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Flournoy et al.

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(54) **EXTRUDED MEDIA FOR SUPPORTING GROWTH BIOLOGY WITHIN A WASTEWATER TREATING SYSTEM**

(75) Inventors: **Wayne J. Flournoy**, Chapel Hill, NC (US); **Richard L. Pehrson**, Efland, NC (US)

(73) Assignee: **Entex Technologies Inc.**, Chapel Hill, NC (US)

(**) Term: **14 Years**

(21) Appl. No.: **29/363,301**

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Related U.S. Application Data

(63) Continuation-in-part of application No. 29/346,510, filed on Nov. 2, 2009, now Pat. No. Des. 618,760.

(51) **LOC (9) Cl.** **23-01**

(52) **U.S. Cl.** **D23/207**

(58) **Field of Classification Search** D23/207, D23/269; 210/614, 616, 150

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

578,548 A	3/1897	Deruelle
3,266,787 A	8/1966	Eckert
3,617,541 A	11/1971	Pan
3,752,453 A	8/1973	Doyne
3,785,620 A	1/1974	Huber
3,842,804 A	10/1974	Christensen et al.
3,864,246 A	2/1975	Casey et al.
3,882,027 A	5/1975	Lunt

(Continued)

FOREIGN PATENT DOCUMENTS

DE 3728812 A1 10/1988

(Continued)

OTHER PUBLICATIONS

Pehrson et al., U.S. Appl. No. 12/719,527, filed Mar. 8, 2010.

(Continued)

Primary Examiner — Robin V Webster

(74) *Attorney, Agent, or Firm* — Stanislav Antolin

(57) **CLAIM**

The ornamental design for an extruded media for supporting growth biology within a wastewater treating system, as shown and described.

DESCRIPTION

The present application in turn claims benefits under 35 U.S.C. § 120 to commonly assigned U.S. application Ser. No. 29/321,003 filed on Jul. 9, 2008, the subject matter of which is incorporated herein by reference, that in turn claims benefits under 35 U.S.C. § 120 to commonly assigned U.S. application Ser. No. 11/552,778 filed on Oct. 25, 2006, the subject matter of which is incorporated herein by reference.

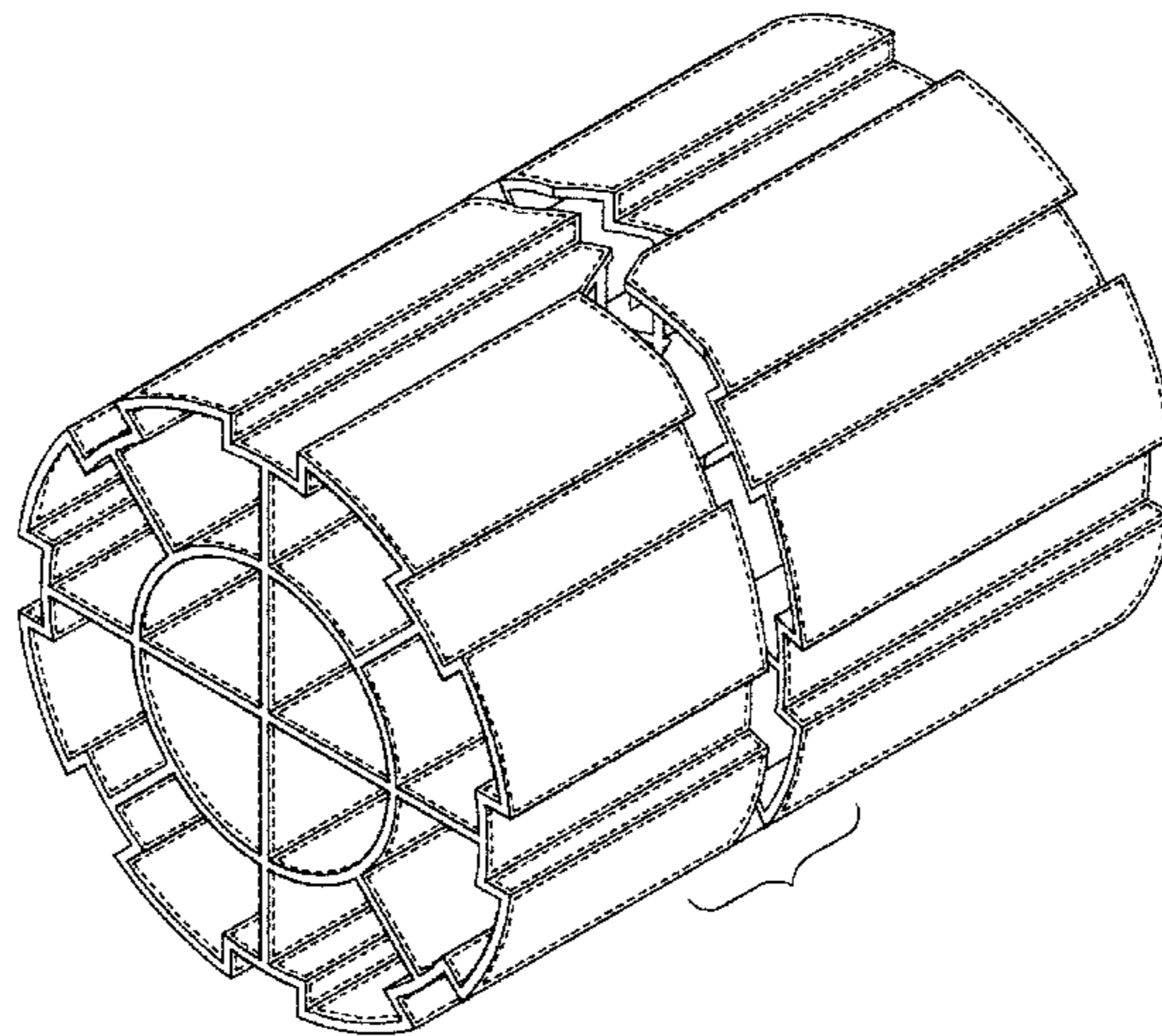
FIG. 1 is a diagram illustrating a cross-sectional view of an extruded media or injection molded media for supporting growth biology within a biological reactor wherein the plane of the cross-sectional view is substantially perpendicular to the longitudinal axis and the view is substantially perpendicular to the plane of the cross-sectional view and substantially along the longitudinal axis of the media;

FIG. 2 is a diagram illustrating the left side view of the extruded media or injection molded media of FIG. 1, the right side view of the media being a mirror image; and,

FIG. 3 is a diagram illustrating an isometric view of the extruded media or injection molded media of FIG. 1.

The broken lines shown in FIGS. 1-3 are included for the purpose of illustrating those portions of the surface of the claimed media design where surface features form no part of the claimed media design and represent only the environment of the claimed media design. None of the broken lines forms a part of the claimed media.

1 Claim, 3 Drawing Sheets



U.S. PATENT DOCUMENTS

3,914,351 A 10/1975 McKeown et al.
 3,947,532 A 3/1976 Skold et al.
 3,954,615 A 5/1976 Shelef
 3,957,931 A 5/1976 Ellis
 3,966,608 A 6/1976 Mason et al.
 D243,531 S 3/1977 Strigle, Jr.
 4,122,011 A 10/1978 Strigle, Jr.
 4,169,050 A 9/1979 Serfling et al.
 4,177,147 A 12/1979 Roberts
 4,195,043 A 3/1980 Foote et al.
 4,267,052 A 5/1981 Chang
 4,279,753 A 7/1981 Nielson et al.
 4,296,050 A 10/1981 Meier
 4,303,600 A 12/1981 Roe, Jr.
 4,333,893 A 6/1982 Clyde
 4,422,930 A 12/1983 Hatanaka
 4,425,231 A 1/1984 Fujimoto et al.
 4,431,549 A 2/1984 Highstreet et al.
 4,434,061 A 2/1984 McDowell
 4,511,519 A 4/1985 Hsia
 4,522,767 A 6/1985 Billet et al.
 4,595,296 A 6/1986 Parks
 4,599,174 A 7/1986 McDowell
 4,600,544 A 7/1986 Mix
 4,620,930 A 11/1986 McDowell
 4,639,314 A 1/1987 Tyer
 4,668,387 A 5/1987 Davie et al.
 4,668,442 A 5/1987 Lang
 4,806,288 A 2/1989 Nowosinski et al.
 4,818,404 A 4/1989 McDowell
 4,940,540 A 7/1990 McDowell
 D345,410 S 3/1994 Del Prete
 5,298,164 A 3/1994 Hapach et al.
 D353,438 S 12/1994 Yuksel
 D354,544 S 1/1995 Erwes
 5,458,779 A 10/1995 Odegaard
 5,468,392 A 11/1995 Hanson et al.
 5,498,376 A 3/1996 St. Louis et al.
 5,543,039 A 8/1996 Odegaard
 5,549,828 A 8/1996 Ehrlich
 5,580,644 A 12/1996 Minami
 5,585,266 A 12/1996 Plitt et al.
 5,690,819 A 11/1997 Chianh
 5,693,383 A 12/1997 Basse et al.
 5,771,716 A 6/1998 Schluskel
 5,779,886 A 7/1998 Couture
 5,839,828 A 11/1998 Glanville
 5,863,128 A 1/1999 Mazzei
 6,039,873 A 3/2000 Stahler
 6,109,781 A 8/2000 Ogasawara et al.
 6,126,829 A 10/2000 Gunnarsson et al.
 6,170,216 B1 1/2001 Rye et al.
 6,173,526 B1 1/2001 Mazzei
 6,383,373 B1 5/2002 Nakao et al.
 6,444,126 B1 9/2002 Gates et al.
 6,464,211 B1 10/2002 Downs
 D465,257 S 11/2002 Van Olst et al.
 6,524,849 B1 2/2003 Adams et al.
 6,685,826 B1 2/2004 James
 6,726,838 B2 4/2004 Schechter et al.
 6,730,214 B2 5/2004 Mazzei
 6,852,227 B1 2/2005 Petrone
 6,858,144 B2 2/2005 Narita et al.
 6,899,359 B2 5/2005 Presby
 6,916,421 B1 7/2005 Cullinan et al.
 7,189,323 B2 3/2007 Lofqvist et al.
 7,246,795 B2 7/2007 Niknafs et al.
 7,445,715 B2 11/2008 Pehrson et al.
 7,691,262 B2 4/2010 Pehrson et al.
 D618,760 S 6/2010 Flournoy et al.
 2003/0127378 A1 7/2003 Schechter et al.
 2003/0192827 A1 10/2003 McDowell et al.
 2004/0011737 A1 1/2004 McDowell et al.
 2004/0151547 A1 8/2004 Presby
 2004/0178132 A1 9/2004 Nakhla et al.
 2004/0256315 A1 12/2004 Boyd et al.

2005/0104376 A1 5/2005 Presby
 2007/0102354 A1 5/2007 Flournoy et al.
 2010/0163485 A1 7/2010 Pehrson et al.

FOREIGN PATENT DOCUMENTS

EP 0346013 A1 12/1989
 EP 0695721 A2 2/1996
 EP 1340720 A1 9/2003
 GB 1498360 1/1978
 WO 8801197 2/1988
 WO 9111396 A1 8/1991
 WO 9603351 A1 2/1996
 WO 0198477 A1 12/2001
 WO 03051485 A1 6/2003
 WO 03068694 A1 8/2003
 WO 2006058097 A1 6/2006

OTHER PUBLICATIONS

Pehrson et al., U.S. Appl. No. 12/752,658, filed Apr. 1, 2010.
 Flournoy et al., U.S. Appl. No. 12/792,721, filed Jun. 2, 2010.
 Brentwood Industries, Integrated Fixed Film/Activated Sludge (IFAS) Technology, article, Copyright Oct. 2001, pp. 1-6, Document 4.0, Brentwood Industries, Reading, PA.
 David Krichen and Curtis McDowell, Simultaneous Nitrification and Denitrification in Biofilms of an Engineered Integrated Fixed-Film Activated Sludge (IFAS) System, article, pp. 1-4, Brentwood Industries, Reading, PA.
 Diffuser Express a Division of Environmental Dynamics Inc., Catalog #105-2006, catalog, Date Unknown, pp. 1-30, Diffuser Express, Columbia, MO.
 Emanuel P. Psaltakis, James Liubicich, Paul Pitt, Paul Antonio and Sole Posada of Hazen and Sawyer, P.C., Demonstration of Integrated Fixed Film Activated Sludge Process for BNR at the Mamaroneck WWTP, article, Copyright 2003, pp. 1-22, Water Environment Federation Technical Exhibition and Conference (WEFTEC) 2003, Water Environment Federation, Alexandria, VA.
 Entex Technologies, Inc., BioWeb fixed media system, article, Copyright 2004, pp. 1-2, Entex Technologies, Inc., Chapel Hill, NC.
 Entex Technologies, Inc., Internet website: (<http://www.entexinc.com/Installations.htm>), pp. 1-2, Entex Technologies, Inc., Chapel Hill, NC.
 Flournoy et al., U.S. Appl. No. 11/552,778 (now abandoned), filed Oct. 25, 2006, Office Action dated Apr. 9, 2008.
 Flournoy et al., U.S. Appl. No. 29/321,003 (now abandoned), filed Jul. 9, 2008, Office Action dated Dec. 1, 2008.
 Flournoy et al., U.S. Appl. No. 29/321,003 (now abandoned), filed Jul. 9, 2008, Office Action dated May 18, 2009.
 Flournoy et al., U.S. Appl. No. 29/363,301, filed Jun. 8, 2010.
 Hydroxyl Systems Inc., Hydroxyl Systems Advanced Water and Wastewater Treatment, article, Copyright 2003, 66 pages, internet address <http://hydroxyl.com/hydroxyl.html>, Hydroxyl Systems Inc., Victoria, BC Canada.
 Hydroxyl Systems Inc., The Hydroxyl—F3R Process innovative biological treatment technology, article, pp. 1-2, Hydroxyl Systems Inc., Sidney, BC Canada.
 International Search Report mailed on Apr. 5, 2008 in PCT/US2005/042503.
 International Search Report mailed on Feb. 23, 2007 in PCT/US2006/041818.
 Pehrson et al., U.S. Appl. No. 11/284,792 (now U.S. Patent No. 7,445,715), filed Nov. 22, 2005, Office Action dated Jul. 11, 2007.
 Pehrson et al., U.S. Appl. No. 11/284,792 (now U.S. Patent No. 7,445,715), filed Nov. 22, 2005, Office Action dated Feb. 13, 2008.
 Pehrson et al., U.S. Appl. No. 12/250,053 (now U.S. Patent No. 7,691,262), filed Oct. 13, 2008, Office Action dated Apr. 2, 2009.
 Pulsed Hydraulics, Inc., Variable "Speed" Tank Mixing With No In-basin Moving Parts, article, Copyright 2005, 8 pages, internet address <http://phiwater.com/>, Pulsed Hydraulics, Inc., Bellevue, WA.
 Robert Zammataro, Andrew G. Lynn, P.E., Dee, Donald E. Maurer, P.E., Dee and Roderick D. Reardon, P.E., Dee, Upgrading a Contact Stabilization Treatment Plant to a Nitrifying Activated Sludge Process by Using Integrated Fixed-Film Activated Sludge (IFFAS) Media, paper, pp. 1-9, Date Unknown.

Sarah B. Hubbell and David J. Krichten of Brentwood Industries Inc., Demonstration and Full Scale Results of a Plant Upgrade for BNR Using Integrated Fixed-Film Activated Sludge (IFAS) Technology, article, Copyright 2004, pp. 1-8, Water Environment Federation Technical Exhibition and Conference (WEFTEC) 2004, New Orleans, Louisiana, Oct. 2-6, Water Environment Federation, Alexandria, VA.

Sarah B. Hubbell, Richard Pehrson and Andrew Schuler of Entex Technologies Inc., Eight Years of Successful Cold Weather Nitrification With Integrated Fixed-Film/Activated Sludge, paper, pp. 1-11, Proceedings of the Water Environment Federation Annual Conference (WEFTEC), Dallas, Texas, Oct. 22-25, 2006.

Sarah B. Hubbell, Richard Pehrson, and Wayne Flournoy, "Webitat Advanced IFAS System Addresses Common Fixed Media Concerns," Entex Technologies, Inc., date unknown.

Terry L. Johnson, Andrew Shaw, Heather Phillips, Nancy Choi, Thomas Lauro, Ralph Butler, and Leah Radko, A Pilot-Scale Comparison of IFAS and MBBR to Achieve Very Low Total Nitrogen Concentrations, article, Copyright 2007, pp. 1-14, vol. 1, No. 5, Water Environment Federation, Alexandria, VA.

United States Environmental Protection Agency, Fine Pore (Fine Bubble) Aeration Systems, Summary Report, Oct. 1985, pp. 1-50, EPA/625/8-85/010, EPA Water Engineering Research Laboratory, Cincinnati, Ohio.

United States Environmental Protection Agency, Fine Pore Aeration Systems, Design Manual, Sep. 1989, pp. 1-305, EPA/625/1-89-023, EPA Center for Environmental Research Information, Cincinnati, Ohio.

United States Environmental Protection Agency, Jeremiah J. McCarthy, Technology Assessment of Fine Bubble Aerators, report, Feb. 1982, pp. 1-48, EPA/600/2-82/003, USEPA Municipal Environmental Research Laboratory, Cincinnati, Ohio.

USFilter, Integrated Headworks Systems, article, Copyright 2000, pp. 1-12, LB-HW-BR-1000, USFilter, Chalfont, PA.

Water Environment & Technology, David R. Jackson, Leonard E. Ripley, Tod Maurina and Sarah Hubbell, Up to the Challenge IFAS Helps Growing Texas City Meet Discharge Limits, Expand Capacity, magazine, Nov. 2007, pp. 51-55, Water Environment & Technology.

Water Environment & Technology, Terry L. Johnson, Cindy Wallis-Lage, Andrew R. Shaw and Jim McQuarrie, IFAS Options Which One is Right for Your Project?, magazine, Nov. 2005, pp. 18-22, Water Environment & Technology.

Written Opinion mailed on Apr. 5, 2008 in PCT/US2005/042503.

Written Opinion of the International Searching Authority mailed on Feb. 23, 2007 in PCT/US2006/041818.

Figure 1

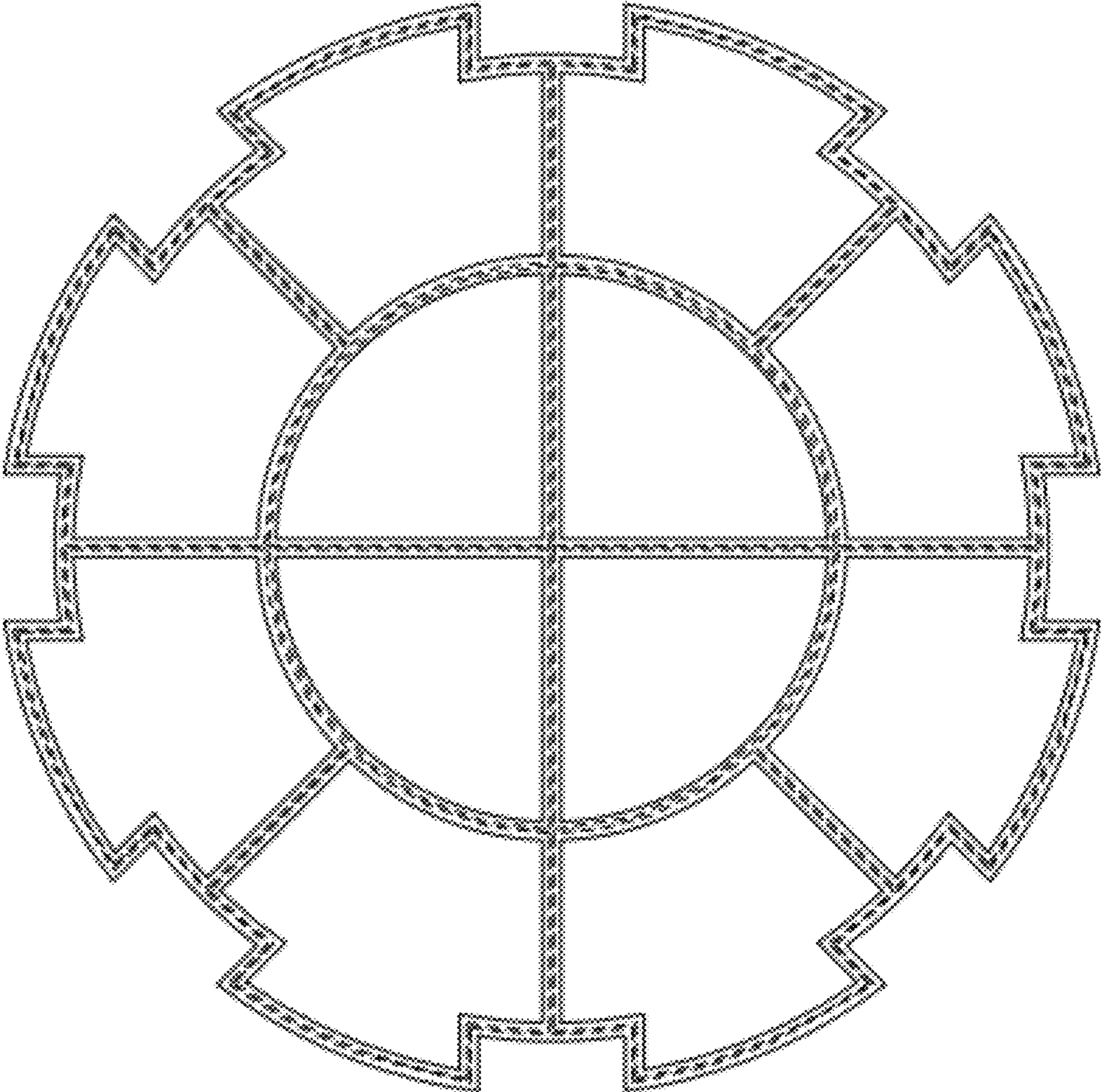


Figure 2

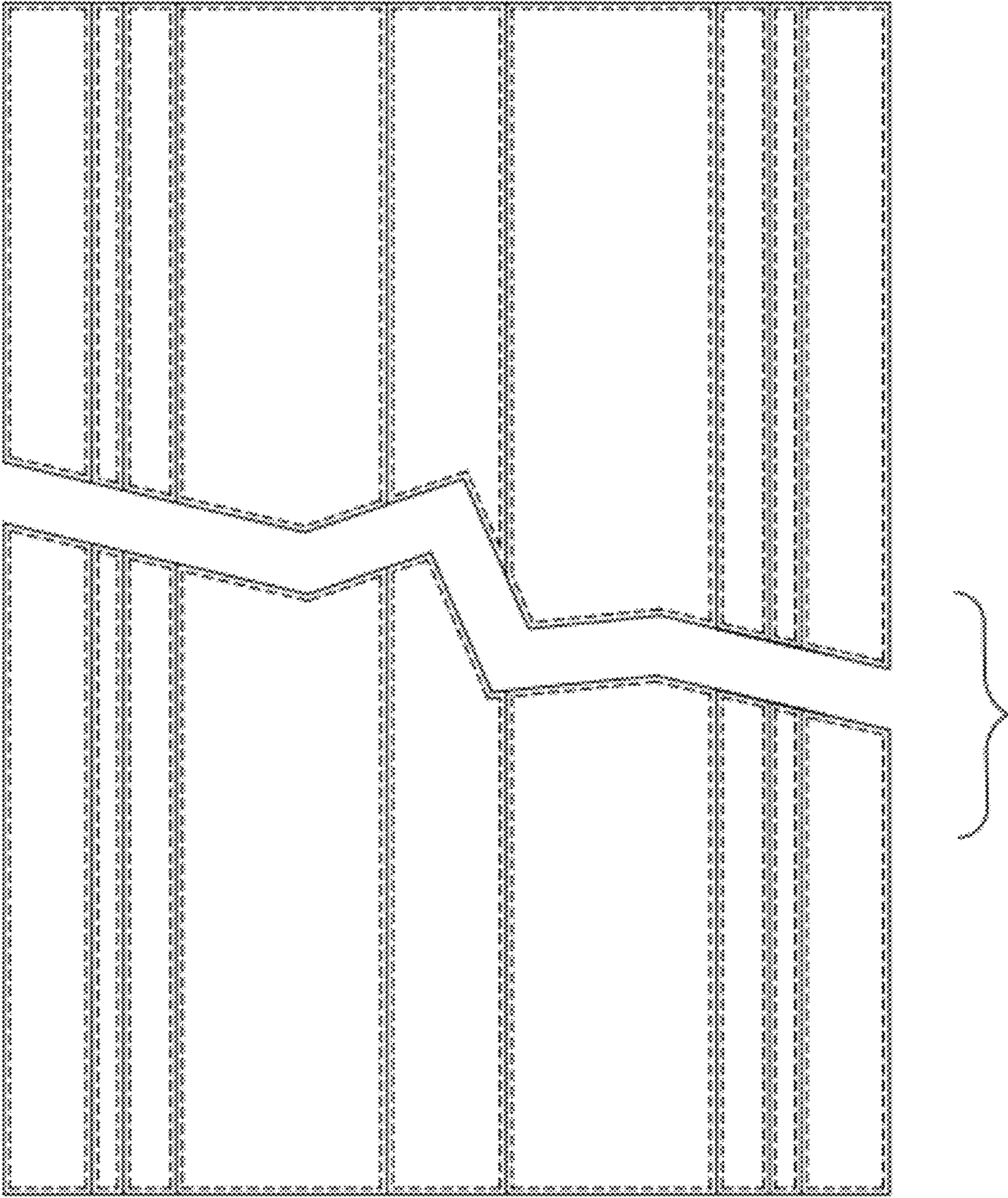


Figure 3

