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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,

KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))
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- (88) Date of publication of the international search report:
24 November 2016

(54) Title: FLUID DISPENSING SYSTEM

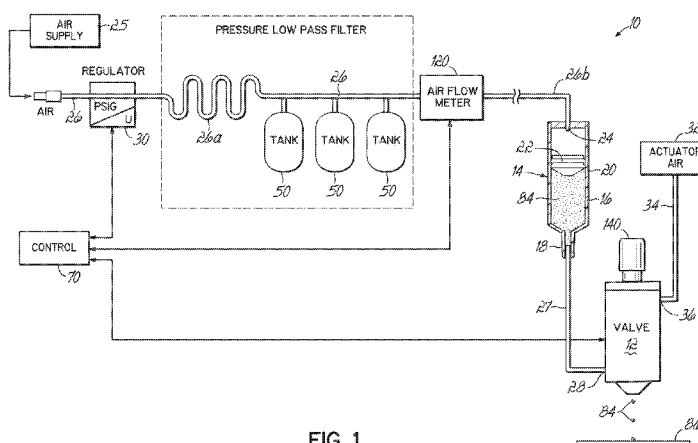


FIG. 1

(57) Abstract: Systems and methods related to dispensing fluid and controlling a dispensing operation. The system includes a fluid dispenser including an inlet and an outlet, the dispenser being operable to start and stop the flow of the fluid from the outlet onto a substrate. A fluid supply reservoir adapted to hold the fluid, and having an outlet coupled in fluid communication with the inlet of the fluid dispenser to establish a flow path for the fluid between the fluid supply reservoir and the outlet of the fluid dispenser. The fluid supply reservoir further includes a pneumatic input coupled to an air flow path adapted to receive pressurized air for forcing the fluid from the outlet of the reservoir. An electronic air mass flow meter device is operatively coupled to the air flow path to produce electrical output signals proportional to the mass flow rate of the air flowing through the pneumatic input. Components and methods are provided to accurately determine the volume of the fluid in the reservoir, and to set the stroke length of a valve used in the system.



INTERNATIONAL SEARCH REPORT

International application No
PCT/US2015/067300

A. CLASSIFICATION OF SUBJECT MATTER
INV. G05D7/06
ADD.
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)
G05D B05B B05C 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 practicable, search terms used)
EPO-Internal, 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 2014/138400 A1 (DONNER JOSEPH E [US] ET AL) 22 May 2014 (2014-05-22) the whole document -----	1-6, 9-21, 25-41
Y	GB 2 069 726 A (LOVELOCK J E) 26 August 1981 (1981-08-26) the whole document -----	1-6,9, 12,25-39
Y	US 2011/315114 A1 (HAMMOND BRYANT G [US] ET AL) 29 December 2011 (2011-12-29) the whole document -----	3-5, 10-21, 27-29, 40,41
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search 7 October 2016	Date of mailing of the international search report 14/10/2016
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Vañó Gea, Joaquín
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2015/067300

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	FR 2 697 825 A1 (FRANCE TELECOM [FR]) 13 May 1994 (1994-05-13) the whole document -----	1-6, 9-21, 25-41
Y	US 5 520 333 A (TOFTE S DAVID [US]) 28 May 1996 (1996-05-28) column 3, lines 45-67; figure 1 -----	1-6,9, 12,25-39

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/067300

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

1-6, 9-21, 25-41

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1, 2, 6, 9, 25, 26, 30-39

Independent claims 1 and 25 are directed to a fluid dispensing system and a method of controlling such a system, respectively, the system comprising a fluid dispenser, a fluid supply reservoir, an electronic air mass flow meter, a pressure regulator and a control, which are known from document US 2014/0138400 A1 (from now on, D1), see paragraphs [0002], [0006], [0007] and [0019]-[0021] and figure 1, and further comprising a pressure low pass filter, which is rendered obvious by the disclosure of document GB 2069726 A (from now on, D2), see page 1, lines 5-11, 67-84 and 97-116 and figure 1. Dependent claims 2 and 26 further specify obvious details of the pressure low pass filter. Dependent claims 6, 9 and 30-39 define different calculations performed based on the signals from the air mass flow meter.

2. claims: 3-5, 10-21, 27-29, 40, 41

Independent claims 10 and 40 are directed to a fluid dispensing system and a method of controlling such a system, respectively, the system comprising a fluid dispenser, a fluid supply reservoir, an electronic air mass flow meter and a control, which are known from document D1, and further comprising electronic temperature, pressure and humidity detectors for providing compensation factors used during processing of the signals from the air mass flow meter. Independent claim 17 is directed to a similar fluid dispensing system comprising only an electronic temperature detector. Dependent claims 3-5 and 27-29, even though they are dependent on independent claims 1 and 25, respectively, relate also to electronic detectors for compensation. Since the subject-matter of claims 1 and 25 is not inventive (see above), these dependent claims are a posteriori not unitarian with the previous dependent claims 2 and 26, respectively, which define the subject-matter of the first invention.

3. claims: 22, 23

Independent claim 22 is directed to a fluid dispensing system comprising a fluid dispenser, a fluid supply reservoir, an electronic air mass flow meter and a control, which are known from document D1, the fluid reservoir being thermally insulated.

4. claims: 7, 8, 24

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Independent claim 24 is directed to a fluid dispensing system comprising a fluid dispenser, a fluid supply reservoir, an electronic air mass flow meter, a pressure regulator and a control, which are known from document D1, the pressure regulator being adjustable to set an air pressure in the air flow path.

Dependent claim 7, even though it is dependent on independent claim 1, relates also to an adjustable pressure regulator. Since the subject-matter of claim 1 is not inventive (see above), this dependent claim is a posteriori not unitarian with the previous dependent claim 2, which defines the subject-matter of the first invention.

5. claim: 42

Independent claim 42 is directed at a method of determining a volume of fluid in a fluid supply reservoir known from D1 of a fluid dispensing system by changing the air pressure in the air flow path from a first to a second pressure.

6. claim: 43

Independent claim 43 is directed at a method of setting a stroke length of a valve with the help of an electronic air flow meter.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2015/067300

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2014138400	A1	22-05-2014	CN 104812500 A
			EP 2922640 A1
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