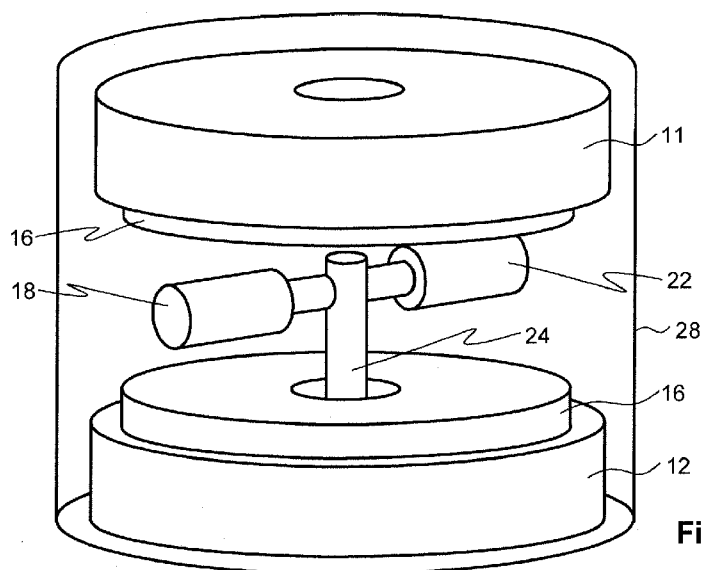




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[Continued on next page]

(54) Title: EXAMINING POROUS SAMPLES

**Fig 1**

(57) **Abstract:** Apparatus for examining a fluid-containing porous sample, by a combination of centrifuging to move fluid into, out of, and/or within the sample and NMR to monitor the amount of fluid present at locations within the sample has a magnet system to provide a magnetic field; and a centrifuge rotor comprising a holder (18) for the sample and mounted to move the sample within the magnetic field. The apparatus preferably includes gradient coils (16, 116) superimposing a magnetic field gradient onto a field provided by magnets (11, 12, 111, 112). At least one radio-frequency coil (20) is located on the centrifuge rotor in a position 10 which surrounds the sample in the holder. The coil axis is transverse to the magnetic field and field gradient when measurement is made. Consequently NMR measurement of the distribution of fluid in the sample can be made while the centrifuge is in motion.



DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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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LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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27 December 2012

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2012/051093**A. CLASSIFICATION OF SUBJECT MATTER****G01V 3/14(2006.01)i, G01N 33/24(2006.01)i, G01N 24/08(2006.01)i**

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)

G01V 3/14; G01V 3/00; G01N 15/08; B04B 7/08

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: porosity, centrifuge, rotor, magnet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7352179 B2 (QUAN CHEN et al.) 01 April 2008 See abstract; column 14, lines 30-52; column 22, line 6 - column 23, line 11; claim 1 and figures 1, 5, 19, 20.	1-4,6,11-13
A	US 6415649 B1 (EUGENE A. SPINLER et al.) 09 July 2002 See abstract; column 5, line 3 - column 7, line 60 and figures 1, 2.	1-4,6,11-13
A	US 7053611 B2 (ROBERT FREEDMAN) 30 May 2006 See abstract; column 4, lines 14-60; claims 1, 2 and figure 2.	1-4,6,11-13
A	US 5351525 A (GIOVANNA RAGAZZINI et al.) 04 October 1994 See abstract; column 3, lines 44-68; claim 1 and figure 2.	1-4,6,11-13



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"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

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Name and mailing address of the ISA/KR

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YANG, Jeong Rok

Telephone No. 82-42-481-5709



INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2012/051093**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.: 9
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:
Claim 9 is unclear because it refers to claim 8 which does not comply with PCT Rule 6.4(a).
3. ☒ Claims Nos.: 5, 7, 8, 10, 14-16
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:

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 fee, this Authority did not invite payment of any additional fee.
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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/IB2012/051093

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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