

US006936156B2

(12) United States Patent Smith et al.

(10) Patent No.: **US 6,936,156 B2**
(45) Date of Patent: **Aug. 30, 2005**

(54) AUTOMATED SELF-CALIBRATING WATER QUALITY MONITORING SENSOR HOUSING ASSEMBLY

(75) Inventors: **Kirk P. Smith, Mason, NH (US);
Gregory E. Granato, Upton, MA (US)**

(73) Assignee: **The United States of America as
represented by the Secretary of the
Department of the Interior,
Washington, DC (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.

(21) Appl. No.: **09/881,243**

(22) Filed: **Aug. 30, 2001**

(65) Prior Publication Data

US 2003/0042149 A1 Mar. 6, 2003

(51) Int. Cl.⁷ **G01N 27/27; G01N 27/416**

(52) U.S. Cl. **205/775; 205/789; 204/409;
204/416**

(58) Field of Search **205/778.5, 781.5,
205/789, 775; 204/409, 411, 412, 416,
418, 419, 401; 422/50, 62, 82.01, 82.03,
82.02**

(56) References Cited

U.S. PATENT DOCUMENTS

4,762,594 A * 8/1988 Guruswamy 205/792

5,230,785 A	*	7/1993	Yager	.....	204/405
5,330,634 A	*	7/1994	Wong et al.	.....	205/777.5
5,496,450 A	*	3/1996	Blumenthal et al.	.....	205/782
5,653,862 A	*	8/1997	Parris	.....	205/777.5
5,993,742 A	*	11/1999	Binz et al.	.....	422/81
6,290,908 B1	*	9/2001	Fukunaga et al.	.....	422/68.1

FOREIGN PATENT DOCUMENTS

JP	10-337556 A	*	12/1998	.....	C02F/1/00
JP	2001033297 A	*	2/2001	.....	G01F/23/28

OTHER PUBLICATIONS

JPO abstract of Komatsu et al. (JP 10337556 A).*

JPO abstract of Takagi et al. (JP 2001033297 A).*

* cited by examiner

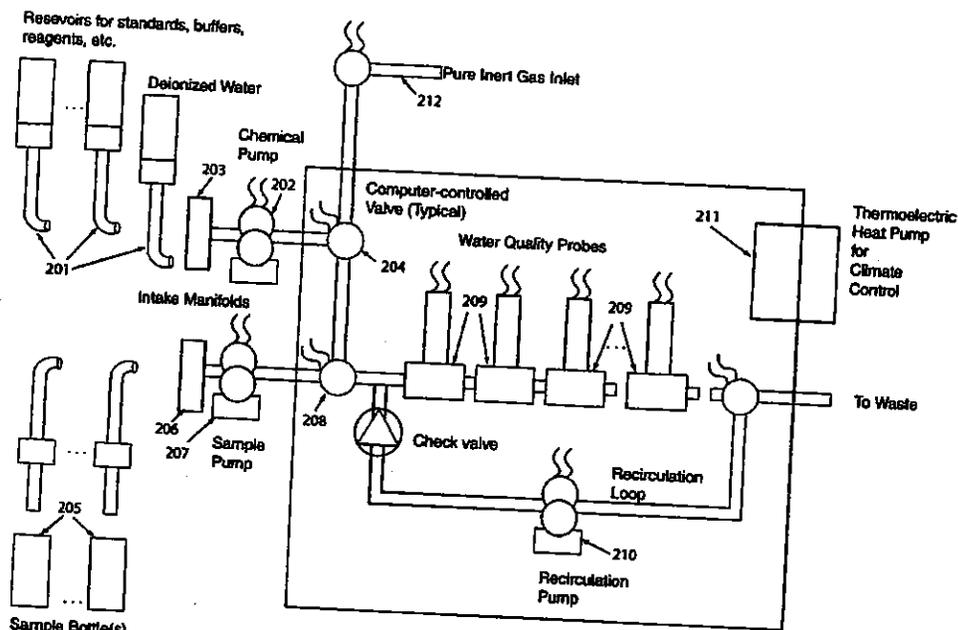
Primary Examiner—Alex Nogueroles

(57)

ABSTRACT

An automated self-calibrating water quality monitoring sensor housing assembly includes a number of ion-selective electrodes combined in a single flow train to provide for the multi constituent analysis of a number of samples without direct intervention by a human operator. An operator can enter the laboratory, connect sample bottles to an intake manifold, activate the device, and download data once the analysis is complete. With the exception of periodic probe maintenance, the system is designed to be self-calibrating and self cleaning.

13 Claims, 4 Drawing Sheets



Simplified schematic of one implementation of the automated self-calibrating water-quality-monitoring sensor-housing assembly.