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Senkiw

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(54) **FLOW-THROUGH OXYGENATOR** 205/701, 628, 633, 742, 756, 757;
22/192, 321.7, 1; 119/263
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MN (US) See application file for complete search history.

(73) Assignee: **Oxygenator Water Technologies, Inc.**,
St. Louis Park, MN (US)

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10, 2003, now Pat. No. 7,396,441, which is a continu-
ation-in-part of application No. 10/372,017, filed on
Feb. 21, 2003, now Pat. No. 6,689,262.
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22, 2002.

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204/628; 204/600; 210/600; 210/243; 210/153;
422/22; 422/186; 422/186.04

(58) **Field of Classification Search**
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422/186.16, 186.21, 616, 243, 305, 308;
204/155, 157.15, 157.5, 164, 176, 178,
204/450, 554, 193, 194, 260, 272, 280, 277,
204/278.5, 287, 288, 288.1, 288.2, 230.2;

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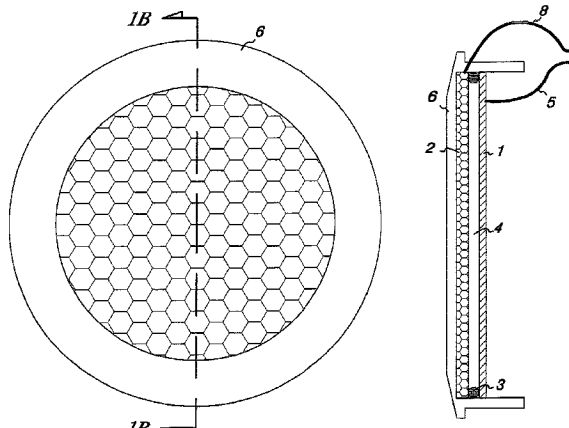
Primary Examiner — Walter D Griffin
Assistant Examiner — Cameron J Allen

(74) *Attorney, Agent, or Firm* — Schwegman Lundberg &
Woessner, 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.

16 Claims, 8 Drawing Sheets



US RE45,415 E

Page 2

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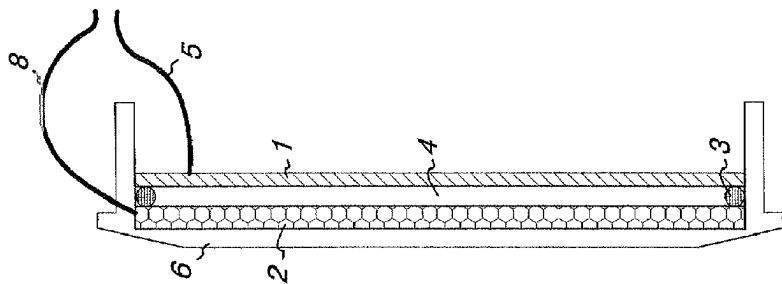


Fig. 1B

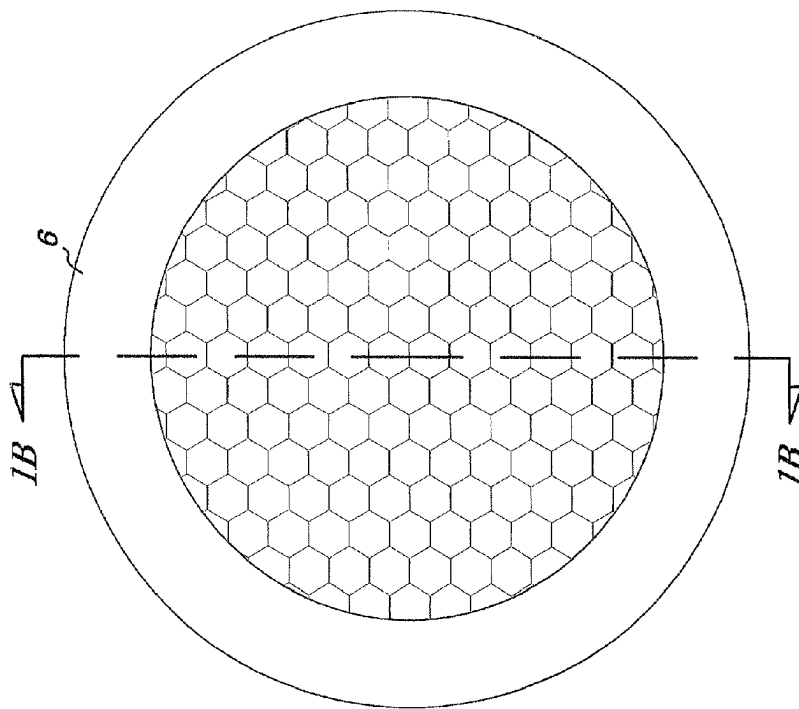


Fig. 1A

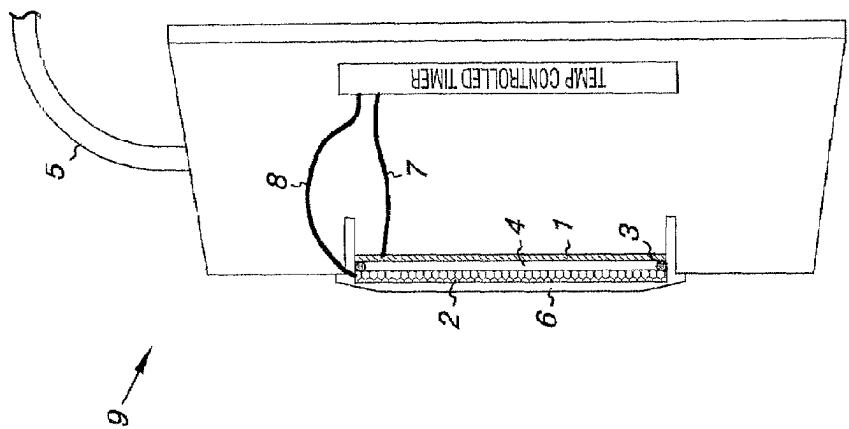


Fig. 2B

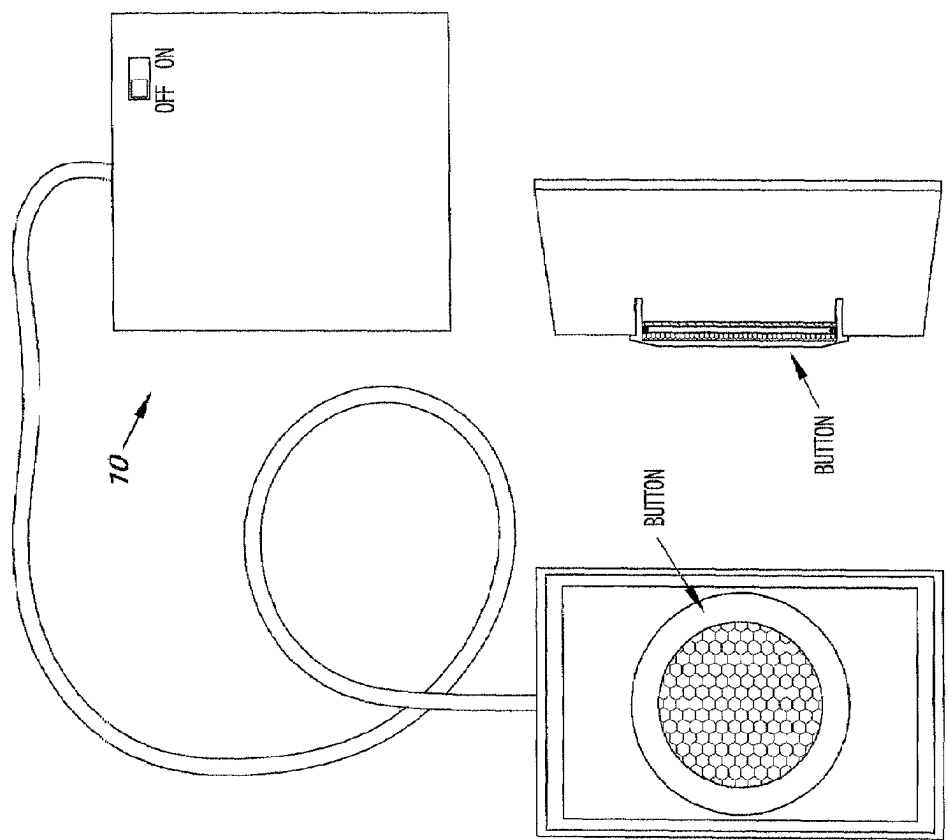


Fig. 2A

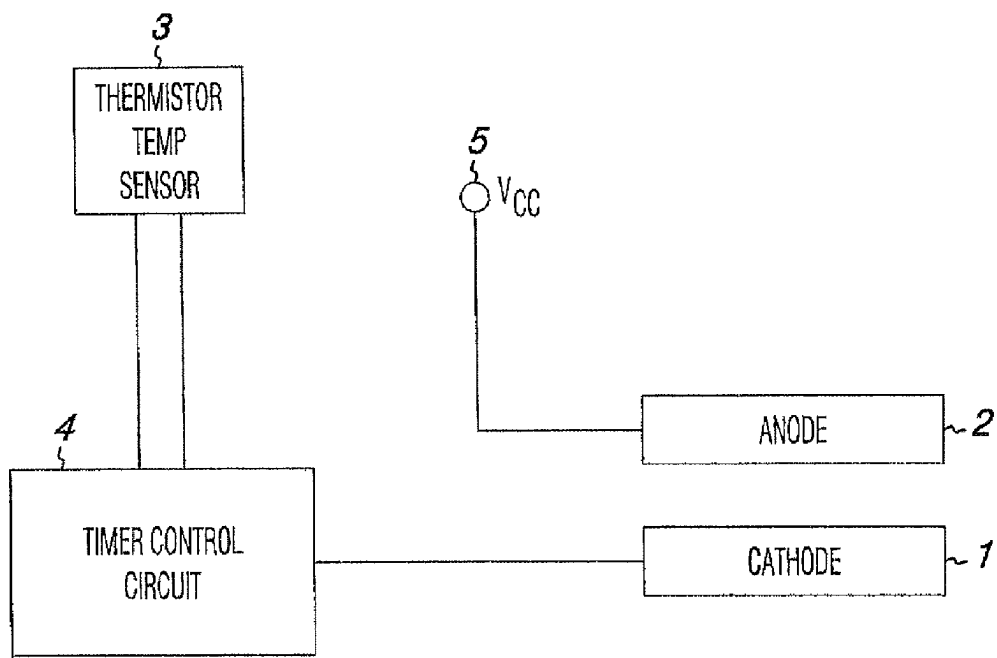


Fig. 3

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