(54) Title: COMRESSED GAD FILLING METHOD AND SYSTEM

(57) Abstract: A method of filling a storage vessel with a fuel gas at a fuel dispenser. In various embodiments, the method includes providing a fuel dispenser comprising a housing defining a fluid flow path therein, the fluid flow path operatively connected with a source of the fuel gas. The fuel dispenser includes a control valve disposed along the fluid flow path and a controller in operative electronic communication therewith. The method also includes actuating the control valve to provide a predetermined difference between the pressure of the fuel gas upstream of the control valve and the pressure of the fuel gas downstream of the control valve. The predetermined difference is selected such that the temperature of the fuel gas is reduced to a predetermined temperature after passing through the control valve. The method also includes dispensing the fuel gas into the storage vessel, the fuel gas having first mass flow rate.

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))

Date of publication of the international search report: 14 July 2016
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - F17C 13/02 (2015.01)
CPC - F17C 13/02

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(8) Classification(s): F17C 5/06, 13/02, 13/04 (2015.01)
CPC Classification(s): F17C 5/06, 13/02, 13/06, 13/04, 2225/0123; USPC Classification(s): 141/83; 53/403

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)

PatScan (US, EP, WO, JP, DE, GB, CN, FR, KR, ES, AU, IN, CA, INPADOC Data); Google; Google Scholar; ProQuest; IP.com;
keywords: flow rate, mass flow rate, increase, reduce, decrease, hydrogen, CNG, compressed natural gas, controller, processor,
pressure sensor, pressure transducer, temperature sensor, temperature transducer, thermometer, thermocouple, inlet, fill, dispense

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 5,881,779 A (KOOUNTZ K J et al.) March 16, 1999; figure 4; column 2, lines 40-45; column 4, lines 10-15; column 7, lines 1-20, 30-40; column 9, lines 45-50; column 10, lines 55-60; column 12, lines 15-30</td>
<td>1-6</td>
</tr>
<tr>
<td>A</td>
<td>US 201 1/0259469 A1 (HARTY R et al.) October 27, 2011; entire document</td>
<td>1-6</td>
</tr>
</tbody>
</table>

* 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

**"V"** 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

**"A"** document member of the same patent family

Date of the actual completion of the international search

29 December 2015 (29.12.2015)

Date of mailing of the international search report

17 MAY 2016

Name and mailing address of the ISA/

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-8300

Authorized officer

Shane Thomas

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

Form PCT/ISA/2 10 (second sheet) (January 2015)