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[Continued on next page]

(54) Title: VIRTUAL GASEOUS FUEL PIPELINE

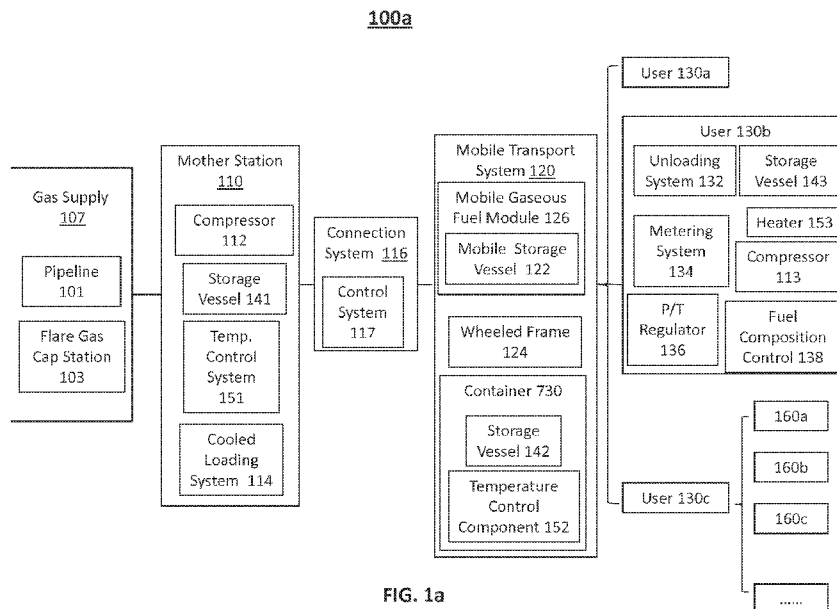
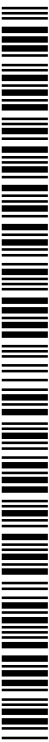


FIG. 1a

(57) Abstract: Various embodiments provide an end-to-end gaseous fuel transportation solution without using physical pipelines. A virtual pipeline system and methods thereof may involve transportation of gaseous fuels including compressed natural gas (CNG), liquefied natural gas (LNG), and/or adsorbed natural gas (ANG). An exemplary pipeline system may include a gas supply station, a mother station for treating gaseous fuels from the gas supply station, a mobile transport system for receiving and transporting the gaseous fuels, and a user site for unloading the gaseous fuels from the mobile transport system. The unloaded gaseous fuels can be further used or distributed.





UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, 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, KM, ML, MR, NE, SN, TD, TG).

— of inventorship (Rule 4.17(iv))

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))

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— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/056456

A. CLASSIFICATION OF SUBJECT MATTER INV. F17C5/00 F17C5/06 F17C7/00 F25J3/00 F17C5/02 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) F17C		
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	EP 1 452 794 A2 (AIR PROD & CHEM [US]) 1 September 2004 (2004-09-01) the whole document -----	1-21
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X	EP 2 390 550 A1 (AIR PROD & CHEM [US]) 30 November 2011 (2011-11-30) paragraph [0027] - paragraph [0063] -----	1-21
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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	"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 application or patent 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 10 June 2015	Date of mailing of the international search report 17/06/2015	
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 Stängl, Gerhard	

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/056456

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 1 208 751 A (BRITISH OXYGEN CO LTD [GB]) 14 October 1970 (1970-10-14) the whole document	34-41, 67-81
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/056456

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.: 6, 20, 91, 92, 99
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:
see FURTHER INFORMATION sheet PCT/ISA/210

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.:
1-21, 34-41, 67-81, 91-99

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: 1-21

A cascade style fluid transfer system
Problem to be solved: Fluid transfer without compressor

2. claims: 22-27

A single vessel transfer system
Problem to be solved: Fluid transfer from a single vessel to a user storage vessel.

3. claims: 28, 29

A multiple connecting system.
Problem to be solved: Provide a coupling between the base station and the mobile station.

4. claims: 30-33

A transfer system using heating of the vessel.
Problem to be solved: unload or load the fluid by heating one of the vessels.

5. claims: 34-41

A transfer system using cooling of a portion of the transfer passageway.
Problem to be solved: unload or load the fluid by cooling.

6. claims: 42-53

A filling method using an injection system.
Problem to be solved: propelling the fluid.

7. claims: 54-65

A filling method using a 2 port system.
Problem to be solved: unload or load the fluid at higher speed.

8. claim: 66

design of the vessel with its fittings to use the Joule Thomsen effect..
Problem to be solved: unload or load the fluid by cooling of

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

the latter.

9. claims: 67-81

A filling method for the transport system.

Problem to be solved: speed up and controlling of the filling procedure.

10. claims: 82-90

A gas transport method using an absorbent medium.

Problem to be solved: transporting the fluid in a chemical bounded way.

11. claims: 91-99

An emptying method of the transportation vessels using a compressor or cascade system.

Problem to be solved: unload the fluid from an adapted mobile storage in a save (brakes) and controlled manner.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 6, 20, 91, 92, 99

The set of Claims lack unity.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/056456

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