberg  
Shareholder

STATE OF MINNESOTA    )  
  )    ss.  
COUNTY OF HENNEPIN    )

On this 23<sup>rd</sup> day of March, 2016, before me personally came Steven W. Lundberg, who being duly sworn did depose and say that he is a shareholder of the Law Firm described in and which executed the foregoing instrument.



  
\_\_\_\_\_  
NOTARY PUBLIC

### Exhibit A

SLW FILE NUMBER	MATTER TYPE	TITLE	COUNTRY	APPLICATION FILING DATE	APPLICATION NUMBER	STATUS	ISSUE DATE	PATENT NUMBER	PRIORITY DATE	PUBLICATION NUMBER	INVENTORS
3406.002US1	Utility - DIV	FLOW-THROUGH OXYGEN	United States of America	Jan 31, 2008	12/023,431	Issued	Mar 2, 2010	7,670,495	Feb 22, 2002	US 2008-0179259 A1	James Andrew Senkiw
3406.005US2	Utility - REIS	FLOW-THROUGH OXYGEN	United States of America	Jan 21, 2015	14/601,340	Transferred			Sep 28, 2011		James Andrew Senkiw
3406.005USR	Utility - REIS	FLOW-THROUGH OXYGEN	United States of America	Sep 28, 2011	13/247,241	Issued	Mar 17, 2015	RE45,415			James Andrew Senkiw
3406.006US1	Utility - NPREG	ENHANCED RESIN REGENI	United States of America	Oct 22, 2012	13/657,311	Pending			Oct 24, 2011	US-2013-0098819-A1	Mark Rolfes





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

Table with 5 columns: APPLICATION NO., ISSUE DATE, PATENT NO., ATTORNEY DOCKET NO., CONFIRMATION NO.
13/247,241 03/17/2015 RE45415 3406.005USR 1737

21186 7590 02/25/2015
SCHWEGMAN LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
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;

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 USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit [SelectUSA.gov](http://SelectUSA.gov).

Substitute for form 1449A/PTO <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)	<i>Complete if Known</i>	
	<b>Application Number</b>	13/247,241
	<b>Filing Date</b>	September 28, 2011
	<b>First Named Inventor</b>	
	<b>Group Art Unit</b>	1774
	<b>Examiner Name</b>	Cameron Allen
Sheet 1 of 2	Attorney Docket No: 3406.005USR	

US PATENT DOCUMENTS			
Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-20020074237A1	6/20/2002	Takesako, Kiyoyuki, et al.
	US-20030164306A1	9/4/2003	Senkiw, James Andrew
	US-20040118701A1	6/24/2004	Senkiw, James Andrew
	US-20060150491A1	7/13/2006	Senkiw, James Andrew
	US-20080202995A1	8/28/2008	Senkiw, James Andrew
	US-4,071,447	1/31/1978	Ramirez, Ernest R
	US-4,225,401	9/30/1980	Divisek, Jiri, et al.
	US-4,252,856	2/24/1981	Sara, Raymond V
	US-4,257,352	3/24/1981	Habegger, William
	US-4,587,001	<del>3/6/1986</del>	Cairns, John F, et al. May 6, 1986
	US-5,015,354	5/14/1991	Nishiki, Yoshinori, et al.
	US-5,148,772	9/22/1992	Kirschbaum, Robert N
	US-5,534,143	7/9/1996	Portier, Ralph J, et al.
	US-5,982,609	11/9/1999	Evans, D. A.
	US-6,171,469	1/9/2001	Hough, G. S, et al.
	US-6,315,886	11/13/2001	Zappi, Guillermo Daniel, et al.
	US-6,328,875	12/11/2001	Zappi, Guillermo Daniel, et al.
	US-6,394,429	<del>3/28/2002</del>	Ganan-Calvo, Alfonso May 28, 2002
	US-6,524,475	2/25/2003	Herrington, Rodney E, et al.
	US-6,689,262	2/10/2004	Senkiw, James Andrew
	US-7,396,441	7/8/2008	Senkiw, James Andrew

Change(s) applied to document, D.H.P./ 1/14/2015

FOREIGN PATENT DOCUMENTS				
Examiner Initial *	Foreign Document Number	Publication Date	Name of Patentee or Applicant of cited Document	T 1
	EP-0723936A2	7/31/1996	Sano, Yoichi	
	GB-1522188A	8/23/1978		
	WO-0189997A2	11/29/2001	Vagnes, Magne	
	WO-03072507A1	9/4/2003	Snekiw, James Andrew	
	WO-9939561A1	8/12/1999	Mazzei, Angelo L	

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

**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

**ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.A./**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: James Andrew Senkiw

Title: FLOW-THROUGH OXYGENATOR / Re-issue of U.S. Patent No. 7,670,495

Docket No.:	3406.005USR	Serial No.:	13/247,241
Filed:	September 28, 2011	Due Date:	N/A
Examiner:	Cameron Allen	Group Art Unit:	1774
Customer No.:	21186	Confirmation No.:	1737

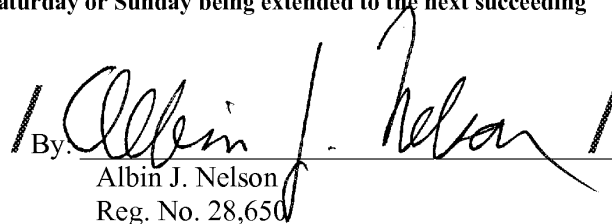
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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

Communication Associated With Allowance and Payment of Base Issue Fee (1 pg.)

**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  
Reg. No. 28,650

S/N 13/247,241

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: Cameron Allen

Serial No.: 13/247,241

Group Art Unit: 1774

Filed: September 28, 2011

Docket No.: 3406.005USR

Customer No.: 21186

Confirmation No.: 1737

Title: FLOW-THROUGH OXYGENATOR / Re-issue of U.S. Patent No. 7,670,495

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COMMUNICATION ASSOCIATED WITH ALLOWANCE  
AND PAYMENT OF BASE ISSUE FEE

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

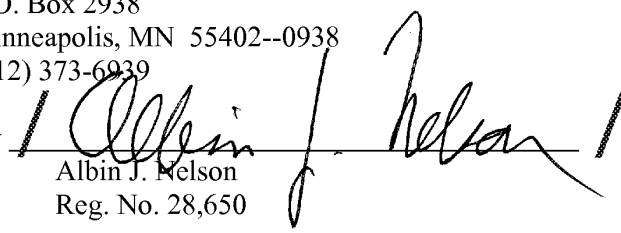
Applicant and Assignee re-affirm the statements made in their response of May 13, 2014 in this reissue application that they have reserved the right to submit one or more reissue continuation applications to address the subject matter that was cancelled in that response. This subject matter includes but is not limited to the apparatus, device, emitter, system and suspension described in the original patent. Applicant stated in his original inventor's declaration for broadening reissue that he had a right to claim this subject matter but did not do so. To this end, Applicant and Assignee confirm that they will file a reissue continuation application and include a preliminary amendment directed to an electrolysis system.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402--0938  
(612) 373-6939

Date January 14, 2015

By

  
Albin J. Nelson  
Reg. No. 28,650

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	21206997
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Janet Elaine Embretson/Tara McMillen
<b>Filer Authorized By:</b>	Janet Elaine Embretson
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	14-JAN-2015
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	14:27:13
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406005USR-Communication.pdf	161147 20534d0149eb42bfff16ed66c091ea6e2231db0f	yes	2

<b>Multipart Description/PDF files in .zip description</b>		
<b>Document Description</b>	<b>Start</b>	<b>End</b>
Miscellaneous Incoming Letter	1	1
Miscellaneous Incoming Letter	2	2
<b>Warnings:</b>		
<b>Information:</b>		
<b>Total Files Size (in bytes):</b>		161147
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>		

**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)

21186 7590 11/18/2014  
**SCHWEGMAN LUNDBERG & WOESSNER, P.A.**  
 P.O. BOX 2938  
 MINNEAPOLIS, MN 55402

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.

Melissa Cuff	(Depositor's name)
/Melissa Cuff/	(Signature)
01-13-15	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/247,241	09/28/2011	James Andrew Senkiw	3406.005USR	1737

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	\$480	\$0	\$0	\$480	02/18/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
ALLEN, CAMERON J	1774	210-748010

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 Schwegman Lundberg  
 2 & Woessner, P.A.  
 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)

Oxygenator Water Technologies, Inc.

St. Louis Park, Minnesota

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 19-0743. (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.

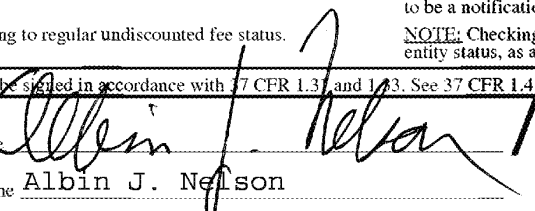
NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

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 January 13, 2015

Typed or printed name Albin J. Nelson

Registration No. 28,650

S/N 13/247,241

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): James Andrew Senkiw  
Serial No.: 13/247,241  
Filed: September 28, 2011  
Customer No.: 21186  
Title: FLOW-THROUGH OXYGENATOR Re-issue of U.S. Patent No. 7,670,495

Examiner: Cameron Allen  
Group Art Unit: 1774  
Docket No.: 3406.005USR  
Confirmation No.: 1737

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COMMUNICATION RE: FEE ADDRESS

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

In response to the Notice of Allowance and Issue Fee Due, please record the Fee Address under the provisions of 37 CFR 1.363 as the following:

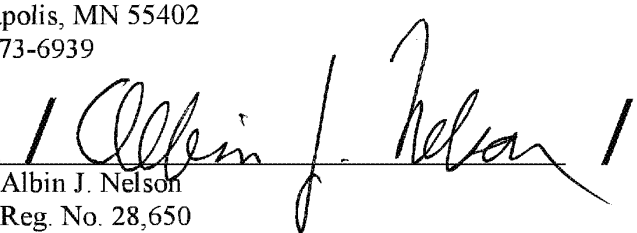
**Customer Number 21186**

Please direct any inquiries to the undersigned attorney at (612) 373-6939.

Respectfully submitted,

SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(612) 373-6939

Date January 13, 2015

By   
Albin J. Nelson  
Reg. No. 28,650



## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13247241			
<b>Filing Date:</b>	28-Sep-2011			
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR			
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw			
<b>Filer:</b>	Mark Victor Muller/Melissa Cuff			
<b>Attorney Docket Number:</b>	3406.005USR			
Filed as Small Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
Utility Appl Issue Fee	2501	1	480	480

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>480</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	21195334
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Mark Victor Muller/Melissa Cuff
<b>Filer Authorized By:</b>	Mark Victor Muller
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	13-JAN-2015
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	14:25:36
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$480
RAM confirmation Number	579
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 1.15 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)  
 Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)  
 Charge any Additional Fees required under 37 C.F.R. Section 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		3406005USRsignesIFEE.pdf	309759 182eff53a1f3996c1d57d51c22ec257e2ca7c219	yes	3

Multipart Description/PDF files in .zip description				
	Document Description	Start	End	
	Transmittal Letter	1	1	
	Issue Fee Payment (PTO-85B)	2	2	
	Miscellaneous Incoming Letter	3	3	

**Warnings:**

**Information:**

2	Fee Worksheet (SB06)	fee-info.pdf	30593 35053182c6ac7e413d921bbc6b53bbfd8ec3e447	no	2
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**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	340352
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**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(s): James Andrew Senkiw  
Title: FLOW-THROUGH OXYGENATOR Re-issue of U.S. Patent No. 7,670,495

Docket No.:	3406.005USR	Serial No.:	13/247,241
Filed:	September 28, 2011	Due Date:	February 18, 2015
Examiner:	Cameron Allen	Group Art Unit:	1774
Customer No.:	21186	Confirmation No.:	1737

Notice of Allowance Date: November 18, 2014

**Mail Stop Issue Fee**

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

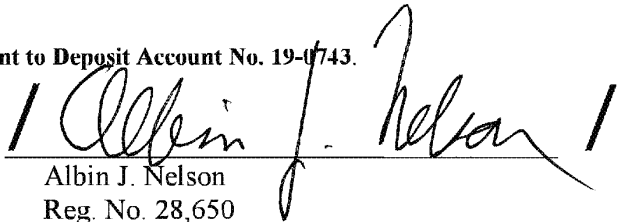
We are transmitting herewith the following:

- Issue Fee Transmittal (Form PTOL-85).
- Communication Re: Fee Address (1 page).
- Authorization to charge Deposit 19-0743 in the amount of \$480.00 to cover the Small Entity Issue Fee Payment.

**Please charge any additional required fees or credit overpayment to Deposit Account No. 19-0743.**

SCHWEGMAN LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

By

  
Albin J. Nelson  
Reg. No. 28,650

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 13<sup>th</sup> day of January, 2015.

Melissa Cuff  
Name

/Melissa Cuff/  
Signature

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<i>Complete if Known</i>
<b>Application Number</b>	13/247,241
<b>Filing Date</b>	September 28, 2011
<b>First Named Inventor</b>	
<b>Group Art Unit</b>	1774
<b>Examiner Name</b>	Cameron Allen
Sheet 1 of 2	Attorney Docket No: 3406.005USR

<b>US PATENT DOCUMENTS</b>			
Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-20020074237A1	6/20/2002	Takesako, Kiyoyuki, et al.
	US-20030164306A1	9/4/2003	Senkiw, James Andrew
	US-20040118701A1	6/24/2004	Senkiw, James Andrew
	US-20060150491A1	7/13/2006	Senkiw, James Andrew
	US-20080202995A1	8/28/2008	Senkiw, James Andrew
	US-4,071,447	1/31/1978	Ramirez, Ernest R
	US-4,225,401	9/30/1980	Divisek, Jiri, et al.
	US-4,252,856	2/24/1981	Sara, Raymond V
	US-4,257,352	3/24/1981	Habegger, William
	US-4,587,001	3/6/1986	Cairns, John F, et al.
	US-5,015,354	5/14/1991	Nishiki, Yoshinori, et al.
	US-5,148,772	9/22/1992	Kirschbaum, Robert N
	US-5,534,143	7/9/1996	Portier, Ralph J, et al.
	US-5,982,609	11/9/1999	Evans, D. A.
	US-6,171,469	1/9/2001	Hough, G. S, et al.
	US-6,315,886	11/13/2001	Zappi, Guillermo Daniel, et al.
	US-6,328,875	12/11/2001	Zappi, Guillermo Daniel, et al.
	US-6,394,429	3/28/2002	Ganan-Calvo, Alfonso
	US-6,524,475	2/25/2003	Herrington, Rodney E, et al.
	US-6,689,262	2/10/2004	Senkiw, James Andrew
	US-7,396,441	7/8/2008	Senkiw, James Andrew

<b>FOREIGN PATENT DOCUMENTS</b>				
Examiner Initial *	Foreign Document Number	Publication Date	Name of Patentee or Applicant of cited Document	T 1
	EP-0723936A2	7/31/1996	Sano, Yoichi	
	GB-1522188A	8/23/1978		
	WO-0189997A2	11/29/2001	Vagnes, Magne	
	WO-03072507A1	9/4/2003	Snekiw, James Andrew	
	WO-9939561A1	8/12/1999	Mazzei, Angelo L	

<b>OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS</b>		
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

**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

**ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.A./**

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE                  STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<i>Complete if Known</i>	
	<b>Application Number</b>	13/247,241
	<b>Filing Date</b>	September 28, 2011
	<b>First Named Inventor</b>	
	<b>Group Art Unit</b>	1774
	<b>Examiner Name</b>	Cameron Allen
Sheet 2 of 2	Attorney Docket No: 3406.005USR	

<b>OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS</b>		
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
	"Effect of Oxygenated Water on the Growth & Biomass Development of Seedless Cucumbers and Tomato Seedlings under Greenhouse Conditions", Project Report: Seair Diffusion Systems, [Online]. Retrieved from the Internet: <URL: <a href="http://www.seair.ca/Pages/pdfs/DrMirzaReport.pdf">http://www.seair.ca/Pages/pdfs/DrMirzaReport.pdf</a> >, (2003), 5 pgs	

**ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.A./**

<b>EXAMINER</b> /Cameron Allen/	<b>DATE CONSIDERED</b> 12/15/2014
---------------------------------	-----------------------------------

\* 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



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

NOTICE OF ALLOWANCE AND FEE(S) DUE

21186 7590 11/18/2014
SCHWEGMAN LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER

ALLEN, CAMERON J

ART UNIT PAPER NUMBER

1774

DATE MAILED: 11/18/2014

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/247,241 09/28/2011 James Andrew Senkiw 3406.005USR 1737

TITLE OF INVENTION: FLOW-THROUGH OXYGENATOR

Table with 7 columns: APPLN. TYPE, ENTITY STATUS, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE
nonprovisional SMALL \$480 \$0 \$0 \$480 02/18/2015

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)

21186 7590 11/18/2014  
**SCHWEGMAN LUNDBERG & WOESSNER, P.A.**  
 P.O. BOX 2938  
 MINNEAPOLIS, MN 55402

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.
13/247,241	09/28/2011	James Andrew Senkiw	3406.005USR	1737

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	\$480	\$0	\$0	\$480	02/18/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
ALLEN, CAMERON J	1774	210-748010

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b></p>	<p>2. For printing on the patent front page, list</p> <p>(1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____</p> <p>(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. 2 _____</p> <p>3 _____</p>
---	---

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

<p>4a. The following fee(s) are submitted:</p> <p><input type="checkbox"/> Issue Fee</p> <p><input type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p>	<p>4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)</p> <p><input type="checkbox"/> A check is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> 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).</p>
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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

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

21186 7590 11/18/2014
SCHWEGMAN LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER

ALLEN, CAMERON J

ART UNIT PAPER NUMBER

1774

DATE MAILED: 11/18/2014

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.

<b>Notice of Allowability</b>	<b>Application No.</b> 13/247,241	<b>Applicant(s)</b> SENKIW, JAMES ANDREW	
	<b>Examiner</b> /CAMERON J. ALLEN/	<b>Art Unit</b> 1774	<b>AIA (First Inventor to File) Status</b> 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 communication received on 10/20/2014.  
 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 1 and 13-27. 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](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto: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 a reply 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)**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. <input type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>7/10/2014</u></li> <li>3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material</li> <li>4. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date _____.</li> </ol> | <ol style="list-style-type: none"> <li>5. <input type="checkbox"/> Examiner's Amendment/Comment</li> <li>6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>7. <input type="checkbox"/> Other _____.</li> </ol> |
|--|--|

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### **DETAILED ACTION**

The present application is being examined under the pre-AIA first to invent provisions.

#### ***Allowable Subject Matter***

Claims 1 and 13-27 are allowed. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose nor fairly suggest the method for producing oxygenated aqueous composition comprising the combination of the critical distance between the cathode and anode of .0005-0.140, the voltage maximum of about 28.3 volts, and 13 or less amperage with a maximum of 12 gallons per minute such that it results in the formation of a suspension comprising oxygen microbubbles and nanobubbles in the water, the nanobubbles having a bubble diameter of less than 50 microns.

Also, with respect to claim 1, the prior art of record, such as Murrell U.S. Patent 5,049,252, does not express nor fairly disclose the method step of placing the emitting device in the fluid to be treated. It discloses flowing the fluid through the device using a pie system.

Support for the amendments may be found at Column 2 lines 64-65, Column 9 lines 35-45 with Table III and Column 4 lines 12-13 and 27-41 also Column 3 lines 13-14.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to /CAMERON J. ALLEN/ whose telephone number is (571)270-3164. The examiner can normally be reached on M-Th 9-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. 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.

/JOSEPH DRODGE/  
Primary Examiner, Art Unit 1778


/CAMERON J. ALLEN/  
Examiner  
Art Unit 1774

<b>Issue Classification</b> 	<b>Application/Control No.</b> 13247241	<b>Applicant(s)/Patent Under Reexamination</b> SENKIW, JAMES ANDREW	
	<b>Examiner</b> CAMERON J ALLEN	<b>Art Unit</b> 1774	

CPC		
Symbol	Type	Version

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version


/CAMERON J ALLEN/ Examiner.Art Unit 1774  (Assistant Examiner)	10/27/2014  (Date)	<b>Total Claims Allowed:</b> 16	
/WALTER D GRIFFIN/ Supervisory Patent Examiner.Art Unit 1774  (Primary Examiner)	10/28/2014  (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

<b>Issue Classification</b> 	<b>Application/Control No.</b> 13247241	<b>Applicant(s)/Patent Under Reexamination</b> SENKIW, JAMES ANDREW
	<b>Examiner</b> CAMERON J ALLEN	<b>Art Unit</b> 1774

US ORIGINAL CLASSIFICATION						INTERNATIONAL CLASSIFICATION							
CLASS			SUBCLASS			CLAIMED				NON-CLAIMED			
210			739			C	0	2	F	1 / 48 (2006.0)			
<b>CROSS REFERENCE(S)</b>						C	0	2	F	1 / 00 (2006.0)			
						C	0	2	F	1 / 02 (2006.0)			
						C	0	2	F	1 / 04 (2006.0)			
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)												
204	157.15	245	232	628	600								
210	600	243	153										
422	22	186	186.04										

/CAMERON J ALLEN/ Examiner.Art Unit 1774  (Assistant Examiner)	10/27/2014  (Date)	<b>Total Claims Allowed:</b>  16	
/WALTER D GRIFFIN/ Supervisory Patent Examiner.Art Unit 1774  (Primary Examiner)	10/28/2014  (Date)	O.G. Print Claim(s)  1	O.G. Print Figure  1



<b>Issue Classification</b> 	<b>Application/Control No.</b> 13247241	<b>Applicant(s)/Patent Under Reexamination</b> SENKIW, JAMES ANDREW
	<b>Examiner</b> CAMERON J ALLEN	<b>Art Unit</b> 1774

<input checked="" type="checkbox"/> <b>Claims renumbered in the same order as presented by applicant</b>																<input type="checkbox"/> <b>CPA</b>		<input type="checkbox"/> <b>T.D.</b>		<input type="checkbox"/> <b>R.1.47</b>	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original						

/CAMERON J ALLEN/ Examiner.Art Unit 1774  (Assistant Examiner)	10/27/2014  (Date)	<b>Total Claims Allowed:</b>  16	
	/WALTER D GRIFFIN/ Supervisory Patent Examiner.Art Unit 1774  (Primary Examiner)	10/28/2014  (Date)	O.G. Print Claim(s)  1

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<i>Complete if Known</i>	
	<b>Application Number</b>	13/247,241
	<b>Filing Date</b>	September 28, 2011
	<b>First Named Inventor</b>	
	<b>Group Art Unit</b>	1774
	<b>Examiner Name</b>	Cameron Allen
Sheet 1 of 1	Attorney Docket No: 3406.005USR	

<b>US PATENT DOCUMENTS</b>			
Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-4,179,347	12/18/1979	Krause, William A., et al.
	US-5,728,287	3/17/1998	Hough, Gary S, et al.
	US-6,110,353	8/29/2000	Hough, Gary S
	US-6,478,949	11/12/2002	Hough, Gary S, et al.

<b>FOREIGN PATENT DOCUMENTS</b>				
Examiner Initial *	Foreign Document Number	Publication Date	Name of Patentee or Applicant of cited Document	T 1

<b>OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS</b>				
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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<b>EXAMINER</b>	/Cameron Allen/	<b>DATE CONSIDERED</b>	09/08/2014
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\* 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

**ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.A./**

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L6	3	"6478949"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2014/09/08 10:58
L7	0	"13247241"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2014/09/08 11:34
L8	8981	(C02F1/48 or C02F1/00 or C02F1/04).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2014/09/08 11:37
S1	1255	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10 12:45
S2	28341	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2).ocls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10 13:32
S3	83	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10 13:33
S4	6	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14 11:48
S5	28493	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2).ocls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14 12:37
S6	48	(anode or cathode or electrode) same (inch or in or "in.") same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14 12:37
S7	6	"10372017"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14 12:51
S8	15	("20020074237"   "4225401"   "4252856"   "4587001"   "5015354"   "5534143"   "5982609"   "6171469"   "6315886"   "6328875"   "6394429"   "6689262").PN. OR ("7396441").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/14 12:52
S9	12	(anode or cathode or electrode) same (inch or "in.") same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14 13:02

S10	110	(anode or cathode or electrode)same (inch or "in.") same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:04
S11	0	("2007/0284245").URPN.	USPAT	ADJ	ON	2013/01/14; 13:06
S12	3	("2007/0187262").URPN.	USPAT	ADJ	ON	2013/01/14; 13:07
S13	1628	(anode or cathode or electrode)same (inch or "in.") and S5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:12
S14	28994	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).cls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:12
S15	1690	(anode or cathode or electrode)same (inch or "in.") and S14	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:12
S16	20	(anode or cathode or electrode)same (inch or "in.") same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:13
S17	32	(anode or cathode or electrode)same (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:16
S18	35	(anode or cathode or electrode)same6 (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:23
S19	10	(anode or cathode or electrode)same6 (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S14	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:23
S20	29002	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).cls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15; 15:17
S21	12	(anode or cathode or electrode)same6 (inch or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15; 15:17
S22	12	(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15; 15:19
S23	39	("3404088"   "3479281"   "3562137"   "3619391"   "3783114"   "3816274"   "3816275"   "3817865"   "3853736"   "3898150"   "3904521"   "3920530"   "3925203"   "3944478"   "3975269"   "4012319"   "4075076"   "4189381"   "4197180"   "4202767"   "4294697"   "4311595"   "4623436"   "Re26329").PN. OR ("5049252").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/15; 15:43
S24	6	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/16; 07:44
S25	3	"20070102371"	US-PGPUB; USPAT; USOCR;	ADJ	ON	2013/01/16; 09:48

			FPRS; EPO; JPO; DERWENT			
S26	29011	(210/739,746,748,01,748,16,748,15,748,17,748,19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157,15,157.5,164,176,178,450,554,193,194,260,272,280,277,278,5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 08:32
S27	3	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S26	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 08:32
S28	8	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 08:33
S29	105	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 08:40
S30	14	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S26	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 08:41
S31	83	(inner or outer or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 08:44
S32	2	(concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 08:44
S33	2	(concentric) same6(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 08:47
S34	2	(concentric) same6 (anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 08:47
S35	3	("2007/0187262").URPN.	USPAT	ADJ	ON	2013/01/17: 11:13
S36	3	("2007/0187261").URPN.	USPAT	ADJ	ON	2013/01/17: 11:14
S37	189	"20010002500"   "20010034922"   "20020023847"   "20020027070"   "20020032141"   "20020038768"   "20020074237"   "20020112314"   "20020185423"   "20030001439"   "20030062068"   "20030070919"   "20030102270"   "20030159230"   "20030159231"   "20030159233"   "20030164306"   "20030213505"   "20040011665"   "20040012913"   "20040037737"   "20040042201"   "20040069611"   "20040094432"   "20040112763"   "20040166019"   "20040168933"   "20040226123"   "20040250323"   "20040256247"   "20050103644"   "20050121334"   "20050126928"   "20050136520"   "20050139239"   "20050139465"   "20050139808"   "20050194261"   "20050244556"   "20060037869"   "20060054205"   "20060076248"   "20060162735"   "20060169575"   "20060231503"   "20060263240"   "20060272120"   "20060280664"   "20070009376"   "20070023273"   "20070037267"   "20070141434"   "20070170072"   "20070186367"   "20070186368"   "20070186369"   "20070186954"   "20070186957"   "20070186958"   "20070187261"   "20070187262"   "20070187263"   "20070272549"   "20080264778"   "20080272060"   "20090008268"   "20090127128"   "20090148342"   "20090162505"   "20090184186"   "20090212132"   "20090235481"   "20100147700"   "20100181208"   "20100189805"   "20100192987"   "20100276301"   "20110121110"   "2288956"   "3725226"   "3859195"   "3897320"   "3933614"   "4018658"   "4099489"   "4105528"   "4108052"   "4121543"   "4129493"   "4154578"   "4244079"   "4324635"   "4374711"   "4405418"   "4502929"   "4574037"   "4600495"   "4630167"   "4663091".PN. OR "4670113"   "4676882"   "4705191"   "4734176"   "4810344"   "4832230"   "4875988"   "4956071"   "5101110"   "5186860"   "5234563"   "5250161"   "5292406"   "5316646"   "5320718"   "5378339"   "5536389"   "5590439"   "5593476"   "5632870"   "5661237"   "5665212"   "5733434"   "5762779"   "5766438"   "5779891"   "5815869"   "5824200"   "5835680"   "5853562"   "5858201"   "5858202"   "5928505"   "5930105"   "5931859"   "5997717"   "6016973"   "6032655"   "6059941"   "6088211"   "6101671"   "6110353"   "6132572"   "6200434"   "6231747"   "6315886"   "6336430"   "6375827"	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/17: 11:14

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S39	160	"20010002500"   "20010112314"   "20020023847"   "20020027070"   "20020032141"   "20020074237"   "20020112314"   "20020185423"   "20030001439"   "20030062068"   "20030070919"   "20030102270"   "20030159230"   "20030159231"   "20030159233"   "20030164306"   "20030213505"   "20040011665"   "20040012913"   "20040037737"   "20040069611"   "20040094432"   "20040112763"   "20040166019"   "20040168933"   "20040226123"   "20040250323"   "20040256247"   "20050103644"   "20050121334"   "20050126928"   "20050136520"   "20050139239"   "20050139808"   "20050194261"   "20050244556"   "20060037869"   "20060076248"   "20060162735"   "20060169575"   "20060231503"   "20060263240"   "20060280664"   "20070023273"   "20070037267"   "20070141434"   "20070170072"   "20070186367"   "20070186368"   "20070186369"   "20070186954"   "20070186957"   "20070186958"   "20070187261"   "20070187262"   "20070187263"   "20070272549"   "20080264778"   "20090008268"   "20090127128"   "20090148342"   "20090162505"   "20090184186"   "20090212132"   "20090235481"   "20100189805"   "20100192987"   "3859195"   "3897320"   "3933614"   "4018658"   "4099489"   "4105528"   "4108052"   "4121543"   "4129493"   "4154578"   "4244079"   "4324635"   "4374711"   "4405418"   "4502929"   "4574037"   "4603167"   "4630167"   "4663091"   "4670113"   "4676882"   "4687558"   "4705191"   "4734176"   "4810344"   "4832230"   "4875988"   "4956071"   "5186860"   "5250161"   "5292406"   "5316646"   "5320718"   "5378339"   "5536389".PN. OR ("5590439"   "5632870"   "5665212"   "5733434"   "5762779"   "5766438"   "5779891"   "5815869"   "5824200"   "5835680"   "5858201"   "5858202"   "5928505"   "5931859"   "5997717"   "6016973"   "6032655"   "6059941"   "6088211"   "6101671"   "6110353"   "6132572"   "6200434"   "6231747"   "6315886"   "6375827"   "6379628"   "6409895"   "6425958"   "6488016"   "6502766"   "6585827"   "6638364"   "6652719"   "6689262"   "6703785"   "6719891"   "6735812"   "6842940"   "6855233"   "6878287"   "6921743"   "6926819"   "6964739"   "6974561"   "7008523"   "7011739"   "7059013"   "7156962"   "7160472"   "7226542"   "7238272"   "7836543"   "7891046"   "8007654"   "8012339"   "8012340"   "8025786"   "8025787").PN. OR ("8236147").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/17 11:14
S40	185	"20010002500"   "20010034922"   "20020023847"   "20020027070"   "20020032141"   "20020038768"   "20020074237"   "20020112314"   "20020185423"   "20030001439"   "20030062068"   "20030070919"   "20030102270"   "20030159230"   "20030159231"   "20030159233"   "20030164306"   "20030213505"   "20040011665"   "20040012913"   "20040037737"   "20040042201"   "20040069611"   "20040094432"   "20040112763"   "20040166019"   "20040168933"   "20040226123"   "20040250323"   "20040256247"   "20050067289"   "20050103644"   "20050121334"   "20050126928"   "20050136520"   "20050139239"   "20050139465"   "20050139808"   "20050194261"   "20050244556"   "20060037869"   "20060054205"   "20060076248"   "20060162735"   "20060169575"   "20060231503"   "20060263240"   "20060280664"   "20070009376"   "20070023273"   "20070037267"   "20070141434"   "20070170072"   "20070186367"   "20070186368"   "20070186369"   "20070186954"   "20070186957"   "20070186958"   "20070187261"   "20070187262"   "20070187263"   "20070272549"   "20080264778"   "20080272060"   "20090008268"   "20090127128"   "20090148342"   "20090162505"   "20090184186"   "20090212132"   "20090235481"   "20100189805"   "20100192987"   "2288956"   "3725226"   "3859195"   "3897320"   "3933614"   "4018658"   "4099489"   "4105528"   "4108052"   "4121543"   "4129493"   "4154578"   "4244079"   "4324635"   "4374711"   "4405418"   "4502929"   "4574037"   "4600495"   "4630167"   "4663091"   "4670113"   "4676882"   "4687558"   "4705191".PN. OR ("4734176"   "4810344"   "4832230"   "4875988"   "4956071"   "5186860"   "5234563"   "5250161"   "5292406"   "5316646"   "5320718"   "5378339"   "5536389"   "5590439"   "5593476"   "5632870"   "5661237"   "5665212"   "5733434"   "5762779"   "5766438"   "5779891"   "5815869"   "5824200"   "5835680"   "5853562"   "5858201"   "5858202"   "5928505"   "5931859"   "5997717"   "6016973"   "6032655"   "6059941"   "6088211"   "6101671"   "6110353"   "6132572"   "6200434"   "6231747"   "6315886"   "6336430"   "6375827"   "6379628"   "6409895"   "6425958"   "6488016"   "6502766"   "6585827"   "6638364"   "6652719"   "6656334"   "6689262"   "6703785"   "6719891"   "6735812"   "6842940"   "6855233"   "6878287"   "6921743"   "6926819"   "6964739"   "6974561"   "7008523"   "7011739"   "7059013"   "7156962"   "7160472"   "7226542"   "7238272"   "7836543"   "7891046"   "8007654"   "8012339"   "8012340"   "8025786"   "8025787"   "8046867"   "8062499").PN. OR ("8319654").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/17 11:15

S41	0	13/247241	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/17 11:25
S42	0	"13247241"	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/17 11:25
S43	5	"7670495"	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/17 11:25
S44	29011	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).cls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 11:59
S45	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 11:59
S46	0	("2007/0284245").URPN.	USPAT	ADJ	ON	2013/01/17 12:08
S47	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:08
S48	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:09
S49	1178	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:09
S50	751	(pyramid\$2 or triang\$5 or funnel or conical or cone) with(anode or cathode or electrode) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:10
S51	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:11
S52	101	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same (oxygen) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:11
S53	0	(platinum same (iridium with oxide)) same(anode or cathode or electrode) same (oxygen) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:39
S54	0	(platinum same (iridium with oxide)) same(anode or cathode or electrode) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:39
S55	38	(platinum same (iridium with oxide)) same(anode or cathode or electrode) same (oxygen) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:39
S56	34	"4,220,529"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/08/13 14:02

S67	8	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/08/27 08:39
S68	11	("5049252").URPN.	USPAT	ADJ	ON	2013/08/27 08:50
S69	1	"20080149485"	USPAT	ADJ	ON	2013/08/27 10:37
S60	3	"20080149485"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/08/27 10:37
S61	135	"4761208"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/08/27 11:18
S62	14	"5,049,252"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/08/28 08:34
S63	243	(microbubble or nanobubble) and (saturat\$3 or supersaturate\$3) and "210"/\$5.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/09/09 11:20
S64	38	(microbubble or nanobubble) and (saturat\$3 or supersaturate\$3) and (bod or biological adj oxygen adj demand) and "210"/\$5.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/09/09 11:21
S65	8	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/09/09 12:41
S66	22	(microbubble or nanobubble) and (anode or cathode or electrode) and (bod or biological adj oxygen adj demand) and "210"/\$5.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/09/09 13:37
S67	8	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/12/11 11:27
S68	14	"5049252"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/12/11 11:48
S69	2	("2007/0284245").URPN.	USPAT	ADJ	ON	2014/01/23 14:24
S70	19	("2003/0164306").URPN.	USPAT	ADJ	ON	2014/01/23 14:45
S71	7242	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23 15:33
S72	2009	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) and ("204"/\$ or "205"/\$).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23 15:34
S73	963	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or	US-PGPUB;	ADJ	ON	2014/01/23




		distance or gap) and ("205"/\$).cls.	USPAT; USOCR; FPRS; EPO; JPO; DERWENT			15:38
S74	1675	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) and ("204"/\$).cls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23 15:40
S75	33201	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).cls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23 15:41
S76	474	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) and S75	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23 15:41
S77	115	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) same (oxygen or O2) and S75	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23 15:43
S78	8	(microbubble or nanobubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) same (oxygen or O2) and S75	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23 15:44
S79	33201	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).cls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/24 07:13
S80	474	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) and S79	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/24 07:13
S81	10	(microbubble or nanobubble) and (anode or cathode or electrode) and (bod or biological adj oxygen adj demand) and S79	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/24 07:14
S82	7	(microbubble or nanobubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) same (mm or "in." or inch) same (oxygen or O2) and S79	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/24 08:10
S83	44	(electrolytic electrochemical electrolytically electrochemically) near3 (oxygenat\$6) and (oxygen) near3 (microbubble microbubbles nanobubble nanobubbles bubble bubbles)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/04 13:11
S84	188	(electrolytic electrochemical electrolytically electrochemically) same(oxygenat\$6) and (oxygen) same (microbubble microbubbles nanobubble nanobubbles bubble bubbles)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/05 07:45
S85	92	(electrolytic electrochemical electrolytically electrochemically) same(oxygenat\$6) and (oxygen) same (microbubble microbubbles nanobubble nanobubbles bubble bubbles) and (gap or space) same (electrode or anode or cathode)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/05 07:46
S86	21084	(bait or bucket or well or aquarium) same (electrode or anoe or cathode) same (oxygen\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/05 10:21
S87	8834	(bait or bucket or well or aquarium) with (electrode or anoe or cathode) same (oxygen\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/05

				USPAT; USOCR; FPRS; EPO; JPO; DERWENT			10:21
S88	3538	(bait or bucket or well or aquarium) with (electrode or anode or cathode) with (oxygen\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON		2014/02/05 10:21
S89	16	(bait or bucket or aquarium) with (electrode or anode or cathode) with (oxygen\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON		2014/02/05 10:21
S90	24	"6,419,815"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON		2014/02/05 10:39
S91	0	"13247241"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON		2014/02/06 07:48
S92	8	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON		2014/02/06 07:48
S93	6	"20030091469"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON		2014/02/06 09:50
S94	80	(electrolytic electrochemical electrolytically electrochemically) same(oxygenat\$6) and (oxygen) same (microbubble microbubbles nanobubble nanobubbles bubble bubbles) and (gap or space) same (electrode or anode or cathode) and oxide	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON		2014/02/06 10:11
S95	17	(electrolytic electrochemical electrolytically electrochemically) same(oxygenat\$6) and (oxygen) same (microbubble microbubbles nanobubble nanobubbles bubble bubbles) and (gap or space) same (electrode or anode or cathode) same oxide	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON		2014/02/06 10:27
S96	1675	(205/628,633,742,756,757).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON		2014/02/06 10:46
S97	406	(119/263 or 210/167.21).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON		2014/02/07 06:10
S98	1	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S97	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON		2014/02/07 06:10
S99	1	("20060054205").PN.	US-PGPUB; USPAT; USOCR	ADJ	ON		2014/02/07 06:19
S100	2417	(119/263 or 210/150,167.21).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON		2014/02/07 06:28
S101	6	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S100	US-PGPUB; USPAT; USOCR; FPRS;	ADJ	ON		2014/02/07 06:28

			EPO; JPO; DERWENT			
S102	2	("2008/0264843").URPN.	USPAT	ADJ	ON	2014/02/07 06:33
S103	6806	(119/263 or 210/150,151,745,532.2,167.21,220,167.21 ).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/07 06:38
S104	13	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S103	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:38
S105	9426	(119/263 or 210/150,151,745,532.2,167.21,220,167.21 or 134/56R or 435/286.6 or 417/5 or 261/26).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/07 06:40
S106	13	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S105	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:41
S107	301	((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3) and S105	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:41
S108	12	((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3) and S97	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:45
S109	1	(anode or cathode or electrode) and(((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S97	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:48
S110	42	(anode or cathode or electrode) and(((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S105	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:49
S111	9866	(119/263 or 210/150,151,745,532.2,167.21,220,167.21 or 134/56R or 435/286.6 or 417/5 or 261/26).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/09/08 08:30
S112	46	(anode or cathode or electrode) and(((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S111	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/09/08 08:30
S113	10	(anode or cathode or electrode) and(((micro and nano) same (bubbl\$3)) or (micro\$bubbl\$3 and nano\$bubbl\$3)) and S111	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/09/08 08:46
S114	411	(anode or cathode or electrode) and(((micro and nano) same (bubbl\$3)) or (micro\$bubbl\$3 and nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/09/08 08:47

9/8/2014 11:55:43 AM

C:\Users\callen\Documents\EAST\Workspaces\13247241.wsp

<b>Search Notes</b>  	<b>Application/Control No.</b>  13247241	<b>Applicant(s)/Patent Under Reexamination</b>  SENKIW, JAMES ANDREW
	<b>Examiner</b>  CAMERON J ALLEN	<b>Art Unit</b>  1774

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner
C02F1/48	9/8/2014	CA
C02F1/00	9/8/2014	CA
C02F1/04	9/8/2014	CA

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
210	739,746,748.01,748.16,748.15,748.17,748.19,749,757	1/16/2013	CA
422	22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308	1/16/2013	CA
204	155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2	1/16/2013	CA
205	701	1/16/2013	CA
22	192,321.7,1	1/17/2013	CA
205	628,633,742,756,757	2/06/2014	CA
119	263	2/07/2014	CA
210	167.21	2/27/2014	CA

SEARCH NOTES		
Search Notes	Date	Examiner
Google Search	1/16/2013	CA
See East Search History	1/16/2013	CA
Primary Joseph Drodge (General Assistance)	1/16/2013	CA
Inventor Search	1/16/2013	CA
See Updated East Search History	8/28/2013	CA
See Updated East Search History	2/06/2014	CA
See Updated East Search History	9/8/2014	CA

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**INTERFERENCE SEARCH**

<b>US Class/ CPC Symbol</b>	<b>US Subclass / CPC Group</b>	<b>Date</b>	<b>Examiner</b>
	See East Search	1/16/2013	CA
	See Updated East Search History	8/28/2013	CA
	See Updated East Search History	6/04/2014	CA
	See Updated East Search History	9/8/2014	CA

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S/N 13/247,241

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.: 13/247,241  
Filed: September 28, 2011  
Customer No.: 21186  
Re-issue of U.S. Patent No. 7,670,495

Group Art Unit: 1774  
Docket No.: 3406.005USR  
Confirmation No.: 1737  
Examiner: Cameron Allen

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**SECOND SUBSTITUTE SUPPLEMENTAL AMENDMENT & RESPONSE**

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

Pursuant to a discussion between the examiner and the undersigned attorney, applicant submits this Second Substitute Supplemental Amendment and Response as a replacement of the Substitute Supplemental Amendment submitted September 23, 2014.

This Second Substitute Supplemental Amendment presents claims not present in U.S. Patent No. 7,670,495 as underlined new claims even through several of these claim were presented and amended in previous amendments and responses. The texts of the claims of this Second Substitute Supplemental Amendment are the same as the texts of the claims presented in the Substitute Supplemental Amendment of September 23<sup>rd</sup>. However, this Second Substitute Supplemental Amendment does NOT present these claims with bracketing of cancelled words and underlining of new words relative to those same claims previously presented. Instead, each claim is presented in “clean” form with completely underlined text as if it had not been previously presented.

This Second Substitute Supplemental Amendment and the Supplemental Reissue Declaration of Inventorship attached hereto are submitted pursuant to instruction from the U.S. PTO re-issue specialist and the examiner in charge. If further formalities need to be changed, please call the undersigned attorney. The undersigned attorney will rapidly provide such changes so that this re-issue application can be passed to issuance.

Applicant respectfully requests consideration of his amended claims presented herein.

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**IN THE CLAIMS**

1. (Allowed) 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.

Claims 2-12 are cancelled.

13. (New) A method for producing an oxygenated aqueous composition comprising:  
flowing water at a flow rate no greater than 12 gallons per minute through an electrolysis emitter comprising an electrical power source electrically connected to an anode electrode and a cathode electrode contained in a tubular housing,  
causing electricity to flow from the power source to the electrodes, and,  
producing the composition comprising a suspension comprising oxygen microbubbles and nanobubbles in the water, the microbubbles and nanobubbles having a bubble diameter of less than 50 microns, wherein:  
the anode electrode is separated at a critical distance from the cathode such that the critical distance is from 0.005 inches to 0.140 inches;  
the power source produces a voltage no greater than about 28.3 volts and an amperage no greater than about 13 amps,  
the tubular housing has an inlet and an outlet and a tubular flow axis from the inlet to the outlet;  
the water flows in the inlet, out the outlet, is in fluid connection with the electrodes, and the water flowing into the inlet has a conductivity produced by the presence of dissolved solids such that the water supports plant or animal life.

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14. (New) A method according to claim 13 wherein the housing contains at least one anode and at least one cathode, the electrodes are of a grid or solid design and are relatively positioned in cross section along the radius of the tubular housing with their long axes substantially parallel to the tubular water flow axis of the housing.

15. (New) A method according to claim 13 wherein the housing has a side arm positioned at an angle relative to the tubular flow axis and the electrodes are located in the side arm.

16. (New) A method according to claim 15 wherein the side arm contains a multiple number of anode and cathode electrodes and the electrodes are plate shaped.

17. (New) A method according to claim 14 wherein a multiple number of anode and cathodes are present and are of grid or solid design.

18. (New) A method according to claim 13 wherein the water has a temperature no greater than about ambient temperature at the inlet and the water temperature is a factor for formation of the suspension.

19. (New) A method according to claim 13 wherein the microbubbles and nanobubbles remain in the water at least in part for a period up to several hours.

20. (New) A method according to claim 19 wherein the period for which the microbubbles and nanobubbles at least in part remain in the water is determined by containing the water with microbubbles and nanobubbles in a two and one half gallon aquarium reservoir container.

21. (New) A method according to claim 13 wherein the microbubbles and nanobubbles supersaturate the water.

22. (New) A method according to claim 13 wherein the bubble diameter of the microbubbles and nanobubbles is less than 0.0006 inches.



23. (New) A method according to claim 13 wherein the separation of electrodes is maintained by a nonconductive spacer.
24. (New) A method according to claim 13 wherein the electrode separation distance is about 0.045 to about 0.06 inches.
25. (New) A method according to claim 13 wherein the microbubbles and nanobubbles are substantially incapable of breaking the surface tension of the water.
26. (New) A method according to claim 13 wherein each anode and cathode electrode of the emitter is positioned so that substantially all points midway between opposing anode and cathode electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing.
27. (New) A method according to claim 26 wherein each anode and cathode electrode of the emitter are positioned so that the electrodes do not obstruct a water flow passage along the center of the tubular housing.

### REMARKS

This Second Substitute Amendment is submitted in place of the Substitute Supplemental Amendment of September 23, 2014. This Substitute Supplemental Amendment follows the formal instruction from the re-issue specialist and the examiner that all claims not present in the original patent are to be presented as underlined new claims irrespective of whether they had been presented in previous amendments during this reissue prosecution. These new claims are to be consecutively numbered and are to include only the text proposed. Bracketing and underlining of terms relative to the terms of similar claims presented in prior amendments are not to be made.

Applicant understands that amendments to original claims present in issued U.S. Patent No. 7,670,495 are to be made relative to the language presented in those issued claims irrespective of intervening amendments. Because of the claim cancellations, the only original claim remaining is claim 1. NO amendments have been made to the original language of issued claim 1 of the '495 patent.

Applicant resubmits his supplemental Declaration of October 13<sup>th</sup> in regard to claimed subject matter not covered by his original re-issue Declaration or his first supplemental Declaration. Applicant has reviewed and agrees with the language of the claims presented herein as this claim language is the same as the claim language of the Substitute Supplemental Amendment of September 23<sup>rd</sup>. While the Declaration of October 13<sup>th</sup> refers to the "substitute supplemental amendment submitted herewith", this amendment had already been submitted to the PTO on September 23<sup>rd</sup>. Applicant reviewed this Sept. 23<sup>rd</sup> amendment attendant to his signing of the October 13<sup>th</sup> Declaration. Because the proposed texts of the claims of the September 23<sup>rd</sup> amendment and this current amendment are the same, submission of this second substitute supplemental amendment simultaneously with the re-submission of the October 13<sup>th</sup> Declaration perfects the Declaration statement regarding the "substitute supplemental amendment filed herewith."

In regard to the text of claim 13 and new claims 24-27, Applicant states the following.

Applicant has adopted certain language of main claim 13 to further characterize the recited range of flow rate, amperage and voltage. The limitations relating to maximums of flow rate, amperage, and voltage have been clarified using the words "no greater than." A device

used in the method need not be capable of operating at the maximum but rather may be operated at a value less than or equal to the recited values. The phrase “the water flowing into the inlet” has been adopted to indicate that the water flowing into the inlet meets the conductivity recitation.

New claims 24, 25, 26 and 27 are added as claims dependent from independent claim 13. Claims 26 and 27 further distinguish the invention from arrangements in which electrodes are positioned at or near the center of the housing. Such center positioning can hinder a central water flow passage.

No new matter is added by claims 24-27. Claim 24 is supported by the specification at 3:13-14. Claim 25 recites the “surface tension” phrase relative to the text of claim 13 and is supported by the specification at 4:27-41. Support for claims 26 and 27 can be found in FIG. 7A and at column 9:5-18. FIG. 7A, for example, shows the electrode positioning as recited by these claims.

Applicant and Assignee submit that this reissue application is now in condition for allowance. A favorable action upon reconsideration is respectfully requested.

### CONCLUSION

Applicant respectfully submits that the pending claims as presented are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant’s representative at (612) 373-6939 to facilitate prosecution of this application.

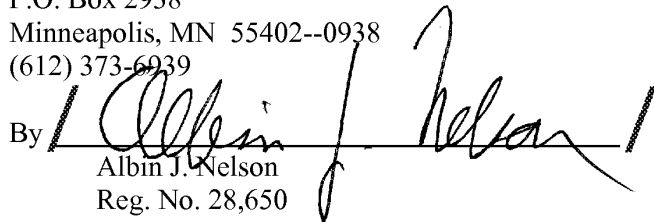
If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402--0938  
(612) 373-6939

Date October 20, 2014

By

  
Albin J. Nelson  
Reg. No. 28,650

### REMARKS

This Second Substitute Amendment is submitted in place of the Substitute Supplemental Amendment of September 23, 2014. This Substitute Supplemental Amendment follows the formal instruction from the re-issue specialist and the examiner that all claims not present in the original patent are to be presented as underlined new claims irrespective of whether they had been presented in previous amendments during this reissue prosecution. These new claims are to be consecutively numbered and are to include only the text proposed. Bracketing and underlining of terms relative to the terms of similar claims presented in prior amendments are not to be made.

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Applicant has adopted certain language of main claim 13 to further characterize the recited range of flow rate, amperage and voltage. The limitations relating to maximums of flow rate, amperage, and voltage have been clarified using the words "no greater than." A device

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No new matter is added by claims 24-27. Claim 24 is supported by the specification at 3:13-14. Claim 25 recites the “surface tension” phrase relative to the text of claim 13 and is supported by the specification at 4:27-41. Support for claims 26 and 27 can be found in FIG. 7A and at column 9:5-18. FIG. 7A, for example, shows the electrode positioning as recited by these claims.

Applicant and Assignee submit that this reissue application is now in condition for allowance. A favorable action upon reconsideration is respectfully requested.

### CONCLUSION

Applicant respectfully submits that the pending claims as presented are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant’s representative at (612) 373-6939 to facilitate prosecution of this application.

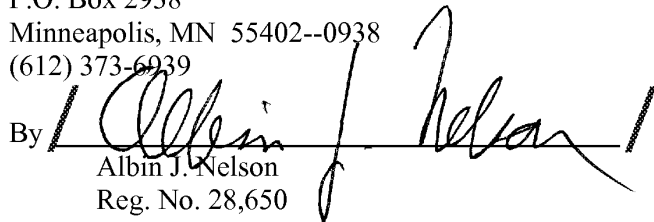
If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402--0938  
(612) 373-6939

Date October 20, 2014

By

  
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 filed September 28, 2011 and as amended by the prior filed amendments and the substitute supplemental amendment filed herewith, which reissue patent application corresponds to U.S. Patent No. **7,670,495** the specification of which was submitted to the U.S. PTO September 28, 2011.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by the prior filed amendments and the substitute supplemental 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.

I state that every error in the patent which was and is corrected in the present reissue application pursuant to amendments previously submitted and submitted herewith and which are not covered by a prior oath/declaration submitted for this application arose without any deceptive intention on my part as 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.

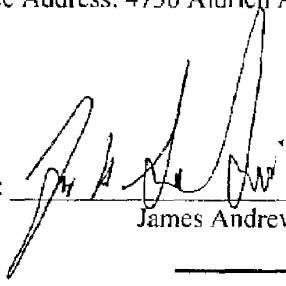
Full Name of James Andrew Senkiw

Citizenship: U.S.A

Residence: Minneapolis, MN

Post Office Address: 4750 Aldrich Ave N, Minneapolis MN 55430-3529

Signature: \_\_\_\_\_



James Andrew Senkiw

Date: \_\_\_\_\_

13 OCT 2014

§ 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

<b>EFS ID:</b>	20463835
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Thomas F. Brennan/Tara McMillen
<b>Filer Authorized By:</b>	Thomas F. Brennan
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	20-OCT-2014
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	16:29:23
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406005USR-amendment-signed.pdf	361340 <small>37d1064d4314c22b03820ebc601a545b7aa9962c</small>	yes	10

<b>Multipart Description/PDF files in .zip description</b>		
<b>Document Description</b>	<b>Start</b>	<b>End</b>
Miscellaneous Incoming Letter	1	1
Supplemental Response or Supplemental Amendment	2	2
Claims	3	5
Applicant Arguments/Remarks Made in an Amendment	6	7
Oath or Declaration filed	8	10

**Warnings:**

**Information:**

**Total Files Size (in bytes):**

361340

**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

Re-issue of U.S. Patent No. 7,670,495  
Docket No.: 3406.005USR  
Filed: September 28, 2011  
Examiner: Cameron Allen  
Customer No.: 21186

Serial No.: 13/247,241  
Due Date: N/A  
Group Art Unit: 1774  
Confirmation No.: 1737

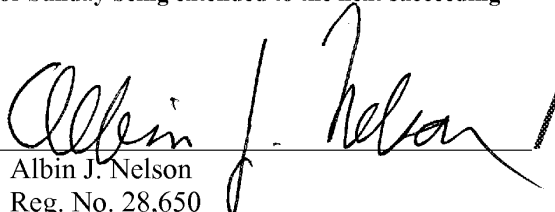
Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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

- Second Substitute Supplemental Amendment and Response (6 pgs.)
- Reissue Declaration of Inventorship (3 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  
Reg. No. 28,650

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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875			Application or Docket Number <b>13/247,241</b>	Filing Date <b>09/28/2011</b>	<input type="checkbox"/> To be Mailed
ENTITY: <input type="checkbox"/> LARGE <input checked="" type="checkbox"/> SMALL <input type="checkbox"/> MICRO					
<b>APPLICATION AS FILED – PART I</b>					
(Column 1)		(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A		
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		
<input type="checkbox"/> 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).				
<input type="checkbox"/> 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		

<b>APPLICATION AS AMENDED – PART II</b>							
(Column 1)		(Column 2)		(Column 3)			
<b>AMENDMENT</b>	<b>10/20/2014</b>	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 16	Minus	** 87	= 0	X \$40 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***5	= 0	X \$210 =	0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	<b>0</b>

(Column 1)		(Column 2)		(Column 3)			
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> 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.						LIE /JOY J. DOBBS/	
** 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.							

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Jame Andrew Senkiw  
Re-issue of U.S. Patent No. 7,670,495

Docket No.: 3406.005USR  
Filed: September 28, 2011  
Examiner: Cameron Allen  
Customer No.: 21186

Serial No.: 13/247,241  
Due Date: N/A  
Group Art Unit: 1774  
Confirmation No.: 1737

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

We are transmitting herewith the attached:

- Communication Re: Submission of Reissue Declaration (1 pg.).
- Signed Reissue Declaration (3 pgs.).

**It is believed that no additional fee is required. However, if necessary, please charge any additional required fees or credit overpayment to Deposit Account No. 19-0743.**

Schwegman Lundberg & Woessner, P.A.  
Customer No: 21186

By: 

Albin J. Nelson  
Reg. No. 28,650

S/N 13/247,241

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	Jame Andrew Senkiw	Examiner:	Cameron Allen
Serial No.:	13/247,241	Group Art Unit:	1774
Filed:	September 28, 2011	Docket:	3406.005USR
Customer No.:	21186	Confirmation No.:	1737
Title:	Re-issue of U.S. Patent No. 7,670,495		

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COMMUNICATION RE: SUBMISSION OF REISSUE DECLARATION

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

Applicant hereby submits a copy of the signed Reissue Declaration of Inventorship.

Applicant assumes the application is now in proper order and in condition for allowance.

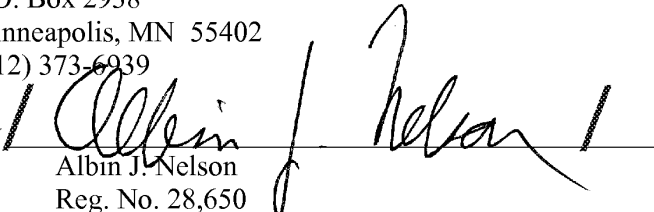
Please direct any inquiries to the undersigned at (612) 373-6939. If necessary, please charge any additional fees or credit overpayment to Deposit Account 19-0743.

Respectfully submitted,

Schwegman Lundberg & Woessner, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(612) 373-6939

Date October 13, 2014

By

  
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 filed September 28, 2011 and as amended by the prior filed amendments and the substitute supplemental amendment filed herewith, which reissue patent application corresponds to U.S. Patent No. 7,670,495 the specification of which was submitted to the U.S. PTO September 28, 2011.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by the prior filed amendments and the substitute supplemental 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.

I state that every error in the patent which was and is corrected in the present reissue application pursuant to amendments previously submitted and submitted herewith and which are not covered by a prior oath/declaration submitted for this application arose without any deceptive intention on my part as 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.

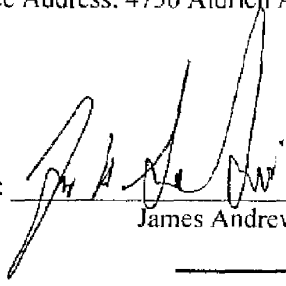
Full Name of James Andrew Senkiw

Citizenship: U.S.A

Residence: Minneapolis, MN

Post Office Address: 4750 Aldrich Ave N, Minneapolis MN 55430-3529

Signature: \_\_\_\_\_



James Andrew Senkiw

Date: \_\_\_\_\_

13 OCT 2014



§ 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

<b>EFS ID:</b>	20399468
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Thomas F. Brennan/Tara McMillen
<b>Filer Authorized By:</b>	Thomas F. Brennan
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	13-OCT-2014
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	16:17:32
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406005USR-Declaration-signed.pdf	316027 ba806db2c9e01927b4a4c1b20bcb9661affc27b5	yes	5

<b>Multipart Description/PDF files in .zip description</b>		
<b>Document Description</b>	<b>Start</b>	<b>End</b>
Miscellaneous Incoming Letter	1	1
Miscellaneous Incoming Letter	2	2
Oath or Declaration filed	3	5

**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	316027
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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.

**S/N 13/247,241**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Serial No.: 13/247,241

Group Art Unit: 1774

Filed: September 28, 2011

Docket No.: 3406.005USR

Customer No.: 21186

Confirmation No.: 1737

Examiner: Cameron Allen

Re-issue of U.S. Patent No. 7,670,495

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**SECOND SUPPLEMENTAL AMENDMENT & RESPONSE**

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

Applicant submits this Second Supplemental Amendment in furtherance of his earlier Amendments of May 13, 2014 and July 18, 2014.

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**IN THE CLAIMS**

Please amend claim 55 as follows.

Please add new dependent claims 89 and 90.

1. (Allowed) A method for treating waste water comprising:

providing a flow-through oxygenator comprising an emitter for electrolytic generation of micro bubbles 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.

Claims 2-54 (Previously Cancelled).

55. (Currently Amended) A method for producing an oxygenated aqueous composition comprising:

flowing water at a flow rate no greater than [up to a maximum flow rate of] 12 gallons per minute through an electrolysis emitter comprising an electrical power source electrically connected to an anode electrode and a cathode electrode contained in a tubular housing,

causing electricity to flow from the power source to the electrodes, and,

producing the composition comprising a suspension comprising oxygen microbubbles and nanobubbles in the water, the microbubbles and nanobubbles having a bubble diameter of less than 50 microns, wherein:

the anode electrode is separated at a critical distance from the cathode such that the critical distance is from 0.005 inches to 0.140 inches;

the power source [is] produces a voltage no greater than [up to a maximum of] about 28.3 volts and an amperage no greater than [up to a maximum amperage of] about 13 amps,

the tubular housing has an inlet and an outlet and a tubular flow axis from the inlet to the outlet;

the water flows in the inlet, out the outlet, is in fluid connection with the electrodes, and the water flowing into the inlet has a conductivity produced by the presence of dissolved solids such that the water supports plant or animal life.

56. (Previously Presented) A method according to claim 55 wherein the housing contains at least one anode and at least one cathode, the electrodes are of a grid or solid design and are relatively positioned in cross section along the radius of the tubular housing with their long axes substantially parallel to the tubular water flow axis of the housing.

57. (Previously Presented) A method according to claim 55 wherein the housing has a side arm positioned at an angle relative to the tubular flow axis and the electrodes are located in the side arm.

58. (Previously Presented) A method according to claim 57 wherein the side arm contains a multiple number of anode and cathode electrodes and the electrodes are plate shaped.

59. (Previously Presented) A method according to claim 56 wherein a multiple number of anode and cathodes are present and are of grid or solid design.

Claims 60 - 65 (Previously Cancelled).

66. (Previously Presented) A method according to claim 55 wherein the water has a temperature no greater than about ambient temperature at the inlet and the water temperature is a factor for formation of the suspension.

Claims 67, 68, 69 (Previously Cancelled).

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70. (Previously Presented) A method according to claim 55 wherein the microbubbles and nanobubbles remain in the water at least in part for a period up to several hours.

Claims 71, 72, 73 (Previously Cancelled).

74. (Previously Presented) A method according to claim 70 wherein the period for which the microbubbles and nanobubbles at least in part remain in the water is determined by containing the water with microbubbles and nanobubbles in a two and one half gallon aquarium reservoir container.

Claims 75, 76, 77, 78, 79 (Previously Cancelled).

80. (Previously Presented) A method according to claim 55 wherein the microbubbles and nanobubbles supersaturate the water.

81. (Previously Presented) A method according to claim 55 wherein the bubble diameter of the microbubbles and nanobubbles is less than 0.0006 inches.

Claims 82, 83, 84 (Previously Cancelled)

85. (Previously Presented) A method according to claim 55 wherein the separation of electrodes is maintained by a nonconductive spacer.

Claim 86 (Previously Cancelled).

87. (Previously Presented) A method according to claim 55 wherein the electrode separation distance is about 0.045 to about 0.06 inches.

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88. (Previously Presented) A method according to claim 55 wherein the microbubbles and nanobubbles are substantially incapable of breaking the surface tension of the water.

89. (New) A method according to claim 55 wherein each anode and cathode electrode of the emitter is positioned so that substantially all points midway between opposing anode and cathode electrodes are closer to a surface of the tubular housing than to a center point within the tubular housing.

90. (New) A method according to claim 89 wherein each anode and cathode electrode of the emitter are positioned so that the electrodes do not obstruct a water flow passage along the center of the tubular housing.



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**REMARKS**

This second supplemental amendment is presented in furtherance of the Amendments of May 13, 2014 and July 18, 2014. All three amendments are in response to the office action dated March 25, 2014.

Applicant has clarified the language of main claim 55 by correcting a typo (cancellation of “is”) and further characterizing the recited range of flow rate, amperage and voltage. The limitations relating to maximums of flow rate, amperage, and voltage have been clarified using the words “no greater than” as a substitute for the previous language of “up to.” A device used in the method need not be capable of operating at the maximum but rather may be operated at a value less than or equal to the recited values. The phrase “the water flowing into the inlet” has been added to indicate that the water flowing into the inlet meets the conductivity recitation.

Two new dependent claims (89, 90) depend from claim 55. These claims further distinguish the invention from arrangements in which electrodes are positioned at or near the center of a housing. Such center positioning can hinder a central water flow passage.

No new matter is added by the claims 89 and 90. Support for these claims can be found in FIG. 7A and at column 9:5-18. FIG. 7A, for example, shows the electrode positioning as recited by these claims.

Applicant and Assignee submit that this reissue application is now in condition for allowance. A favorable action upon reconsideration is respectfully requested.

The Examiner is invited to telephone Applicant's representative at (612) 373-6939 to facilitate prosecution of this application.

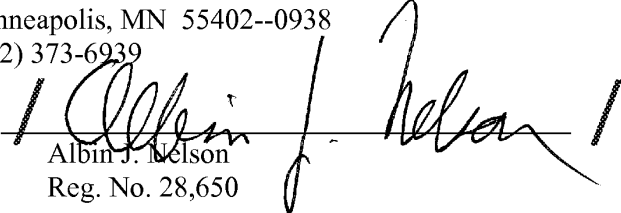
If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402--0938  
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Date Sept. 17, 2014

By

  
Albin J. Nelson  
Reg. No. 28,650

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	20162389
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Thomas F. Brennan/Tara McMillen
<b>Filer Authorized By:</b>	Thomas F. Brennan
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	17-SEP-2014
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	12:51:05
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406005USR-AMD-signed.pdf	178319 c06072798ab1b5c32544a7163d5d8683817bf148	yes	8

<b>Multipart Description/PDF files in .zip description</b>			
<b>Document Description</b>	<b>Start</b>	<b>End</b>	
Miscellaneous Incoming Letter	1	1	
Preliminary Amendment	2	2	
Claims	3	6	
Applicant Arguments/Remarks Made in an Amendment	7	8	
<b>Warnings:</b>			
<b>Information:</b>			
<b>Total Files Size (in bytes):</b>		178319	
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  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.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  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.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  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.</p>			

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re-issue of U.S. Patent No. 7,670,495  
Docket No.: 3406.005USR  
Filed: September 28, 2011  
Examiner: Cameron Allen  
Customer No.: 21186

Serial No.: 13/247,241  
Due Date: N/A  
Group Art Unit: 1774  
Confirmation No.: 1737

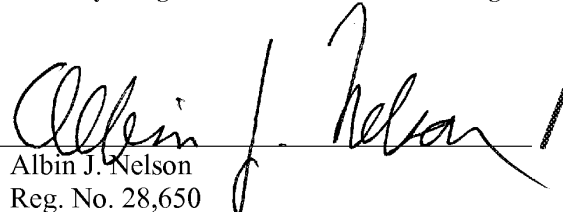
Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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

X Second Supplemental Amendment and Response (7 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

B/:   
Albin J. Nelson  
Reg. No. 28,650

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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875			Application or Docket Number <b>13/247,241</b>	Filing Date <b>09/28/2011</b>	<input type="checkbox"/> To be Mailed
ENTITY: <input type="checkbox"/> LARGE <input checked="" type="checkbox"/> SMALL <input type="checkbox"/> MICRO					
<b>APPLICATION AS FILED – PART I</b>					
(Column 1)		(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		
<input type="checkbox"/> 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).				
<input type="checkbox"/> 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		

<b>APPLICATION AS AMENDED – PART II</b>								
(Column 1)		(Column 2)		(Column 3)				
<b>AMENDMENT</b>	<b>09/17/2014</b>	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 16	Minus	** 87	= 0	X \$40 =	0	
	Independent (37 CFR 1.16(h))	* 2	Minus	***5	= 0	X \$210 =	0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
TOTAL ADD'L FEE						<b>0</b>		

(Column 1)		(Column 2)		(Column 3)				
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
	<input type="checkbox"/> 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.						LIE		
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".						/HALLEY MASSEY/		
*** 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.								

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.

**S/N 13/247,241**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Serial No.: 13/247,241

Group Art Unit: 1774

Filed: September 28, 2011

Docket No.: 3406.005USR

Customer No.: 21186

Confirmation No.: 1737

Examiner: Cameron Allen

Re-issue of U.S. Patent No. 7,670,495

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**SUPPLEMENTAL AMENDMENT & RESPONSE**

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

Applicant submits this Supplemental Amendment in connection with its earlier Amendment and Response filed May 13, 2014.

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**IN THE CLAIMS**

Please amend claims 55 and 56 as follows. Please add new dependent claims 87 and 88.

1. (Allowed) 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.

Claims 2-54, 60-65, 67-69, 71-73, 75-79, 82-84, 86. (Cancelled).

55. (Currently Amended) A method for producing an oxygenated aqueous composition comprising:

flowing water at up to a maximum flow rate of 12 gallons per minute through an electrolysis emitter comprising an electrical power source electrically connected to an anode electrode and a cathode electrode contained in a tubular housing,

causing electricity to flow from the power source to the electrodes, and,

producing the composition comprising a suspension comprising oxygen microbubbles and nanobubbles in the water, the microbubbles and nanobubbles having a bubble diameter of less than 50 microns ~~and the microbubbles and nanobubbles being incapable of breaking the surface tension of the water~~, wherein:

the anode electrode is separated at a critical distance from the cathode such that the critical distance is from 0.005 inches to 0.140 inches;

the power source is produces a voltage up to a maximum of about 28.3 volts and an amperage up to a maximum amperage of about 13 amps,

the tubular housing has an inlet and an outlet and a tubular flow axis from the inlet to the outlet;



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the water flows in the inlet, out the outlet, is in fluid connection with the electrodes, and has a conductivity produced by the presence of dissolved solids such that the water supports plant or animal life.

56. (Currently Amended) A method according to claim 55 wherein the housing contains at least one anode and at least one cathode, the electrodes, are of a grid or solid design and are relatively positioned in cross section along the radius of the tubular housing with their long axes substantially parallel to the tubular water flow axis of the housing.

57. (Previously Presented) A method according to claim 55 wherein the housing has a side arm positioned at an angle relative to the tubular flow axis and the electrodes are located in the side arm.

58. (Previously Presented) A method according to claim 57 wherein the side arm contains a multiple number of anode and cathode electrodes and the electrodes are plate shaped.

59. (Previously Presented) A method according to claim 56 wherein a multiple number of anode and cathodes are present and are of grid or solid design.

66. (Previously Presented) A method according to claim 55 wherein the water has a temperature no greater than about ambient temperature at the inlet and the water temperature is a factor for formation of the suspension.

70. (Previously Presented) A method according to claim 55 wherein the microbubbles and nanobubbles remain in the water at least in part for a period up to several hours.

74. (Previously Presented) A method according to claim 70 wherein the period for which the microbubbles and nanobubbles at least in part remain in the water is determined by containing

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the water with microbubbles and nanobubbles in a two and one half gallon aquarium reservoir container.

80. (Previously Presented) A method according to claim 55 wherein the microbubbles and nanobubbles supersaturate the water.

81. (Previously Presented) A method according to claim 55 wherein the bubble diameter of the microbubbles and nanobubbles is less than 0.0006 inches.

85. (Previously Presented) A method according to claim 55 wherein the separation of electrodes is maintained by a nonconductive spacer.

87. (New) A method according to claim 55 wherein the electrode separation distance is about 0.045 to about 0.06 inches.

88. (New) A method according to claim 55 wherein the microbubbles and nanobubbles are substantially incapable of breaking the surface tension of the water.

**REMARKS**

This Supplemental Amendment is submitted in furtherance of the Amendment filed May 13, 2014 in response to the Office Action dated March 25, 2014. Claims 1, 55-59, 66, 70, 74, 80, 81 and 85 are pending. Claims 87 and 88 are new.

Applicant has made the amendments to claim 55 and 56 in order to clarify certain terms therein. The claim phrases of claim 55 concerning maxima are understood to include all values up to the maxima. Inclusion of the phrase "up to" makes explicit this understanding. The word "and" has been added to correct for proper English. The phrase of claim 55 concerning "surface tension" has been removed as it is substantially redundant with respect to the recited bubble size. See the specification at 4:27-41. Claim 56 has been amended to remove an extraneous comma.

Applicant adds claims 87 and 88 as claims dependent from independent claim 55. Claim 87 is supported by the specification at 3:13-14. Claim 88 recites the "surface tension" phrase taken from claim 55 and is supported by the specification at 4:27-41.

Applicant and Assignee submit that this reissue application is now in condition for allowance. A favorable action upon reconsideration is respectfully requested.

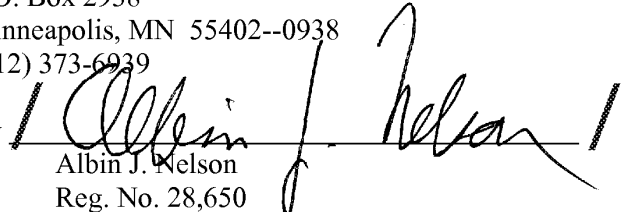
The Examiner is invited to telephone Applicant's representative at (612) 373-6939 to facilitate prosecution of this application.

If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402--0938  
(612) 373-6939

Date July 18, 2014

By   
Albin J. Nelson  
Reg. No. 28,650

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	19620838
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Thomas F. Brennan/Tara McMillen
<b>Filer Authorized By:</b>	Thomas F. Brennan
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	18-JUL-2014
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	14:48:04
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406005USR-SupAmend-signed.pdf	169316 <small>a55286719bfc8e880daef2b6a62c870266360d7</small>	yes	6

<b>Multipart Description/PDF files in .zip description</b>		
<b>Document Description</b>	<b>Start</b>	<b>End</b>
Miscellaneous Incoming Letter	1	1
Supplemental Response or Supplemental Amendment	2	2
Claims	3	5
Applicant Arguments/Remarks Made in an Amendment	6	6
<b>Warnings:</b>		
<b>Information:</b>		
<b>Total Files Size (in bytes):</b>	169316	
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  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.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  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.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  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.</p>		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re-issue of U.S. Patent No. 7,670,495

Docket No.: 3406.005USR  
Filed: September 28, 2011  
Examiner: Cameron Allen  
Customer No.: 21186

Serial No.: 13/247,241  
Due Date: N/A  
Group Art Unit: 1774  
Confirmation No.: 1737

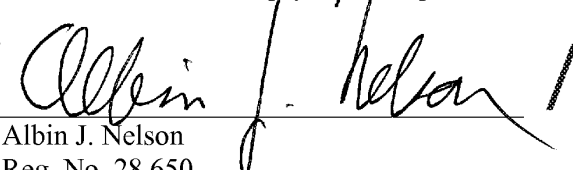
Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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

Supplemental Amendment and Response (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.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

By:   
Albin J. Nelson  
Reg. No. 28,650

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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875			Application or Docket Number <b>13/247,241</b>	Filing Date <b>09/28/2011</b>	<input type="checkbox"/> To be Mailed		
ENTITY: <input type="checkbox"/> LARGE <input checked="" type="checkbox"/> SMALL <input type="checkbox"/> MICRO							
<b>APPLICATION AS FILED – PART I</b>							
(Column 1)		(Column 2)					
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)			
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A				
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (i), or (m))</small>	N/A	N/A	N/A				
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A				
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =				
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =				
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	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).						
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL				
<b>APPLICATION AS AMENDED – PART II</b>							
(Column 1)		(Column 2)	(Column 3)				
AMENDMENT	<b>07/18/2014</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 14	Minus	** 87	= 0	X \$40 = 0	
	Independent (37 CFR 1.16(h))	* 2	Minus	***5	= 0	X \$210 = 0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
			TOTAL ADD'L FEE		<b>0</b>		
(Column 1)		(Column 2)	(Column 3)				
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
			TOTAL ADD'L FEE				
<p>* 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.</p>							
LIE /MARQUITA JONES/							

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.

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<i>Complete if Known</i>	
	<b>Application Number</b>	13/247,241
	<b>Filing Date</b>	September 28, 2011
	<b>First Named Inventor</b>	
	<b>Group Art Unit</b>	1774
	<b>Examiner Name</b>	Cameron Allen
Sheet 1 of 1		Attorney Docket No: 3406.005USR

US PATENT DOCUMENTS			
Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-4,179,347	12/18/1979	Krause, William A., et al.
	US-5,728,287	3/17/1998	Hough, Gary S, et al.
	US-6,110,353	8/29/2000	Hough, Gary S
	US-6,478,949	11/12/2002	Hough, Gary S, et al.

FOREIGN PATENT DOCUMENTS				
Examiner Initial *	Foreign Document Number	Publication Date	Name of Patentee or Applicant of cited Document	T 1

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

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



## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13247241			
<b>Filing Date:</b>	28-Sep-2011			
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR			
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw			
<b>Filer:</b>	Garrett M. Hall/Tikvah Kolbow			
<b>Attorney Docket Number:</b>	3406.005USR			
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	2806	1	90	90
<b>Total in USD (\$)</b>				<b>90</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	19541653
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Garrett M. Hall/Tikvah Kolbow
<b>Filer Authorized By:</b>	Garrett M. Hall
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	10-JUL-2014
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	12:54:27
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$90
RAM confirmation Number	8770
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)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)  
 Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)  
 Charge any Additional Fees required under 37 C.F.R. Section 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		13247241_SIDS_07-10-14.pdf	233683 <small>aaef0915cd7462370563cbaf78735d91f8fc3b</small>	yes	4

**Multipart Description/PDF files in .zip description**

Document Description	Start	End
Miscellaneous Incoming Letter	1	1
Transmittal Letter	2	3
Information Disclosure Statement (IDS) Form (SB08)	4	4

**Warnings:**

**Information:**

2	Fee Worksheet (SB06)	fee-info.pdf	30591 <small>dda90b6c160945cb2a8a7eb5c8e97d59db606fff</small>	no	2
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**Warnings:**

**Information:**

**Total Files Size (in bytes):** 264274

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(s):

Title: Re-issue of U.S. Patent No. 7,670,495

Docket No.: 3406.005USR  
Filed: September 28, 2011  
Examiner: Cameron Allen  
Customer No.: 21186

Serial No.: 13/247,241  
Due Date: N/A  
Group Art Unit: 1774  
Confirmation No.: 1737

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"):

- Supplemental Information Disclosure Statement (2 pgs.), Form 1449 (1 pg.) Documents NOT enclosed, citing US patents
- Authorization to charge Deposit Account 19-0743 in the amount of \$90.00 to cover the fee for consideration of Information Disclosure Statement under 37 C.F.R. § 1.97(c).

**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.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

By: 

Albin J. Nelson  
Reg. No. 28,650

S/N 13/247,241

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s):	Examiner: Cameron Allen
Serial No.: 13/247,241	Group Art Unit: 1774
Filed: September 28, 2011	Docket: 3406.005USR
Customer No.: 21186	Confirmation No.: 1737
Title: Re-issue of U.S. Patent No. 7,670,495	

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SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

MS Amendment  
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(c)(2), Applicant hereby authorizes the Commissioner to charge the fee of \$90.00 as set forth in 37 C.F.R. § 1.17(p), to Deposit Account No. 19-0743. Please charge any additional fees or deficiencies, or credit any overpayment to Deposit Account No. 19-0743.

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).

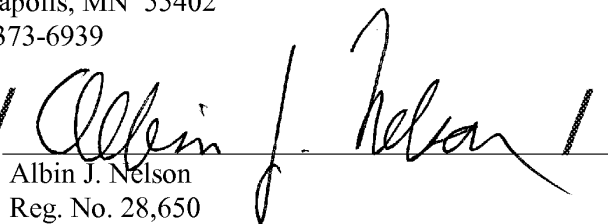
The Examiner is invited to contact the undersigned at the telephone number indicated if there are any questions regarding this communication.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(612) 373-6939

Date July 10, 2014

By

  
Albin J. Nelson  
Reg. No. 28,650

AJN:tjk

**S/N 13/247,241**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Examiner: Cameron Allen

Serial No.: 13/247,241

Group Art Unit: 1774

Filed: September 28, 2011

Docket No.: 3406.005USR

Customer No.: 21186

Confirmation No.: 1737

Title: Re-issue of U.S. Patent No. 7,670,495

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**AMENDMENT & RESPONSE UNDER 37 C.F.R. 1.111**

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

Applicant submits this Amendment and Response in reply to the Office Action dated March 25, 2014.

Applicant respectfully requests consideration of his amended claims presented herein.



**IN THE CLAIMS**

Please cancel claims 2-12, 13-49, 50-54, 60 – 65, 67, 68, 69, 71, 72, 73, 75, 76, 77, 78, 79, 82, 83, 84, 86.

Please amend claims 1, 55-59, 66, 70, 74, 80, 81 and 85 as follows.

1. (Allowed) 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.

Claims 2-12. (Cancelled).

Claims 13 – 49. (Cancelled).

Claims 50 - 54. (Cancelled).

55. (Once Amended) A method for producing an oxygenated aqueous composition comprising:  
flowing water at a maximum flow rate of 12 gallons per minute through an electrolysis emitter comprising an electrical power source electrically connected to an anode electrode and a cathode electrode contained in a tubular housing,

causing electricity to flow from the power source to the electrodes, and,

producing the composition comprising a suspension comprising oxygen microbubbles and nanobubbles in the water, the microbubbles and nanobubbles having a bubble diameter of less than 50 microns and the microbubbles and nanobubbles being incapable of breaking the surface tension of the water, wherein:

the anode electrode is separated at a critical distance from the cathode such that the critical distance is from 0.005 inches to 0.140 inches;

the power source is produces a voltage maximum of about 28.3 volts and a maximum amperage of about 13 amps,

the tubular housing has an inlet and an outlet and a tubular flow axis from the inlet to the outlet;

the water flows in the inlet, out the outlet, is in fluid connection with the electrodes, has a conductivity produced by the presence of dissolved solids such that the water supports plant or animal life.

56. (Once Amended) A method according to claim 55 wherein the housing contains at least one anode and at least one cathode, the electrodes, are of a grid or solid design and are relatively positioned in cross section along the radius of the tubular housing with their long axes substantially parallel to the tubular water flow axis of the housing.

57. (Previously Presented) A method according to claim 55 wherein the housing has a side arm positioned at an angle relative to the tubular flow axis and the electrodes are located in the side arm.

58. (Previously Presented) A method according to claim 57 wherein the side arm contains a multiple number of anode and cathode electrodes and the electrodes are plate shaped.

59. (Twice Amended) A method according to claim 56 wherein [the] a multiple number of anode and cathodes are present and are of grid or solid design.

Claims 60 – 65 (Cancelled).

66. (Previously Presented) A method according to claim 55 wherein the water has a temperature no greater than about ambient temperature at the inlet and the water temperature is a factor for formation of the suspension.

Claims 67, 68, 69 (Cancelled).

70. (Previously Presented) A method according to claim 55 wherein the microbubbles and nanobubbles remain in the water at least in part for a period up to several hours.

Claims 71, 72, 73 (Cancelled).

74. (Previously Presented) A method according to claim 70 wherein the period for which the microbubbles and nanobubbles at least in part remain in the water is determined by containing the water with microbubbles and nanobubbles in a two and one half gallon aquarium reservoir container.

Claims 75, 76, 77, 78, 79 (Cancelled).

80. (Previously Presented) A method according to claim 55 wherein the microbubbles and nanobubbles supersaturate the water.

81. (Previously Presented) A method according to claim 55 wherein the bubble diameter of the microbubbles and nanobubbles is less than 0.0006 inches.

Claims 82, 83, 84 (Cancelled)

85. (Previously Presented) A method according to claim 55 wherein the separation of electrodes is maintained by a nonconductive spacer.

Claim 86 (Cancelled).

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**REMARKS**

This Amendment is submitted in response to the Office Action dated March 25, 2014. Claims 1, 55-59, 66, 70, 74, 80, 81 and 85 are pending. All other claims have been cancelled.

The PTO has stated that the claims presented above would be allowable if all formal requirements are complied with. Applicant submits that the foregoing claims comply with this requirement pursuant to 37 CFR 1.173. Applicant has indicated the number of times each claim has been amended relative to its original presentation. Applicant has bracketed subject matter that is to be deleted from the pending claims (see claim 59) and has underlined new amended subject matter, if any (none).

Applicant reserves the right to submit a continuation reissue application to address the PTO concerns in regard to the system and suspension claims cancelled by this amendment.

**Text of Claim 1**

The undersigned attorney states that claim 1 as presented in the foregoing claims repeats the correct text of claim 1 allowed in the PTO action of March 6, 2013. This action addressed the preliminary amendment of September 28, 2013 in which amended claims and new claims were presented. Because original claim 1 was not amended, the text of original claim 1 was not recited in this preliminary amendment. In the subsequent amendment of July 8, 2013, the text of claim 1 was included. However, the text of claim 1 from sister patent, U.S. 7,396,441 was inadvertently and incorrectly copied as the text of claim 1 for this reissue application instead of the text of original allowed claim 1. This mistake is corrected in this amendment. The text of original claim 1 of U.S. 7,670,495 is now presented as an allowed claim of this reissue application.

The undersigned attorney called Examiner Allen on May 12, 2014 to inform Examiner Allen of the mistake and the correction. The undersigned attorney apologizes for the mistake and states that the text of claim 1 allowed by Examiner Allen is now presented in this amendment.

Applicant and Assignee submit that this reissue application is now in condition for allowance. A favorable action upon reconsideration is respectfully requested.

**CONCLUSION**

Applicant respectfully submits that the pending claims as presented are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's representative at (612) 373-6939 to facilitate prosecution of this application.

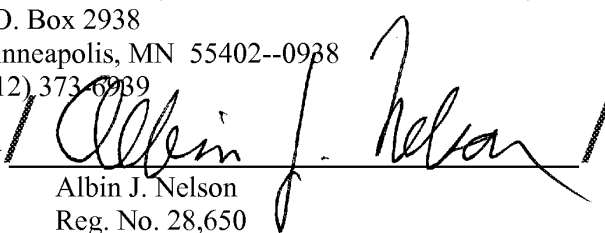
If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402--0938  
(612) 373-6939

Date May 13, 2014

By

  
Albin J. Nelson  
Reg. No. 28,650

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	19015354
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Thomas F. Brennan/Tara McMillen
<b>Filer Authorized By:</b>	Thomas F. Brennan
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	13-MAY-2014
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	12:12:21
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406005USR-AARN.pdf	174933 <small>9d35830a65b1d865a3ffb394ded8b62f8a79f486</small>	yes	7

<b>Multipart Description/PDF files in .zip description</b>			
<b>Document Description</b>		<b>Start</b>	<b>End</b>
Miscellaneous Incoming Letter		1	1
Amendment/Req. Reconsideration-After Non-Final Reject		2	2
Claims		3	5
Applicant Arguments/Remarks Made in an Amendment		6	7

**Warnings:**

**Information:**

**Total Files Size (in bytes):**

174933

**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

Title: Re-issue of U.S. Patent No. 7,670,495

Docket No.:	3406.005USR	Serial No.:	13/247,241
Filed:	September 28, 2011	Due Date:	June 25, 2014
Examiner:	Cameron Allen	Group Art Unit:	1774
Customer No.:	21186	Confirmation No.:	1737

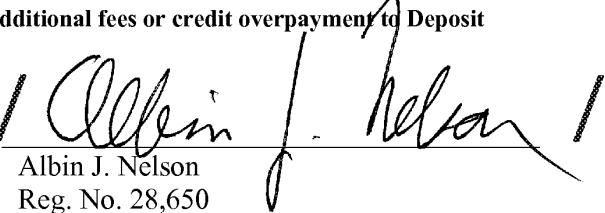
Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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

Amendment and Response under 37 C.F.R. § 1.111 (6 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.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

By:   
Albin J. Nelson  
Reg. No. 28,650



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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875			Application or Docket Number <b>13/247,241</b>	Filing Date <b>09/28/2011</b>	<input type="checkbox"/> To be Mailed
ENTITY: <input type="checkbox"/> LARGE <input checked="" type="checkbox"/> SMALL <input type="checkbox"/> MICRO					
<b>APPLICATION AS FILED – PART I</b>					
(Column 1)		(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A		
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A		
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A		
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =		
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =		
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	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).				
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>					
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		

<b>APPLICATION AS AMENDED – PART II</b>								
(Column 1)		(Column 2)		(Column 3)				
<b>AMENDMENT</b>	<b>05/13/2014</b>	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 12	Minus	** 87	= 0	X \$40 =	0	
	Independent (37 CFR 1.16(h))	* 2	Minus	***5	= 0	X \$210 =	0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
TOTAL ADD'L FEE						<b>0</b>		

(Column 1)		(Column 2)		(Column 3)				
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
	<input type="checkbox"/> 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  
 /PEARLIE A. FENNEL/

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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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/247,241 09/28/2011 James Andrew Senkiw 3406.005USR 1737

21186 7590 03/25/2014
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

Table with 1 column: EXAMINER

ALLEN, CAMERON J

Table with 2 columns: ART UNIT, PAPER NUMBER

1774

Table with 2 columns: NOTIFICATION DATE, DELIVERY MODE

03/25/2014

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

<b>Office Action Summary</b>	<b>Application No.</b> 13/247,241	<b>Applicant(s)</b> SENKIW, JAMES ANDREW	
	<b>Examiner</b> /CAMERON J. ALLEN/	<b>Art Unit</b> 1774	<b>AIA (First Inventor to File) Status</b> 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 1/21/2014.  
 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) 1-12 and 50-86 is/are pending in the application.  
5a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 6)  Claim(s) 1, and 55-59 is/are allowed.
- 7)  Claim(s) 2, 3,4, 5, 6, 7,8, 9-11, 12, 50, 51, 54, 60, 61, 64, 65, 67, 68, 69, 71, 72, 73, 75, 76, 77,78, 79, 82, 83, 84, are 86 is/are rejected.
- 8)  Claim(s) 52,53,62,63,66,70,74,80,81 and 85 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](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto: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: \_\_\_\_\_.

Continuation of Disposition of Claims: Claims rejected are 2, 3, 5, 6, 7, 9-11, 12, 50, 51, 54, 60, 61, 64, 65, 67, 68, 69, 71, 72, 73, 75, 76, 77, 79, 82, 83, 84, are 86 .

### **DETAILED ACTION**

The present application is being examined under the pre-AIA first to invent provisions.

#### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/21/2014 has been entered.

#### ***Response to Arguments***

Applicant's arguments with respect to 1-12 and 50-86 have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection. Newly discovered reference Hough U.S. Patent 6,296,756 B1 will be used for new rejections.

#### ***Claim Objections***

The newly amended claims are objected to because of the following informalities: Applicants have used strikethroughs to show deleted subject matter rather than single bracketing. Single brackets should be used to indicate newly added limitations. Also, all changes to the claims should be shown with respect to the original patent claims. Applicants are showing changes made with respect to the last version of the claims filed. All changes from the parent applicant must be continuously

tracked. Additionally, all newly added claims need to be underlined in their entirety. Indicating that the entire claim is new, not amended. No other mark-ups should be present in these claims. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, 5, 6, 7, 9-11, 12, 50, 51, 54, 60, 61, 64, 65, 67, 68, 69, 71, 72, 73, 75, 76, 77,78, 79, 82, 83, 84, are 86 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hough U.S. Patent 6,296,756 B1.

With respect to claims 2, 6, 7, 11, 50, 51, 54, 60, 61, 64, 65, and 67 the Hough reference discloses (Column 3 lines 53-67) an electrolytic cell 102 may be connected in a monopolar electrolytic cell circuit operating at 3 to 12 volts DC and from 0.1 to 5 amperes or up to 50 amperes, and with the plates/solid (relevant to claims 51, 54, 61 and 64) spaced 0.030 inches apart. The electrolytic cell 102 also may include up to twenty plates (relevant to claim 7) and operating in the range of 12 to 150 volts DC and in the range of less than 1 ampere to over 5 amperes with the plates spaced 0.030 inches apart (relevant to claim 6). The electrolytic cell 102 coupled to a power supply via

a system control circuit 118. A power cord 120 provides power to the system control circuit 118. Power cord 119 outputs electronic controls and power from the system control circuit 118 directly to the electrolytic cell 102 within the housing 106. The device is used to produce drinking water which is known to be capable of supporting animal life, such as humans. The cell 102 (Column 6 lines 13-34) is energized and power is provided in step 608. This causes the water to begin oxygenation. As oxygen gas is created, bubbles are placed into the water which naturally rise. In batch operation, the flow rate is 0. The set of electrodes 104 may be oval, cylindrical or other acceptable shape. Figure 5 discloses the pitcher or tubular housing. A timer (Figure 4 relevant to claim 11) will usually be implemented within in the electronic control 122, or user control panel 126, since electronic timers are easily constructed and are well known in the art. The water is at room temperature according to column 6 lines 1-12 wherein water to be treated sits out overnight thereby coming to room temperature (relevant to claims 65 and 67).

Although the prior art does not specifically state the formation of nano bubbles and micro bubbles it does disclose it is a result of the configuration. Since the Hough reference discloses the same configuration, it is capable of providing the same results.

It is within the ordinary skill of one in the art to optimize the spacing and power supply, since it has been held that wherein the general conditions exist, it is within the ordinary skill of one in the art to find or discover the workable or optimum values.

With respect to claims 3 and 5, the reference further discloses (Claim 8) that the electrodes may be welded together. Welding is a technique known to bond metal pieces together, therefore the electrodes are metal.

With respect to claims 9 and 10, the reference discloses that drinking water is produced which has a neutral pH after being treated in the pitcher contain the emitter system of claim 2.

Regarding claim 12, the Hough reference discloses (Figure 9B) a pyramid shaped emitter system.

Regarding claims 68, 69, and 71, the claims do not further disclose additional structure that further limits it over its dependent claim; therefore they are rejected for the same reasons.

Regarding claims 72, 73, and 75, the Hough reference discloses (Abstract) the container is from .5 to 5 gallon capacity. Therefore the device is capable of being used at the 2.5 gallon mark.

Regarding claims 77, 79, and 83, the claims do not further disclose additional structure that further limits it over its dependent claim. The claim states that the bubble size is a diameter less than 0.0006 inches. Since all of the claimed structure is present and independent claims state that the bubbles are due to the electrode gap, the device should create the bubble size for at least same reasons as applicant.

Regarding claims 76, 78, and 82, the Hough reference discloses that the saturation level is determined by the length of time the device is allowed to operate. Therefore the device is capable of saturation when given enough time.



Regarding claims 84 and 86, the Hough reference discloses spacers 108 are used to maintain the gaps. The spacers must be nonconductive to avoid shorting.

Claim 4 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hough, further in view of Kondo U.S. 2003/0091469 A1.

With respect to claim 4, the Hough reference discloses the limitation of claim 2, but does not disclose wherein the anode is platinum and iridium oxide.

The Kondo reference does disclose the use of a water treating device with anodes made of a mixture of platinum and iridium oxide (Paragraph 0056, 0096, and 0136) to enhance the production of chlorine or ozone and oxygen at the cathode. The microorganisms on the surface in the treatment-object water are annihilated also by these chlorine (hypochlorous acid), ozone and active oxygen.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Hough reference by making the anodes a mixture of platinum and iridium oxide, since it would provide the added benefit and expected result of enhanced treatment and increased oxygen production.

Claim 8 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hough, further in view of Mun KR 940003935.

With respect to claim 8, the art of record does not expressly disclose that the device is placed in an aquarium, bait bucket, or live well. The device is however used to

treat water and provide increased oxygen to water. It would be obvious to use the device wherein water treatment and increased oxygen is needed.

The Mun KR 940003935 reference discloses that fish in aquarium water needing water treatment and oxygen generation.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Hough reference by using it to prepare water for fish, since it would provide the expected result of solving the problem of providing water treatment while supplying increased oxygen.

***Allowable Subject Matter***

As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

Claims 1, 52, 53, 55-59, 62, 63, 66, 70, 74, 80, 81, and 85 would be allowable if applicant's reply complies with all formal requirements.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose the method step of placing the emitting device in the fluid to be treated. The prior art discloses flowing the fluid through the device using a pipe system.

The prior art does not suggest nor fairly disclose wherein the housing has a side arm positioned at an angle relative to the tubular flow axis and the electrodes are located in the side arm.

**Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. 6,419,815 and PCT/JP03/12523 using US Publication 2006/0054205 A1 as a translation, 7,628,912: 5,336,399.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to /CAMERON J. ALLEN/ whose telephone number is (571)270-3164. The examiner can normally be reached on M-Th 9-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Griffin Walter can be reached on 571-272-1447. 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.

/JOSEPH DRODGE/  
Primary Examiner, Art Unit 1778

/CAMERON J. ALLEN/  
Examiner  
Art Unit 1774

Application/Control Number: 13/247,241  
Art Unit: 1774

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<b>Notice of References Cited</b>	Application/Control No. 13/247,241	Applicant(s)/Patent Under Reexamination SENKIW, JAMES ANDREW	
	Examiner /CAMERON J. ALLEN/	Art Unit 1774	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,419,815	07-2002	Chambers, Stephen Barrie	205/628
*	B	US-6,296,756	10-2001	Hough et al.	205/744
*	C	US-2006/0054205	03-2006	Yabe et al.	134/184
*	D	US-7,628,912	12-2009	Yamasaki et al.	210/150
*	E	US-5,336,399	08-1994	Kajisono, Takekazu	210/170.02
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

**FOREIGN PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N	KR940003935a1	12-1991	KR	MUN JAE-DOK	A01K63/04
	O					
	P					
	Q					
	R					
	S					
	T					

**NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	406	(119/263 or 210/167.21 ).ocls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/07 06:10
L2	1	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and I1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:10
L3	1	("20060054205").PN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2014/02/07 06:19
L4	2417	(119/263 or 210/150,167.21 ).ocls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/07 06:28
L5	6	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and I4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:28
L6	2	("2008/0264843").URPN.	USPAT	ADJ	ON	2014/02/07 06:33
L7	6806	(119/263 or 210/150,151,745,532.2,167.21,220,167.21 ).ocls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/07 06:38
L8	13	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and I7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:38
L9	9426	(119/263 or 210/150,151,745,532.2,167.21,220,167.21 or 134/56R or 435/286.6 or 417/5 or 261/26).ocls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/07 06:40
L10	13	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and I9	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:41
L11	301	(((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and I9	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:41
L12	12	(((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and I1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:45
L13	1	(anode or cathode or electrode) and(((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and I1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07 06:48

L14	42	(anode or cathode or electrode) and(((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and I9	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/07: 06:49
S1	1255	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10: 12:45
S2	28341	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10: 13:32
S3	83	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10: 13:33
S4	6	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 11:48
S5	28493	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 12:37
S6	48	(anode or cathode or electrode)same (inch or in or "in.") same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 12:37
S7	6	"10372017"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 12:51
S8	15	("20020074237"   "4225401"   "4252856"   "4587001"   "5015354"   "5534143"   "5982609"   "6171469"   "6315886"   "6328875"   "6394429"   "6689262").PN. OR ("7396441").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/14: 12:52
S9	12	(anode or cathode or electrode)same (inch or "in.") same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:02
S10	110	(anode or cathode or electrode)same (inch or "in.") same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:04
S11	0	("2007/0284245").URPN.	USPAT	ADJ	ON	2013/01/14: 13:06
S12	3	("2007/0187262").URPN.	USPAT	ADJ	ON	2013/01/14: 13:07
S13	1628	(anode or cathode or electrode)same (inch or "in.") and S5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:12
S14	28994	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:12
S15	1690	(anode or cathode or electrode)same (inch or "in.") and S14	US-PGPUB; USPAT; USOCR; FPRS;	ADJ	ON	2013/01/14: 13:12

			EPO; JPO; DERWENT			
S16	20	(anode or cathode or electrode) same (inch or "in.") same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:13
S17	32	(anode or cathode or electrode) same (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:16
S18	35	(anode or cathode or electrode) same 6 (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:23
S19	10	(anode or cathode or electrode) same 6 (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S14	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:23
S20	29002	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15; 15:17
S21	12	(anode or cathode or electrode) same 6 (inch or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15; 15:17
S22	12	(anode or cathode or electrode) same 6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15; 15:19
S23	39	("3404088"   "3479281"   "3562137"   "3619391"   "3783114"   "3816274"   "3816275"   "3817865"   "3853736"   "3898150"   "3904521"   "3920530"   "3925203"   "3944478"   "3975269"   "4012319"   "4075076"   "4189381"   "4197180"   "4202767"   "4294697"   "4311595"   "4623436"   "Re26329").PN. OR ("5049252").URFN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/15; 15:43
S24	6	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/16; 07:44
S25	3	"20070102371"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/16; 09:48
S26	29011	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17; 08:32
S27	3	(inner or outer or inside or concentric) same (anode or cathode or electrode) same 6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S26	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17; 08:32
S28	8	(inner or outer or inside or concentric) same (anode or cathode or electrode) same 6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17; 08:33
S29	105	(inner or outer or inside or concentric) same (anode or cathode or electrode) same 6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2013/01/17; 08:40



S30	14	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S26	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:41
S31	83	(inner or outer or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:44
S32	2	(concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:44
S33	2	(concentric) same6(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:47
S34	2	(concentric) same6 (anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:47
S35	3	("2007/0187262").URPN.	USPAT	ADJ	ON	2013/01/17 11:13
S36	3	("2007/0187261").URPN.	USPAT	ADJ	ON	2013/01/17 11:14
S37	189	("20010002500"   "20010034922"   "20020023847"   "20020027070"   "20020032141"   "20020038768"   "20020074237"   "20020112314"   "20020185423"   "20030001439"   "20030062068"   "20030070919"   "20030102270"   "20030159230"   "20030159231"   "20030159233"   "20030164306"   "20030213505"   "20040011665"   "20040012913"   "20040037737"   "20040042201"   "20040069611"   "20040094432"   "20040112763"   "20040166019"   "20040168933"   "20040226123"   "20040250323"   "20040256247"   "20050103644"   "20050121334"   "20050126928"   "20050136520"   "20050139239"   "20050139465"   "20050139808"   "20050194261"   "20050244556"   "20060037869"   "20060054205"   "20060076248"   "20060162735"   "20060169575"   "20060231503"   "20060263240"   "20060272120"   "20060280664"   "20070009376"   "20070023273"   "20070037267"   "20070141434"   "20070170072"   "20070186367"   "20070186368"   "20070186369"   "20070186954"   "20070186957"   "20070186958"   "20070187261"   "20070187262"   "20070187263"   "20070272549"   "20080264778"   "20080272060"   "20090008268"   "20090127128"   "20090148342"   "20090162505"   "20090184186"   "20090212132"   "20090235481"   "20100147700"   "20100181208"   "20100189805"   "20100192987"   "20100276301"   "20110121110"   "2288956"   "3725226"   "3859195"   "3897320"   "3933614"   "4018658"   "4099489"   "4105528"   "4108052"   "4121543"   "4129493"   "4154578"   "4244079"   "4324635"   "4374711"   "4405418"   "4502929"   "4574037"   "4600495"   "4630167"   "4663091".PN. OR ("4670113"   "4676882"   "4705191"   "4734176"   "4810344"   "4832230"   "4875988"   "4956071"   "5101110"   "5186860"   "5234563"   "5250161"   "5292406"   "5316646"   "5320718"   "5378339"   "5536389"   "5590439"   "5593476"   "5632870"   "5661237"   "5665212"   "5733434"   "5762779"   "5766438"   "5779891"   "5815869"   "5824200"   "5835680"   "5853562"   "5858201"   "5858202"   "5928505"   "5930105"   "5931859"   "5997717"   "6016973"   "6032655"   "6059941"   "6088211"   "6101671"   "6110353"   "6132572"   "6200434"   "6231747"   "6315886"   "6336430"   "6375827"   "6379628"   "6409895"   "6425958"   "6488016"   "6502766"   "6585827"   "6638364"   "6652719"   "6656334"   "6689262"   "6703785"   "6719891"   "6735812"   "6842940"   "6855233"   "6878287"   "6921743"   "6926819"   "6964739"   "6974561"   "6991593"   "7008523"   "7011739"   "7059013"   "7107046"   "7156962"   "7160472"   "7226542"   "7238272"   "7303300"   "7309136"   "7836543"   "7891046"   "8007654"   "8012339"   "8012340"   "8025786"   "8025787"   "8046867"   "8062499").PN. OR ("8337690").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/17 11:14
S38	189	("20010002500"   "20010034922"   "20020023847"   "20020027070"   "20020032141"   "20020038768"   "20020074237"   "20020112314"   "20020185423"   "20030001439"   "20030062068"   "20030070919"   "20030102270"   "20030159230"   "20030159231"   "20030159233"   "20030164306"   "20030213505"   "20040011665"   "20040012913"   "20040037737"   "20040042201"   "20040069611"   "20040094432"   "20040112763"   "20040166019"   "20040168933"   "20040226123"   "20040250323"   "20040256247"   "20050103644"   "20050121334"   "20050126928"   "20050136520"   "20050139239"   "20050139465"   "20050139808"   "20050194261"   "20050244556"   "20060037869"   "20060054205"   "20060076248"   "20060162735"   "20060169575"   "20060231503"   "20060263240"   "20060272120"   "20060280664"   "20070009376"   "20070023273"   "20070037267"   "20070141434"   "20070170072"   "20070186367"   "20070186368"   "20070186369"   "20070186954"   "20070186957"   "20070186958"   "20070187261"   "20070187262"   "20070187263"   "20070272549"   "20080264778"   "20080272060"   "20090008268"   "20090127128"   "20090148342"   "20090162505"   "20090184186"   "20090212132"   "20090235481"   "20100147700"   "20100181208"   "20100189805"   "20100192987"   "20100276301"   "20110121110"   "2288956"   "3725226"   "3859195"   "3897320"   "3933614"   "4018658"   "4099489"   "4105528"   "4108052"   "4121543"   "4129493"   "4154578"   "4244079"   "4324635"   "4374711"   "4405418"   "4502929"   "4574037"   "4600495"   "4630167"   "4663091".PN. OR ("4670113"   "4676882"   "4705191"   "4734176"   "4810344"   "4832230"   "4875988"   "4956071"   "5101110"   "5186860"   "5234563"   "5250161"   "5292406"   "5316646"   "5320718"   "5378339"   "5536389"   "5590439"   "5593476"   "5632870"   "5661237"   "5665212"   "5733434"   "5762779"   "5766438"   "5779891"   "5815869"   "5824200"   "5835680"   "5853562"   "5858201"   "5858202"   "5928505"   "5930105"   "5931859"   "5997717"   "6016973"   "6032655"   "6059941"   "6088211"   "6101671"   "6110353"   "6132572"   "6200434"   "6231747"   "6315886"   "6336430"   "6375827"   "6379628"   "6409895"   "6425958"   "6488016"   "6502766"   "6585827"   "6638364"   "6652719"   "6656334"   "6689262"   "6703785"   "6719891"   "6735812"   "6842940"   "6855233"   "6878287"   "6921743"   "6926819"   "6964739"   "6974561"   "6991593"   "7008523"   "7011739"   "7059013"   "7107046"   "7156962"   "7160472"   "7226542"   "7238272"   "7303300"   "7309136"   "7836543"   "7891046"   "8007654"   "8012339"   "8012340"   "8025786"   "8025787"   "8046867"   "8062499").PN. OR ("8337690").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/17 11:14

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S40	185	("20010002500"   "20010034922"   "20020023847"   "20020027070"   "20020032141"   "20020038768"   "20020074237"   "20020112314"   "20020185423"   "20030001439"   "20030062068"   "20030070919"   "20030102270"   "20030159230"   "20030159231"   "20030159233"   "20030164306"   "20030213505"   "20040011665"   "20040012913"   "20040037737"   "20040042201"   "20040069611"   "20040094432"   "20040112763"   "20040166019"   "20040168933"   "20040226123"   "20040250323"   "20040256247"   "20050067289"   "20050103644"   "20050121334"   "20050126928"   "20050136520"   "20050139239"   "20050139465"   "20050139808"   "20050194261"   "20050244556"   "20060037869"   "20060054205"   "20060076248"   "20060162735"   "20060169575"   "20060231503"   "20060263240"   "20060280664"   "20070009376"   "20070023273"   "20070037267"   "20070141434"   "20070170072"   "20070186367"   "20070186368"   "20070186369"   "20070186954"   "20070186957"   "20070186958"   "20070187261"   "20070187262"   "20070187263"   "20070272549"   "20080264778"   "20080272060"   "20090008268"   "20090127128"   "20090148342"   "20090162505"   "20090184186"   "20090212132"   "20090235481"   "20100189805"   "20100192987"   "2288956"   "3725226"   "3859195"   "3897320"   "3933614"   "4018658"   "4099489"   "4105528"   "4108052"   "4121543"   "4129493"   "4154578"   "4244079"   "4324635"   "4374711"   "4405418"   "4502929"   "4574037"   "4600495"   "4603167"   "4630167"   "4663091"   "4670113"   "4676882"   "4687558"   "4705191"). PN. OR ("4734176"   "4810344"   "4832230"   "4875988"   "4956071"   "5186860"   "5234563"   "5250161"   "5292406"   "5316646"   "5320718"   "5378339"   "5536389"   "5590439"   "5593476"   "5632870"   "5661237"   "5665212"   "5733434"   "5762779"   "5766438"   "5779891"   "5815869"   "5824200"   "5835662"   "5858201"   "5858202"   "5928505"   "5931859"   "5997717"   "6016973"   "6032655"   "6059941"   "6059941"   "6088211"   "6101671"   "6110353"   "6132572"   "6200434"   "6231747"   "6315886"   "6336430"   "6375827"   "6379628"   "6409895"   "6425958"   "6488016"   "6502766"   "6585827"   "6638364"   "6652719"   "6656334"   "6689262"   "6703785"   "6719891"   "6735812"   "6842940"   "6855233"   "6878287"   "6921743"   "6926819"   "6964739"   "6974561"   "6991593"   "7008523"   "7011739"   "7059013"   "7107046"   "7156962"   "7160472"   "7226542"   "7238272"   "7303300"   "7309136"   "7836543"   "7891046"   "8007654"   "8012339"   "8012340"   "8025786"   "8025787"   "8046867"   "8062499"). PN. OR ("8319654").URPN.	US-FGPUB; USPAT; USOCR	ADJ	ON	2013/01/17 11:15
S41	0	13/247241	US-FGPUB; USPAT; USOCR	ADJ	ON	2013/01/17 11:25
S42	0	"13247241"	US-FGPUB; USPAT; USOCR	ADJ	ON	2013/01/17 11:25
S43	5	"7670495"	US-FGPUB; USPAT; USOCR	ADJ	ON	2013/01/17 11:25
S44	29011	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321,7,1).ccls.	US-FGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 11:59
S45	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S44	US-FGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 11:59
S46	0	("2007/0284245").URPN.	USPAT	ADJ	ON	2013/01/17 12:08
S47	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same	US-FGPUB; USPAT; USOCR	ADJ	ON	2013/01/17

		((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3) same oxygen and S44	USPAT; USOCR; FPRS; EPO; JPO; DERWENT			12:08
S48	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same ((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:09
S49	1178	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:09
S50	751	(pyramid\$2 or triang\$5 or funnel or conical or cone) with(anode or cathode or electrode) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:10
S51	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same ((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:11
S52	101	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same (oxygen) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:11
S53	0	(platinum same (iridium with oxide)) same(anode or cathode or electrode) same (oxygen) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:39
S54	0	(platinum same (iridium with oxide)) same(anode or cathode or electrode) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:39
S55	38	(platinum same (iridium with oxide)) same(anode or cathode or electrode) same (oxygen) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:39
S56	34	"4,220,529"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/08/13 14:02
S57	8	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/08/27 08:39
S58	11	("5049252").URPN.	USPAT	ADJ	ON	2013/08/27 08:50
S59	1	"20080149485"	USPAT	ADJ	ON	2013/08/27 10:37
S60	3	"20080149485"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/08/27 10:37
S61	135	"4761208"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/08/27 11:18


S62	14	"5,049,252"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/08/28; 08:34
S63	243	(microbubble or nanobubble) and (saturat\$3 or supersaturate\$3) and "210"/\$5.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/09/09; 11:20
S64	38	(microbubble or nanobubble) and (saturat\$3 or supersaturate\$3) and (bod or biological adj oxygen adj demand) and "210"/\$5.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/09/09; 11:21
S65	8	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/09/09; 12:41
S66	22	(microbubble or nanobubble) and (anode or cathode or electrode) and (bod or biological adj oxygen adj demand) and "210"/\$5.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/09/09; 13:37
S67	8	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/12/11; 11:27
S68	14	"5049252"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/12/11; 11:48
S69	2	("2007/0284245").URPN.	USPAT	ADJ	ON	2014/01/23; 14:24
S70	19	("2003/0164306").URPN.	USPAT	ADJ	ON	2014/01/23; 14:45
S71	7242	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23; 15:33
S72	2009	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) and ("204"/\$ or "205"/\$).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23; 15:34
S73	963	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) and ("205"/\$).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23; 15:38
S74	1675	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) and ("204"/\$).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23; 15:40
S75	33201	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23; 15:41
S76	474	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) and S75	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23; 15:41
S77	115	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or	US-PGPUB;	ADJ	ON	2014/01/23;

		distance or gap) same (oxygen or O2) and S75	USPAT; USOCR; FPRS; EPO; JPO; DERWENT			15:43
S78	8	(microbubble or nanobubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) same (oxygen or O2) and S75	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/23: 15:44
S79	33201	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/24: 07:13
S80	474	(microbubble or nanobubble or bubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) and S79	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/24: 07:13
S81	10	(microbubble or nanobubble) and (anode or cathode or electrode) and (bod or biological adj oxygen adj demand) and S79	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/24: 07:14
S82	7	(microbubble or nanobubble) same (anode or cathode or electrode) same (space\$3 or distance or gap) same (mm or "in." or inch) same (oxygen or O2) and S79	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/01/24: 08:10
S83	44	(electrolytic electrochemical electrolytically electrochemically) near3 (oxygenat\$6) and (oxygen) near3 (microbubble microbubbles nanobubble nanobubbles bubble bubbles)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/04: 13:11
S84	188	(electrolytic electrochemical electrolytically electrochemically) same(oxygenat\$6) and (oxygen) same (microbubble microbubbles nanobubble nanobubbles bubble bubbles)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/05: 07:45
S85	92	(electrolytic electrochemical electrolytically electrochemically) same(oxygenat\$6) and (oxygen) same (microbubble microbubbles nanobubble nanobubbles bubble bubbles) and (gap or space) same (electrode or anode or cathode)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/05: 07:46
S86	21084	(bait or bucket or well or aquarium) same (electrode or anoe or cathode) same (oxygen\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/05: 10:21
S87	8834	(bait or bucket or well or aquarium) with (electrode or anoe or cathode) same (oxygen\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/05: 10:21
S88	3538	(bait or bucket or well or aquarium) with (electrode or anoe or cathode) with (oxygen\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/05: 10:21
S89	16	(bait or bucket or aquarium) with (electrode or anoe or cathode) with (oxygen\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/05: 10:21
S90	24	"6,419,815"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/05: 10:39

S91	0	"13247241"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/06: 07:48
S92	8	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/06: 07:48
S93	6	"20030091469"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2014/02/06: 09:50
S94	80	(electrolytic electrochemical electrolytically electrochemically) same(oxygenat\$6) and (oxygen) same (microbubble microbubbles nanobubble nanobubbles bubble bubbles) and (gap or space) same (electrode or anode or cathode) and oxide	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/06: 10:11
S95	17	(electrolytic electrochemical electrolytically electrochemically) same(oxygenat\$6) and (oxygen) same (microbubble microbubbles nanobubble nanobubbles bubble bubbles) and (gap or space) same (electrode or anode or cathode) same oxide	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/06: 10:27
S96	1675	(205/628,633,742,756,757).ocls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/02/06: 10:46

2/ 7/ 2014 7:22:07 AM

C:\Users\callen\Documents\EAST\Workspaces\13247241.wsp

<b>Search Notes</b>  	<b>Application/Control No.</b>  13247241	<b>Applicant(s)/Patent Under Reexamination</b>  SENKIW, JAMES ANDREW
	<b>Examiner</b>  CAMERON J ALLEN	<b>Art Unit</b>  1774

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
210	739,746,748.01,748.16,748.15,748.17,748.19,749,757	1/16/2013	CA
422	22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308	1/16/2013	CA
204	155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2	1/16/2013	CA
205	701	1/16/2013	CA
22	192,321.7,1	1/17/2013	CA
205	628,633,742,756,757	2/06/2014	CA
119	263	2/07/2014	CA
210	167.21	2/27/2014	CA

SEARCH NOTES		
Search Notes	Date	Examiner
Google Search	1/16/2013	CA
See East Search History	1/16/2013	CA
Primary Joseph Drodge (General Assistance)	1/16/2013	CA
Inventor Search	1/16/2013	CA
See Updated East Search History	8/28/2013	CA
See Updated East Search History	2/06/2014	CA

INTERFERENCE SEARCH	

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US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	See East Search	1/16/2013	CA
	See Updated East Search History	8/28/2013	CA

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Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<i>Complete if Known</i>	
	<b>Application Number</b>	13/247,241
	<b>Filing Date</b>	September 28, 2011
	<b>First Named Inventor</b>	
	<b>Group Art Unit</b>	1774
	<b>Examiner Name</b>	Cameron Allen
Sheet 1 of 2	Attorney Docket No: 3406.005USR	

US PATENT DOCUMENTS			
Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document
	US-20020074237A1	6/20/2002	Takesako, Kiyoyuki, et al.
	US-20030164306A1	9/4/2003	Senkiw, James Andrew
	US-20040118701A1	6/24/2004	Senkiw, James Andrew
	US-20060150491A1	7/13/2006	Senkiw, James Andrew
	US-20080202995A1	8/28/2008	Senkiw, James Andrew
	US-4,071,447	1/31/1978	Ramirez, Ernest R
	US-4,225,401	9/30/1980	Divisek, Jiri, et al.
	US-4,252,856	2/24/1981	Sara, Raymond V
	US-4,257,352	3/24/1981	Habegger, William
	US-4,587,001	3/6/1986	Cairns, John F, et al.
	US-5,015,354	5/14/1991	Nishiki, Yoshinori, et al.
	US-5,148,772	9/22/1992	Kirschbaum, Robert N
	US-5,534,143	7/9/1996	Portier, Ralph J, et al.
	US-5,982,609	11/9/1999	Evans, D. A.
	US-6,171,469	1/9/2001	Hough, G. S, et al.
	US-6,315,886	11/13/2001	Zappi, Guillermo Daniel, et al.
	US-6,328,875	12/11/2001	Zappi, Guillermo Daniel, et al.
	US-6,394,429	3/28/2002	Ganan-Calvo, Alfonso
	US-6,524,475	2/25/2003	Herrington, Rodney E, et al.
	US-6,689,262	2/10/2004	Senkiw, James Andrew
	US-7,396,441	7/8/2008	Senkiw, James Andrew

FOREIGN PATENT DOCUMENTS				
Examiner Initial *	Foreign Document Number	Publication Date	Name of Patentee or Applicant of cited Document	T 1
	EP-0723936A2	7/31/1996	Sano, Yoichi	
	GB-1522188A	8/23/1978		
	WO-0189997A2	11/29/2001	Vagnes, Magne	
	WO-03072507A1	9/4/2003	Snekiw, James Andrew	
	WO-9939561A1	8/12/1999	Mazzei, Angelo L	

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

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

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<i>Complete if Known</i>	
	<b>Application Number</b>	13/247,241
	<b>Filing Date</b>	September 28, 2011
	<b>First Named Inventor</b>	
	<b>Group Art Unit</b>	1774
	<b>Examiner Name</b>	Cameron Allen
Sheet 2 of 2	Attorney Docket No: 3406.005USR	

<b>OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS</b>		
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
	"Effect of Oxygenated Water on the Growth & Biomass Development of Seedless Cucumbers and Tomato Seedlings under Greenhouse Conditions", Project Report: Seair Diffusion Systems, [Online]. Retrieved from the Internet: <URL: <a href="http://www.seair.ca/Pages/pdfs/DrMirzaReport.pdf">http://www.seair.ca/Pages/pdfs/DrMirzaReport.pdf</a> >, (2003), 5 pgs	

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<b>US PATENT DOCUMENTS</b>			
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	US-20040118701A1	6/24/2004	Senkiw, James Andrew
	US-20060150491A1	7/13/2006	Senkiw, James Andrew
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	US-4,071,447	1/31/1978	Ramirez, Ernest R
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	US-5,015,354	5/14/1991	Nishiki, Yoshinori, et al.
	US-5,148,772	9/22/1992	Kirschbaum, Robert N
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	US-5,982,609	11/9/1999	Evans, D. A.
	US-6,171,469	1/9/2001	Hough, G. S, et al.
	US-6,315,886	11/13/2001	Zappi, Guillermo Daniel, et al.
	US-6,328,875	12/11/2001	Zappi, Guillermo Daniel, et al.
	US-6,394,429	3/28/2002	Ganan-Calvo, Alfonso
	US-6,524,475	2/25/2003	Herrington, Rodney E, et al.
	US-6,689,262	2/10/2004	Senkiw, James Andrew
	US-7,396,441	7/8/2008	Senkiw, James Andrew

<b>FOREIGN PATENT DOCUMENTS</b>				
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	EP-0723936A2	7/31/1996	Sano, Yoichi	
	GB-1522188A	8/23/1978		
	WO-0189997A2	11/29/2001	Vagnes, Magne	
	WO-03072507A1	9/4/2003	Snekiw, James Andrew	
	WO-9939561A1	8/12/1999	Mazzei, Angelo L	

<b>OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS</b>		
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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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.

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<i>Complete if Known</i>	
	<b>Application Number</b>	13/247,241
	<b>Filing Date</b>	September 28, 2011
	<b>First Named Inventor</b>	
	<b>Group Art Unit</b>	1774
	<b>Examiner Name</b>	Cameron Allen
Sheet 2 of 2	Attorney Docket No: 3406.005USR	

<b>OTHER DOCUMENTS – NON PATENT LITERATURE DOCUMENTS</b>		
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
	"Effect of Oxygenated Water on the Growth & Biomass Development of Seedless Cucumbers and Tomato Seedlings under Greenhouse Conditions", Project Report: Seair Diffusion Systems, [Online]. Retrieved from the Internet: <URL: <a href="http://www.seair.ca/Pages/pdfs/DrMirzaReport.pdf">http://www.seair.ca/Pages/pdfs/DrMirzaReport.pdf</a> >, (2003), 5 pgs	

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## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	18316777
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Garrett M. Hall/Tikvah Kolbow
<b>Filer Authorized By:</b>	Garrett M. Hall
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	27-FEB-2014
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	10:13:37
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		13247241_IDS_02-25-14.pdf	244258 4900d05d1c34b13ec2e5616b4f2eec03f46998c5	yes	5

Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Miscellaneous Incoming Letter			1	1	
Transmittal Letter			2	3	
Information Disclosure Statement (IDS) Form (SB08)			4	5	
<b>Warnings:</b>					
<b>Information:</b>					
2	Foreign Reference	0001_ep0723936a2.pdf	959350 e4f967fc01ed183e3d1368480810c6c7bec6beb2	no	9
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<b>Information:</b>					
3	Foreign Reference	0002_gb1522188a.pdf	3630696 7793de029b42e2dfbe5881e8701448ef878bc43c	no	19
<b>Warnings:</b>					
<b>Information:</b>					
4	Foreign Reference	0003_wo0189997a2.pdf	1962876 6327464bd068cb792211b09da12cfa7c9973693f	no	15
<b>Warnings:</b>					
<b>Information:</b>					
5	Foreign Reference	0004_wo03072507a1.pdf	2205372 6ff6a20afa26518e0308f79c9d99359f27544d45	no	20
<b>Warnings:</b>					
<b>Information:</b>					
6	Foreign Reference	0005_wo9939561a1.pdf	2576197 86410c1040c703da43e4f30b7283ec1050fb5a1b	no	21
<b>Warnings:</b>					
<b>Information:</b>					
7	Non Patent Literature	0006_drmirzareport.pdf	2647423 c4610752c7ac06be341971764585502a1d8c952b	no	5
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			14226172		

**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(s):

Title: Re-issue of U.S. Patent No. 7,670,495

Docket No.: 3406.005USR  
Filed: September 28, 2011  
Examiner: Cameron Allen  
Customer No.: 21186

Serial No.: 13/247,241  
Due Date: N/A  
Group Art Unit: 1774  
Confirmation No.: 1737

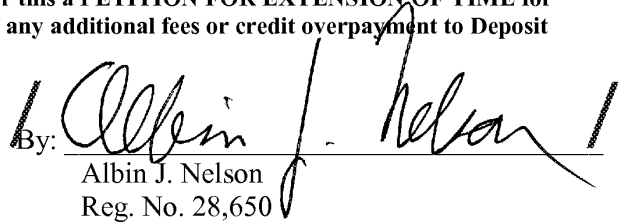
Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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

Information Disclosure Statement (2 pgs.), Form 1449 (2 pgs.) Copies of Cited References (6).

**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.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

By:   
Albin J. Nelson  
Reg. No. 28,650



S/N 13/247,241

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s):	Examiner: Cameron Allen
Serial No.: 13/247,241	Group Art Unit: 1774
Filed: September 28, 2011	Docket: 3406.005USR
Customer No.: 21186	Confirmation No.: 1737
Title: Re-issue of U.S. Patent No. 7,670,495	

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INFORMATION DISCLOSURE STATEMENT

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

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. 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. Applicant understands that pursuant to M.P.E.P §1406, the Examiner has already considered these references.

Pursuant to 37 C.F.R. § 1.97(b), 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). Applicant provides such copies herewith.

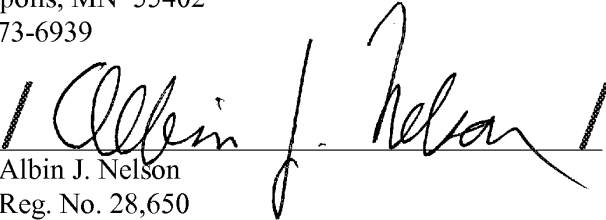
The Examiner is invited to contact the undersigned at the telephone number indicated if there are any questions regarding this communication.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
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Date February 25, 2014

By

  
Albin J. Nelson  
Reg. No. 28,650

AJN:tjk

<b>REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL</b>	<i>Application Number</i>	13/247,241
	<i>Filing Date</i>	September 28, 2011
	<i>First Named Inventor</i>	James Andrew Senkiw
	<i>Confirmation Number</i>	1737
	<i>Group Art Unit</i>	1774
	<i>Examiner Name</i>	Cameron Allen
	<i>Attorney Docket Number</i>	3406.005USR
	<i>Customer No.</i>	21186

This is a Request for Continued Examination (RCE) under 37 C.F.R § 1.114 of the above-identified application entitled  
Re-issue of U.S. Patent No. 7,670,495

1. Submission required under 37 C.F.R. § 1.114:

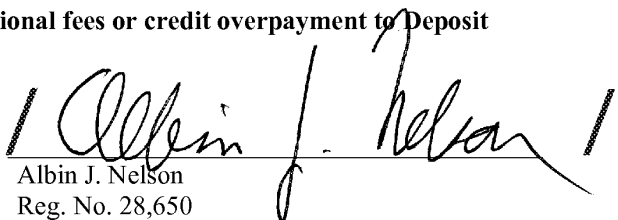
- Amendment and Response Under 37 C.F.R § 1.116 (18 pages) is enclosed.
- Signed Reissue Declaration of Inventorship (3 pgs)

2. Fees

- Authorization to charge deposit account 19-0743 in the amount of \$600.00 to pay the RCE filing fee required under 37 C.F.R. § 1.17(e).

**The Commissioner is hereby authorized to charge any additional fees or credit overpayment to Deposit Account No. 19-0743.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.

By:   
 Albin J. Nelson  
 Reg. No. 28,650

**EXPEDITED PROCEDURE-EXAMINING GROUP 1774**

**S/N 13/247,241**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Examiner: Cameron Allen

Serial No.: 13/247,241

Group Art Unit: 1774

Filed: September 28, 2011

Docket No.: 3406.005USR

Customer No.: 21186

Confirmation No.: 1737

Title: Re-issue of U.S. Patent No. 7,670,495

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**AMENDMENT & RESPONSE UNDER 37 C.F.R. 1.116**

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

Applicant submits this Amendment and Response in reply to the Final Office Action dated November 5, 2013. This response is accompanied by a Request for Continued Examination.

Applicant respectfully requests consideration of his amended claims presented herein in accordance with his Request for Continued Examination.

### IN THE CLAIMS

Please amend the claims as follows.

1. (Allowed) 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 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.
  
2. (Currently Amended) An emitter system ~~for production of oxygen~~ comprising:  
an aqueous medium having a conductivity produced by dissolved solids so that the aqueous medium is capable of supporting plant or animal life, the aqueous medium containing oxygen microbubbles and nanobubbles having a bubble diameter of less than 50 microns and that are incapable of breaking the surface tension of the aqueous medium;  
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 such that the critical distance is from 0.005 inches to 0.140 inches,  
a power source producing a voltage maximum of 28.3 volts and amperage maximum of about 13 amps, the electrodes, power source and aqueous medium all in electrical communication with each other; and,  
the aqueous medium is ~~tap water~~ in fluid and electrical communication with the anode and cathode electrodes at no flow rate to a maximum flow rate of about 12 gallons per minute wherein the communication of the electrodes and the ~~tap water~~ aqueous medium results in the formation of the oxygen microbubbles and the nanobubbles in the ~~tap water~~ aqueous medium; ~~the microbubbles having a bubble diameter of less than 0.0006 inches, said oxygen nanobubbles being incapable of breaking the surface tension of the aqueous medium such that the~~

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~~microbubbles and nanobubbles remain in the tap water at least in part for a period up to several hours such that said aqueous medium is supersaturated with oxygen.~~

3. (Previously Presented) The emitter system of claim 2, wherein the anode is a metal or a metallic oxide or a combination of a metal and a metallic oxide.

4. (Previously Presented) The emitter system of claim 2, wherein the anode is titanium and iridium oxide on a support.

5. (Previously Presented) The emitter system of claim 2 wherein the cathode is a metal or metallic oxide or a combination of a metal and a metallic oxide.

6. (Previously Presented) The emitter system of claim 2, wherein the critical distance is 0.005 to 0.060 inches.

7. (Previously Presented) The emitter system of claim 2, comprising a plurality of anodes separated at the critical distance from a plurality of cathodes.

8. (Currently Amended) A method for oxygenating a non-native habitat for temporarily keeping aquatic animals comprising:

operating the emitter system of claim 2 by placing the electrodes in an aquarium, bait bucket or live well and wherein the aqueous medium comprises a the non-native habitat comprising in an the aquarium, a the bait bucket or a the live well.

9. (Previously Presented) A method for lowering the biologic oxygen demand of polluted water comprising:

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

10. (Previously Presented) A supersaturated aqueous product formed with the emitter system of claim 2, the supersaturated aqueous product having an approximately neutral pH.

11. (Previously Presented) The emitter system of claim 2, further comprising a timer control.

12. (Previously Presented) The emitter system of claim 2 wherein the anode and cathode are arranged such that the emitter system assumes a funnel or pyramidal shaped emitter system.

Claim 13 - 49 (Cancelled).

50. (Currently Amended) An electrolysis ~~emitter system for generation of~~ containing a suspension of microbubbles and nanobubbles of oxygen in water comprising:

a power source, an anode electrode and a cathode electrode contained in a tubular housing with an inlet and outlet and a tubular flow axis from the inlet to the outlet, and water flowing into the inlet and out of the outlet at a maximum flow rate of about 12 gallons per minute, wherein:

the anode electrode is separated at a critical distance from the cathode electrode ~~by a nonconductive spacer maintaining the separation of the electrodes~~ such that the critical distance is from 0.005 inches to 0.140 inches;

the power source is in electrical communication with the electrodes and produces a voltage ~~of a~~ maximum of about 28.3 volts and a maximum amperage of about 13 amps,

the water is in fluid and electrical communication with the electrodes, has a conductivity produced by ~~a maximum of about 2000 ppm total~~ the presence of dissolved solids such that the water is suitable for support of plant and/or animal life, and the water flowing out of the outlet contains the suspension of oxygen microbubbles and nanobubbles having a bubble diameter of less than 50 microns, the microbubbles and nanobubbles being incapable of breaking the surface tension of the water.

~~the combination of the critical distance, the voltage, amperage, and the water conductivity results in the formation of a suspension comprising oxygen nanobubbles in~~

- ~~the water, the nanobubbles having a bubble diameter of less than 0.0006 inches and the nanobubbles being incapable of breaking the surface tension of the tap water so that the suspension remains at least in part for a period of up to several hours.~~
51. (Currently Amended) An electrolysis ~~emitter~~ system according to claim 50 wherein the housing contains at least one anode and at least one cathode, the electrodes ~~are tubular~~ are of a grid or solid design and are relatively positioned in cross section along the radius of the tubular housing, one inside the other with their long axes substantially ~~collinear~~ colinear with the tubular flow axis of the housing.
52. (Currently Amended) An electrolysis ~~emitter~~ system according to claim 50 wherein the housing has a side arm positioned at a transverse angle relative to the tubular flow axis and the electrodes are located in the side arm.
53. (Currently Amended) An electrolysis ~~emitter~~ system according to claim 52 wherein the side arm contains a multiple number of anode and cathode electrodes and the electrodes are plate shaped.
54. (Currently Amended) An electrolysis ~~emitter~~ system according to claim ~~50~~ 51 wherein ~~the water flow is up to about 12 gallons per minute~~ a multiple number of plate shaped electrodes of grid or solid design are present.
55. (Currently Amended) A method for producing an oxygenated aqueous composition comprising:  
    flowing water at a maximum flow rate of 12 gallons per minute through an electrolysis emitter system comprising an electrical power source electrically connected to an anode electrode and a cathode electrode contained in a tubular housing,  
    causing electricity to flow from the power source to the electrodes, and,  
    producing the composition comprising a suspension comprising oxygen microbubbles and nanobubbles in the water, the microbubbles and nanobubbles having a bubble diameter of



less than 50 microns and the microbubbles and nanobubbles being incapable of breaking the surface tension of the water, wherein:

the anode electrode is separated at a critical distance from the cathode ~~electrode by a nonconductive spacer maintaining the separation of the electrodes~~ such that the critical distance is from 0.005 inches to 0.140 inches;

the power source is ~~in electrical communication with the electrodes,~~ produces a voltage ~~of a~~ maximum of about 28.3 volts and a maximum amperage of about 13 amps,

the tubular housing has an inlet and an outlet and a tubular flow axis from the inlet to the outlet;

the water flows in the inlet, out the outlet, is in fluid connection with the electrodes, has a conductivity produced by [a maximum of about 2000 ppm total] the presence of dissolved solids such that the water supports plant or animal life ~~the combination of the critical distance, the voltage, amperage and the water conductivity results in the formation of a suspension comprising oxygen nanobubbles in the water, the nanobubbles having a bubble diameter of less than 0.0006 inches and the nanobubbles being incapable of breaking the surface tension of the tap water so that the suspension remains at least in part for a period of up to several hours.~~

56. (Presently Amended) A method according to claim 55 wherein the housing contains at least one anode and at least one cathode, the electrodes ~~are tubular,~~ are of a grid or solid design and are relatively positioned in cross section along the radius of the tubular housing ~~one inside the other~~ with their long axes substantially parallel to the tubular water flow axis of the housing.

57. (Previously Presented) A method according to claim 55 wherein the housing has a side arm positioned at an angle relative to the tubular flow axis and the electrodes are located in the side arm.

58. (Previously Presented) A method according to claim 57 wherein the side arm contains a multiple number of anode and cathode electrodes and the electrodes are plate shaped.

59. (Currently Amended) A method according to claim ~~55~~ 56 wherein the ~~water flow is up to about 12 gallons per minute~~ a multiple number of anode and cathodes are present and are of grid or solid design.

60. (Currently Amended) A suspension of ~~nanobubbles of~~ oxygen in water which is suitable as an aqueous oxygenation composition, the suspension comprising oxygen microbubbles and nanobubbles in the water, the microbubbles and nanobubbles having a bubble diameter of less than 50 microns and the microbubbles and nanobubbles being incapable of breaking the surface tension of the water;

the suspension being produced by

flowing water through an electrolysis ~~emitter~~ system comprising a power source electrically connected to an anode electrode and a cathode electrode contained in a tubular housing, causing electricity to flow to the electrodes, and, producing the suspension

wherein:

the anode electrode is separated at a critical distance from the cathode electrode ~~by a nonconductive spacer maintaining the separation of the electrodes~~ such that the critical distance is from 0.005 inches to 0.140 inches;

the power source ~~is in electrical communication with the electrodes,~~ produces a voltage of a maximum of about 28.3 volts and a maximum amperage of about 13 amps,

the tubular housing has an inlet and an outlet and a tubular flow axis from the inlet to the outlet;

the water flows at a maximum rate of 12 gallons per minute in the inlet, out the outlet, is in fluid connection with the electrodes, has a conductivity produced by a ~~maximum of about 2000 ppm total~~ the presence of dissolved solids in the water such that the water is suitable for support of animal and/or plant life.

~~the combination of the critical distance, the voltage, amperage and the water conductivity results in the formation of the suspension comprising oxygen nanobubbles in the water, the nanobubbles having a bubble diameter of less than 0.0006 inches and the nanobubbles being incapable of breaking the surface tension of the water so that the suspension remains at least in part for a period of up to several hours.~~

61. (Currently Amended) A suspension according to claim 60 wherein the housing contains at least one anode and at least one cathode, the electrodes ~~are tubular~~, are of a grid or solid design and are relatively positioned in cross section along the radius of the tubular housing ~~one inside the other~~ with their long axes substantially parallel to the tubular water flow axis of the housing.

62. (Previously Presented) A suspension according to claim 60 wherein the housing has a side arm positioned at an angle relative to the tubular flow axis and the electrodes are located in the side arm.

63. (Plate Presented) A suspension according to claim 62 wherein the side arm contains a multiple number of anode and cathode electrodes and the electrodes are plate shaped.

64. (Currently Amended) A suspension according to claim ~~60~~ 61 wherein the tubular housing contains a multiple number of anode and cathode electrodes and the electrodes are of grid or solid design ~~wherein the water flow is up to about 12 gallons per minute.~~

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65. (Currently Amended) ~~An emitter~~ system according to claim 50 wherein the water has a temperature no greater than about ambient temperature at the inlet and the water temperature is a factor for formation of the suspension.

66. (Previously Presented) A method according to claim 55 wherein the water has a temperature no greater than about ambient temperature at the inlet and the water temperature is a factor for formation of the suspension.

67. (Previously Presented) A suspension according to claim 60 wherein the water has a temperature no greater than about ambient temperature at the inlet and the water temperature is a factor for formation of the suspension.

68. (New) An emitter system according to claim 2 wherein the microbubbles and nanobubbles remain in the aqueous medium at least in part for a period up to several hours.

69. (New) An electrolysis system according to claim 50 wherein the microbubbles and nanobubbles remain in the water at least in part for a period up to several hours.

70. (New) A method according to claim 55 wherein the microbubbles and nanobubbles remain in the water at least in part for a period up to several hours.

71. (New) A suspension according to claim 60 wherein the microbubbles and nanobubbles remain in the water at least in part for a period up to several hours.

72. (New) An emitter system according to claim 68 wherein the period for which the microbubbles and nanobubbles at least in part remain in the aqueous medium is determined by containing the aqueous medium with micro and nanobubbles in a two and one half gallon aquarium reservoir container.

73. (New) An electrolysis system according to claim 69 wherein the period for which the microbubbles and nanobubbles at least in part remain in the water is determined by containing the water with microbubbles and nanobubbles in a two and one half gallon aquarium reservoir container.

74. (New) A method according to claim 70 wherein the period for which the microbubbles and nanobubbles at least in part remain in the water is determined by containing the water with microbubbles and nanobubbles in a two and one half gallon aquarium reservoir container.

75. (New) A suspension according to claim 71 wherein the period for which the microbubbles and nanobubbles at least in part remain in the water is determined by containing the water with microbubbles and nanobubbles in a two and one half gallon aquarium reservoir container.

76. (New) An emitter system according to claim 2 wherein the microbubbles and nanobubbles supersaturate the aqueous medium.

77. (New) An emitter system according to claim 2 wherein the bubble diameter of the microbubbles and nanobubbles is less than 0.0006 inches.

78. (New) An electrolysis system according to claim 50 wherein the microbubbles and nanobubbles supersaturate the water.

79. (New) An electrolysis system according to claim 50 wherein the bubble diameter of the microbubbles and nanobubbles is less than 0.0006 inches.

80. (New) A method according to claim 55 wherein the microbubbles and nanobubbles supersaturate the water.

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81. (New) A method according to claim 55 wherein the bubble diameter of the microbubbles and nanobubbles is less than 0.0006 inches.

82. (New) A suspension according to claim 60 wherein the microbubbles and nanobubbles supersaturate the water.

83. (New) A suspension according to claim 60 wherein the bubble diameter of the microbubbles and nanobubbles is less than 0.0006 inches.

84. (New) An electrolysis system according to claim 50 wherein the separation of electrodes is maintained by a nonconductive spacer.

85. (New) A method according to claim 55 wherein the separation of electrodes is maintained by a nonconductive spacer.

86. (New) A suspension according to claim 60 wherein the separation of electrodes is maintained by a nonconductive spacer.

### REMARKS

This Amendment is submitted in conjunction with an RCE to continue the prosecution of Applicant's reissue patent application. A supplemental Inventor's Declaration is submitted herewith. Although the inventor is currently ill and is in the Veteran's Administration Hospital in Minneapolis Minnesota, he has reviewed the amendment and signed this supplemental Declaration.

Assignee's attorney thanks Examiner Allen for his helpful comments during the PTO interview held December 11, 2013. The interview was originally scheduled for Tuesday December 10, 2013 but because of severe winter weather, the Federal Government closed all Washington D.C. facilities. Examiner Allen graciously agreed to reschedule the interview for the next day, December 11th.

During the interview, the undersigned attorney and Examiner Allen discussed support of the amended claims, differences of the claimed subject matter compared with the prior art and the need to submit a substitute Inventor's Declaration. Examiner Allen agreed that the amended claims are supported by the text of the specification and overcome the cited prior art. Examiner Allen stated that he would need to conduct an additional search but suggested that he expected that no closer art would be found.

#### *The Claims and Their Support*

Claims 1-12, 50-67 and new claims 68-86 are pending in this application. Claims 13-40 have been cancelled.

No new matter is added by the amendments to the claims.

The phrases characterizing "aqueous medium" and "water" are supported by the specification at 1:26-48; 2: 38-56; 1:62-67; 3:23-43; example 3, example 5 and example 6. Example 5 (8:4-10) discloses the use of municipal tap water from Minneapolis Minnesota to irrigate tomato plants. Example 3 (6:24-35) discloses water for use in a bait bucket or live well for support of fish. The passage at 1:62 discloses that the general process of production of oxygen and hydrogen by electrolysis of water is well-known. One of the factors for electrolysis

of water is the requirement that the water contain dissolved solids. The dissolved solids enable the water to carry the electrolysis current. These phases accordingly support the characterizing phrase "aqueous medium (or water) having a conductivity produced by dissolved solids so that the aqueous medium (or water) is capable of supporting plant or animal life."

The alternative phrase "tap water" had formerly been recited by these claims. The PTO questioned the kind of water this phrase referred to. While the specification at Example 5 (8:4-10) discloses the words "tap water" from a municipal source (Minneapolis Minnesota where the inventor lives and conducted his experiments), the descriptive phrase recited above has been used in place of tap water. The current phrase describing the water covers potable water delivered by a municipal water treatment plant in addition to well water, lake water and irrigation water. Water used to clean clothes, wash floors and water plants is included in this phrase. All of these kinds of water are suitable for supporting plant or animal life and will contain dissolved solids.

The water is also characterized being in fluid and electrical communication with the electrodes and having a maximum flow rate of 12 gallons per minute. Because the water generally can be contained in a static state such as in an aquarium, the water such as the water of claim 2 and its dependent claims can have no flow rate so that the flow rate generally can be no flow to a maximum of 12 gallons per minute. For systems, methods and suspensions for which water is affirmatively recited as flowing through a tubular housing, such as claims 50-67, 68-71, 73-75, the water has a positive flow rate through the emitter at a maximum of 12 gallons per minute.

The flow rate for the system, method and suspension recited by the claims operates per device so that the flow rate for multiple systems would be a multiple of the flow rate per device. The electrode size and other features also interact with the flow rate. A unifying feature of these parameters is the current density per electrode area as shown by Tables I and III.

The phrase describing the electrodes in a tubular housing as recited by claims 50-67, 69-71, 73-86 is supported by the specification at 2:63-3:43 as well as by Example 6. These passages disclose the tubular housing containing the electrodes. The passage at col. 2 discloses that "the anode is placed toward the outside of the tube and the cathode is placed on the inside, contacting



the water flow." This relative arrangement requires both electrodes to be inside the tube. Otherwise, no current would be produced. The phrase "placed toward the outside of the tube" accordingly means placed toward the outside of the inside surface of the tube. The electrodes are positioned inside the tube with one being close to the inside surface of the tube and the other electrode positioned closer to the center of the tube. To clarify this description, the phrase describing the position of the electrodes as "relatively positioned in cross section along the radius of the tubular housing" has been added to the appropriate claims (51, 56, 61).

The PTO questioned the characterization of the electrodes as "tubular" because this word does not appear in the specification. The specification teaches that the electrodes may be formed from alloys, metals or metal oxides co-deposited on a substrate. The cathodes and anodes may be formed on any convenient support in any desired shape or size" (2:27-31). This disclosure generally covers plates, tubes, rods, triangles, wafer stacks or in short any electrode design "determined according to the uses" (2:33). One or more pairs of electrodes can be incorporated into the emitter system. The specification teaches that "the anodes and cathodes may be in plates parallel to the long axis of the tube" (3:28-30). This phrase shows that multiple pairs may be present as plates parallel to the long axis of the tube. This disclosure establishes multiple pairs of electrode plates arranged as described above ("relatively positioned in cross section along the radius of the tubular housing"). Putting these two characterizations together results in multiple pairs of electrodes arranged in a circumferential relationship in the tubular housing. This arrangement is tantamount to tubular.

Claims 2-12 and 50-86 now include water and the oxygenated water as affirmative features. They recite an emitter system (claim 2 and its dependent claims), an electrolysis system containing a suspension of microbubbles and nanobubbles of oxygen in water (claim 50 and its dependent claims), a method for producing an oxygenated aqueous composition (claim 55 and its dependent claims) and a suspension of microbubbles and nanobubbles of oxygen in water which is suitable as an aqueous oxygenation composition (claim 60 and its dependent claims). The suspension of oxygen microbubbles and nanobubbles in water displays the characteristic that these bubbles are substantially incapable of breaking the surface tension of the water (2:63-67, 4:30-33). This phenomenon is described as making an opalescent or milky fluid

(the nanobubbles in water, 4:27-54). This phenomenon is capable of remaining for several hours when the suspension is contained in an appropriate container (4:34-37, 7:45-55). A container such as a two and one-half gallon aquarium reservoir is appropriate (7:45-55). A volume of the water having some depth is needed to maintain this suspension for such a period. If the suspension is spread as a film or layer of water on a flat surface such as a floor or other flat surface, the microbubbles and nanobubbles can escape in a short time from such films or layers of water.

One basis for the inventive aspect of the claimed subject matter is the inability of the microbubbles and nanobubbles to immediately break the surface tension of the water. This phenomenon results at least in part from their small size. This phenomenon ameliorates rapid escape of the oxygen bubbles from the suspension. This phenomenon enables the suspension microbubbles and nanobubbles in water to remain for a sufficient time to enable the oxygen to clean, oxidize, be absorbed or otherwise engage in chemical and biochemical interactions expected and known for oxygen.

Eventually, however, the microbubbles and nanobubbles will coalesce and/or escape from the aqueous suspension as discussed above. Some minor number of microbubbles and nanobubbles will also escape fairly rapidly from the suspension according to the principles of thermodynamics and entropy. This means that while the milky fluid will remain for a period of time, a minor amount of oxygen microbubbles and nanobubbles is apt to coalesce and escape during this period.

Claims 2, 50, 55 and 60 also recite a microbubble and nanobubble diameter of less than 50 microns as specified in the definitions section of the specification (3:65-4:15). The microbubble and nanobubble diameter of 0.0006 inches recited in originally issued claim 2 is now presented in claims 77, 79, 81 and 83 which depend respectively from claims 2, 50, 55 and 60. The diameter measurement of 0.0006 inches converts to about 15 microns. This bubble dimension is provided in example 2 of the specification.

As explained in the Summary of the Invention, the separation of the electrodes within a certain range is a factor for production of the microbubbles and nanobubbles. While use of a nonconductive spacer is one way to achieve this separation, the separation can be achieved in

other routine ways, see 3:1-42 and 4:42-54 of the specification. Consequently, the presence of a nonconductive spacer for achieving this separation is now recited in dependent claims 84-86.

While the specification recites the phrases “supersaturation” and “superoxygenated” as indicating the presence of the microbubbles and nanobubbles of oxygen in water, the skilled chemist recognizes that this composition involves two physical forms. One is oxygen dissolved in water to form a solution while the other is microbubbles and nanobubbles of oxygen suspended in water to form an aerosol. Hence, the “opalescent or milky fluid” (4:31-35) is a combination of a solution of oxygen dissolved water as a single liquid phase and an aerosol of oxygen microbubbles and nanobubbles suspended in water, i.e., an emulsification of two phases, gas and liquid. The terms “supersaturation” and “superoxygenated” are used according to the overall description presented by the application to cover this combination. The solution may not be supersaturated with dissolved oxygen but the overall composition will carry additional oxygen as an aerosol. Hence, an abundance of oxygen is present even though the water may not contain dissolved oxygen above its dissolution saturation point.

Rejections Under 35 USC §112

The PTO rejected claims 2 and 8 because they do not recite a chamber or channel. Claim 2 has been amended to recite a system. The system is operational in any kind of chamber including aquariums, bait buckets, tubular housings and other chambers containing either static water or flowing water. For this reason a chamber is not affirmatively recited.

Claim 8 has been amended to specify the chamber and aqueous medium.

Claims 51 and 56 have been amended to revise the description of electrodes in the tubular housing in place of tubular electrodes as discussed above.

It is submitted that the amendments of claims 2, 8, 51 and 56 overcome this §112 rejection.

Rejection Under 35 USC §251

The PTO has rejected claims 51 and 61 under § 251. It is submitted that this rejection is rendered moot by the amendments of these claims.

Rejection Under 35 USC §103

It is submitted that the claims as amended overcome the obviousness rejections over Murrell and Erickson. Murrell discloses a flocculation method to bring debris and waste in water to the surface. The method concerns generation of large bubbles of oxygen and hydrogen that immediately rise to the surface of the water and break the surface tension of the water. Murrell generates his bubbles by electrodes separated by 23 mm. This separation is almost one inch (0.9 inches).

As discussed during the interview, Murrell's electrode separation is more than ten times greater than the separation of the electrodes used according to the present invention ((0.005 to 0.140 inches). Murrell's separation will produce large bubbles which immediately rise to the surface, In contrast, the microbubbles and nanobubbles generated according to the present claims have a diameter of less than 50 microns and for the most part do not immediately rise to the surface. Instead, according to the present invention, these micro and nanobubbles form an opalescent or milky fluid and are suspended in the water.

Also as discussed during the interview, Erickson discloses an electronic filtration system. Erickson does not disclose electrolysis of water to produce oxygen and hydrogen.

The claims as amended now recite the suspension of micro and nanobubbles of oxygen in water as an affirmative element of the system, electrolysis system, method and suspension. Examiner Allen agreed with the undersigned attorney that these amendments overcame the cited prior art.

It is respectfully submitted therefore that the obviousness rejection has been overcome.

**CONCLUSION**

Applicant respectfully submits that the claims as amended and new claims as presented are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's representative at (612) 373-6939 to facilitate prosecution of this application.

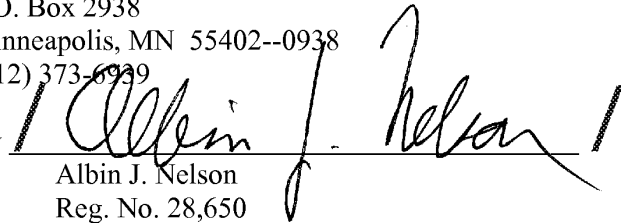
If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402--0938  
(612) 373-6939

Date January 21, 2014

By

  
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 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 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.

I state that every error in the patent which was and is corrected in the present reissue application and is not covered by a prior oath/declaration submitted in this application arose without any deceptive intention on my part as 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.

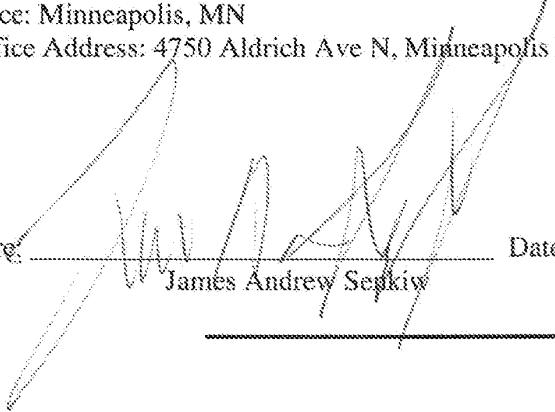
Full Name of James Andrew Senkiw

Citizenship: U.S.A

Residence: Minneapolis, MN

Post Office Address: 4750 Aldrich Ave N, Minneapolis MN 55430-3529

Signature: \_\_\_\_\_



James Andrew Senkiw

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Date: \_\_\_\_\_

1/8/2014

§ 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 Patent Application Fee Transmittal

<b>Application Number:</b>	13247241			
<b>Filing Date:</b>	28-Sep-2011			
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR			
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw			
<b>Filer:</b>	Janet Elaine Embretson/Tara McMillen			
<b>Attorney Docket Number:</b>	3406.005USR			
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Request for Continued Examination	2801	1	600	600
<b>Total in USD (\$)</b>				<b>600</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	17969741
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Janet Elaine Embretson/Tara McMillen
<b>Filer Authorized By:</b>	Janet Elaine Embretson
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	21-JAN-2014
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	14:52:23
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$600
RAM confirmation Number	1066
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 1.47 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)  
 Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)  
 Charge any Additional Fees required under 37 C.F.R. Section 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		3406005USr-RCE-signed.pdf	2357713 <small>c9166e8b291aa9b5256fb0906937e5fa8ae29415</small>	yes	22
<b>Multipart Description/PDF files in .zip description</b>					
	<b>Document Description</b>		<b>Start</b>		<b>End</b>
	Request for Continued Examination (RCE)		1		1
	Amendment Submitted/Entered with Filing of CPA/RCE		2		2
	Claims		3		12
	Applicant Arguments/Remarks Made in an Amendment		13		19
	Oath or Declaration filed		20		22
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (SB06)	fee-info.pdf	30466 <small>acd077ae9d30f38af02f3b1126639f5c25ae7870</small>	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			2388179		

**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.**

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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875			Application or Docket Number <b>13/247,241</b>	Filing Date <b>09/28/2011</b>	<input type="checkbox"/> To be Mailed
ENTITY: <input type="checkbox"/> LARGE <input checked="" type="checkbox"/> SMALL <input type="checkbox"/> MICRO					
<b>APPLICATION AS FILED – PART I</b>					
(Column 1)		(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A		
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A		
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A		
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =		
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =		
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	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).				
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>					
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		

<b>APPLICATION AS AMENDED – PART II</b>								
(Column 1)		(Column 2)		(Column 3)				
<b>AMENDMENT</b>	<b>01/21/2014</b>	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 49	Minus	** 87	= 0	X \$40 =	0	
	Independent (37 CFR 1.16(h))	* 5	Minus	***5	= 0	X \$210 =	0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
TOTAL ADD'L FEE						<b>0</b>		

(Column 1)		(Column 2)		(Column 3)				
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
	<input type="checkbox"/> 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  
/ROSA WEST/

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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Table with columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO., EXAMINER, ART UNIT, PAPER NUMBER, NOTIFICATION DATE, DELIVERY MODE. Includes application details for James Andrew Senkiw and examiner ALLEN, CAMERON J.

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

<b>Office Action Summary</b>	<b>Application No.</b> 13/247,241	<b>Applicant(s)</b> SENKIW, JAMES ANDREW	
	<b>Examiner</b> /CAMERON J. ALLEN/	<b>Art Unit</b> 1774	<b>AIA (First Inventor to File) Status</b> 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 18 July 2013.  
 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) 1-12 and 50-67 is/are pending in the application.  
5a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 6)  Claim(s) 1,52,55-59,62 and 66 is/are allowed.
- 7)  Claim(s) 1-12 and 50-67 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](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto: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/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 3)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 4)  Other: \_\_\_\_\_.



### **DETAILED ACTION**

The present application is being examined under the pre-AIA first to invent provisions.

#### ***Response to Arguments***

Claim 2 has been amended to contain new issues. The claim has been amended to disclose a nonconductive spacer, a maximum voltage and amperage, and the use of tap water. Also the claims have been amended to the limitation requiring water being supersaturated. These new issues require new rejections made in view of newly discovered reference Erickson U.S. Patent 5,389,214. This action is final necessitated by amendment. Claim 8 has been amended and no longer contains the limitation wherein the device is inserted in the aqueous medium. The claims 50-67 are new.

#### ***Claim Rejections - 35 USC § 112***

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.

Claims 2 and 8 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.

Claim 2 contains the phrase "remain in water" but does not disclose a chamber or channel for containing the water or limiting its flow, therefore it is unclear as to the structure in which the action occurs. Therefore the claim is indefinite.

Claim 8 contain the phrase “operating the emitter system of claim 2 wherein the aqueous medium comprises a non-native habitat comprising an aquarium, a bait bucket or a live well”. It is unclear how an aqueous medium may comprise a solid object such as a bucket, aquarium, or well. Therefore the scope of the claim is unclear and the claim is indefinite.

Perhaps applicant intended for the aqueous medium to be contained in such containers.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), first paragraph:

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.

Claims 51 and 56 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 specification does not disclose wherein the anode and cathode sets being tubular and are disposed inside each thereby making the anodes and cathodes concentric.

***Claim Rejections - 35 USC § 251***

Claims 51 and 61 are rejected under 35 U.S.C. 251 as being based upon new matter added to the patent for which reissue is sought. The added material which is not supported by the prior patent is as follows:

The specification does not disclose wherein the anode and cathode sets being tubular and are disposed inside each thereby making the anodes and cathodes concentric.

In accordance with pre-AIA 37 CFR 1.175(b)(1), for applications filed before September 16, 2012, a supplemental reissue oath/declaration must be received before this reissue application can be allowed.

Claims 1-12 and 50-67 are rejected as being based upon a defective reissue oath under 35 U.S.C. 251. See 37 CFR 1.175. The nature of the defect is set forth above.

Receipt of an appropriate supplemental oath/declaration will overcome this rejection. An example of acceptable language to be used in the supplemental oath/declaration is as follows:

“Every error in the patent which was corrected in the present reissue application, and is not covered by a prior oath/declaration submitted in this application, arose without any deceptive intention on the part of the applicant.”

See MPEP § 1414.01.

**EXAMINERS NOTE:**

Claim 2 has been amended to contain the new limitation of tap water. The applicant point out page 3 line 25 of the specification which discloses a watering hose. The reference is silent on what type of water the hose is attached to. Therefore, reading the claim in light of the specification, the term tap water can only mean water capable of flowing through a tap. Essentially any water is capable of flowing through a tap. There is no positive recitation of a tap, therefore the claim is only drawn to water of any type. Claiming a water hose, does not provide enough support to claim a specific type of water. A water hose may be attached and used in several different ways, and may be used to transport several types of waters. Water hoses are not known to only deliver a certain type of water. For Examination purposes, "tap water" will be any water capable of flowing through a tap, essentially any water.

***Claim Rejections - 35 USC § 103***

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, 5, 7, 9, 10, 50, 53, 60, 63, 65, and 67 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Murrell U.S. Patent 5,049,252, further in view of Erickson U.S. Patent 5,389,214.

With respect to claims 2, 3, 5, 7, 9, 10, 50, 53, 60 and 63, the Murrell reference discloses (Claim 1) a device and a method of using the device wherein a flow is introduced that contains electrodes (anode and cathode 104 and 103 and 101) that form a grid pattern separated by a distance of 23mm or .09 inches (Column 7 line 53- column 8 line 2 and Figure 5a) made from the metal aluminum (relevant to claim 21) (Column 5 lines 55-68). The electrodes may be in the form of, rods, tubes, mesh or net connected to a power source (Column 6 lines 21-29). It produces micro bubbles of oxygen. Murrell indicates that electrode number, spacing, surface area, form, material of construction, configuration, and voltage and current output as well as conductivity of the water being treated all may vary widely (column 5, lines 56-62, column 4, lines 8-15, etc.). The reference further discloses the use of insulating spacer 112 and washer 114 (Column 10 lines 8-28 relevant for claim 16). The electrodes may be plates (Abstract).

Generation of micro-bubbles and nano-bubbles which are incapable of breaking surface tension of an aqueous medium is not positively recited structure in the apparatus claim. The claim states it is a result of the disclosed configuration. The formation of bubbles is a function of flow rates, temperatures, liquid viscosity, voltage or current output of the electrodes etc., and not just of electrode spacing. The applicant try to define some of these parameters by claiming tap water. This does not limit flow rater or temperature or pressure.

The reference further discloses (figure 10) washer and spacer combination between each plate. The washer is 1.6 mm and the space is between around 23 mm

leaving 21.4 mm or 0.084 inches. The space is insulating, meaning also nonconductive. The reference further discloses the power supply is typically capable of delivering a voltage in the region of say 4 to 40 volts at a current rating depending on the size of the apparatus typical preferred current will be 12 to 15 amps.

The reference differs in that it does not disclose the use of tap water or a tubular housing.

The Erickson reference discloses (Abstract) an electrolysis system that treat municipal water (tap water) with an anode electrode configuration wherein the spacing is 0.2 cm or .07 inches. The reference discloses a control circuit (20) that response to the resistivity of the water to provide constant and efficient treatment. The reference further discloses fluid source (12) may be water from different municipalities to range between 30 to 1400 ohm-meter (Column 5 lines 25-30). The Erickson reference further discloses (Figure 2) a tubular housing. The examiner notes the production of drinking water is the production of water with approximately a neutral pH.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Murrell reference by using tap water, since it is known in the art that using municipal (tap water) in electrolysis system provides the expected result of providing increased/further treatment to the water.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Murrell reference by using the tubular housing shape, since the choice of a known shaped housing is an obvious matter of design choice.

With respect to claims 9 and 10 the claims contain language drawn to inherent results of using the device disclosed above. Therefore the claims are anticipated above. Also the treated water can be city water which is known to have a neutral pH (Column 1 lines 7-13)

With respect to claims 54 and 64, the claimed statement is a recitation of intended use. The claim does not further disclose additional structure that further limits it over its dependent claim.

A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

With respect to claims 65, and 67, the Erickson reference does not disclose heating the inlet, so therefor it is implied that the water temperature at the ambient temperature of the environment  $t$  is in and temperature being a factor of formation of bubbles is an inherent property.

Claim 4 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Murrell in view of Erickson as applied above further in view of Kondo U.S. Publication 2003/0091469 A1.

With respect to claim 4, the Muller reference discloses the limitation of claim 2, but does not disclose wherein the anode is platinum and iridium oxide.

The Kondo reference does disclose the use of a water treating device with anodes made of a mixture of platinum and iridium oxide (Paragraph 0056, 0096, and 0136) to enhance the production of chlorine or ozone.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller reference by making the anodes a mixture of platinum and iridium oxide, since it would provide the added benefit and expected result of enhances chlorine and or ozone production.

Claims 6, and 12, are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Murrell in view of Erickson further in view of Muller U.S. Patent 5,049,252.

With respect to claims 6 the Muller reference discloses the limitation not taught by the previous reference which is, (bridge between columns 7 and 8) the electrode spacing is about 20 or 23 mm (approximately 0.07 and 0.09 inches) and further states that the spacing is not critical. The reference also states that the number size and spacing may be varied in order to obtain the most convenient or most efficient conditions. The reference also states closer spacing will increase the amount of current for a specified voltage, or alternatively a lower voltage can be used to maintain a specified current flow (Column 2 lines 22-25).

The reference does not disclose that the spacing is less than about 0.060 inches.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Murrell in view of Erickson reference by making the spacing less



than about 0.060 inches since the reference discloses spacing adjustment modification would provide the expected result of varying the efficiency of the system.

With respect to claim 12, the Muller reference discloses that the shape of the container for the electrodes is unimportant but the shape generally may be square or rectangular or may be an upright cylinder with the electrode 2 being a pipe or similar linear electrode (Column 2 lines 25-32).

The reference does not disclose that the shape is funnel or pyramidal shaped.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller reference by making the shape funnel or pyramidal shaped since it is known that the shape is unimportant and would be an obvious matter of design choice.

Claim 8 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Murrell in view of Erickson further in view of Metz U.S. Patent 5,500,131.

With respect to claim 8, the Muller in view of Erickson references disclose the generation of gas bubbles to create floc and provide treatment to the water.

The Metz reference discloses (Abstract and Column 3 lines 60-67) a method of treat water including aquatic water including the generations of bubbles and floc. The reference further discloses a supersaturated solution of gas bubbles can be incorporated into the floc and thereby render the floc less dense than the water.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller in view of Erickson references by using it on aquatic water

such as in the Metz reference, since it would provide the expected result of making the floc less dense thereby increasing separation.

Claim 9 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Murrell in view of Erickson further in view of Ramirez U.S Patent 4,219,417.

With respect to claim 9, the Muller in view of Erickson references disclose the generation of gas bubbles to create floc and provide treatment to the water.

The reference does not specifically disclose a method for lowering the biological oxygen demand

The Ramirez reference discloses the treatment of wastewater for decreasing BOD. The reference discloses that treating water including the generations of bubbles and floc. The reference further discloses the formation electrolytic microbubbles would decrease the BOD.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller in view of Erickson references by using it to lower the BOD of waste water, since the Muller in view of Erickson references would solve the problem disclosed by Ramirez, which is the generation of bubbles that create floc thereby providing the added benefit of increased treatment to wastewater.

Examiners note: applicant states in the specification "Contaminated water is described as having an increased biological oxygen demand (BOD)" therefore treated water has a decreased BOD.

Claims 11 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Murrell in view of Erickson as applied to claim 2, further in view of Field U.S. Publication 2007/0187262 A1.

With respect to claim 11, the Murrell in view of Erickson references disclose the device of claim 2, but does not disclose the use of a timer.

The Field reference does disclose the use of a timer to control the operation (Paragraph 0162 and 0148).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller reference by using the timer to control the process, since the use would provide the added benefit of increased control and less user interaction.

#### ***Allowable Subject Matter***

As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

Claims 1, 52, 55-59, 62 and 66 would be allowable if applicant's reply complies with all formal requirements.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose the method step of placing the emitting device in the fluid to be treated. The prior art discloses flowing the fluid through the device using a pipe system.

The prior art also does not disclose the method or combination of the critical distance, the voltage, amperage and the water conductivity results in the formation of a suspension comprising oxygen nanobubbles in the water, the nanobubbles having a bubble diameter of less than 0.0006 inches and the nanobubbles being incapable of breaking the surface tension of the water so that the suspension remains at least in part for a period of up to several hours.

The prior art does not suggest nor fairly disclose wherein the housing has a side arm positioned at an angle relative to the tubular flow axis and the electrodes are located in the side arm.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). 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 date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to /CAMERON J. ALLEN/ whose telephone number is (571)270-3164. The examiner can normally be reached on M-Th 9-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Griffin Walter can be reached on 571-272-1447. 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.

/Joseph W. Drodge/  
Primary Examiner, Art Unit 1778

/CAMERON J. ALLEN/  
Examiner  
Art Unit 1774

<b>Notice of References Cited</b>	Application/Control No. 13/247,241	Applicant(s)/Patent Under Reexamination SENKIW, JAMES ANDREW	
	Examiner /CAMERON J. ALLEN/	Art Unit 1774	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-5,389,214	02-1995	Erickson et al.	205/701
*	B US-5,500,131	03-1996	Metz, Jean-Paul	210/705
*	C US-4,219,417	08-1980	Ramirez, Ernest R.	210/707
	D US-			
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

**NON-PATENT DOCUMENTS**

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U
	V
	W
	X

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L12	14	"5,049,252"	US-PGPUB; USPAT; USOOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/08/28 08:34
S1	1255	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10 12:45
S2	28341	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2).ccls.	US-PGPUB; USPAT; USOOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10 13:32
S3	83	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S2	US-PGPUB; USPAT; USOOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10 13:33
S4	6	"7670495"	US-PGPUB; USPAT; USOOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14 11:48
S5	28493	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2).ccls.	US-PGPUB; USPAT; USOOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14 12:37
S6	48	(anode or cathode or electrode) same (inch or in or "in.") same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S5	US-PGPUB; USPAT; USOOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14 12:37
S7	6	"10372017"	US-PGPUB; USPAT; USOOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14 12:51
S8	15	("20020074237"   "4225401"   "4252856"   "4587001"   "5015354"   "5534143"   "5982609"   "6171469"   "6315886"   "6328875"   "6394429"   "6689262").PN OR ("7396441").URPN.	US-PGPUB; USPAT; USOOCR	ADJ	ON	2013/01/14 12:52
S9	12	(anode or cathode or electrode) same (inch or "in.") same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S5	US-PGPUB; USPAT; USOOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14 13:02
S10	110	(anode or cathode or electrode) same (inch or "in.") same (((micro or nano) same (bubbl\$3) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14 13:04
S11	0	("2007/0284245").URPN.	USPAT	ADJ	ON	2013/01/14 13:06
S12	3	("2007/0187262").URPN.	USPAT	ADJ	ON	2013/01/14 13:07
S13	1628	(anode or cathode or electrode) same (inch or "in.") and S5	US-PGPUB; USPAT; USOOCR; FPRS;	ADJ	ON	2013/01/14 13:12

			EPO; JPO; DERWENT			
S14	28994	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:12
S15	1690	(anode or cathode or electrode)same (inch or "in.") and S14	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:12
S16	20	(anode or cathode or electrode)same (inch or "in.") same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:13
S17	32	(anode or cathode or electrode)same (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:16
S18	35	(anode or cathode or electrode)same6 (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:23
S19	10	(anode or cathode or electrode)same6 (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S14	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14; 13:23
S20	29002	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15; 15:17
S21	12	(anode or cathode or electrode)same6 (inch or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15; 15:17
S22	12	(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15; 15:19
S23	39	("3404088"   "3479281"   "3562137"   "3619391"   "3783114"   "3816274"   "3816275"   "3817865"   "3853736"   "3898150"   "3904521"   "3920530"   "3925203"   "3944478"   "3975269"   "4012319"   "4075076"   "4189381"   "4197180"   "4202767"   "4294697"   "4311595"   "4623436"   "Pe26329").PN. OR ("5049252").URFN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/15; 15:43
S24	6	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/16; 07:44
S25	3	"20070102371"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/16; 09:48
S26	29011	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321.7,1).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17; 08:32
S27	3	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S26	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2013/01/17; 08:32



S28	8	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:33
S29	105	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:40
S30	14	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S26	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:41
S31	83	(inner or outer or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:44
S32	2	(concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:44
S33	2	(concentric) same6(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:47
S34	2	(concentric) same6 (anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:47
S35	3	("2007/0187262").URPN.	USPAT	ADJ	ON	2013/01/17 11:13
S36	3	("2007/0187261").URPN.	USPAT	ADJ	ON	2013/01/17 11:14
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		or 205/701 or 22/192,321.7,1).cls.	FPRS; EPO; JPO; DERWENT			
S45	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode)same6 ((inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 11:59
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S51	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 12:11
S52	101	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same (oxygen) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 12:11
S53	0	(platinum same (iridium with oxide)) same(anode or cathode or electrode) same (oxygen) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 12:39
S54	0	(platinum same (iridium with oxide)) same(anode or cathode or electrode) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 12:39
S55	38	(platinum same (iridium with oxide)) same(anode or cathode or electrode) same (oxygen) and S44	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 12:39
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S59	1	"20080149485"	USPAT	ADJ	ON	2013/08/27: 10:37
S60	3	"20080149485"	US-PGPUB;	ADJ	ON	2013/08/27

EAST Search History

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8/28/2013 9:18:16 AM  
 C:\Users\callen\Documents\EAST\Workspaces\13247241.wsp

<b>Search Notes</b>  	<b>Application/Control No.</b>  13247241	<b>Applicant(s)/Patent Under Reexamination</b>  SENKIW, JAMES ANDREW
	<b>Examiner</b>  CAMERON J ALLEN	<b>Art Unit</b>  1774

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
210	739,746,748.01,748.16,748.15,748.17,748.19,749,757	1/16/2013	CA
422	22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308	1/16/2013	CA
204	155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2	1/16/2013	CA
205	701	1/16/2013	CA
22	192,321.7,1	1/17/2013	CA

SEARCH NOTES		
Search Notes	Date	Examiner
Google Search	1/16/2013	CA
See East Search History	1/16/2013	CA
Primary Joseph Drodge (General Assistance)	1/16/2013	CA
Inventor Search	1/16/2013	CA
See Updated East Search History	8/28/2013	CA

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
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	See Updated East Search History	8/28/2013	CA

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**S/N 13/247,241**

**REISSUE PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: James Andrew Senkiw

Examiner: Cameron Allen

Serial No.: 13/247,241

Group Art Unit: 1774

Filed: September 28, 2011

Docket No.: 3406.005USR

Customer No.: 21186

Confirmation No.: 1737

Title: FLOW-THROUGH OXYGENATOR

Re-issue of U.S. Patent No. 7,670,495

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**AMENDMENT & RESPONSE UNDER 37 C.F.R. § 1.111**

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

Applicant submits this Amendment and Response in reply to the Office Action dated March 6, 2013.

This response is accompanied by a Petition, as well as the appropriate fee, to obtain a one-month extension of the period for responding to the Office action, thereby moving the deadline for response from June 6, 2013 to July 6, 2013 (Saturday).

AMENDMENT

Serial Number: 13/247,241

Filing Date: Sept 28, 2011

Reissue of U.S. Patent No. 7,670,495, Issued March 2, 2010

Title: FLOW-THROUGH OXYGENATOR

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Dkt: 3406.005USR

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**IN THE CLAIMS**

Please amend the claims as follows.

1. (Previously Submitted, Allowed) 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 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.
  
2. (Currently Amended) An emitter system for production of oxygen [electrolytic generation of microbubbles of oxygen in an aqueous medium] comprising: an aqueous medium, 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 such that the critical distance is from 0.005 inches to 0.140 inches, and a power source producing a voltage maximum of 28.8 volts and amperage maximum of about 13 amps all in electrical communication with each other and the aqueous medium is tap water in fluid communication with the anode and cathode electrodes wherein the communication of the electrodes and the tap water results in the formation of oxygen microbubbles and nanobubbles in the tap water, the microbubbles having a bubble diameter of less than 0.0006 inches, said oxygen nanobubbles [microbubbles] being incapable of breaking the surface tension of the aqueous medium such that the microbubbles and nanobubbles remain in the tap water at least in part for a period up to several hours such that said aqueous medium is supersaturated with oxygen.
  
3. (Currently Amended) The emitter system of claim 2, wherein the anode is a metal or a metallic oxide or a combination of a metal and a metallic oxide.
  
4. (Currently Amended) The emitter system of claim 2, wherein the anode is [platinum] titanium and iridium oxide on a support.

AMENDMENT

Serial Number: 13/247,241

Filing Date: Sept 28, 2011

Reissue of U.S. Patent No. 7,670,495, Issued March 2, 2010

Title: FLOW-THROUGH OXYGENATOR

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5. (Currently Amended) The emitter system of claim 2 wherein the cathode is a metal or metallic oxide or a combination of a metal and a metallic oxide.
  6. (Currently Amended) The emitter system of claim 2, wherein the critical distance is 0.005 to 0.060 inches.
  7. (Currently Amended) The emitter system of claim 2, comprising a plurality of anodes separated at the critical distance from a plurality of cathodes.
  8. (Currently Amended) A method for oxygenating a non-native habitat for temporarily keeping aquatic animals comprising:  
    [inserting] operating the emitter system of claim 2 [into] wherein the aqueous medium[,] comprises a [the] non-native habitat comprising an aquarium, a bait bucket or a live well.
  9. (Currently Amended) A method for lowering the biologic oxygen demand of polluted water comprising:  
    passing the polluted water through a vessel containing the emitter system of claim 2.
  10. (Currently Amended) A supersaturated aqueous product formed with the emitter system of claim 2, the supersaturated aqueous product having an approximately neutral pH.
  11. (Currently Amended) The emitter system of claim 2, further comprising a timer control.
  12. (Currently Amended) The emitter system of claim 2 wherein the anode and cathode are arranged such that the emitter system assumes a funnel or pyramidal shaped emitter system.

Please cancel claims 13 through 49.

Please add new claims 50- 67.



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50. (New) An electrolysis emitter system for generation of nanobubbles of oxygen in water comprising: a power source, an anode electrode and a cathode electrode contained in a tubular housing with an inlet and outlet and a tubular flow axis from the inlet to the outlet, and water flowing into the inlet and out of the outlet, wherein:
- the anode electrode is separated at a critical distance from the cathode electrode by a nonconductive spacer maintaining the separation of the electrodes such that the critical distance is from 0.005 inches to 0.140 inches;
- the power source is in electrical communication with the electrodes and produces a voltage of a maximum of about 28.3 volts and a maximum amperage of about 13 amps,
- the water is in fluid communication with the electrodes, has a conductivity produced by a maximum of about 2000 ppm total dissolved solids;
- the combination of the critical distance, the voltage, amperage and the water conductivity results in the formation of a suspension comprising oxygen nanobubbles in the water, the nanobubbles having a bubble diameter of less than 0.0006 inches and the nanobubbles being incapable of breaking the surface tension of the tap water so that the suspension remains at least in part for a period of up to several hours.
51. (New) An electrolysis emitter system according to claim 50 wherein the housing contains at least one anode and at least one cathode, the electrodes are tubular, are of a grid or solid design and are relatively positioned one inside the other with their long axes substantially collinear with the tubular flow axis of the housing.
52. (New) An electrolysis emitter system according to claim 50 wherein the housing has a side arm positioned at a transverse angle relative to the tubular flow axis and the electrodes are located in the side arm.
53. (New) An electrolysis emitter system according to claim 52 wherein the side arm contains a multiple number of anode and cathode electrodes and the electrodes are plate shaped.
54. (New) An electrolysis emitter system according to claim 50 wherein the water flow is up to about 12 gallons per minute.

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55. (New) A method for producing an oxygenated aqueous composition comprising:

flowing water through an electrolysis emitter system comprising:

a power source, an anode electrode and a cathode electrodes contained in a tubular housing, wherein:

the anode electrode is separated at a critical distance from the cathode electrode by a nonconductive spacer maintaining the separation of the electrodes such that the critical distance is from 0.005 inches to 0.140 inches;

the power source is in electrical communication with the electrodes, produces a voltage of a maximum of about 28.3 volts and a maximum amperage of about 13 amps,

the tubular housing has an inlet and an outlet and a tubular flow axis from the inlet to the outlet;

the water flows in the inlet, out the outlet, is in fluid connection with the electrodes, has a conductivity produced by a maximum of about 2000 ppm total dissolved solids;

the combination of the critical distance, the voltage, amperage and the water conductivity results in the formation of a suspension comprising oxygen nanobubbles in the water, the nanobubbles having a bubble diameter of less than 0.0006 inches and the nanobubbles being incapable of breaking the surface tension of the water so that the suspension remains at least in part for a period of up to several hours.

56. (New) A method according to claim 55 wherein the housing contains at least one anode and at least one cathode, the electrodes are tubular, are of a grid or solid design and are relatively positioned one inside the other with their long axes substantially parallel to the tubular flow axis of the housing.

57. (New) A method according to claim 55 wherein the housing has a side arm positioned at an angle relative to the tubular flow axis and the electrodes are located in the side arm.

58. (New) A method according to claim 57 wherein the side arm contains a multiple number of anode and cathode electrodes and the electrodes are plate shaped.

59. (New) A method according to claim 55 wherein the water flow is up to about 12 gallons per minute

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60. (New) A suspension of nanobubbles of oxygen in water which is suitable as an aqueous oxygenation composition, the suspension being produced by flowing water through an electrolysis emitter system comprising a power source, an anode electrode and a cathode electrode contained in a tubular housing, wherein:

the anode electrode is separated at a critical distance from the cathode electrode by a nonconductive spacer maintaining the separation of the electrodes such that the critical distance is from 0.005 inches to 0.140 inches;

the power source is in electrical communication with the electrodes, produces a voltage of a maximum of about 28.3 volts and a maximum amperage of about 13 amps,

the tubular housing has an inlet and an outlet and a tubular flow axis from the inlet to the outlet; the water flows in the inlet, out the outlet, is in fluid connection with the electrodes, has a conductivity produced by a maximum of about 2000 ppm total dissolved solids;

the combination of the critical distance, the voltage, amperage and the water conductivity results in the formation of the suspension comprising oxygen nanobubbles in the water, the nanobubbles having a bubble diameter of less than 0.0006 inches and the nanobubbles being incapable of breaking the surface tension of the water so that the suspension remains at least in part for a period of up to several hours.

61. (New) A suspension according to claim 60 wherein the housing contains at least one anode and at least one cathode, the electrodes are tubular, are of a grid or solid design and are relatively positioned one inside the other with their long axes substantially parallel to the tubular flow axis of the housing.

62. (New) A suspension according to claim 60 wherein the housing has a side arm positioned at an angle relative to the tubular flow axis and the electrodes are located in the side arm.

63. (New) A suspension according to claim 62 wherein the side arm contains a multiple number of anode and cathode electrodes and the electrodes are plate shaped.

64. (New) A suspension according to claim 60 wherein the water flow is up to about 12 gallons per minute.

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65. (New) An emitter system according to claim 50 wherein the water has a temperature no greater than about ambient temperature at the inlet and the water temperature is a factor for formation of the suspension.

66. (New) A method according to claim 55 wherein the water has a temperature no greater than about ambient temperature at the inlet and the water temperature is a factor for formation of the suspension.

67. (New) A suspension according to claim 60 wherein the water has a temperature no greater than about ambient temperature at the inlet and the water temperature is a factor for formation of the suspension.

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**REMARKS**

Applicant presents this amendment for his reissue application in response to the Action issued March 6, 2013 and discussions with Examiner Allen during an in-person interview with the undersigned attorney on May 16, 2013. The undersigned attorney thanks Examiner Allen for his very helpful comments and for extending the time to conduct the in-person interview.

During the interview, Examiner Allen discussed the field of art relating to electrolysis devices. Examiner Allen stated that generally such devices are well-known in the art. He said that the pending claims of the current re-issue application should address how to distinguish electrolysis disclosed in the art. The distinction could be based upon the character of the oxygenated water produced and the features that produce that character as described in the specification. Incorporation of such features and product characteristics will facilitate advancing the prosecution of the application according to Examiner Allen.

Pursuant to these suggestions and comments by Examiner Allen, Applicant has incorporated a water requirement into the emitter claims thus describing an emitter system. The system includes the characteristics of the oxygenated water with nanobubbles of oxygen. Applicant has also presented method and suspension claims that incorporate these suggestions and comments. The details are set forth in the claims and explained in these remarks.

*The Claims and Their Support*

Original claims 1-12 and new claims 50-67 are pending in this application. Claims 13-40 have been cancelled.

No new matter is added by the amendments to claim 2 or by the new claims 50-67. The amendments to claim 2 are supported throughout the specification. Specifically, the added terms of claim 2 are supported by the following column and line numbers delineated as column: lines, e.g., for column 2, lines 64-65 the delineation is 2:64-65:

1. Nanobubbles – 2:64-65;
2. Spacer providing the critical distance of 0.005 to 0.140 inches – 3:11-13, 4:1-3, 5:4-8;
3. Power source voltage and amperage – 9:35-45 (Table III);
4. Tap water – 3:25 (watering hose);
5. Tap water in fluid communication with the emitter – 3:27-29 (anode and cathode contacting the water flow);

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6. Nanobubbles being incapable of breaking the surface tension of the aqueous medium – 4:12-13;
  7. Nanobubbles remain in tap water at least in part for a period up to several hours – 4:30-37.

The new claims 50-67 also do not add new matter. The independent claims reciting an emitter system (claim 50), method for producing a composition (claim 55) and a suspension of nanobubbles (claim 60) all contain the same parameters describing the water conductivity, the electrodes, the voltage, amperage, nanobubbles, arrangement of electrodes within the tubular housing. Support for these features is provided by the specification as follows:

1. Electrolysis emitter system including water – 2:63-67, 3:24-29;
2. Nanobubbles of oxygen in water – 2:63-67, 4:12-15;
3. Electrodes in a tubular housing – 3:26-29; 9:5-11;
4. Inlet and outlet and tubular flow axis from inlet to outlet – 3:24-29;
5. Flowing water – 3:24, 9:6;
6. Anode separated at critical distance from cathode, separation of 0.005 to 0.140 inches – 3:11-14, 6:4-8;
7. Power source of voltage and amperage – 9:35-45;
8. Water contacting electrodes – 3:27-29;
9. Water conductivity – 4:22-26;
10. Critical distance, voltage, amperage, conductivity produces nanobubbles of diameter less than 0.0006 inches and incapable of breaking surface tension so that suspension remains at least in part for a period up to several hours – 2:63-67, 3: 11-14, 4:27-54;
11. Electrodes are tubular, of a grid design, one inside the other with long axes substantially collinear with tubular flow axis – 3:24-31.
12. Electrodes in side arm relative to flow through tube – 3:31-33 (T model);
13. Electrodes are plate shaped – 3:29-31;
14. Water flow up to 12 gallons per minute – 9: 35-45 (Table III);
15. Method for producing an oxygenated aqueous composition – 2:63-67, 3:24-36;
16. Suspension of nanobubbles of oxygen in water – 2:63-67, 4:12-21.

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*Rejection of the claims Under 35 USC §251 and 35 USC §112 First Paragraph*

The PTO rejected now cancelled claims 19, 20, 23-25, 33, 34, 36, 37, 38 and 43-49 as being based upon new matter. Applicant replies that these claims have been cancelled in favor of new claims 50-67. Therefore, this rejection is moot as it relates to these claims.

The reason for the new matter rejection bears discussion, however. The basis for this rejection is alleged to be the failure of the specification to disclose the anode and cathode sets are disposed inside each other or wherein the anodes and cathodes are concentric. Examiner Allen explained during the interview that the term “sets” in combination with the term “concentric” suggested a series of tube shaped electrodes of decreasing diameters so that the smallest diameter electrode is surrounded by the electrode of next larger diameter and this nesting continues with larger and larger diameter electrodes. Examiner Allen explained that this nesting of multiple electrodes was not supported by the specification but he did not have an objection to a description of an individual electrode as tubular.

In response, Applicant’s attorney explained that the description at 3:24-29 characterizes a tubular electrode with an anode being positioned toward the outside of the flow-through model housing and the cathode being positioned on the inside. This passage necessarily infers that both electrodes are inside the housing because both must be in contact with water flowing through the flow-through housing. Moreover, the anode and cathode are to be separated by the critical distance which means that they cannot be randomly placed inside the housing. These features place one tubular electrode inside the other and space them apart in a relative spatial relationship determined by the critical distance. In other words, the smaller diameter electrode will fit inside the larger diameter electrode with the relative internal separation between the two being the critical distance.

In clarification of this characterization, Applicant has recited such an electrode arrangement in claims 51, 56 and 61 in which the two electrodes are placed one inside the other, the space between them being the critical distance of separation and their long axes substantially parallel to the tubular flow axis of the emitter housing. Applicant respectfully submits that this arrangement is supported by the specification and that the “new matter” rejection of the cancelled claims ought not to be applied to these new claims.

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*Second Rejection of Claims Under 35 USC §112, Second Paragraph*

The PTO rejected claims 29 and 39 under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite. The PTO stated that these these claims failed to recite a feature of the apparatus that results in generation of microbubbles.

In response, Applicant states that the currently pending claims now recite water as a positive feature of the emitter system and recite the combination of emitter system factors needed to achieve a suspension of micro bubbles and nanobubbles in the water. Applicant respectfully submits that his new claims are not indefinite in regard to this issue.

*The Rejection of Claims under 35 U.S.C. §102 and §103 in View of Murrell*

The PTO has rejected claims 2, 3, 5, 7, 9, 10, 13-17, 21, 22, 26, 27, 29-32, 35, and 39-42 under 35 U.S.C. 102(b) as being anticipated by Murrell (U.S. Patent No. 5,049,252) and has rejected claims 6, 12 and 18 as obvious under 35 U.S.C. §103 over Murrell. .

Applicant responds that as to claims 13-17, 21, 22, 26, 29-32 and 39-42, the anticipation rejection is moot. These claims are cancelled.

In regard to the pending claims, the PTO has asserted that the Murrell device including electrodes and a power source used for electrolysis of water seems to be a device similar to that of Applicant. The PTO comments that generation of microbubbles that are incapable of breaking surface tension is a function of flow rates, temperature, liquid viscosity, voltage and current as well as electrode spacing. This comment follows the Examiner's discussion during the interview that electrolysis devices are well known. To distinguish from prior art electrolysis devices, the Examiner suggested that the pending claims should incorporate features for production of the microbubbles that are incapable of breaking water surface tension.

Applicant responds that the new claims provide these features. The new claims are directed to an emitter system that affirmatively incorporates water and nanobubbles suspended in the water, to a method of producing the suspension of nanobubbles in water and to such a suspension. Hence, the water and microbubbles/nanobubbles of oxygen suspended in the water are positively recited features of a system, a method and a suspension. In addition, the voltage, amperage, the separation of the electrode spacing, and the total solids in the water signifying viscosity and conductivity of the water, which can be summed by the phrase tap water, are positively recited features of this system. These features achieve the suspension of nanobubbles in water.



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Murrell discloses an electrolysis apparatus that produces a flocculation result. Murrell's electrolysis produces large bubbles designed to rise to the surface of the electrolyzed water. The large bubbles cause contaminants in the water to form a floc and float to the surface of the water. Because Applicant's system, method and suspension concern production of microbubbles and nanobubbles that do not break water surface tension and do not rise to the water surface over a significant period of time, Applicant's system, method and suspension are not taught or suggested by Murrell.

Murrell describes his system as an apparatus and method of treating water for separation and removal of contaminants. He states that his method comprises:

The steps of: introducing a quantity of untreated water into a container; passing DC or rectified AC electricity through the water by way of vertically arranged aluminum electrodes so as to treat the water causing at least some of the contaminants to rise; removing at least part of the water contaminants from the surface of the water; and removing at least part of the treated water.  
Murrell, 1:58-65.

Murrell provides further detail in his Detailed Description:

Fig 3 shows the progress as time progresses with a dense material of coagulated contaminant deposits forming in a layer 12 on top of the water, which is a combination of fine gas bubbles and most of the contaminants including heavy contaminants. This layer 12 is formed by the action of extremely small gas bubbles attracting the contaminants and forming a floc, then floating to the surface because of gas content.  
Murrell, 4:66 – 5:5.

Murrell does not teach the size of his gas bubbles. He only says they rise to the surface. However, this distinction is more than sufficient to show that Applicant's system, method and suspension significantly differ from Murrell's teaching. Applicant's system, method and suspension produce microbubbles and nanobubbles of oxygen that remain suspended in water at least in part for a period up to several hours. This phenomenon is achieved because the bubbles are so small that they are incapable of breaking the surface tension of the water. In contrast, Murrell's bubbles rise to the surface. This action means that his bubbles are relatively large and, as Murrell states, "float to the surface." Murrell's gas bubbles break the surface tension of the water.

Murrell achieves gas bubble production by electrolysis of water. As pointed out by the Examiner during the interview, the general phenomenon of water electrolysis is not novel to Applicant, or to Murrell. Instead, details are important for differentiation of various electrolysis techniques. Thus, Murrell teaches that to produce gas bubbles that will flocculate contaminants and float to the surface of water. He uses a power source

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with electrodes having a spacing of around 23 millimeters or about one inch. He teaches generally that the power delivered to the electrodes and the electrode spacing may be varied to achieve the desired result and will also depend upon the conductivity of the water. Murrell, 4:13-43. The desired result is key for Murrell. This result is the production of gas bubbles that rise to the surface of the water, in other words that break the water surface tension.

Applicant's system, method and suspension are the opposite. Applicant's micro and nanobubbles do not rise to the surface and do not break water surface tension. Applicant's claims now recite the conditions needed to produce this result, including voltage, amperage, total water solids indicating conductivity, and the electrode spacing. In particular, Applicant's electrode spacing is significantly smaller than the one inch spacing of Murrell. As Applicant states:

Above that thickness (0.0140 inches), the power needs are higher and the oxygen bubbles formed at a higher voltage will coalesce and escape the fluid.  
Reissue patent - 5:4-10

In other words, higher voltages and higher electrode separations cause larger bubbles that will rise to the surface like Murrell's development.

Thus, Murrell does not teach or suggest Applicant's claimed system, method or suspension. In fact, Murrell leads away from Applicant's claimed system, method and suspension because Murrell teaches an apparatus and method that achieve a result diametrically opposed to Applicant's claimed invention. These diametrically opposed results are:

Murrell's development produces bubbles rising to the surface and breaking water surface tension; and  
Applicant's invention produces a suspension of nanobubbles that do not rise to the surface and do not break the water surface tension.

Applicant respectfully submits therefore that his pending claims as amended and his new claims as presently presented are not anticipated or rendered obvious by Murrell. Applicant respectfully requests that the anticipation rejection and obviousness rejection over Murrell be withdrawn.

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*The Rejection of Claims under 35 U.S.C. §103 Over a Combination of References*

The PTO has rejected certain pending claims under 35 U.S.C. 103(a) as being unpatentable over Murrell<sup>1</sup> as applied above further in view of Kondo (U.S. Publication No. 2003/0091469) (claim 4) .

The PTO has also rejected claims 11, 19, 20, 23-25, 28, 33, 34, 36, 37, and 38 under 35 U.S.C. 103(a) as being unpatentable over Murrell (U.S. Patent No. 5,049,252) further in view of Field (U.S. Publication 2007/0187262).

The rejection based upon Murrell and Kondo uses Murrell as the primary reference. Kondo is cited only as a teaching of electrolysis anodes of platinum and iridium oxide. However, Kondo does not correct the deficiencies of Murrell as discussed above, nor does Kondo teach or suggest producing micro and nanobubbles of oxygen that do not break the surface tension of water in which the micro and nanobubbles are suspended. Applicant therefore respectfully submits that his pending claims as amended and his new claims are patentable over Murrell in view of Kondo.

With regard to the obviousness rejection based upon Murrell and Field, Applicant points out that Field is not a properly cited reference. Field's earliest filing date is the date of provisional application No 60/772,104, February 10, 2006. Even assuming *arguendo* that the continuation-in-part status of Applicant's grandparent patent, U.S Patent No. 6,689,262, does not fully support for Applicant's presently pending claims<sup>2</sup>, Applicant's present application (SN13/247,241) is a reissue of US Patent No. 7,670,495 which in turn is a divisional of US patent No. 7,396,441 filed December 10, 2003. Consequently, the priority date of this reissue application is at least December 10, 2003 or some two and one-half years prior to the earliest filing date of the Field patent application. For this reason, the Field patent application does not qualify as proper prior art against the presently pending claims.

Applicant respectfully submits that citation of Field does not meet the requirements for properly citable prior art and Murrell does not teach or suggest Applicant's pending claims as discussed above.

Applicant respectfully requests that these obviousness rejections be withdrawn.

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1 The PTO action refers to Muller in these §103 rejections and mentions US 5,049,252. Consequently, it is believed that the reference to Muller is meant to be a reference to Murrell.

2 Applicant states, however, that his grandparent patent US 6,689,262 does provide full support for the presently pending claims.

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**CONCLUSION**

Applicant states that 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 respectfully submits that the previously pending claims as amended and new claims as presented are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's representative at (612) 373-6939 to facilitate prosecution of this application.

If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.

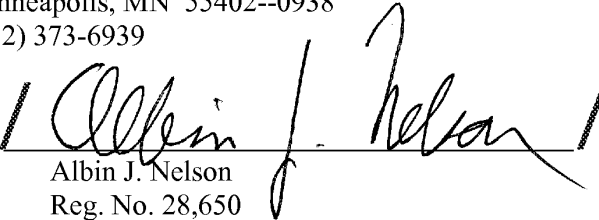
P.O. Box 2938

Minneapolis, MN 55402--0938

(612) 373-6939

Date July 8, 2013

By



Albin J. Nelson  
Reg. No. 28,650

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13247241				
<b>Filing Date:</b>	28-Sep-2011				
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR				
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw				
<b>Filer:</b>	James Lee Shands/Chris Bartl				
<b>Attorney Docket Number:</b>	3406.005USR				
Filed as Small Entity					
<b>Utility under 35 USC 111(a) Filing Fees</b>					
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>	
<b>Basic Filing:</b>					
<b>Pages:</b>					
<b>Claims:</b>					
<b>Miscellaneous-Filing:</b>					
<b>Petition:</b>					
<b>Patent-Appeals-and-Interference:</b>					
<b>Post-Allowance-and-Post-Issuance:</b>					
<b>Extension-of-Time:</b>					
Extension - 1 month with \$0 paid	201 2251	1	100	100	

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>100</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	16254136
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	James Lee Shands/Chris Bartl
<b>Filer Authorized By:</b>	James Lee Shands
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	08-JUL-2013
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	16:46:55
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$100
RAM confirmation Number	4073
Deposit Account	190743
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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203

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)  
 Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)  
 Charge any Additional Fees required under 37 C.F.R. Section 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		3406005USR-OA-RESP-07-08-13.pdf	340345 <small>66f81df94cbb4ed941a0b586196a438b4ad28d26</small>	yes	17
<b>Multipart Description/PDF files in .zip description</b>					
	<b>Document Description</b>		<b>Start</b>		<b>End</b>
	Miscellaneous Incoming Letter		1		1
	Extension of Time		2		2
	Amendment/Req. Reconsideration-After Non-Final Reject		3		3
	Claims		4		9
	Applicant Arguments/Remarks Made in an Amendment		10		17
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (SB06)	fee-info.pdf	30132 <small>37defb57f2e7727f3fd68e7ea69ab077bd7a7dc6</small>	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			370477		



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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

Applicant: James Andrew Senkiw

Title: Re-issue of U.S. Patent No. 7,670,495

Docket No.: 3406.005USR  
Filed: September 28, 2011  
Examiner: Cameron Allen  
Customer No.: 21186

Serial No.: 13/247,241  
Due Date: July 6, 2013 (Saturday)  
Group Art Unit: 1774  
Confirmation No.: 1737

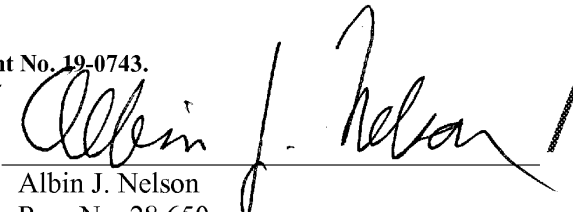
Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

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

- Amendment and Response under 37 C.F.R. § 1.111 (15 pgs.)
- Petition for Extension of Time (1 pg.)
- Authorization to charge Deposit Account 19-0743 in the amount of \$100.00 to cover the Extension of Time Fee.**

**Please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

By:   
Albin J. Nelson  
Reg. No. 28,650

S/N 13/247,241

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	James Andrew Senkiw	Examiner:	Cameron Allen
Serial No.:	13/247,241	Group Art Unit:	1774
Filed:	September 28, 2011	Docket:	3406.005USR
Customer No.:	21186	Confirmation No.:	1737
Title:	Re-issue of U.S. Patent No. 7,670,495		

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PETITION FOR A ONE-MONTH EXTENSION OF TIME

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

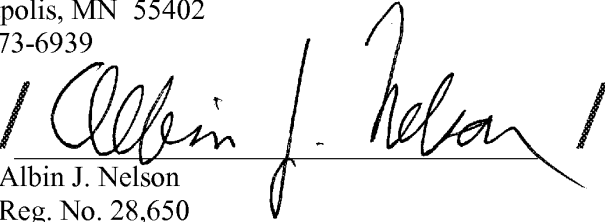
In accordance with the provision of 37 C.F.R § 1.136(a), it is respectfully requested that a one-month extension of time be granted in which to respond to the Non-Final Office Action mailed March 6, 2013, said period of response being extended from June 6, 2013 to July 6, 2013 (Saturday).

**Please charge Deposit Account No. 19-0743 in the amount of \$100.00 to cover the required extension fee. Please charge any additional fees or credit overpayment to deposit Account No. 19-0743.**

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(612) 373-6939

Date July 8, 2013

By   
Albin J. Nelson  
Reg. No. 28,650

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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>13/247,241</b>	Filing Date <b>09/28/2011</b>	<input type="checkbox"/> To be Mailed
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ENTITY:  LARGE  SMALL  MICRO

**APPLICATION AS FILED – PART I**

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> 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 \$ =	
<input type="checkbox"/> 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).			
<input type="checkbox"/> 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**

	(Column 1)	(Column 2)	(Column 3)	RATE (\$)	ADDITIONAL FEE (\$)	
<b>AMENDMENT</b>	<b>07/08/2013</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total (37 CFR 1.16(i))	* 30	Minus	** 87	= 0	X \$40 = 0
	Independent (37 CFR 1.16(h))	* 5	Minus	***5	= 0	X \$210 = 0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
			TOTAL ADD'L FEE	<b>0</b>		

	(Column 1)	(Column 2)	(Column 3)	RATE (\$)	ADDITIONAL FEE (\$)	
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> 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  
 /PARTHENIA D. MERRILL/

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.
13/247,241	09/28/2011	James Andrew Senkiw	3406.005USR	1737
21186	7590	05/23/2013	EXAMINER	
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.			ALLEN, CAMERON J	
P.O. BOX 2938			ART UNIT	PAPER NUMBER
MINNEAPOLIS, MN 55402			1774	
			NOTIFICATION DATE	DELIVERY MODE
			05/23/2013	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

<b>Applicant-Initiated Interview Summary</b>	<b>Application No.</b> 13/247,241	<b>Applicant(s)</b> SENKIW, JAMES ANDREW	
	<b>Examiner</b> CAMERON J. ALLEN	<b>Art Unit</b> 1774	

All participants (applicant, applicant's representative, PTO personnel):

(1) CAMERON J. ALLEN. (3)\_\_\_\_\_.

(2) Albin Nelson. (4)\_\_\_\_\_.

Date of Interview: 16 May 2013.

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: 1-49.

Identification of prior art discussed: Murrell Paten 5,049,252.

**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...)

The applicant has requested an interview to determine how to overcome the prior art. Currently the claims are drawn to an apparatus. Applicant has been advised that more structure is needed to overcome the art of record. The Examiner is unable to suggest structural changes from the instant specification that can be added at this time. It is unclear to the Examiner if these changes exist in the instant specification. Applicant is advised that structure added to the instant claims, supported by the instant specification, and not disclosed by the art of record, would help overcome the current rejections and further prosecution.

**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

/Joseph W. Drodge/ Primary Examiner, Art Unit 1778	
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## 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.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/247,241	09/28/2011	James Andrew Senkiw	3406.005USR	1737

21186 7590 03/06/2013  
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. BOX 2938  
MINNEAPOLIS, MN 55402

EXAMINER
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ALLEN, CAMERON J

ART UNIT	PAPER NUMBER
1774	

NOTIFICATION DATE	DELIVERY MODE
03/06/2013	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



<b>Office Action Summary</b>	<b>Application No.</b> 13/247,241	<b>Applicant(s)</b> SENKIW, JAMES ANDREW	
	<b>Examiner</b> CAMERON J. ALLEN	<b>Art Unit</b> 1774	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 28 September 2011.
- 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) 1-49 is/are pending in the application.  
5a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 6)  Claim(s) 1 is/are allowed.
- 7)  Claim(s) 2-7 and 9-49 is/are rejected.
- 8)  Claim(s) 8 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](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

**Application Papers**

- 10)  The specification is objected to by the Examiner.
- 11)  The drawing(s) filed on 28 September 2011 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).  
a)  All    b)  Some \* c)  None of:  
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/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 3)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4)  Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 251***

Claims 19, 20, 23-25, 33, 34, 36, 37, 38 and 43-49 are rejected under 35 U.S.C. 251 as being based upon new matter added to the patent for which reissue is sought. The added material which is not supported by the prior patent is as follows:

The specification does not disclose wherein the anode and cathode sets are disposed inside each other or wherein the anodes and cathodes are concentric.

***Claim Rejections - 35 USC § 112***

The following is a quotation 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 35 U.S.C. 112 (pre-AIA), first paragraph:  
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.

Claims 19, 20, 23-25, 33, 34, 36, 37, 38 and 43-49 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 applicant does not point out support for the amendments and some limitations cannot be found in the original specification. Specifically, the specification does not disclose wherein the anode and cathode sets are disposed inside each other or wherein the anodes and cathodes are concentric. Therefore the claims have been amended to contain new matter.

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.

Claims 29 and 39 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 claims fail to further limit the claim by providing a structural difference from the claim from which it depends. Generation of micro-bubbles which are incapable of breaking surface tension of an aqueous medium is not positively

recited structure in the apparatus claims and therefore makes the claims indefinite.

Claims 2 and 7 recite the term "critical distance" which fails to narrow the claim in any way and is vague and therefore indefinite. It is unclear what the critical distance is intended to achieve or its intended function of the emitter. Therefore it is impossible to determine the scope of the claims and the claims is therefore indefinite.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 2, 3, 5, 7, 9, 10, 13- 17, 21, 22, 26, 27, 29- 32, 35, and 39-42, are rejected under 35 U.S.C. 102(b) as being anticipated by Murrell U.S. Patent 5,049,252.

With respect to claims 2, 3, 5, 7, 13, 16, 17, 21, 22, 26, 27, 29, 30, 32, 35, and 39-42 the Murrell reference seems to disclose (Claim 1) a device and a method of using the device wherein a flow is introduced that contains electrodes (anode and cathode 104 and 103 and 101) that form a grid pattern separated by a distance of 23mm or .09 inches (Column 7 line 53- column 8 line 2 and Figure 5a) made from the metal aluminum (relevant to claim 21) (Column 5 lines 55-

68). The electrodes may be in the form of, rods, tubes, mesh or net connected to a power source (Column 6 lines 21-29). It produces micro bubbles of oxygen. Murrell indicates that electrode number, spacing, surface area, form, material of construction, configuration, and voltage and current output as well as conductivity of the water being treated all may vary widely (column 5, lines 56-62, column 4, lines 8-15, etc.). The reference further discloses the use of insulating spacer 112 and washer 114 (Column 10 lines 8-28 relevant for claim 16).

Generation of micro-bubbles which are incapable of breaking surface tension of an aqueous medium is not positively recited structure in the apparatus claim and would be a function of flow rates, temperatures, liquid viscosity, voltage or current output of the electrodes etc., and not just of electrode spacing.

With respect to claims 9 and 10 the claims contain language drawn to inherent results of using the device disclosed above. Therefore the claims are anticipated above. Also the treated water can be city water which is known to have a neutral pH (Column 1 lines 7-13)

With respect to claims 14, 15, and 31, the Muller reference discloses that the shape of the container for the electrodes is unimportant but the shape generally may be square or rectangular or may be an upright cylinder with the electrode 2 being a pipe or similar linear electrode (Column 2 lines 25-32).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Muller as applied above further in view of Kondo U.S. Publication 2003/0091469 A1.

With respect to claim 4, the Muller reference discloses the limitation of claim 2, but does not disclose wherein the anode is platinum and iridium oxide.

The Kondo reference does disclose the use of a water treating device with anodes made of a mixture of platinum and iridium oxide (Paragraph 0056, 0096, and 0136) to enhance the production of chlorine or ozone.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller reference by making the anodes a mixture of platinum and iridium oxide, since it would provide the added benefit and expected result of enhances chlorine and or ozone production.

Claims 6, 12, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muller U.S. Patent 5,049,252.

With respect to claims 6 and 18 the Muller reference discloses (bridge between columns 7 and 8) the electrode spacing is about 20 or 23 mm (approximately 0.07 and 0.09 inches) and further states that the spacing is not critical. The reference also states that the number size and spacing may be varied in order to obtain the most convenient or most efficient conditions. The reference also states closer spacing will increase the amount of current for a specified voltage, or alternatively a lower voltage can be used to maintain a specified current flow (Column 2 lines 22-25).

The reference does not disclose that the spacing is less than about 0.060 inches.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller reference by making the spacing less than about 0.060 inches since the reference discloses spacing adjustment modification would provide the expected result of varying the efficiency of the system.

With respect to claim 12, the Muller reference discloses that the shape of the container for the electrodes is unimportant but the shape generally may be square or rectangular or may be an upright cylinder with the electrode 2 being a pipe or similar linear electrode (Column 2 lines 25-32).

The reference does not disclose that the shape is funnel or pyramidal shaped.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller reference by making the shape funnel or

pyramidal shaped since it is known that the shape is unimportant and would be an obvious matter of design choice.

Claims 11,19, 20, 23-25, 28, 33, 34, 36, 37, and 38 rejected under 35 U.S.C. 103(a) as being unpatentable over Muller U.S. Patent 5,049,252 further in view of Field U.S. Publication 2007/0187262 A1.

With respect to claim 11, the Muller reference discloses the device of claim 2, but does not disclose the use of a timer.

The Field reference does disclose the use of a timer to control the operation (Paragraph 0162 and 0148).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller reference by using the timer to control the process, since the use would provide the added benefit of increased control and less user interaction.

With respect to claims 19, 20, 23-25, 33, 34, 36, 37, 38, and 43-49, the Muller reference discloses a flow through device/method of using the device wherein at least one anode and cathode set is arranged wherein the electrode alternate creating sets wherein the sets are positioned by the walls of the vessel.

The reference does not disclose that the electrode sets are located inside each other, or concentric.

The Field reference discloses (paragraph 0128 and figure 9a) the use of a tubular vessel containing a concentric (inner and outer) electrode with a gap of



0.02 inches for the generation of micro-bubbles therefore making a set of anode and cathodes adjacent the wall of the container and located inside each other.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller reference by making the electrodes concentric, since the use of concentric electrodes is known to solve the problem disclosed in Muller by producing the expected result of the production of micro-bubbles.

With respect to claim 28 the Muller reference does not disclose the use of a control unit that couples the power source and electrodes when water is flowing.

The Field reference does disclose (0154) the use of a similar device that uses a control unit that energizes the pump controlling the flow and the charging of the electrodes.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller reference by using a control circuit to control the pump and electrodes, since the control unit would provide the added benefit of increased control.

With respect to claims 43-49, the Muller reference discloses a method waste with oxygenated water (such as the filth contain in the solution when the solution is oxygenated comprising and a method of using the device wherein a fluid flow is introduced that contains electrodes (anode and cathode 104 and 103 and 101) that form a grid pattern separated by a distance of 23mm or .09 inches (Column 7 line 53- column 8 line 2 and Figure 5a) made from the metal aluminum (relevant to claim 21) (Column 5 lines 55-68). The electrodes may be

in the form of, rods, tubes, mesh or net connected to a power source (Column 6 lines 21-29). It produces micro bubbles of oxygen. Murrell indicates that electrode number, spacing, surface area, form, material of construction, configuration, and voltage and current output as well as conductivity of the water being treated all may vary widely (column 5, lines 56-62, column 4, lines 8-15, etc.). The reference further discloses the use of insulating spacer 112 and washer 114 (Column 10 lines 8-28 relevant for claim 16).

The reference does not disclose that the electrode sets are located inside each other, or concentric.

The Field reference discloses (paragraph 0128 and figure 9a) the use of a tubular vessel containing a concentric (inner and outer) electrode with a gap of 0.02 inches for the generation of micro-bubbles therefore making a set of anode and cathodes adjacent the wall of the container and located inside each other.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Muller reference by making the electrodes concentric, since the use of concentric electrodes is known to solve the problem disclosed in Muller by producing the expected result of the production of micro-bubbles.

Generation of microbubbles which are incapable of breaking surface tension of an aqueous medium is not positively recited structure in the apparatus claim and would be a function of flow rates, temperatures, liquid viscosity, voltage or current output of the electrodes etc., and not just of electrode spacing.

***Allowable Subject Matter***

Claim 1 is allowed. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose the method step of placing the emitting device in the fluid to be treated. It discloses flowing the fluid through the device using a pie system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAMERON J. ALLEN whose telephone number is (571)270-3164. The examiner can normally be reached on M-Th 9-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Griffin Walter can be reached on 571-272-1447. 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.

CJA  
1/16/2013

/Joseph W. Drodge/

Primary Examiner, Art Unit 1778

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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L6	3	("2007/0187261").URPN.	USPAT	ADJ	ON	2013/01/17 11:14
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L16	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and L15	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 11:59
L17	0	("2007/0284245").URPN.	USPAT	ADJ	ON	2013/01/17 12:08
L18	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and L15	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:08
L19	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and L15	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 12:09
L20	1178	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) and L15	US-PGPUB;	ADJ	ON	2013/01/17 12:09

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT			
L21	751	(pyramid\$2 or triang\$5 or funnel or conical or cone) with(anode or cathode or electrode) and L15	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 12:10
L22	1	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and L15	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 12:11
L23	101	(pyramid\$2 or triang\$5 or funnel or conical or cone) same(anode or cathode or electrode) same (oxygen) and L15	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 12:11
L24	0	(platinum same (iridium with oxide)) same(anode or cathode or electrode) same (oxygen) and L15	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 12:39
L25	0	(platinum same (iridium with oxide)) same(anode or cathode or electrode) and L15	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 12:39
L26	38	(platinum same (iridium with oxide)) same(anode or cathode or electrode) same (oxygen) and L15	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17: 12:39
S1	1255	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10: 12:45
S2	28341	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2).ocls.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10: 13:32
S3	83	(anode or cathode or electrode) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S2	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2012/12/10: 13:33
S4	6	"7670495"	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 11:48
S5	28493	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2).ocls.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 12:37
S6	48	(anode or cathode or electrode) same (inch or in or "in.") same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S5	US- PGPUB;	ADJ	ON	2013/01/14: 12:37



			USPAT; USOCR; FPRS; EPO; JPO; DERWENT			
S7	6	"10372017"	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 12:51
S8	15	("20020074237"   "4225401"   "4252856"   "4587001"   "5015354"   "5534143"   "5982609"   "6171469"   "6315886"   "6328875"   "6394429"   "6689262").PN. OR ("7396441").URPN.	US- PGPUB; USPAT; USOCR	ADJ	ON	2013/01/14: 12:52
S9	12	(anode or cathode or electrode)same (inch or "in.") same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S5	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:02
S10	110	(anode or cathode or electrode)same (inch or "in.") same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:04
S11	0	("2007/0284245").URPN.	USPAT	ADJ	ON	2013/01/14: 13:06
S12	3	("2007/0187262").URPN.	USPAT	ADJ	ON	2013/01/14: 13:07
S13	1628	(anode or cathode or electrode)same (inch or "in.") and S5	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:12
S14	28994	(210/739,746,748,01,748,16,748,15,748,17,748,19,749,757 or 422/22,27,28,129,186,186,04,186,03,186,07,186,01,186,1,186,15,186,16,186,21,616,243,305,308 or 204/155,157,15,157,5,164,176,178,450,554,193,194,260,272,280,277,278,5,287,288,288,1,288,2,230,2 or 205/701 or 22/192,321,7,1).ocls.	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:12
S15	1690	(anode or cathode or electrode)same (inch or "in.") and S14	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:12
S16	20	(anode or cathode or electrode)same (inch or "in.") same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:13
S17	32	(anode or cathode or electrode)same (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:16
S18	35	(anode or cathode or electrode)same6 (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:23
S19	10	(anode or cathode or electrode)same6 (inch or "in." or mm or cm) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S14	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/14: 13:23

S20	29002	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321,7,1).ocls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15:15:17
S21	12	(anode or cathode or electrode)same6 (inch or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15:15:17
S22	12	(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/15:15:19
S23	39	("3404088"   "3479281"   "3562137"   "3619391"   "3783114"   "3816274"   "3816275"   "3817865"   "3853736"   "3898150"   "3904521"   "3920530"   "3925203"   "3944478"   "3975269"   "4012319"   "4075076"   "4189381"   "4197180"   "4202767"   "4294697"   "4311595"   "4623436"   "Re26329").PN. OR ("5049252").URFN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2013/01/15:15:43
S24	6	"7670495"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/16:07:44
S25	3	"20070102371"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/16:09:48
S26	29011	(210/739,746,748.01,748.16,748.15,748.17,748.19,749,757 or 422/22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308 or 204/155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2 or 205/701 or 22/192,321,7,1).ocls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17:08:32
S27	3	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen and S26	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17:08:32
S28	8	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) same oxygen	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17:08:33
S29	105	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17:08:40
S30	14	(inner or outer or inside or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3)) and S26	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17:08:41
S31	83	(inner or outer or concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17:08:44
S32	2	(concentric) same(anode or cathode or electrode)same6 (inch\$2 or "in." or mm or cm or gap) same (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US-PGPUB; USPAT;	ADJ	ON	2013/01/17:08:44

			USOCR; FPRS; EPO; JPO; DERWENT			
S33	2	(concentric) same6 (anode or cathode or electrode) same6 (inch\$2 or "in." or mm or cm or gap) same6 (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:47
S34	2	(concentric) same6 (anode or cathode or electrode) same6 (inch\$2 or "in." or mm or cm or gap) same6 (((micro or nano) same (bubbl\$3)) or (micro\$bubbl\$3 or nano\$bubbl\$3))	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2013/01/17 08:47

1/17/2013 1:08:35 PM

C:\Users\callen\Documents\EAST\Workspaces\13247241.wsp




## UNITED STATES PATENT AND TRADEMARK OFFICE

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## BIB DATA SHEET

CONFIRMATION NO. 1737

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
13/247,241	09/28/2011	210	1774	3406.005USR		
<b>APPLICANTS</b> James Andrew Senkiw, Minneapolis, MN;						
<b>** CONTINUING DATA *****</b> This application is a REI of 12/023,431 01/31/2008 PAT 7,670,495 which is a DIV of 10/732,326 12/10/2003 PAT 7,396,441 which is a CIP of 10/372,017 02/21/2003 PAT 6,689,262 which claims benefit of 60/358,534 02/22/2002						
<b>** FOREIGN APPLICATIONS *****</b>						
<b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY **</b>						
Foreign Priority claimed 35 USC 119(a-d) conditions met Verified and Acknowledged	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No /CAMERON J ALLEN/ Examiner's Signature	<input type="checkbox"/> Met after Allowance Initials	<b>STATE OR COUNTRY</b> MN	<b>SHEETS DRAWINGS</b> 8	<b>TOTAL CLAIMS</b> 65	<b>INDEPENDENT CLAIMS</b> 5
<b>ADDRESS</b> SCHWEGMAN, LUNDBERG & WOESSNER, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402 UNITED STATES						
<b>TITLE</b> FLOW-THROUGH OXYGENATOR						
<b>FILING FEE RECEIVED</b> 3135	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit			

<b>Search Notes</b>  	<b>Application/Control No.</b>  13247241	<b>Applicant(s)/Patent Under Reexamination</b>  SENKIW, JAMES ANDREW
	<b>Examiner</b>  CAMERON J ALLEN	<b>Art Unit</b>  1774

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
210	739,746,748.01,748.16,748.15,748.17,748.19,749,757	1/16/2013	CA
422	22,27,28,129,186,186.04,186.03,186.07,186.01,186.1,186.15,186.16,186.21,616,243,305,308	1/16/2013	CA
204	155,157.15,157.5,164,176,178,450,554,193,194,260,272,280,277,278.5,287,288,288.1,288.2,230.2	1/16/2013	CA
205	701	1/16/2013	CA
22	192,321.7,1	1/17/2013	CA

SEARCH NOTES		
Search Notes	Date	Examiner
Google Search	1/16/2013	CA
See East Search History	1/16/2013	CA
Primary Joseph Drodge (General Assistance)	1/16/2013	CA
Inventor Search	1/16/2013	CA

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	See East Search	1/16/2013	CA

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**S/N 13/247,241**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant:	James Andrew Senkiw	Examiner:	Unknown
Serial No.:	13/247,241	Group Art Unit:	1797
Filed:	September 28, 2011	Docket No.:	3406.005USR
Customer No.:	21186	Confirmation No.:	1737
Title:	Re-issue of U.S. Patent No. 7,670,495		

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**SPECIAL STATUS UNDER MPEP SECTION 1442**

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

This application constitutes a re-issue of U.S. Patent No. 7,670,495. This re-issue application was filed September 28, 2011.

According to private communications between the paralegal for the undersigned attorney and officials at the U.S. PTO, this re-issue application was classified as secret under M.P.E.P §120, secrecy order. As a result, information about this application under public and private PAIR was not available. Only after several discussions between this law firm and officials of the PTO did the PTO realize that the secrecy classification of this re-issue application was in error. Those discussions are marked under PTO case no. 1-215326741

The gist of the discussion with the PTO was that the subject matter of this re-issue application cannot be secret because the underlying U.S. patent is already in the public record.

Subsequent to the PTO's reclassification of this re-issue application to ordinary re-issue status, this law firm submitted a status inquiry dated June 1, 2012. The PTO response was that a first office action would be issued in 16 months, in other words, on or about October 2013. Another status inquiry recently made through private PAIR confirmed this pendency.

M.P.E.P. §1442 specifies that "all reissue applications are take up 'special' and remain 'special' even through applicant does not respond promptly." The erroneous "secrecy" action

by the PTO, however, has delayed a prompt examination of this re-issue application. In effect, the PTO has not considered this re-issue application to fall under the "special" category for examination. Waiting more than two (2) years for a first office action on a re-issue application that officially is to have "special" status is puzzling to say the least.

Applicant respectfully requests that the PTO make every effort to promptly and speedily examine this re-issue application. Applicant desires to reach a successful conclusion of the examination of this re-issue application so that Applicant can take steps to enforce its re-issued patent. In light of the PTO misjudgment about the secrecy of the subject matter, Applicant asks the PTO to make every effort to rectify the situation. Such efforts can best be demonstrated by affording a prompt, speedy, special-status examination.

#### CONCLUSION

Applicant respectfully requests a speedy examination and submits that the claims are in condition for allowance. Notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's representative at (612) 373-6939 to facilitate prosecution of this application.

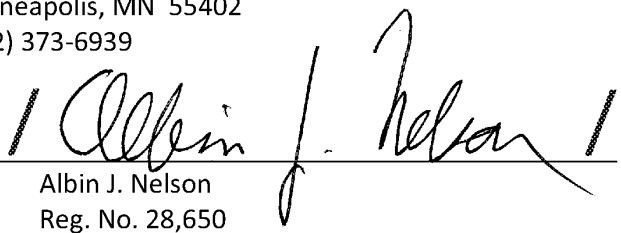
If necessary, please charge any additional fees or credit overpayment to Deposit Account 19-0743.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(612) 373-6939

Date September 26, 2012

By

  
Albin J. Nelson  
Reg. No. 28,650

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	13855088
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Gregory M. Stark/John Gustav-Wrathall
<b>Filer Authorized By:</b>	Gregory M. Stark
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	27-SEP-2012
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	15:14:42
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406005usr_requ_092712.pdf	85701 <small>96cdf1e3b11dc7f756ca5856e19c1f51ba015d03</small>	yes	3



<b>Multipart Description/PDF files in .zip description</b>		
<b>Document Description</b>	<b>Start</b>	<b>End</b>
Miscellaneous Incoming Letter	1	1
Petition for review by the Office of Petitions.	2	3
<b>Warnings:</b>		
<b>Information:</b>		
<b>Total Files Size (in bytes):</b>		85701
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:

Title: Re-issue of U.S. Patent No. 7,670,495

Docket No.: 3406.005USR  
Filed: September 28, 2011  
Examiner: Unknown  
Customer No.: 21186

Serial No.: 13/247,241  
Due Date: N/A  
Group Art Unit: 1797  
Confirmation No.: 1737

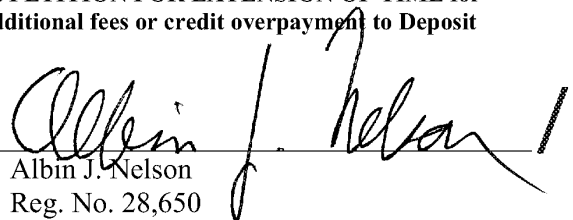
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P.O. Box 1450  
Alexandria, VA 22313-1450

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

Request for Special Status (2 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.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

B/   
Albin J. Nelson  
Reg. No. 28,650

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:

Title: Combined Re-issue/reexam of U.S. Patent No. 7,670,495

Docket No.:	3406.005USR	Serial No.:	13/247,241
Filed:	September 28, 2011	Due Date:	N/A
Examiner:	Unknown	Group Art Unit:	1797
Customer No.:	21186	Confirmation No.:	1737

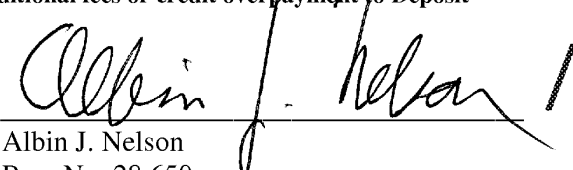
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Status Inquiry (1 pg.)

**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.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
Customer No.: 21186

By:   
Albin J. Nelson  
Reg. No. 28,650

S/N 13/247,241

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Oxygenator Water Technologies, Inc. Examiner: Unknown  
Serial No.: 13/247,241 Group Art Unit: 1797  
Filed: September 28, 2011 Docket: 3406.005USR  
Title: Combined Re-issue/reexam of U.S. Patent No. 7,670,495

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STATUS INQUIRY

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

Dear Sir:

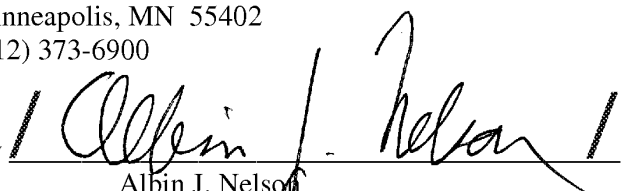
The above-identified patent application was filed on September 28, 2011. Applicant's last communication from the Patent Office was the Filing Receipt dated October 4, 2011.

Kindly inform us as to the status of this application, directing such notice to the attention of the below-signed attorney for Applicants.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(612) 373-6900

Date June 1, 2012

By   
Albin J. Nelson  
Reg. No. 28,660

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	12918532
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Gregory M. Stark/John Gustav-Wrathall
<b>Filer Authorized By:</b>	Gregory M. Stark
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	01-JUN-2012
<b>Filing Date:</b>	28-SEP-2011
<b>Time Stamp:</b>	17:55:19
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406005usr_stat_060112.pdf	66981 <small>dc700db34e5c3c50041fd0bd3e4bb9378 d8e277</small>	yes	2

<b>Multipart Description/PDF files in .zip description</b>			
<b>Document Description</b>		<b>Start</b>	<b>End</b>
Miscellaneous Incoming Letter		1	1
Miscellaneous Incoming Letter		2	2
<b>Warnings:</b>			
<b>Information:</b>			
<b>Total Files Size (in bytes):</b>		66981	
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>			



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

Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/247,241, 09/28/2011, 1797, 2475, 3406.005USR, 65, 5

CONFIRMATION NO. 1737

21186
SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

FILING RECEIPT



Date Mailed: 10/04/2011

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

Applicant(s)

James Andrew Senkiw, Minneapolis, MN;

Assignment For Published Patent Application

Oxygenator Water Technologies, Inc D/B/A Water D.O.G Works, Orono, MN

Power of Attorney: The patent practitioners associated with Customer Number 21186

Domestic Priority data as claimed by applicant

This application is a REI of 12/023,431 01/31/2008 PAT 7,670,495
which is a DIV of 10/732,326 12/10/2003 PAT 7,396,441
which is a CIP of 10/372,017 02/21/2003 PAT 6,689,262
which claims benefit of 60/358,534 02/22/2002

Foreign Applications (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.)

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

**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 (1-866-999-4158).

**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

page 2 of 3



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 Assets Control, 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).

Electronic Patent Application Fee Transmittal				
<b>Application Number:</b>				
<b>Filing Date:</b>				
<b>Title of Invention:</b>		FLOW-THROUGH OXYGENATOR		
<b>First Named Inventor/Applicant Name:</b>		James Andrew Senkiw		
<b>Filer:</b>		Gregory M. Stark/John Gustav-Wrathall		
<b>Attorney Docket Number:</b>		3406.005USR		
Filed as Small Entity				
<b>Reissue (Utility) Filing Fees</b>				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
Utility Reissue Basic	2014	1	190	190
Design and utility Reissue Basic	2114	1	310	310
Design and utility Reissue Basic	2314	1	375	375
<b>Pages:</b>				
<b>Claims:</b>				
Reissue claims in excess of 20 for small	2205	45	30	1350
Independent claims reissue small	2204	2	125	250
Multiple dependent claims	2203	1	225	225

Void date: 09/29/2011 SDIRET01  
09/29/2011 INTEFSW 00001034 190743 13247241  
06 FC:2203 225.00 CR

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Reissue Patent Application of:  
Title: FLOW-THROUGH OXYGENATOR  
Attorney Docket No.: 3406.005USR  
Customer No.: 21186

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**REISSUE PATENT APPLICATION TRANSMITTAL**

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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 - REIS comprising:**

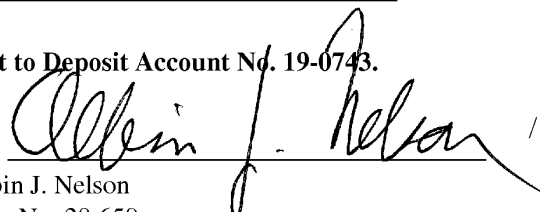
- X Reissue Patent Application Transmittal (PTO/SB/50) (1 pg.)
- X Specification (6 pgs, including claims numbered 1 through 49 and a 1 page Abstract).
- X Drawing(s) (8 sheets).
- X Copy of Certificate of Correction (1 pg.).
- X Signed Reissue Declaration (3 pgs).
- X Signed Power of Attorney (1 pg), Statement Under 37 C.F.R. § 3.73(b)(2 pgs.), Evidence of Ownership (4 pgs).
- X Consent of Assignee of Security Interest to Reissue (6 pgs.).
- X Consent of Assignee to Reissue (6 pgs.).
- X Authorization to charge Deposit Account 19-0743 in the amount of \$2700.00 to pay the filing fee.
- X Preliminary Amendment (17 pgs.).
- X Applicant claims small entity status under 37 CFR 1.27.

The filing fee has been calculated below as follows:

	No. Filed	No. Extra	Rate	Fee
TOTAL CLAIMS	65- 20	45	x \$30.00 =	<b>\$1350.00</b>
INDEPENDENT CLAIMS	5 - 3	2	x \$125.00 =	<b>\$250.00</b>
[X]MULTIPLE DEPENDENT CLAIMS PRESENTED				<b>\$225.00</b>
BASIC FEE				<b>\$190.00</b>
SEARCH FEE				<b>\$310.00</b>
EXAMINATION FEE				<b>\$375.00</b>
	No. of pages (75% for e-filing)	Extra sets of 50 pages	Rate	
APPLICATION SIZE FEE	( 11 - 100) / 50	0	\$155.00	<b>\$0.00</b>
<b>TOTAL</b>				<b>\$2700.00</b>

**Please charge any additional required fees or credit overpayment to Deposit Account No. 19-0743.**

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
Customer Number: 21186

By:   
Albin J. Nelson  
Reg. No. 28,650

Date of Deposit: September 28, 2011

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.

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.

## REISSUE PATENT APPLICATION TRANSMITTAL

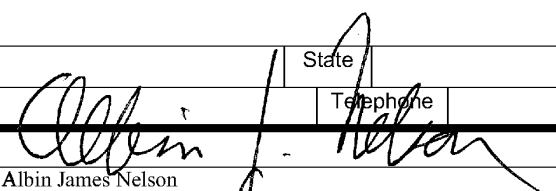
Address to:  <b>Mail Stop Reissue Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450</b>	Attorney Docket No.	3406.005USR
	First Named Inventor	James Andrew Senkiw
	Original Patent Number	7,670,495
	Original Patent Issue Date (Month/Day/Year)	March 2, 2010
	Express Mail Label No.	Submitted via EFS Web

**APPLICATION FOR REISSUE OF:**  Utility Patent  Design Patent  Plant Patent  
*(Check applicable box)*

APPLICATION ELEMENTS (37 CFR 1.173)	ACCOMPANYING APPLICATION PARTS
1. <input type="checkbox"/> Fee Transmittal Form (PTO/SB/56) 2. <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. 3. <input checked="" type="checkbox"/> Specification and Claims in double column copy of patent format <i>(amended, if appropriate)</i> 4. <input checked="" type="checkbox"/> Drawing(s) <i>(proposed amendments, if appropriate)</i> 5. <input checked="" type="checkbox"/> Reissue Oath/Declaration (original or copy) (37 C.F.R. 1.175) (PTO/SB/51 or 52) 6. <input checked="" type="checkbox"/> Power of Attorney 7. <input checked="" type="checkbox"/> Original U.S. Patent currently assigned? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>(If Yes, check applicable box(es))</i> <input checked="" type="checkbox"/> Written Consent of all Assignees (PTO/SB/53) <input checked="" type="checkbox"/> 37 CFR 3.73(b) Statement (PTO/SB/96) 8. <input type="checkbox"/> CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table <input type="checkbox"/> Landscape Table on CD 9. Nucleotide and/or Amino Acid Sequence Submission <i>(if applicable, items a. – c. are required)</i> a. <input type="checkbox"/> Computer Readable Form (CRF) b. Specification Sequence Listing on: i <input type="checkbox"/> CD-ROM (2 copies) or CD-R (2 copies); or ii <input type="checkbox"/> paper c. <input type="checkbox"/> Statements verifying identity of above copies	10. <input type="checkbox"/> Statement of status and support for all changes to the claims. See 37 CFR 1.173(c). 11. <input type="checkbox"/> Foreign Priority Claim (35 U.S.C. 119) <i>(if applicable)</i> 12. <input type="checkbox"/> Information Disclosure Statement (IDS) PTO/SB/08 or PTO-1449 <input type="checkbox"/> Copies of foreign patent documents, publications & other information 13. <input type="checkbox"/> English Translation of Reissue Oath/Declaration <i>(if applicable)</i> 14. <input checked="" type="checkbox"/> Preliminary Amendment 15. <input type="checkbox"/> Return Receipt Postcard (MPEP 503) (Should be specifically itemized) 16. <input type="checkbox"/> Other:

**17. CORRESPONDENCE ADDRESS**

The address associated with Customer Number: 21186 **OR**  Correspondence address below

Name					
Address					
City	State	Zip Code			
Country	Telephone	Email			
Signature				Date	28 Sept 2011
Name (Print/Type)	Albin James Nelson	Registration No. (Attorney/Agent)	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.

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 through 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.

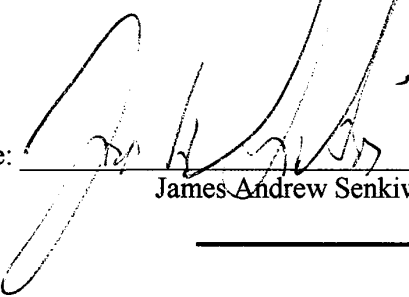
I understand that pursuant to 37 C.F.R. §3.71, the assignee, Oxygenator Water Technologies, Inc., has granted the power of attorney, for prosecuting this reissue patent application and for transacting all related business, to attorneys and agents of the firm of Schwegman, Lundberg, & Woessner, P. A., **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.

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 TO PROSECUTE APPLICATIONS BEFORE THE USPTO**

I hereby revoke all previous powers of attorney given in the Patents identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

Practitioners associated with the Customer Number:  
21186

**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, patents and reissue patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

The address associated with Customer Number:  
21186

**OR**

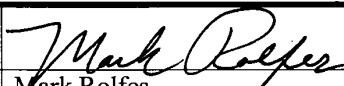
<input type="checkbox"/> Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

Assignee Name and Address:  
 Oxygenator Water Technologies  
 6101 Baker road, suite 206  
 Minnetonka Minnesota 55345.  
 United States of America

**A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, 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		Date:	09-22-2011
Name	Mark Rolfes	Telephone:	
Title	President		

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**S/N Filed Herewith**

**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
Reissue of U.S. Patent No.	7,670,495	Issued March 2,	2010
Title:	FLOW-THROUGH OXYGENATOR	Customer Number:	44367

---

**STATEMENT OF PATENTS, PATENT APPLICATIONS AND REISSUE PATENT  
APPLICATION PURSUANT TO 37 C.F.R. §3,73(b)**

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

Oxygenator Water Technologies as the sole assignee of the following U.S. Patents and Reissue patent applications names practitioners associated with Customer Number 21186 as attorneys or agents to represent Oxygenator Water Technologies before the U.S. Patent and Trademark office and to transact all business in connection therewith.

**Designated U.S. Patents and Patent Application**

U.S Patent No. 6,689,262  
U.S. Patent No.7,396,441  
U.S. Patent No. 7,670,495  
Reissue application of U.S. Patent No. 7,670,495 filed herewith

Oxygenator Water Technologies states that its right to assert its status as sole assignee of the above-identified U.S. Patent No. 7,670,495 and the corresponding reissue application is shown by the assignment records recorded at 020546/0241 showing the assignment of the sole inventor to Aqua Innovations Inc.; at 021354/0676 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 026079/0823 is not an assignment of ownership but rather is a security interest in and to the designated patent.


Oxygenator Water Technologies states that its right to assert its status as sole assignee of the above-identified U.S. Patent No. 7,396,441 is 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.

Oxygenator Water Technologies states that its right to assert its status as sole assignee of the above-identified U.S. Patent No. 6,689,262 and the corresponding reissue application is shown by the assignment records recorded at 019690/0523 showing the assignment of the sole inventor to Aqua Innovations Inc.; at 021354/676 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 026079/0823 is not an assignment of ownership but rather is a security interest in and to the designated patent.

Oxygenator Water Technologies states that its right to assert its status as sole assignee of the above-identified Reissue Patent Application stems from its ownership of the U.S. Patent on which the Reissue Patent Application is based, namely, U.S. Patent No. 7,670,495.

The Patent Assignment Abstract of Title for each of the above-identified U.S. Patents is attached to this statement under 37 C.F.R. §3.74(b).

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.

  
\_\_\_\_\_  
Mark Rolfes  
President, Oxygenator Water Technologies

09-22-2011  
Date



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Reel/Frame: [Q20546/0241](#)

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<br>Publication #: <a href="#">US20080202995</a><br>Title: FLOW-THROUGH OXYGENATOR                    | Issue Dt: 08/28/2008                       | Application #: 12023416 | Filing Dt: 01/31/2008 |
| 2 | Patent #: <a href="#">7670495</a><br>Publication #: <a href="#">US20080179259</a><br>Title: FLOW-THROUGH OXYGENATOR | Issue Dt: 03/02/2010<br>Pub Dt: 07/31/2008 | Application #: 12023431 | Filing Dt: 01/31/2008 |

**Assignor**

- 1 [SENKIW, JAMES ANDREW](#)

Exec Dt: 05/25/2006

**Assignee**

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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: [Q21354/0676](#)

Pages: 6

Recorded: 08/11/2008

Attorney Dkt #: 4056.00-00-01

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

**Total properties: 7**

<b>1</b>	<b>Patent #:</b> <a href="#">6689262</a>	<b>Issue Dt:</b> 02/10/2004	<b>Application #:</b> 10372017	<b>Filing Dt:</b> 02/21/2003
	<b>Publication #:</b> <a href="#">US20030164306</a>	<b>Pub Dt:</b> 09/04/2003		
	<b>Title:</b> MICROBUBBLES OF OXYGEN			
<b>2</b>	<b>Patent #:</b> <a href="#">7395441</a>	<b>Issue Dt:</b> 07/08/2008	<b>Application #:</b> 10732326	<b>Filing Dt:</b> 12/10/2003
	<b>Publication #:</b> <a href="#">US20040118701</a>	<b>Pub Dt:</b> 06/24/2004		
	<b>Title:</b> FLOW-THROUGH OXYGENATOR			
<b>3</b>	<b>Patent #:</b> NONE	<b>Issue Dt:</b>	<b>Application #:</b> 11367134	<b>Filing Dt:</b> 03/04/2006
	<b>Publication #:</b> <a href="#">US20060158491</a>	<b>Pub Dt:</b> 07/13/2006		
	<b>Title:</b> Flow-through oxygenator			
<b>4</b>	<b>Patent #:</b> NONE	<b>Issue Dt:</b>	<b>Application #:</b> 11810540	<b>Filing Dt:</b> 06/06/2007
	<b>Publication #:</b> <a href="#">US20070284245</a>	<b>Pub Dt:</b> 12/13/2007		
	<b>Title:</b> Water treatment system			
<b>5</b>	<b>Patent #:</b> NONE	<b>Issue Dt:</b>	<b>Application #:</b> 12023416	<b>Filing Dt:</b> 01/31/2008
	<b>Publication #:</b> <a href="#">US20080202995</a>	<b>Pub Dt:</b> 08/28/2008		
	<b>Title:</b> FLOW-THROUGH OXYGENATOR			
<b>6</b>	<b>Patent #:</b> <a href="#">7670495</a>	<b>Issue Dt:</b> 03/02/2010	<b>Application #:</b> 12023431	<b>Filing Dt:</b> 01/31/2008
	<b>Publication #:</b> <a href="#">US20080179259</a>	<b>Pub Dt:</b> 07/31/2008		
	<b>Title:</b> FLOW-THROUGH OXYGENATOR			
<b>7</b>	<b>Patent #:</b> NONE	<b>Issue Dt:</b>	<b>Application #:</b> 12055723	<b>Filing Dt:</b> 03/26/2008
	<b>Publication #:</b> <a href="#">US20080237060</a>	<b>Pub Dt:</b> 10/02/2008		
	<b>Title:</b> 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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Recorded: 02/09/2011

Conveyance: PROMISSORY NOTES GRANTING SECURITY INT

**Total properties: 3**

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|---|--|--|--------------------------------|------------------------------|
| 1 | <b>Patent #:</b> <a href="#">6689262</a><br><b>Publication #:</b> <a href="#">US20030164306</a><br><b>Title:</b> MICROBUBBLES OF OXYGEN  | <b>Issue Dt:</b> 02/10/2004<br><b>Pub Dt:</b> 09/04/2003 | <b>Application #:</b> 10372017 | <b>Filing Dt:</b> 02/21/2003 |
| 2 | <b>Patent #:</b> <a href="#">7396441</a><br><b>Publication #:</b> <a href="#">US20040118701</a><br><b>Title:</b> FLOW-THROUGH OXYGENATOR | <b>Issue Dt:</b> 07/08/2008<br><b>Pub Dt:</b> 06/24/2004 | <b>Application #:</b> 10732326 | <b>Filing Dt:</b> 12/10/2003 |
| 3 | <b>Patent #:</b> <a href="#">7670485</a><br><b>Publication #:</b> <a href="#">US20080179259</a><br><b>Title:</b> FLOW-THROUGH OXYGENATOR | <b>Issue Dt:</b> 03/02/2010<br><b>Pub Dt:</b> 07/31/2008 | <b>Application #:</b> 12023431 | <b>Filing Dt:</b> 01/31/2008 |

**Assignors**

- |   |   |                            |
|---|---|----------------------------|
| 1 | <a href="#">OXYGENATOR WATER TECHNOLOGIES, INC.</a> | <b>Exec Dt:</b> 09/09/2008 |
| 2 | <a href="#">WATER D.O.G. WORKS</a>                  | <b>Exec Dt:</b> 10/24/2008 |

**Assignee**

- 1 [BRINK, JEFFREY P.](#)  
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**S/N Filed Herewith**

**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
Reissue of U.S. Patent No.	7,670,495	Issued March 2,	2010
Title:	FLOW-THROUGH OXYGENATOR	Customer Number:	44367

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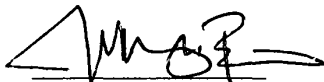
**CONSENT BY ASSIGNEE OF SECURITY INTEREST TO FILE REISSUE APPLICATION OF U.S. PATENT NO. 7,670,495 PURSUANT TO 37 C.F.R. §1.172**

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 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 broadening reissue of 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 re-issue 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.

  
\_\_\_\_\_  
Jeffrey P. Brink  
Declarant

9/12/11  
\_\_\_\_\_  
Date





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Reel/Frame: Q20546/0241

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**

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**Correspondence name and address**

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**Pages:** 6

**Recorded:** 08/11/2008

**Attorney Dkt #:** 4056.00-00-01

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

**Total properties: 7**

<b>1</b>	<b>Patent #:</b> <a href="#">6689262</a>	<b>Issue Dt:</b> 02/10/2004	<b>Application #:</b> 10372017	<b>Filing Dt:</b> 02/21/2003
	<b>Publication #:</b> <a href="#">US20030164306</a>	<b>Pub Dt:</b> 09/04/2003		
	<b>Title:</b> MICROBUBBLES OF OXYGEN			
<b>2</b>	<b>Patent #:</b> <a href="#">7395441</a>	<b>Issue Dt:</b> 07/08/2008	<b>Application #:</b> 10732326	<b>Filing Dt:</b> 12/10/2003
	<b>Publication #:</b> <a href="#">US20040118701</a>	<b>Pub Dt:</b> 06/24/2004		
	<b>Title:</b> FLOW-THROUGH OXYGENATOR			
<b>3</b>	<b>Patent #:</b> NONE	<b>Issue Dt:</b>	<b>Application #:</b> 11367134	<b>Filing Dt:</b> 03/04/2006
	<b>Publication #:</b> <a href="#">US20060158491</a>	<b>Pub Dt:</b> 07/13/2006		
	<b>Title:</b> Flow-through oxygenator			
<b>4</b>	<b>Patent #:</b> NONE	<b>Issue Dt:</b>	<b>Application #:</b> 11810540	<b>Filing Dt:</b> 06/06/2007
	<b>Publication #:</b> <a href="#">US20070284245</a>	<b>Pub Dt:</b> 12/13/2007		
	<b>Title:</b> Water treatment system			
<b>5</b>	<b>Patent #:</b> NONE	<b>Issue Dt:</b>	<b>Application #:</b> 12023416	<b>Filing Dt:</b> 01/31/2008
	<b>Publication #:</b> <a href="#">US20080202995</a>	<b>Pub Dt:</b> 08/28/2008		
	<b>Title:</b> FLOW-THROUGH OXYGENATOR			
<b>6</b>	<b>Patent #:</b> <a href="#">7670495</a>	<b>Issue Dt:</b> 03/02/2010	<b>Application #:</b> 12023431	<b>Filing Dt:</b> 01/31/2008
	<b>Publication #:</b> <a href="#">US20080179259</a>	<b>Pub Dt:</b> 07/31/2008		
	<b>Title:</b> FLOW-THROUGH OXYGENATOR			
<b>7</b>	<b>Patent #:</b> NONE	<b>Issue Dt:</b>	<b>Application #:</b> 12055723	<b>Filing Dt:</b> 03/26/2008
	<b>Publication #:</b> <a href="#">US20080237060</a>	<b>Pub Dt:</b> 10/02/2008		
	<b>Title:</b> 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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**Pages:** 10

**Recorded:** 02/09/2011

**Conveyance:** PROMISSORY NOTES GRANTING SECURITY INT

**Total properties: 3**

<p><b>1</b></p> <p><b>Patent #:</b> <a href="#">6689262</a></p> <p><b>Publication #:</b> <a href="#">US20030164306</a></p> <p><b>Title:</b> MICROBUBBLES OF OXYGEN</p>	<p><b>Issue Dt:</b> 02/10/2004</p> <p><b>Pub Dt:</b> 09/04/2003</p>	<p><b>Application #:</b> 10372017</p>	<p><b>Filing Dt:</b> 02/21/2003</p>
<p><b>2</b></p> <p><b>Patent #:</b> <a href="#">7396441</a></p> <p><b>Publication #:</b> <a href="#">US20040118701</a></p> <p><b>Title:</b> FLOW-THROUGH OXYGENATOR</p>	<p><b>Issue Dt:</b> 07/08/2008</p> <p><b>Pub Dt:</b> 06/24/2004</p>	<p><b>Application #:</b> 10732326</p>	<p><b>Filing Dt:</b> 12/10/2003</p>
<p><b>3</b></p> <p><b>Patent #:</b> <a href="#">7670485</a></p> <p><b>Publication #:</b> <a href="#">US20080179259</a></p> <p><b>Title:</b> FLOW-THROUGH OXYGENATOR</p>	<p><b>Issue Dt:</b> 03/02/2010</p> <p><b>Pub Dt:</b> 07/31/2008</p>	<p><b>Application #:</b> 12023431</p>	<p><b>Filing Dt:</b> 01/31/2008</p>

**Assignors**

<p><b>1</b> <a href="#">OXYGENATOR WATER TECHNOLOGIES, INC.</a></p>	<p><b>Exec Dt:</b> 09/09/2008</p>
<p><b>2</b> <a href="#">WATER D.O.G. WORKS</a></p>	<p><b>Exec Dt:</b> 10/24/2008</p>

**Assignee**

**1** [BRINK, JEFFREY P.](#)  
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**Correspondence name and address**

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**S/N Filed Herewith**

**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
Reissue of U.S. Patent No.	7,670,495	Issued	March 2, 2010
Title:	FLOW-THROUGH OXYGENATOR	Customer Number:	44367

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**CONSENT BY ASSIGNEE OF ENTIRE OWNERSHIP INTEREST TO FILE REISSUE APPLICATION OF U.S. PATENT NO. 7,670,495 PURSUANT TO 37 C.F.R. §1.172**

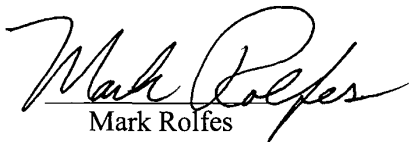
Mail Stop Reissue  
Commissioner for Patents  
P.O. Box 1450  
Alexandria , VA 22313-1450

I, 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 further 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 broadening reissue 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 re-issue 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  
President, Oxygenator Water Technologies  
DBA Water D.O.G. Works

09-22-2011  
Date



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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: [Q20546/0241](#)

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<br>Publication #: <a href="#">US20080202995</a><br>Title: FLOW-THROUGH OXYGENATOR                    | Issue Dt: 08/28/2008                       | Application #: 12023416 | Filing Dt: 01/31/2008 |
| 2 | Patent #: <a href="#">7670495</a><br>Publication #: <a href="#">US20080179259</a><br>Title: FLOW-THROUGH OXYGENATOR | Issue Dt: 03/02/2010<br>Pub Dt: 07/31/2008 | Application #: 12023431 | Filing Dt: 01/31/2008 |

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Exec Dt: 05/25/2006

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**Reel/Frame:** [Q21354/0676](#)

**Pages:** 6

**Recorded:** 08/11/2008

**Attorney Dkt #:** 4056.00-00-01

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

**Total properties: 7**

<b>1</b>	<b>Patent #:</b> <a href="#">6689262</a> <b>Publication #:</b> <a href="#">US20030164306</a> <b>Title:</b> MICROBUBBLES OF OXYGEN	<b>Issue Dt:</b> 02/10/2004 <b>Pub Dt:</b> 09/04/2003	<b>Application #:</b> 10372017	<b>Filing Dt:</b> 02/21/2003
<b>2</b>	<b>Patent #:</b> <a href="#">7395441</a> <b>Publication #:</b> <a href="#">US20040118701</a> <b>Title:</b> FLOW-THROUGH OXYGENATOR	<b>Issue Dt:</b> 07/08/2008 <b>Pub Dt:</b> 06/24/2004	<b>Application #:</b> 10732326	<b>Filing Dt:</b> 12/10/2003
<b>3</b>	<b>Patent #:</b> NONE <b>Publication #:</b> <a href="#">US20060158491</a> <b>Title:</b> Flow-through oxygenator	<b>Issue Dt:</b> <b>Pub Dt:</b> 07/13/2006	<b>Application #:</b> 11367134	<b>Filing Dt:</b> 03/04/2006
<b>4</b>	<b>Patent #:</b> NONE <b>Publication #:</b> <a href="#">US20070284245</a> <b>Title:</b> Water treatment system	<b>Issue Dt:</b> <b>Pub Dt:</b> 12/13/2007	<b>Application #:</b> 11810540	<b>Filing Dt:</b> 06/06/2007
<b>5</b>	<b>Patent #:</b> NONE <b>Publication #:</b> <a href="#">US20080202995</a> <b>Title:</b> FLOW-THROUGH OXYGENATOR	<b>Issue Dt:</b> <b>Pub Dt:</b> 08/28/2008	<b>Application #:</b> 12023416	<b>Filing Dt:</b> 01/31/2008
<b>6</b>	<b>Patent #:</b> <a href="#">7670495</a> <b>Publication #:</b> <a href="#">US20080179259</a> <b>Title:</b> FLOW-THROUGH OXYGENATOR	<b>Issue Dt:</b> 03/02/2010 <b>Pub Dt:</b> 07/31/2008	<b>Application #:</b> 12023431	<b>Filing Dt:</b> 01/31/2008
<b>7</b>	<b>Patent #:</b> NONE <b>Publication #:</b> <a href="#">US20080237060</a> <b>Title:</b> METHODS AND APPARATUS FOR ELECTROLYTIC TREATMENT OF WATER	<b>Issue Dt:</b> <b>Pub Dt:</b> 10/02/2008	<b>Application #:</b> 12055723	<b>Filing Dt:</b> 03/26/2008

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**Exec Dt:** 08/08/2008

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**Total properties: 3**

- |          |  |                             |                                |                              |
|----------|--|-----------------------------|--------------------------------|------------------------------|
| <b>1</b> | <b>Patent #:</b> <u>6689262</u>            | <b>Issue Dt:</b> 02/10/2004 | <b>Application #:</b> 10372017 | <b>Filing Dt:</b> 02/21/2003 |
|          | <b>Publication #:</b> <u>US20030164306</u> | <b>Pub Dt:</b> 09/04/2003   |                                |                              |
|          | <b>Title:</b> MICROBUBBLES OF OXYGEN       |                             |                                |                              |
| <b>2</b> | <b>Patent #:</b> <u>7396441</u>            | <b>Issue Dt:</b> 07/08/2008 | <b>Application #:</b> 10732326 | <b>Filing Dt:</b> 12/10/2003 |
|          | <b>Publication #:</b> <u>US20040118701</u> | <b>Pub Dt:</b> 06/24/2004   |                                |                              |
|          | <b>Title:</b> FLOW-THROUGH OXYGENATOR      |                             |                                |                              |
| <b>3</b> | <b>Patent #:</b> <u>7670485</u>            | <b>Issue Dt:</b> 03/02/2010 | <b>Application #:</b> 12023431 | <b>Filing Dt:</b> 01/31/2008 |
|          | <b>Publication #:</b> <u>US20080179259</u> | <b>Pub Dt:</b> 07/31/2008   |                                |                              |
|          | <b>Title:</b> FLOW-THROUGH OXYGENATOR      |                             |                                |                              |

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**S/N Filed Herewith**

**REISSUE PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicants:	James Andrew Senkiw.	Examiner:	Unknown
Serial No.:	Unknown	Group Art Unit:	Unknown
Filed:	Filed Herewith	Atty. Docket No.:	3406.005USR
Reissue of U.S. Patent No.	7,670,495	Issued	March 2, 2010
Title:	FLOW-THROUGH OXYGENATOR	Customer Number:	44367

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**PRELIMINARY AMENDMENT FOR 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 reissue patent application, please enter the following preliminary amendment of the claims:

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**IN THE CLAIMS**

Please amend the claims as follows:

Please amend claim 2 as follows.

**2.** (Amended) 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 and 0.050 inches] **such that the critical distance is from 0.005 inches to 0.140 inches [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 microbubbles [bubbles] having a bubble diameter of less than 0.0006 inches, said oxygen microbubbles [bubbles] being incapable of breaking the surface tension of the aqueous medium [such that said aqueous medium is supersaturated with oxygen].

Please add the following new claims.

**13.** An emitter suitable for producing microbubbles and nanobubbles of oxygen in an aqueous medium or liquid water, comprising:  
a flow through device with an inlet end, an outlet end and a long axis measured from the inlet to outlet ends,  
the device containing at least one anode electrode and at least one cathode electrode, both of a grid design, the electrodes having long axes which are parallel to the long axis of the device, and  
the electrodes being separated by a distance of less than about 0.140 inches.

**14.** An emitter according to claim 13 wherein the flow through device is shaped as a conduit and the conduit has inlet and outlet ends and the long axis, and contains the electrodes.

15. An emitter according to claim 13 wherein the flow through device is shaped as a tube and the tube has inlet and outlet ends and the long axis and contains the electrodes.

16. An emitter according to claim 13, 14 or 15 wherein the electrodes are separated by a nonconductive spacer.

17. An emitter according to claim 13, 14 or 15 wherein the electrodes are separated by a nonconductive spacer and a distance of from about 0.005 inches to about 0.140 inches.

18. An emitter according to claim 17 wherein the electrodes are separated by a nonconductive spacer and a distance of less than about 0.060 inches.

19. An emitter according to claim 13, 14 or 15 wherein the flow through device, conduit or tube has an inner wall, the at least one anode is an anode set, the at least one cathode is a cathode set and the arrangement of the electrodes places one of the anode set and the cathode set next to the inner wall and the other set inside the set next to the inner wall.

20. An emitter according to claim 19 wherein the anode and cathode sets have a concentric arrangement.

21. An emitter according to claim 13, 14 or 15 wherein the electrodes are composed of a metal or metal oxide or a combination thereof.

22. An emitter according to claim 13, 14 or 15 wherein a multiple number of anode and cathode electrodes are present.

23. An emitter according to claim 22 wherein the flow through device, conduit or tube has an inner wall, the multiple number of anodes is an anode set, the multiple number of cathodes is a cathode set, the arrangement of the sets of electrodes places one set next to the inner wall and the

other set inside the set next to the inner wall.

24. An emitter according to claim 23 wherein each electrode of each set of electrodes has a width such that each set of electrodes approximates a cylinder.

25. An emitter according to claim 24 wherein the cylinders have a concentric arrangement.

26. An emitter according to claim 13, 14 or 15 further comprising a power source electrically connected to the anode and cathode.

27. An emitter according to claim 26 further comprising a liquid water source flowably connected to the inlet of the flow through device, conduit or tube.

28. An emitter according to claim 27 further comprising a control circuit to selectively couple the power source to the electrodes when water flows through the device, conduit or tube.

29. An emitter according to claim 28, wherein when liquid water flows through the emitter and a current is applied to the electrodes by the power source, the emitter operates to produce microbubbles and nanobubbles of oxygen in the liquid water and the microbubbles and nanobubbles are substantially incapable of breaking the surface tension of the water.

30. A system suitable for producing microbubbles and nanobubbles of oxygen in liquid water or an aqueous medium, comprising:

a flow through device with an inlet end, an outlet end and a long axis measured from the inlet to outlet ends,

the device containing at least one anode electrode and at least one cathode electrode, both of a grid design, the electrodes having long axes which are parallel to the long axis of the flow through device, and

the electrodes being separated by a distance less than about 0.140 inches;

a power source electrically connected to the electrodes; and,  
a water source flowably connected to the inlet.

31. A system according to claim 30 wherein the flow through device is shaped as a conduit or tube and the conduit or tube has inlet and outlet ends, the long axis and contains the electrodes.

32. A system according to claim 30 or 31 wherein the electrodes are composed of metal, a metal oxide or a combination thereof.

33. A system according to claim 30 or 31 wherein the flow through device, conduit or tube has an inner wall, the at least one anode is an anode set, the at least one cathode is a cathode set and the arrangement of the electrodes places one of the anode set and the cathode set next to the inner wall and the other set inside the set next to the inner wall.

34. A system according to claim 33 wherein the anode and cathode sets have a concentric arrangement.

35. A system according to claim 30 or 31 wherein a multiple number of anode and cathode electrodes are present.

36. A system according to claim 35 wherein the flow through device, conduit or tube has an inner wall, the multiple number of anodes is an anode set, the multiple number of cathodes is a cathode set, the arrangement of the sets of electrodes places one set next to the inner wall and the other set inside the set next to the inner wall.

37. A system according to claim 36 wherein each electrode of each set of electrodes has a width such that each set of electrodes approximates a cylinder.

38. A system according to claim 37 wherein the cylinders have a concentric arrangement.

39. A system according to claim 30 wherein the flow through device, power source and water source operate to electrolytically generate microbubbles and nanobubbles of oxygen in the liquid water or aqueous medium and the microbubbles and nanobubbles are substantially incapable of breaking the surface tension of the water.

40. A method for treating organic and/or inorganic pollutants comprising flowing water through the system of claim 30 or 31 while applying a current to the electrodes of the emitter to produce oxygenated water and applying the oxygenated water to the organic pollutants.

41. A method according to claim 40 wherein the oxygenated water comprises microbubbles and nanobubbles of oxygen in the liquid water or aqueous medium, and the microbubbles and nanobubbles are substantially incapable of breaking the surface tension of the water.

42. A method according to claim 40 wherein applying the oxygenated water to the organic and/or inorganic pollutants cleans up the pollutants.

43. A method for cleaning waste and filth at least with oxygenated water, comprising: flowing liquid water through an emitter comprising  
a flow through device which comprises a conduit or tube with an inner wall, an inlet end, an outlet end and a long axis measured from the inlet to outlet ends, the conduit or tube containing at least one anode electrode and at least one cathode electrode, both of a grid design, the electrodes having long axes which are parallel to the long axis of the conduit or tube and a physical arrangement of the electrodes places one of the electrodes next to the inner wall and the other electrode inside the electrode next to the inner wall, the electrodes being separated by a distance less than about 0.140 inches, wherein the liquid water enters the inlet of the conduit or tube and exits the outlet of the conduit or tube,  
applying a current to the electrodes through a power source electrically connected to the



electrodes while flowing liquid water through the emitter to produce oxygenated water;  
and,  
contacting the waste and filth at least with the oxygenated water.

44. A method according to claim 43 wherein the electrodes are composed of a metal or metal oxide or a combination thereof.

45. A method according to claim 43 wherein a multiple number of anode and cathode electrodes are present.

46. A method according to claim 45 wherein the multiple number of anodes is an anode set, the multiple number of cathodes is a cathode set, the arrangement of the sets of electrodes places one set next to the inner wall and the other set inside the set next to the inner wall.

47. A method according to claim 46 wherein each electrode of each set of electrodes has a width such that each set of electrodes approximates a cylinder.

48. A method according to claim 47 wherein the cylinders have a concentric arrangement.

49. A method according to claim 43 wherein the oxygenated water contains microbubbles and nanobubbles of oxygen in the water, the microbubbles and nanobubbles being substantially incapable of breaking the surface tension of the water.

### REMARKS

Applicant presents this preliminary amendment for his reissue application to correct errors of the claims of original U.S. Patent No. 7,670,495 in that those claims recite subject matter that is less in scope than Applicant was entitled to claim. As indicated in the accompanying Reissue Declaration, all errors that are addressed and corrected by this preliminary amendment arose without any deceptive intention on the part of Applicant.

Claim 2 of the original patent has been amended and pursuant to M.P.E.P 1411.01, the earlier correction of claim 2 provided by the Certificate of Correction has been made in the text of the copy of the printed patent included with this Reissue Filing.

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. Claims 13 – 29 generally are directed to an emitter as is disclosed at col. 2, line 63 – col. 3, line 43 of the original patent. Claims 30-39 are directed to a system incorporating a flow through device, power source and water source as are disclosed at col. 3, lines 23-43 of the original patent. Claims 40 – 49 are directed to methods for treatment of waste and pollution as disclosed at col. 3, lines 36 – 43, Example 7 and claim 9 of the original patent.

Support in the specification for the term recitations of the new claims is provided in the following chart.

**PRELIMINARY AMENDMENT**

Serial Number: Unknown

Filing Date: Herewith

Reissue of U.S. Patent No. 7,670,495, Issued March 2, 2010

Title: FLOW-THROUGH OXYGENATOR

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Dkt: 3406.005USR

CHART SHOWING DISCLOSURE SUPPORT FOR THE NEW CLAIMS

Claim and Term	Location	Phrase
13 – Flow Through Device with inlet and outlet ends and a long axis	Col. 3, lines 23 - 30	A flow-through model is provided which may be connected in-line to a watering hose ... The flow-through model can be formed into a tube ... Alternatively the anodes and cathodes may be in plates parallel to the long axis of the tube...
At least one anode, at least one cathode	Col. 3, lines 1-14, issued claim 7	The anode and cathode (eg., single electrodes) are separated by a critical distance ... a plurality of anodes, a plurality of cathodes (claim 7).
13 - Electrodes having a grid design	Col. 3, line 25	The electrodes may be formed into open grids
13 – Electrode arrangement of long axes parallel to long axis of device	Col. 3, lines 28-30	Anodes and cathodes may be in plates parallel to the long axis of the tube

**PRELIMINARY AMENDMENT**

Serial Number: Unknown

Filing Date: Herewith

Reissue of U.S. Patent No. 7,670,495, Issued March 2, 2010

Title: FLOW-THROUGH OXYGENATOR

13 – electrodes being separated by a distance of less than about 0.140 inches	Col. 3, lines 11-13; Col. 4, lines 46-54	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.
14 – flow through device shaped as a conduit	Col. 3, lines 23-26, originally issued claim 1	A flow-through model is provided which may be connected in-line to a watering hose...Placing the emitter within a conduit
15 - flow through device is shaped as a tube	Col. 3, lines 23-26	A flow-through model is provided which may be connected in-line to a watering hose...The flow-through model can be formed into a tube
16 – electrodes separated by a nonconductive spacer	Col. 4, lines 64-65	The anode and cathode are separated by a non-conducting spacer
17 – distance of from about 0.005 inches to about 0.140 inches	Col. 3, lines 11-13; col. 4, lines 52-54	Therefore, the critical distance for microbubble and nanobubble formation was determined to be between 0.005 inches and 0.140 inches
18 – distance of less than about 0.060 inches	Col. 3, lines 13 - 14	The preferred critical distance is from 0.045 to 0.060 inches

**PRELIMINARY AMENDMENT**

Serial Number: Unknown

Filing Date: Herewith

Reissue of U.S. Patent No. 7,670,495, Issued March 2, 2010

Title: FLOW-THROUGH OXYGENATOR

**Page 11**

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19 - tube has inner wall and the arrangement of the set of electrodes places one set next to the inner wall and the other set inside the electrode next to the wall	Col. 3, lines 23-28,	The flow-through model can be formed into a tube... In this model, the anode is placed toward the outside of the tube and the cathode is placed on the inside.
20 - electrodes have a concentric arrangement	Col. 3, lines 11-14 and lines 23-30	Electrodes are inside of a tube, electrodes have a grid design, one electrode is next to the inner wall of the tube and the other is inside the electrode next to the wall. Because the tube is cylinder shaped and one electrode is inside the other, the electrodes have a concentric arrangement.
21 - electrodes composed of metal or metal oxide ...	Col. 3, lines 1-2, issued claim 3	The electrodes may be a metal or oxide of at least one metal
22 - multiple number of electrodes	Issued claim 7	Plurality of anodes and cathodes

**PRELIMINARY AMENDMENT**

Serial Number:Unknown

Filing Date: Herewith

Reissue of U.S. Patent No. 7,670,495, Issued March 2, 2010

Title: FLOW-THROUGH OXYGENATOR

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23 - tube has inner wall and the arrangement of the set of multiple electrodes places one set next to the inner wall and the other set inside the electrode next to the wall	Col. 3, lines 23-28, Issued claim 7	The flow-through model can be formed into a tube... In this model, the anode is placed toward the outside of the tube and the cathode is placed on the inside, plurality of anodes and cathodes
24 – each set of electrodes approximates a cylinder	Col. 3, lines 23-28, issued claim 7	Multiple number of electrodes arranged along the inner wall of the tube yields a set of electrodes arranged as a cylinder, tube is a cylinder.
25 – cylinders have a concentric arrangement	Col. 3, lines 11-14 and lines 23-30	Electrodes are inside of a tube, electrodes have a grid design, one set of multiple electrodes is next to the inner wall of the tube and the other set is inside the set next to the wall. Because the tube is cylinder shaped and one set of electrodes is inside the other, the cylinder shaped sets of electrodes have a concentric arrangement.
26 - power source	Originally Issued claim 2	Power source

**PRELIMINARY AMENDMENT**

Serial Number:Unknown

Filing Date: Herewith

Reissue of U.S. Patent No. 7,670,495, Issued March 2, 2010

Title: FLOW-THROUGH OXYGENATOR

**Page 13**

Dkt: 3406.005USR

27 – liquid water source flowably connected to device, conduit or tube	Col. 3, lines 23-24	A flow-through model is provide which may be connected in-line to a watering hose
28 – control circuit	Col. 5, lines 26-38	It is convenient to attach a control circuit ...
29 - microbubbles of oxygen having certain characteristics are formed	Col. 2, line 63 – col. 4, line 67; col. 4, lines 10-15; originally issued claim 2	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 ...
30 – system of flow though device, power source and water source	Col. 3, lines 23-28 Col. 5, lines 31-37; Claim 2	A flow-through model is provided which may be connected in –line to a watering hose ...a power source all in electrical communication with each other
31 – conduit or tube	See entries for claims 14 and 15	See entries for claims 14 and 15

**PRELIMINARY AMENDMENT**

Serial Number: Unknown

Filing Date: Herewith

Reissue of U.S. Patent No. 7,670,495, Issued March 2, 2010

Title: FLOW-THROUGH OXYGENATOR

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32 – electrodes of metal ...	See entry for claim 21	See entry for claim 21
33 – inner wall, electrode sets and arrangement of electrode sets	See entry for claims 19 and 23	See entry for claim 23
34 – concentric arrangement	See entry for claim 20	See entry for claim 20
35 – multiple number of electrodes	See entry for claim 22	See entry for claim 22
36 – multiple number of electrodes, arrangement of sets of electrodes relative to the inner wall and each other	See entry for claim 23	See entry for claim 23
37 – each set of electrodes approximates a cylinder	See entry for claim 24	See entry for claim 24
38 – concentric arrangement	See entry for claim 25	See entry for claim 25
39 - generation of microbubbles with certain characteristics	See entry for claim 29	See entry for claim 29



**PRELIMINARY AMENDMENT**

Serial Number: Unknown

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Title: FLOW-THROUGH OXYGENATOR

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40 – method for treating organic pollutants	Col. 1, lines 38-43; col. 3, lines 41-43	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 ... Use of the follow-through model for ... waste water treatment is disclosed
41 – generation of microbubbles with certain characteristics	See entry for claim 29	See entry for claim 29
42 – cleans up the pollutants	Example 7	Dissolved oxygen increased
43 – method to clean waste and filth	Col. 1, lines 26-48, Example 7	Use of oxygen to clean and detoxify, the waste in waste water is cleaned up through use of the water with microbubbles of oxygen
44 – electrodes are metal and/or metal oxide	See entry for claim 21	See entry for claim 21
45 – multiple number of anodes and cathodes	See entry for claim 22	See entry for claim 22

**PRELIMINARY AMENDMENT**

Serial Number: Unknown

Filing Date: Herewith

Reissue of U.S. Patent No. 7,670,495, Issued March 2, 2010

Title: FLOW-THROUGH OXYGENATOR

**Page 16**  
Dkt: 3406.005USR

46 – multiple number of electrodes as a set, arrangement of sets – one next to inner wall, other inside set next to wall	See entry for claim 23	See entry for claim 23
47 – electrode sets approximate cylinders	See entry for claim 24	See entry for claim 24
48 – concentric arrangement	See entry for claim 25	See entry for claim 25
49 – generation of microbubbles with certain characteristics	See entry for claim 29	See entry for claim 29

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 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 application for re-issue of U.S. Patent No. 7,670,495.

**PRELIMINARY AMENDMENT**

Serial Number: Unknown

Filing Date: Herewith

Reissue of U.S. Patent No. 7,670,495, Issued March 2, 2010

Title: FLOW-THROUGH OXYGENATOR

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**Page 17**  
Dkt: 3406.005USR

**CONCLUSION**

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's representative at (612) 373-6939 to facilitate prosecution of this application.

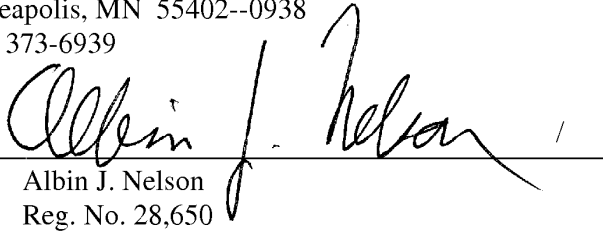
If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully Submitted,

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Date 28 September 2011

By/

  
Albin J. Nelson  
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US007670495B2

(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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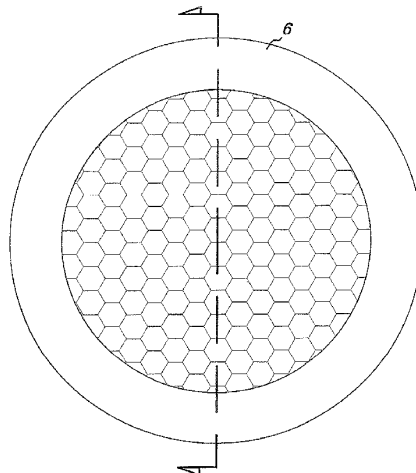
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*Primary Examiner*—Walter D Griffin  
*Assistant Examiner*—Cameron J Allen  
(74) *Attorney, Agent, or Firm*—Patterson, Thuente, Skaar & Christensen, P.A.

(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**



US 7,670,495 B2

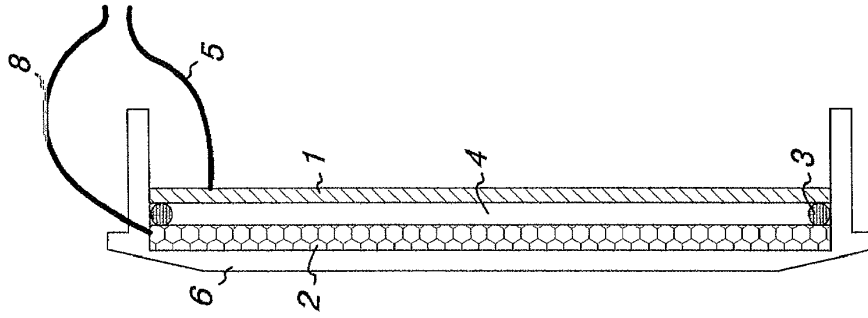
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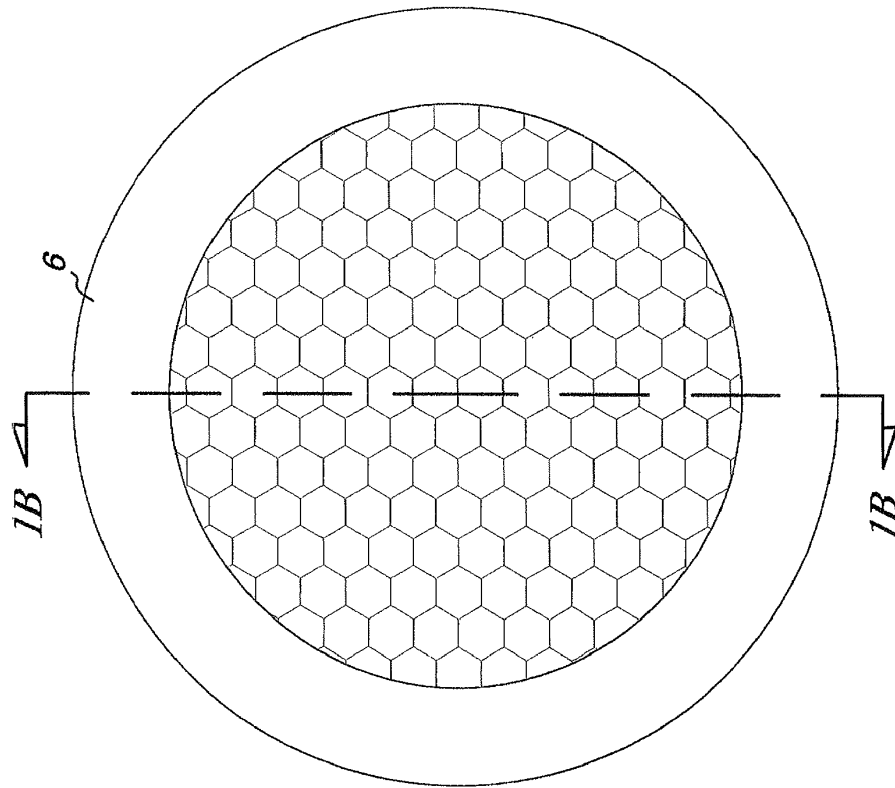
  

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*Fig. 1B*



*Fig. 1A*

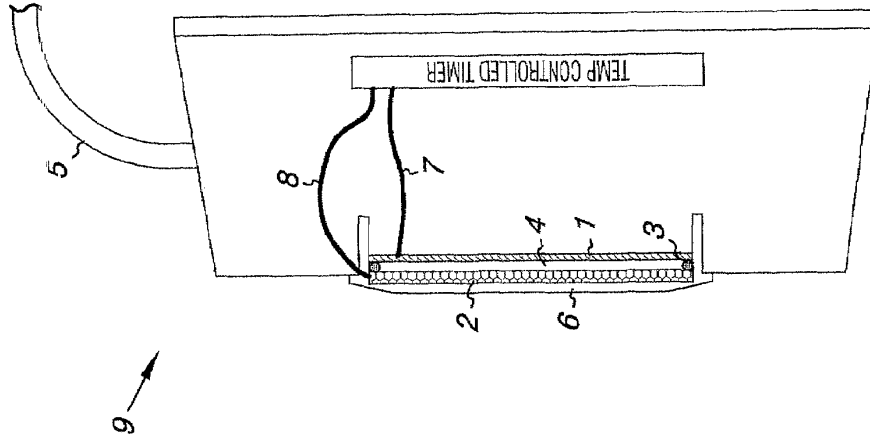


Fig. 2B

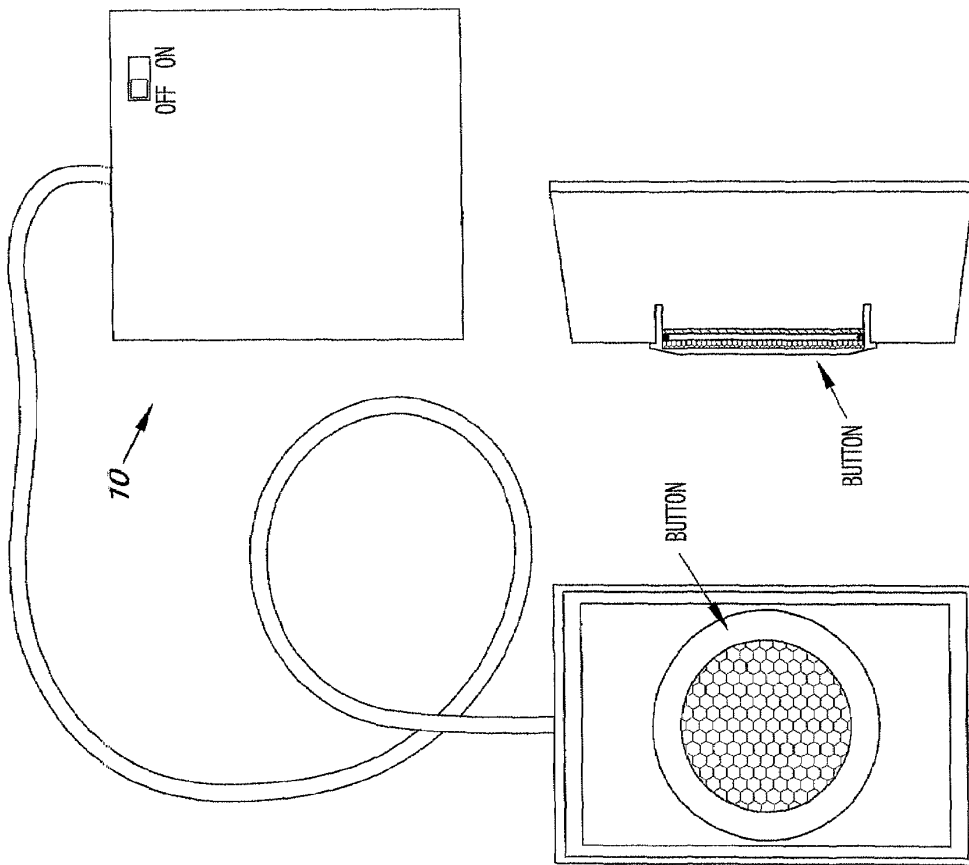
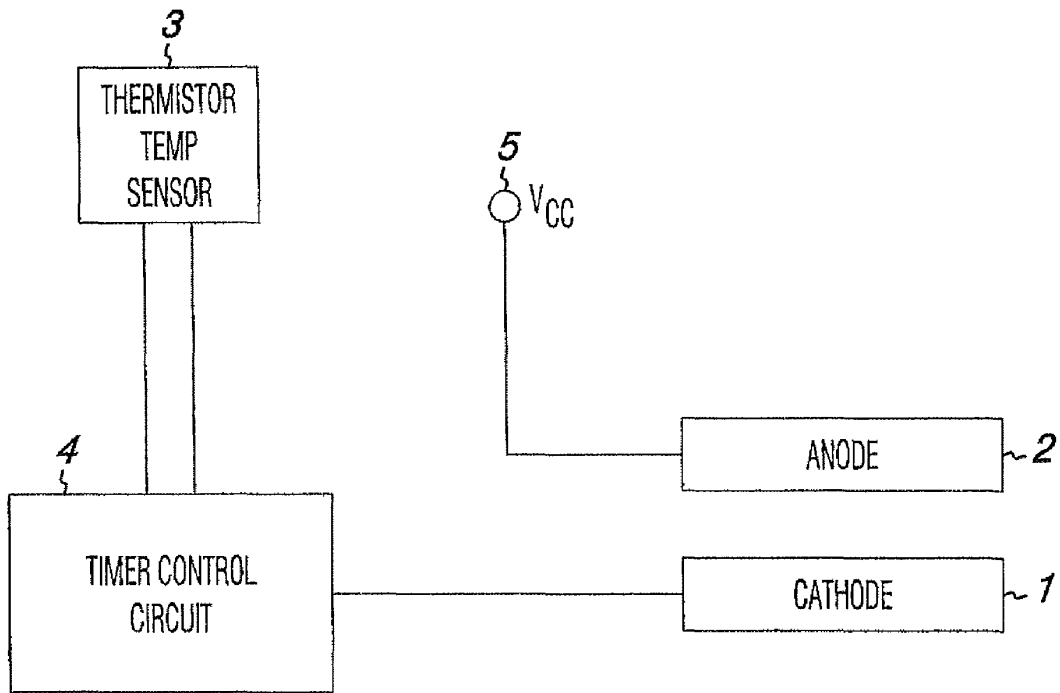
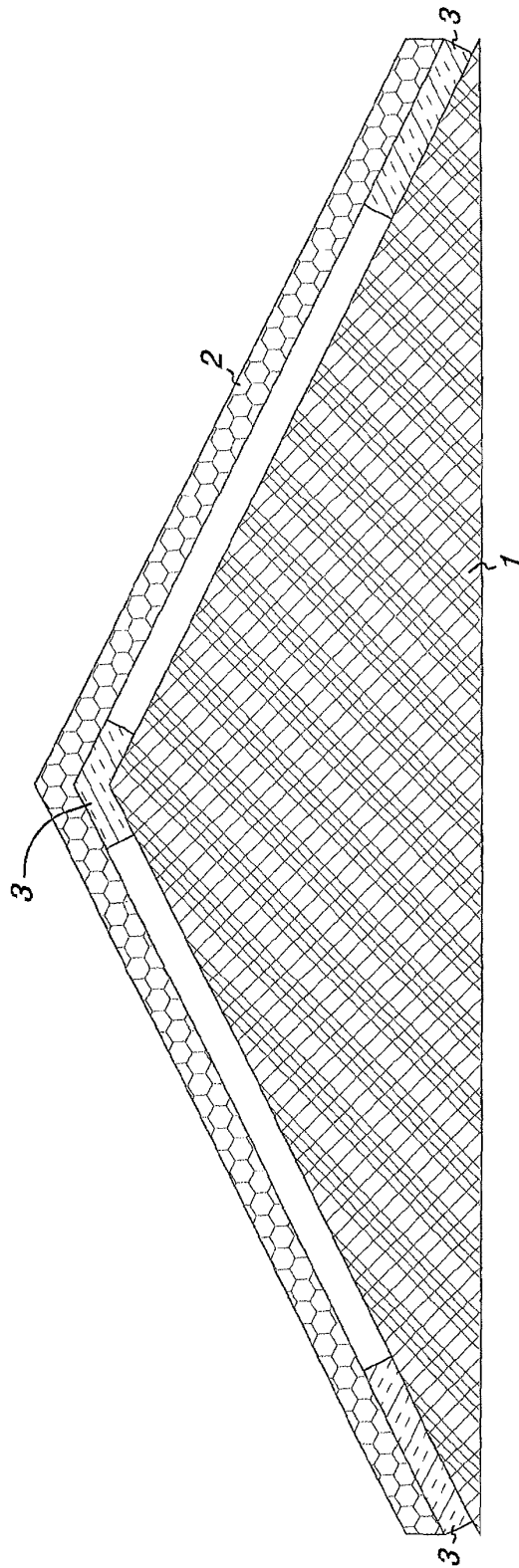


Fig. 2A

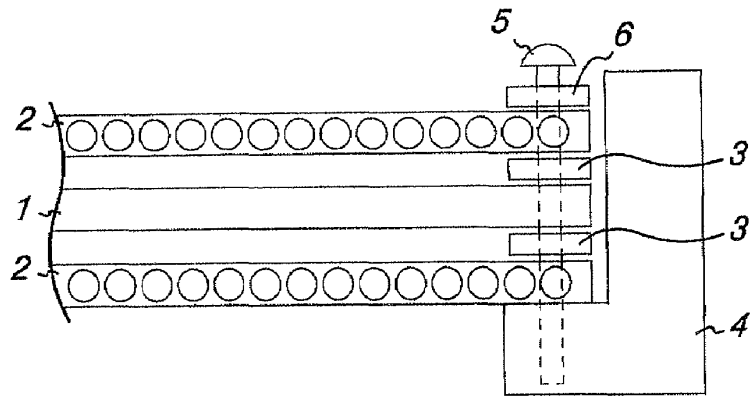


*Fig. 3*

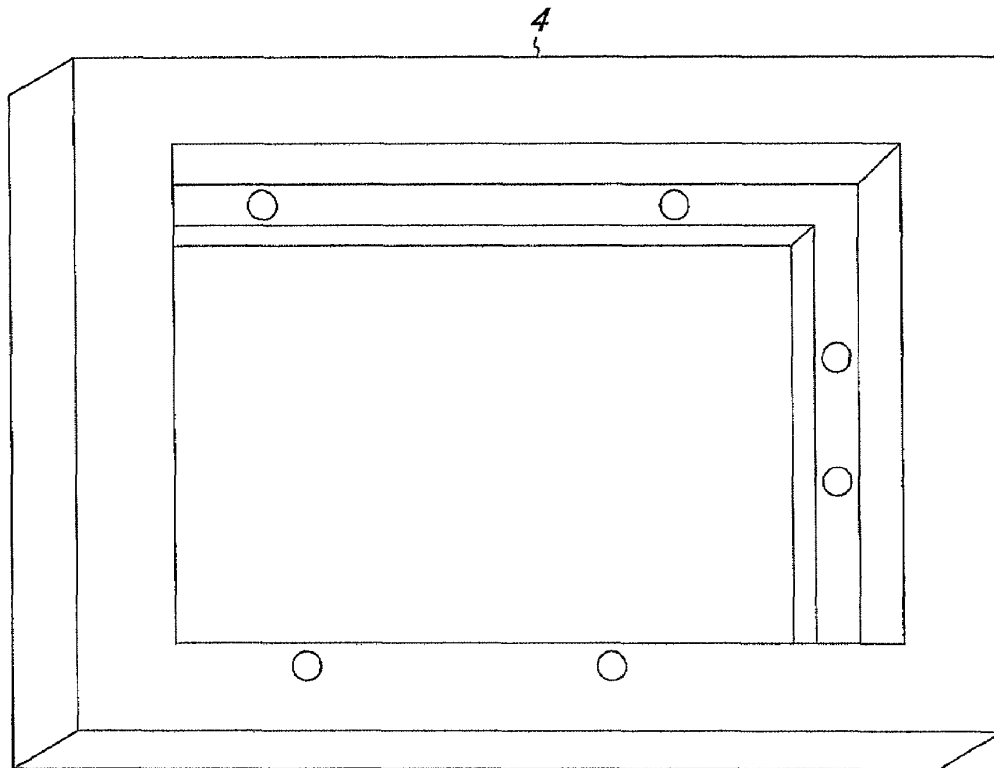




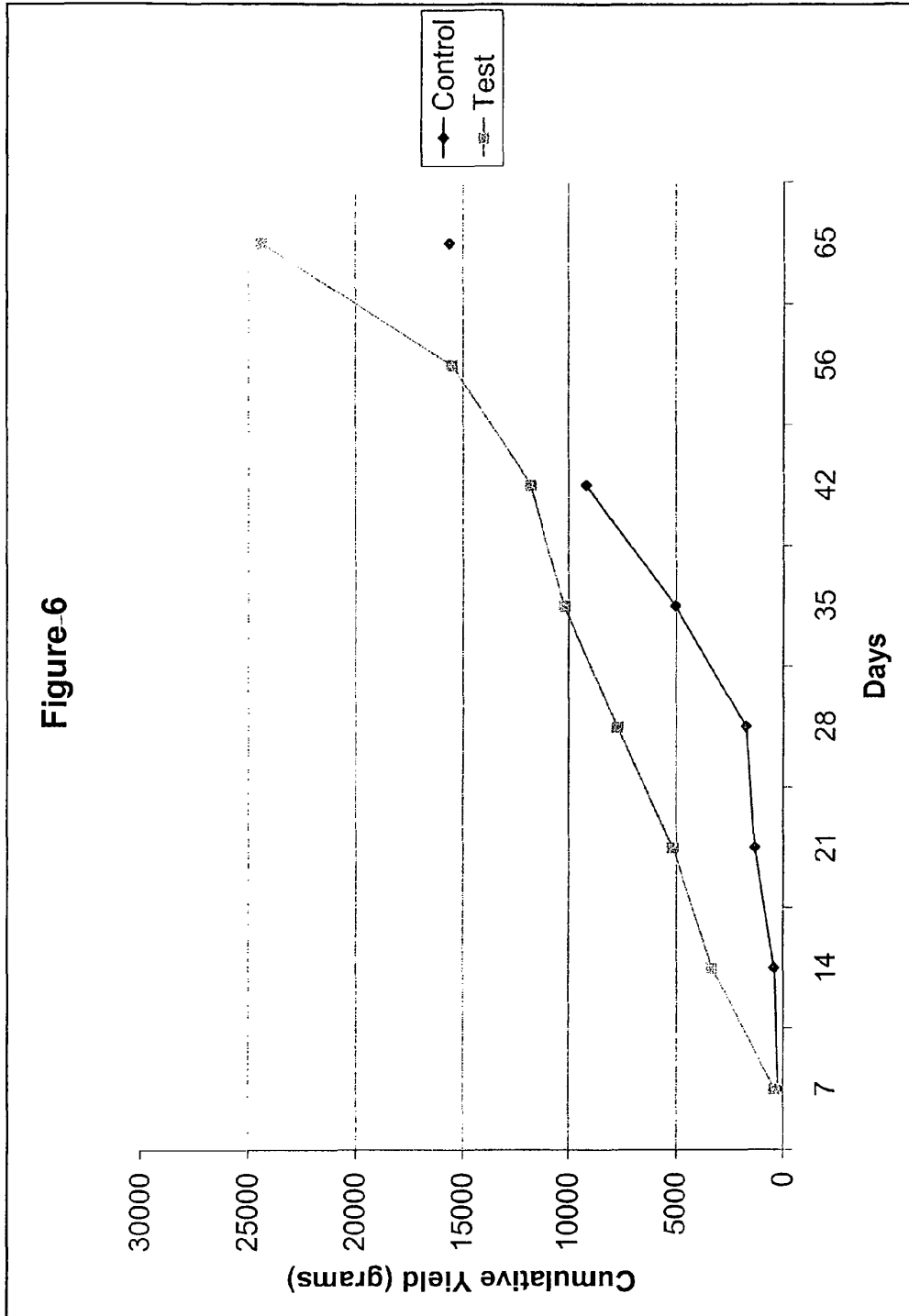
*Fig. 4*



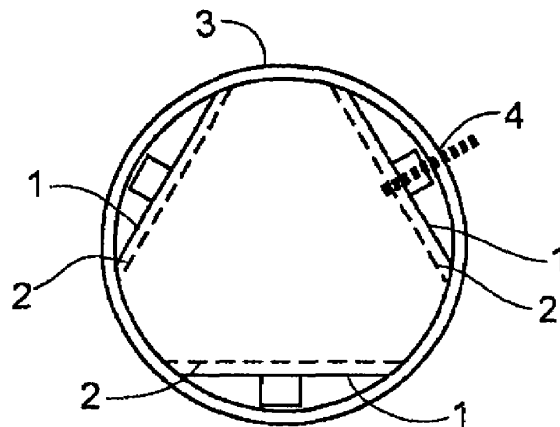
*Fig. 5A*



*Fig. 5B*



**Fig. 7A**



**Fig. 7B**

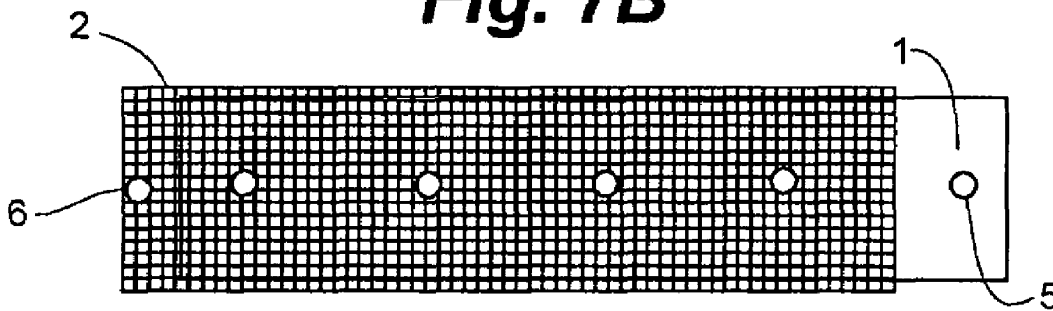
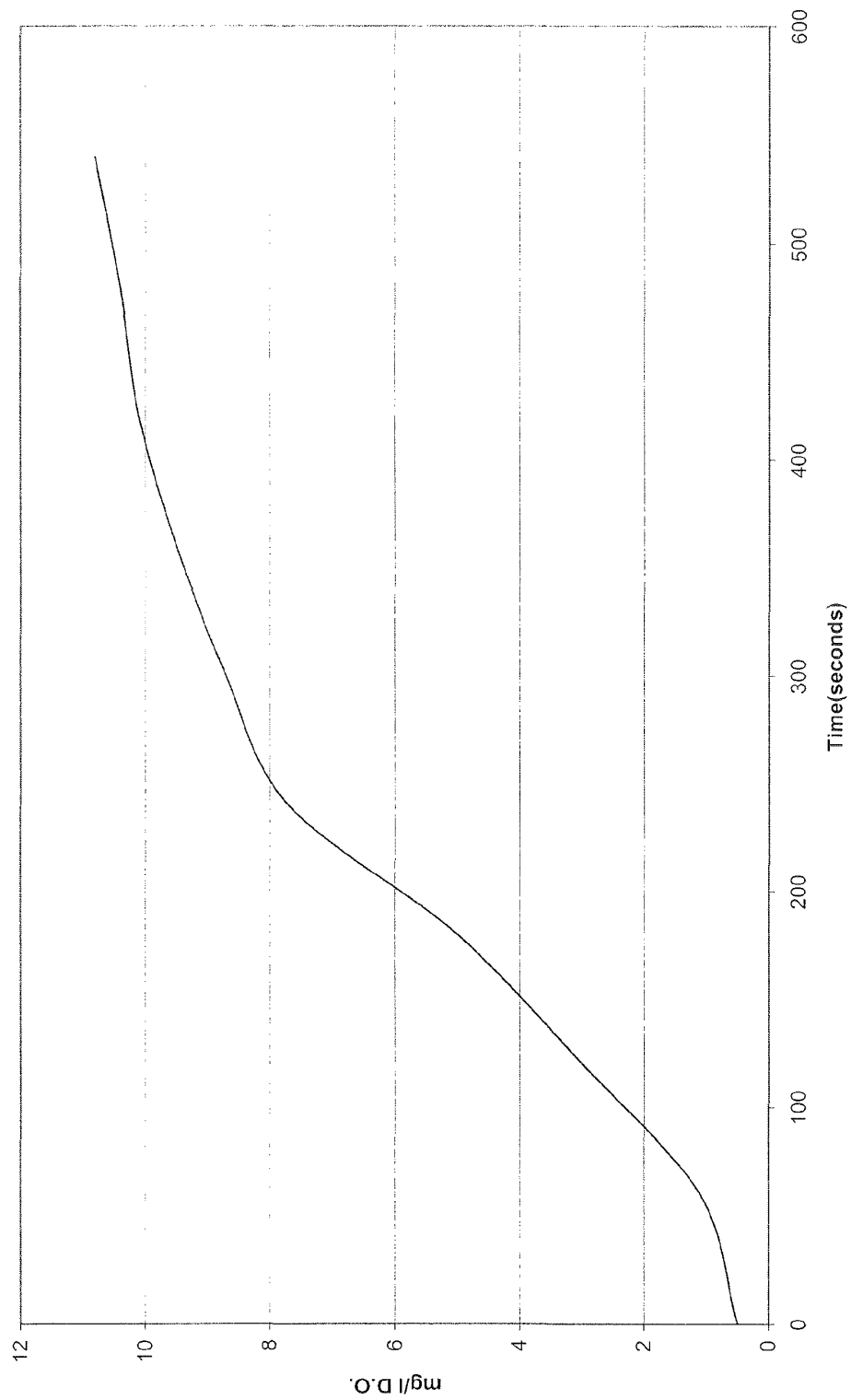


Fig. 8 Time vs D.O.



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**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

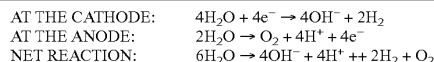
Many benefits may be obtained through raising the oxygen content of aqueous media. Efforts have been made to achieve higher saturated or supersaturated oxygen levels for applications such as the improvement of water quality in ponds, lakes, marshes and reservoirs, the detoxification of contaminated water, 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

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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:



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.

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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 ( $\frac{1}{16}$ )} 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<sub>2</sub> emitter of the invention.

FIG. 2 is an assembled device.

FIG. 3 is a diagram of the electronic controls of the O<sub>2</sub> emitter.

FIG. 4 shows a funnel or pyramid variation of the O<sub>2</sub> emitter.

FIG. 5 shows a multilayer sandwich O<sub>2</sub> 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. 7A is a cross section showing arrangement of three plate electrodes. FIG. 7B 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:

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"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<sub>2</sub> 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<sub>2</sub>. In the special dimensions of the invention, as explained in more detail in the following examples, O<sub>2</sub> 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<sub>2</sub> 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 ( $\frac{1}{16}$ )) 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

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connection point 5. FIG. 2 shows a plan view of the assembled device. The O<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> Bubbles

Attempts were made to measure the diameter of the O<sub>2</sub> 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<sub>2</sub> 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

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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<sub>2</sub>) 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
OFM 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<sub>2</sub> Emitter

An O<sub>2</sub> 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 1/2 gallon water reservoir for the Control plant was erated 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 appli-

cation 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	2910
August 10	905	1325
August 17	410	1735
August 24	3300	5035
August 31	4150	9175
September 15	not weighed	3710
Final Harvest	6435	15620
September 24		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.

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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, 5  
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 10  
emitter of claim 2.

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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

Page 1 of 1

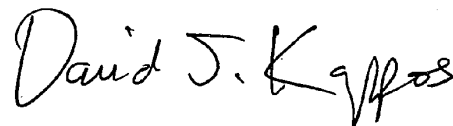
It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 10, Line 55:

Delete "breeding" and insert --breaking--.

Signed and Sealed this

First Day of June, 2010

A handwritten signature in black ink that reads "David J. Kappos". The signature is written in a cursive style with a large initial "D".

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

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>				
<b>Filing Date:</b>				
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR			
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw			
<b>Filer:</b>	Gregory M. Stark/John Gustav-Wrathall			
<b>Attorney Docket Number:</b>	3406.005USR			
Filed as Small Entity				
<b>Reissue (Utility) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
Utility Reissue Basic	2014	1	190	190
Design and utility Reissue Basic	2114	1	310	310
Design and utility Reissue Basic	2314	1	375	375
<b>Pages:</b>				
<b>Claims:</b>				
Reissue claims in excess of 20 for small	2205	45	30	1350
Independent claims reissue small	2204	2	125	250
Multiple dependent claims	2203	1	225	225

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>2700</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	11068096
<b>Application Number:</b>	13247241
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1737
<b>Title of Invention:</b>	FLOW-THROUGH OXYGENATOR
<b>First Named Inventor/Applicant Name:</b>	James Andrew Senkiw
<b>Customer Number:</b>	21186
<b>Filer:</b>	Gregory M. Stark/John Gustav-Wrathall
<b>Filer Authorized By:</b>	Gregory M. Stark
<b>Attorney Docket Number:</b>	3406.005USR
<b>Receipt Date:</b>	28-SEP-2011
<b>Filing Date:</b>	
<b>Time Stamp:</b>	14:45:32
<b>Application Type:</b>	Reissue (Utility)

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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3406006USR_apln_092811.pdf	3220942  078100ec4241370d721640d942314a61f86b993a	yes	58
<b>Multipart Description/PDF files in .zip description</b>					
	<b>Document Description</b>		<b>Start</b>		<b>End</b>
	Transmittal Reissue Application		1		1
	Transmittal Reissue Application		2		2
	Oath or Declaration filed		3		5
	Power of Attorney		6		12
	Consent of Assignee accompanying the declaration		13		18
	Consent of Assignee accompanying the declaration		19		24
	Preliminary Amendment		25		25
	Claims		26		31
	Applicant Arguments/Remarks Made in an Amendment		32		41
	Specification		42		43
	Drawings-only black and white line drawings		44		51
	Specification		52		58
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (SB06)	fee-info.pdf	39650  bd46527f494427d20ef0f7169f7d3d0e97bff311	no	2
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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**

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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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875				Application or Docket Number <b>13/247,241</b>		Filing Date <b>09/28/2011</b>		<input type="checkbox"/> To be Mailed			
<b>APPLICATION AS FILED – PART I</b>											
(Column 1)			(Column 2)			SMALL ENTITY <input checked="" type="checkbox"/>		OR		OTHER THAN SMALL ENTITY	
FOR		NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)	OR		RATE (\$)	FEE (\$)	
<input checked="" type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A		N/A	<b>190</b>			N/A		
<input checked="" type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (i), or (m))		N/A	N/A		N/A	<b>310</b>			N/A		
<input checked="" type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A		N/A	<b>375</b>			N/A		
TOTAL CLAIMS (37 CFR 1.16(i))		87 minus 20 =	* 67		X \$30 =	<b>2010</b>	OR		X \$ =		
INDEPENDENT CLAIMS (37 CFR 1.16(h))		5 minus 3 =	* 2		X \$125 =	<b>250</b>	OR		X \$ =		
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 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).									
<input checked="" type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))											
* If the difference in column 1 is less than zero, enter "0" in column 2.											
<b>APPLICATION AS AMENDED – PART II</b>					SMALL ENTITY		OR		OTHER THAN SMALL ENTITY		
(Column 1)			(Column 2)			(Column 3)					
AMENDMENT	<b>09/28/2011</b>		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))		* 87	Minus	** 87	=	0	X \$30 =	0	OR X \$ =	
	Independent (37 CFR 1.16(h))		* 5	Minus	***5	=	0	X \$125 =	0	OR X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))										
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
							TOTAL ADD'L FEE	<b>0</b>	OR		TOTAL ADD'L FEE
AMENDMENT			CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))		*	Minus	**	=	X \$ =	OR		X \$ =	
	Independent (37 CFR 1.16(h))		*	Minus	***	=	X \$ =	OR		X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))										
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
							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.										Legal Instrument Examiner: /CORALIA BETANCOURT/	
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".											
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The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.											

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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