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*G01K 1/14* (2006.01)      *G01K 7/42* (2006.01)
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- (71) **Applicant:** **CENTRICA HIVE LIMITED** [GB/GB];  
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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, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, 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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(54) **Title:** METHOD AND SYSTEM FOR DETERMINING FLOW RATE IN A PIPE

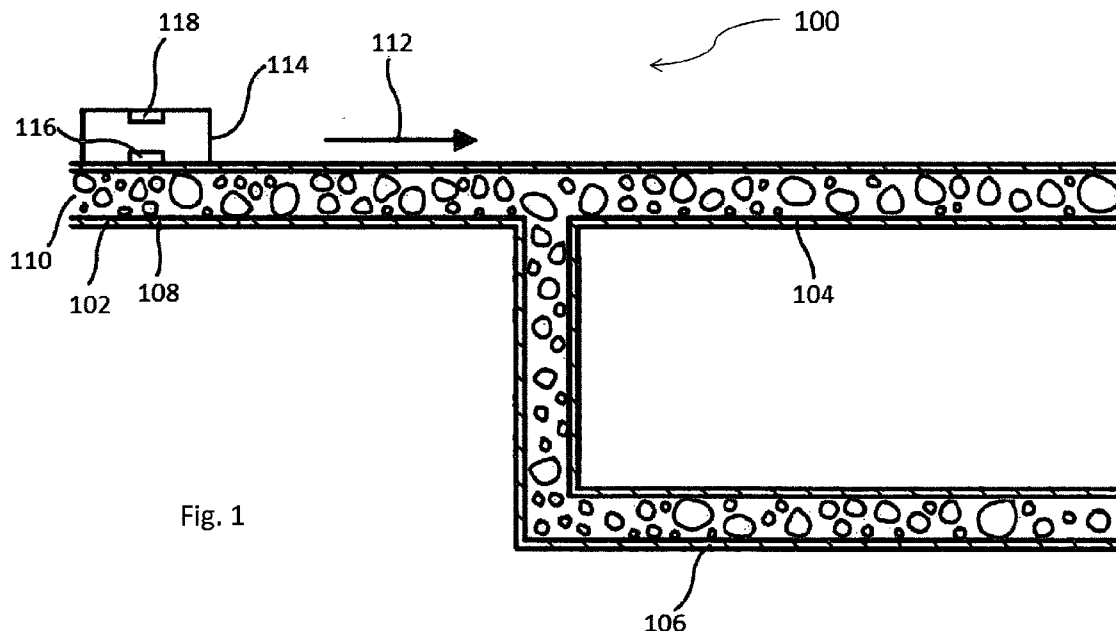


Fig. 1

(57) **Abstract:** A method for determining the flow rate in a pipe includes measuring a temperature difference between the pipe and the temperature of the surroundings of the pipe and dividing this difference by the difference between the temperature of the fluid entering the pipe and the temperature of the surroundings of the pipe. A non-linear conversion between the ratio derived in this way and the flow rate is used to estimate the flow rate. Also disclosed herein are methods for estimating the temperature of the fluid entering the pipe.



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,  
KM, ML, MR, NE, SN, TD, TG).

**Published:**

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

**(88) Date of publication of the international search report:**

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**INTERNATIONAL SEARCH REPORT**

International application No  
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A. CLASSIFICATION OF SUBJECT MATTER  
 INV. G01F1/684 G01K1/14 G01K13/02 G01K7/42  
 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)  
 G01F G01K  
 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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2016/124931 A1 (INVENIO SYSTEMS LTD [GB]; TOOMS MOORE CONSULTING LTD [GB]; TOOMS STEPH) 11 August 2016 (2016-08-11)	1-11,26
Y	figures 1,2 page 35, line 1 - page 37, line 13	25
A	GB 2 533 936 A (HOMESERVE PLC [GB]) 13 July 2016 (2016-07-13) the whole document	1-11,26
X	AU 2017 100 989 A4 (HOMESERVE PLC) 17 August 2017 (2017-08-17)	12,13, 15-24
Y	page 24, line 1 - line 5 page 4, line 6 - line 14 page 7	25
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Further documents are listed in the continuation of Box C.  See patent family annex.

\* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&amp;" document member of the same patent family</p>
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Date of the actual completion of the international search  17 May 2019	Date of mailing of the international search report  31/05/2019
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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  Stitou, Adel
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# INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2018/053197

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 546 126 A (HOMESERVE PLC [GB]) 12 July 2017 (2017-07-12) figure 14 page 41, line 32 - page 42, line 3 -----	12,14

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB2018/053197

## 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.:
  
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: 1-11(completely); 26(partially)

determining the flow rate of a fluid entering a conduit  
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2. claims: 12-25(completely); 26(partially)

estimating the temperature of a fluid entering a conduit  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2018/053197

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2016124931	A1	11-08-2016	
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