(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
29 July 2004 (29.07.2004)

PCT

(10) International Publication Number
WO 2004/063675 A3

(51) International Patent Classification[7]: G01F 1/66, 1/74, 1/704, 1/708, 1/712

(21) International Application Number: PCT/US2004/000940

(22) International Filing Date: 13 January 2004 (13.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/439,715	13 January 2003 (13.01.2003)	US
60/440,014	14 January 2003 (14.01.2003)	US
60/447,498	14 February 2003 (14.02.2003)	US
60/524,066	21 November 2003 (21.11.2003)	US
60/531,065	19 December 2003 (19.12.2003)	US

(71) Applicant *(for all designated States except US)*: **CIDRA CORPORATION** [US/US]; 50 Barnes Park North, Willingford, CT 06492 (US).

(72) Inventors: **KERSEY, Alan, D.**; 75 Taylor Town Road, South Glastonbury, CT 06973 (US). **GYSLING, Daniel, L.**; 763 Chesnut Hill Road, Glastonbury, CT 06033 (US).

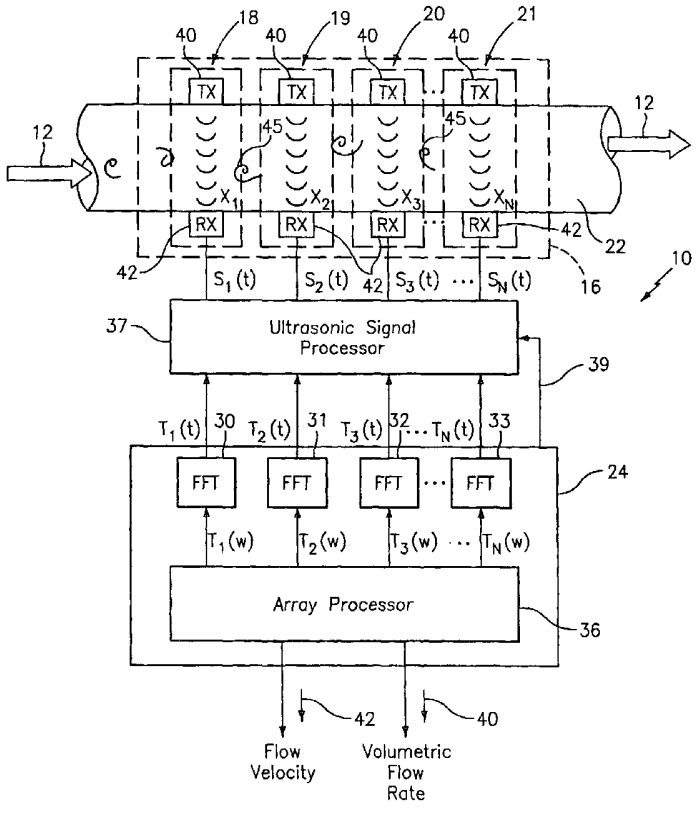
(74) Agent: **HIRSCH, Peter**; Klunker, Schmitt-Nilson, Hirsch, Winzererstrasse 106, D-80796 Munich (DE).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(54) Title: APPARATUS AND METHOD USING AN ARRAY OF ULTRASONIC SENSORS FOR DETERMINING THE VELOCITY OF A FLUID WITHIN A PIPE



(57) Abstract: An apparatus and method for measuring the flow velocity of a fluid flowing through a pipe that includes an array of at least two ultrasonic sensor units (with as many as 16 sensor units) disposed at predetermined locations along the pipe. Each sensor unit includes an ultrasonic transmitter and an ultrasonic receiver. Each sensor unit provides a respective signal indicative of a parameter of the transit time or amplitude of the ultrasonic signal propagating between each respective ultrasonic transmitter and ultrasonic receiver. A signal processor defines a convective ridge in the k-ω plane in response to the ultrasonic signals using an adaptive beamforming algorithm, such as Capon and Music. The signal processor further determines the slope of at least a portion of the convective ridge to determine the flow velocity of the fluid.

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Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:
9 December 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No
US2004/000940

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01F1/66 G01F1/74 G01F1/704 G01F1/708 G01F1/712

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 367 911 A (JEWELL ANDREW D ET AL) 29 November 1994 (1994-11-29) abstract; figures 1-3,13-15 column 11 - column 12	1-21
Y	US 2002/095263 A1 (GYSLING DANIEL L) 18 July 2002 (2002-07-18) cited in the application abstract; figures 1,2 paragraph '0016! - paragraph '0030!	1-21
A	US 4 248 085 A (COULTHARD JOHN) 3 February 1981 (1981-02-03) abstract; figures 3A,5J column 7, line 23 - line 57	1,11,21

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Date of the actual completion of the international search	Date of mailing of the international search report
5 October 2004	13/10/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Vorropoulos, G

INTERNATIONAL SEARCH REPORT

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US2004/000940

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