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[Continued on next page]

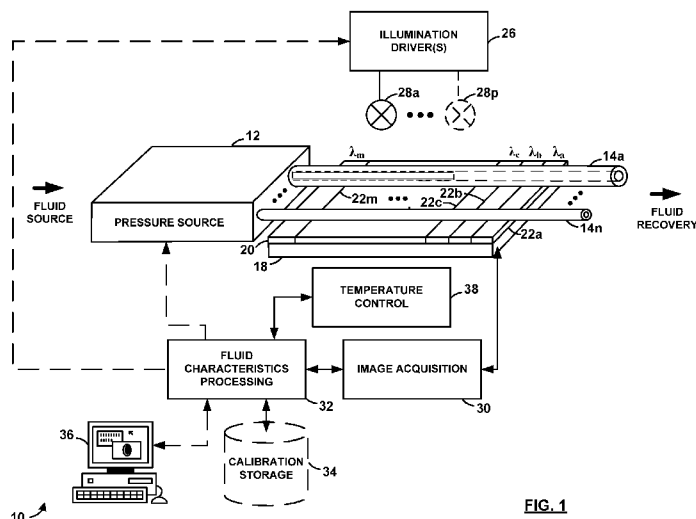
(54) **Title:** IMAGING MICROVISCOMETER

FIG. 1

(57) **Abstract:** A viscometer, comprising: a source of fluid pressure, a tube, an array of optical detectors, an acquisition driver circuit and viscosity computation logic. The tube has an inside volume that is hydraulically responsive to the source of fluid pressure. The array of optical detectors is positioned along a length of the first tube with a plurality of its detectors optically responsive to the inside volume of the first tube and including an image data output. The acquisition driver circuit is responsive to the image data output of the first array to acquire a series of successive images of the inside volume of the first tube. The viscosity computation logic is responsive to the acquisition driver circuit and operative to compute the viscosity of a fluid flowing along the first tube from the series of images of the inside volume of the first tube.



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- *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:**
9 June 2016

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2014/050505

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01N11/06 G01N11/04
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)
G01N

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.
X	US 2002/088953 A1 (KENSEY KENNETH [US] ET AL) 11 July 2002 (2002-07-11)	1-8,10, 14-19, 23,29, 33-35, 37-40, 42,43, 46,47, 55,61
Y	paragraphs [0037] - [0039], [0053], [0056], [0057], [0077] - [0125]; figures 1-6,10A-C	9,11-13, 24-28, 45,56-60
X	US 5 959 195 A (GOETTFERT AXEL [DE]) 28 September 1999 (1999-09-28)	31,32,56
Y	column 2, line 37 - line 52 column 8, line 36 - line 44 column 9, line 4 - line 20 column 10, line 1 - line 14 ----- -/-	45



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

23 May 2014

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INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2014/050505

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 99/10724 A2 (VISCO TECHNOLOGIES INC [US]) 4 March 1999 (1999-03-04)	9,11-13, 24-28, 56-60
A	page 14, line 13 - page 15, line 5; figures 8A,8B	38,39,47
A	----- WO 2013/005185 A1 (CONSEJO NAC INVEST CIENT TEC [AR]; COMISION NAC DE EN ATOMICA [AR]; IN) 10 January 2013 (2013-01-10) page 6, line 8 - line 11	9-13, 56-60
A	----- GB 2 304 408 A (RAVENFIELD DESIGNS LTD [GB]) 19 March 1997 (1997-03-19) page 3, line 6 - line 26 -----	9,56-61

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2014/050505

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US 2002088953	A1	11-07-2002	US 6428488 B1 06-08-2002
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			CN 103814284 A 21-05-2014
			DE 112012002817 T5 10-04-2014
			US 2014216140 A1 07-08-2014
			WO 2013005185 A1 10-01-2013
GB 2304408	A	19-03-1997	NONE

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2014/050505

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.:
1-19, 24-28, 31-35, 37-40, 43, 45-47, 57-60(completely); 23, 29, 42, 55, 56
61(partially)

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: 1-19, 31-35, 37-40, 46, 47(completely); 23-29, 42, 43, 45, 55-61(partially)

a viscometer / viscometry method comprising tubes with different cross sectional areas

- 1.1. claims: 11-13

a viscometer comprising test tubes wherein a cross sectional area of the first tube and the further tubes are all different from each other

- 1.2. claim: 18

a viscometer comprising a test tube having a diameter below 500 micrometer

- 1.3. claims: 24-26

a viscometer comprising a pressure transducer

- 1.4. claims: 27, 28

a viscometer comprising a viscosity value selection logic

- 1.5. claims: 31, 32

a viscometer comprising a syringe

- 1.6. claim: 35

a viscometry method comprising pulsing pulses a plurality of times during an acquisition

- 1.7. claims: 38, 39, 47

a viscometry method comprising acquiring a succession of pressure values

- 1.8. claim: 43

a viscometry method operative to derive a viscosity of a sample of less than 10 microliters

- 1.9. claim: 45

a viscometry method comprising deriving a spectrum

- 1.10. claims: 57-60

a capillary viscometer / viscometry method

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

2. claims: 20-22(completely); 23-29, 55-58, 61(partially)

a viscometer including a filter

3. claims: 30, 36(completely); 55-61(partially)

a viscometer / viscometry method comprising multilevel
strobed illumination

4. claims: 41(completely); 42, 43, 45, 59, 60(partially)

a viscometry method comprising recovering a fluid under test

5. claims: 44(completely); 45, 59, 60(partially)

a viscometry method comprising introducing a dye

6. claims: 48-54(completely); 59, 60(partially)

a viscometry method comprising deriving a property of a
fluid
