



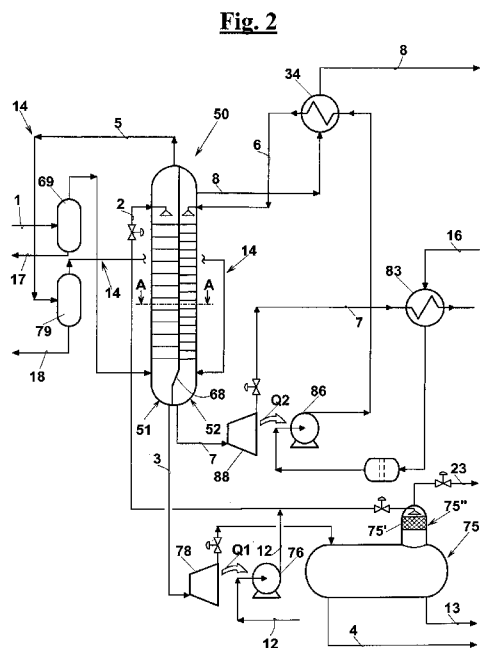
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(54) **Title:** A METHOD AND AN APPARATUS FOR SWEETENING AND DEHYDRATING A HYDROCARBON GAS, IN PARTICULAR A NATURAL GAS



(57) **Abstract:** A method and an apparatus for removing acid compounds (sweetening) and moisture (dehydration) from a hydrocarbon gas, in particular from a natural gas or from a refinery gas fraction or a gas of synthesis, by subsequent absorption operations using a sweetening liquid and a dehydration liquid. The method comprises a step of prearranging a sweetening chamber (51) and a dehydration chamber (52) within a vertical elongated container (50), each chamber defined by an inner partition wall (68) of said vertical elongated container (50), wherein a gas transfer passageway (14) is provided between an upper outlet port of the sweetening chamber (51) and an inlet port of the dehydration chamber (52); the method also comprises steps of feeding the absorption liquid from the above into the two chambers and of feeding the gas from below into the sweetening chamber. The apparatus and the method according to the invention make it possible to reduce the overall dimensions of the treatment unit with respect to the prior art units, which is particularly relevant for off-shore installations.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER  
INV. B01D53/14 B01D53/18 B01D53/52  
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)  
B01D  
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 6 183 540 B1 (THONSGAARD JONATHAN E [US]) 6 February 2001 (2001-02-06)	1-11
A	figure 2 column 8, line 18 - column 9, line 52 column 1, line 15 - line 30 -----	12-19
X	GB 2 111 852 A (TOYO ENGINEERING CORP) 13 July 1983 (1983-07-13)	12-19
A	figure 2 page 1, line 38 - line 51 page 1, line 120 - page 2, line 43 -----	1-11
A	WO 85/01058 A1 (PALL CORP [US]) 14 March 1985 (1985-03-14) the whole document -----	1-19
A	WO 2008/022426 A1 (SEIBERT BRIAN HOWARD [CA]) 28 February 2008 (2008-02-28) the whole document -----	1-19

Further documents are listed in the continuation of Box C.  See patent family annex.

\* Special categories of cited documents :

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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  Bernet, Olivier
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/IB2011/000669
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6183540	B1	06-02-2001	CA 2316577 A1 13-11-2000 US 6183540 B1 06-02-2001
GB 2111852	A	13-07-1983	DE 3244521 A1 09-06-1983 GB 2111852 A 13-07-1983 IT 1154624 B 21-01-1987 JP 58098101 A 10-06-1983
WO 8501058	A1	14-03-1985	AU 3318484 A 29-03-1985 EP 0153406 A1 04-09-1985 ES 8505829 A1 16-10-1985 IT 1178505 B 09-09-1987 PT 79128 A 01-09-1984 WO 8501058 A1 14-03-1985 ZA 8406511 A 24-04-1985
WO 2008022426	A1	28-02-2008	NONE