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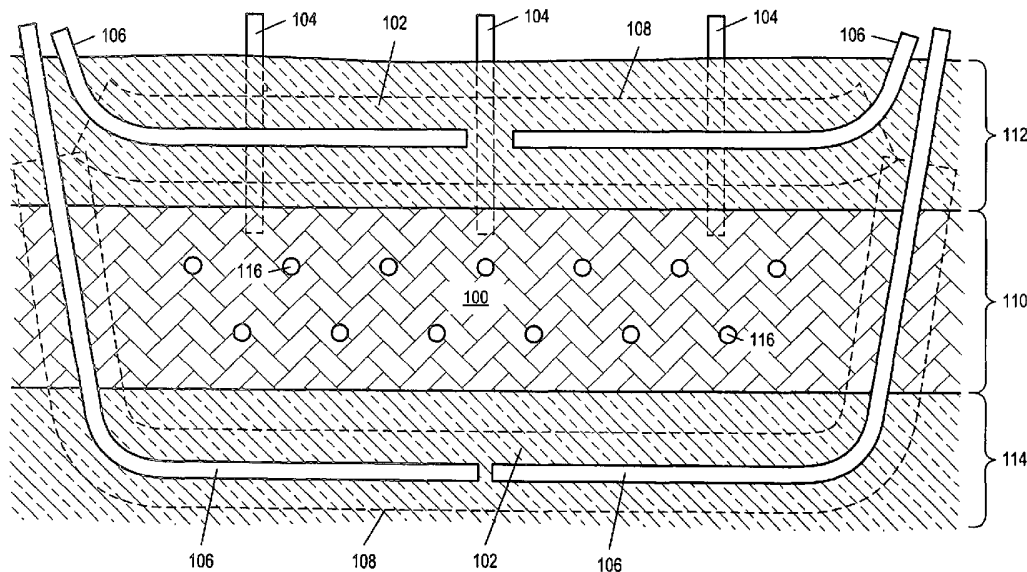
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[Continued on next page]

(54) Title: IN SITU RECOVERY FROM A HYDROCARBON CONTAINING FORMATION USING BARRIERS



(57) Abstract: A method is described for inhibiting migration of fluids into and/or out of a treatment area undergoing an in situ conversion process. Barriers in the formation proximate a treatment area may be used to inhibit migration of fluids. Inhibition of migration of fluids may occur before, during, and/or after an in situ treatment process. For example, migration of fluids may be inhibited while heat is provided from heaters to at least a portion of the treatment area. Barriers may include naturally occurring portions (e.g., overburden, and/or underburden) and/or installed portions, such as frozen barrier zones, cooled by a refrigerant.



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LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

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

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16 October 2003

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
PCT/US 02/34274

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E21B43/30 E21B36/00 E21B43/24

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 E21B

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, 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 2 780 450 A (FREDRIK LJUNGSTROM) 5 February 1957 (1957-02-05)	1-11,14, 18-25, 27,28, 34-38
Y	column 3, line 21 -column 5, line 25; figures 1-9	12

X	US 2 777 679 A (FREDRIK LJUNGSTROM) 15 January 1957 (1957-01-15) the whole document	1

Y	US 6 035 701 A (MEREWETHER DANIEL ET AL) 14 March 2000 (2000-03-14) the whole document	12

A	US 4 474 238 A (GENTRY CECIL C ET AL) 2 October 1984 (1984-10-02) the whole document	1

Further documents are listed in the continuation of box C. Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier document but published on or after the international filing date	"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
"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)	"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.
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 3 February 2003	Date of mailing of the international search report 04.06.2003
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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, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer van Berlo, A
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/34274

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2780450	A	05-02-1957	NONE
US 2777679	A	15-01-1957	NONE
US 6035701	A	14-03-2000	NONE
US 4474238	A	02-10-1984	NONE

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 02/34274

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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 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.:

1-14, 18-28, 34, 35, 37, 38

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- 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: 1-14,18-28,34,35,37,38
method of treating a hydrocarbon containing formation
2. Claims: 15,36
sulfur well/grout wall
3. Claims: 16,17
dewatering well
4. Claims: 29-33
absorption refrigeration unit
5. Claims: 38-42
opening with 2 surface locations