

Internal distribution code:

- (A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

**Datasheet for the decision
of 5 May 2015**

Case Number: T 2345/12 - 3.2.05

Application Number: 02021730.3

Publication Number: 1298381

IPC: F17C9/02

Language of the proceedings: EN

Title of invention:

High flow rate transportable UHP gas supply system

Applicant:

Air Products and Chemicals, Inc.

Headword:

-

Relevant legal provisions:

EPC 1973 Art. 54, 56

Keyword:

Novelty - (yes)
Inventive step - (yes)

Decisions cited:

Catchword:

-



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 2345/12 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 5 May 2015

Appellant: Air Products and Chemicals, Inc.
(Applicant) 7201 Hamilton Boulevard
Allentown, PA 18195-1501 (US)

Representative: Wolfgang Wess
Schwabe - Sandmair - Marx
Patentanwälte
Stuntzstraße 16
81677 München (DE)

Decision under appeal: **Decision of the examining division of the European Patent Office posted on 25 May 2012 refusing European patent application No. 02021730.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman M. Poock
Members: H. Schram
M. J. Vogel

Summary of Facts and Submissions

- I. The appellant (applicant) filed a notice of appeal on 24 July 2012 against the decision of the examining division, posted on 25 May 2012, by which European patent application No. 02 021 730.3 was refused on the grounds that the subject-matter of claims 1 and 16 of the main request filed on 2 December 2011 was not new, Article 54 EPC 1973, and that the subject-matter of claims 1 and 16 of the auxiliary request filed also on 2 December 2011 did not involve an inventive step, Article 56 EPC 1973. The statement setting out the grounds of appeal was filed on 4 October 2012.
- II. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request filed on 28 January 2015 or any of the auxiliary requests I to III filed as auxiliary requests III to V on 4 October 2012.
- III. Claims 1 and 15 of the main request read as follows:
- "1. A high flow rate, transportable, ultra high purity gas vaporization and supply system (10, 10'), comprising:
- (a) a vessel (20, 20') suitable for carrying large quantities of a liquefied gas;
 - (b) a plurality of valves adapted to operate with liquid or gas phases;
 - (c) a loading/unloading unit (30, 30') disposed on said vessel for loading and unloading the liquefied gas to be supplied;
 - (d) at least one heater (50, 50') containing a plurality of heating elements (54A, 54B... 54n; 54A', 54B'... 54n') to supply energy into the liquefied gas, said heater adapted to cause said

liquefied gas to be supplied through said loading/unloading unit as a gas; and

- (e) a heater controller (60, 60') adapted to use process variables feedback for regulating said heating elements (54A, 54B... 54n; 54A', 54B'... 54n') maintaining and regulating gas output;

characterized in that

- (f) the vessel (20; 20') is covered with thermal vessel insulation (26; 26') and cladding (28; 28'); and
- (g) said heating elements (54A, 54B... 54n; 54A', 54B'... 54n') are permanently positioned on said vessel (20; 20'), namely permanently attached to an outer surface (23; 23') of the vessel (20; 20') and positioned between the outer surface (23; 23') and the vessel insulation (26; 26')."

"15. A method for providing high flow rate, transportable, ultra high purity gas, comprising:

- (a) providing a vessel (20, 20') suitable for carrying large quantities of a liquefied gas;
- (b) providing a plurality of valves adapted to operate with liquid or gas phases;
- (c) providing a loading/unloading unit (30, 30') disposed on said vessel (20, 20') for loading and unloading the liquefied gas to be supplied;
- (d) providing at least one heater (50, 50') containing a plurality of heating elements (54A, 54B... 54n; 54A', 54B'... 54n') to supply energy into the liquefied gas, said heater (50, 50') adapted to cause said liquefied gas to be supplied through said loading/unloading unit (30, 30') as a gas;
- (e) providing a heater controller (60, 60') adapted to use process variables feedback for regulating said heating elements (54A, 54B... 54n; 54A', 54B'... 54n') maintaining and regulating gas output; and

(f) controlling flow of said gas out of said vessel (20, 20') through said loading/unloading unit (30, 30') by said heater controller (60, 60') utilizing process variables feedback to regulate said heating elements (54A, 54B... 54n; 54A', 54B'... 54n');

characterized in that

(g) the vessel (20; 20') is covered with thermal vessel insulation (26; 26') and cladding (28; 28'); and

(h) said heating elements (54A, 54B... 54n; 54A', 54B'... 54n') are permanently positioned on said vessel (20; 20'), namely permanently attached to an outer surface (23; 23') of the vessel (20; 20') and positioned between the outer surface (23; 23') and the vessel insulation (26; 26')."

IV. The documents referred to in the appeal proceedings include the following:

D1 US 6,025,576;

D3 US 5,799,640.

V. In support of its request, the appellant submitted the following:

The invention related to a vaporization and supply system of ultra-high purity gases in large volumes and at high flow rates from a container of liquefied gas. The evaporation of liquefied gas during dispensing of gas resulted in cooling of the liquid, which caused the pressure in the container and the flow rate to drop, cf paragraphs [0006] to [0010] of the application. To alleviate the cooling effect, it was known from document D1 to use a skid with built-in heating

elements for heating and supporting a compressed-gas dispensing bulk vessel. The drawbacks of this heating arrangement were discussed in paragraph [0010] of the application. The invention proposed to position heating elements permanently on the outer surface of the vessel, rather than on a skid as in document D1, to supply energy into the liquefied gas, which outer surface was covered with thermal vessel insulation and cladding. Document D1 did not disclose a vessel with heating elements permanently positioned thereon and covered with thermal insulation and a cladding.

Document D3 related to a fuel feed device for gas engines including a disposable gas cartridge for home or domestic use, and a gas-engine-powered working machine driven by a gas engine, as stated in column 1, lines 7 to 10. These apparatuses included a thermally insulated cartridge case capable of being opened and closed for removably receiving therein a gas cartridge, see claims 1 and 6. The gas cartridge was a commercially available disposable gas cartridge filled with a liquefied gas (column 5, lines 31 to 33) and was not a vessel suitable for carrying large quantities of a liquefied gas. The single heating element 35 was built in the cartridge case 31 and not permanently positioned on the gas cartridge. The subject-matter of claims 1 and 15 of the main request was therefore new with respect to documents D1 and D3.

Document D1 did not provide any hint or suggestion to the person skilled in the art to abandon the concept of using a skid with built-in heating elements and instead attaching the heating elements to an outer surface of the vessel. Likewise, document D3 did not provide any hint or suggestion to mount a heating element on the disposable gas cartridge, rather than on the inside

wall of the cartridge case 31 as taught by that document, cf claim 1 and figures 3, 5a and 5b. It followed that the subject-matter of said claims also involved an inventive step.

Reasons for the Decision

1. The appeal is admissible.

MAIN REQUEST

2. *Allowability of the amendments, Article 123(2) EPC*

The preambles of claims 1 and 15 of the main request correspond, apart from the insertion of reference signs (cf Rule 43(7) EPC) substantially to the preambles of claims 1 and 16 as filed.

A basis for the first characterizing feature of claims 1 and 15 of the main request, viz "the vessel (20; 20') is covered with thermal vessel insulation (26; 26') and cladding (28; 28')", is paragraph [0020] and claim 5 of the application as filed (published version).

A basis for the second characterizing feature of claims 1 and 15 of the main request, viz "said heating elements (54A, 54B... 54n; 54A', 54B'... 54n') are permanently positioned on said vessel (20; 20'), namely permanently attached to an outer surface (23; 23') of the vessel (20; 20') and positioned between the outer surface (23; 23') and the vessel insulation (26; 26')", is the passage in column 5, lines 29 to 32, and figures 1 and 2, of the published version of the application as filed.

Claims 2 to 4 and claims 5 to 13 of the main request correspond to claims 2 to 4 and claims 6 to 14 as filed, respectively. Claim 14 of the main request differs from claim 15 as filed in that the word "above", which is a clerical error, has been replaced by the word "below". A basis for this amendment is the passage in column 4, lines 15 to 19, of the application as filed (published version).

The description has been brought into conformity with the amended claims. The unit [lbs] mentioned in claims 3 and 4 as filed and in paragraphs [0007], [0014] and [0021] of the application as filed (published version) and the unit "Fahrenheit" mentioned in paragraph [0036] have been additionally expressed in units conforming to international standard.

The amendments thus meet the requirements of Article 123(2) EPC.

3. *Novelty and inventive step, Articles 54 and 56 EPC 1973*

3.1 The invention relates to a transportable, ultra high purity gas vaporization and supply system, and a method for providing said gas in large volumes and at high flow rates from a container of liquefied gas.

3.2 The invention disclosed in document D1, which is cited in paragraphs [0006], [0007] and [0009] of the application as filed (published version), represents the closest prior art. This document relates to a skid for heating bulk vessels that store and dispense liquefied compressed gas, cf column 1, lines 5 to 8. In the section "Background of the invention" the following is stated: "More effective is the use of heaters applied to the cylinder. However, the cylinders are

handled and stored by placement or attachment to skeletal frameworks, or "skids." This makes it cumbersome to attach heaters to the cylinder. The heaters must be attached when the cylinders are taken from a transport skid and placed onto a storage skid. The heaters must later be removed when the cylinder is exhausted and needs to be sent back for re-filling". With a view to solving the problem of providing a more efficient method for heating cylinders that store liquefied compressed gases, document D1 proposes a skid having built-in heating elements, cf column 2, lines 26 to 35, and claim 1.

3.3 Novelty

- 3.3.1 Claims 1 and 15 require that "the vessel (20; 20') is covered with thermal vessel insulation (26; 26') and cladding (28; 28')".

The verb "to cover" may have various meanings, inter alia (1) to place or spread something over, so as to protect or conceal; (2) to provide with a covering, eg a cloth; (3) to extend over or lie thickly on the surface of. The expression "vessel is covered with thermal vessel insulation and cladding" should be construed in the light of the description read as a whole as meaning that the vessel is substantially, and permanently covered with, firstly, said insulation, and then with said cladding, cf meaning (3) mentioned above. Document D1 does not disclose a cladding. In Figures 2C and 2D of this document a cylinder 100 resting in skid 110 and surrounded by panels 140 is shown (column 4, line 56, to column 5, line 2). A standoff structure 180 attached to the skid and panels provides a small amount of space between said standoff structure and the cylinder. A removable weather proof

Teflon impregnated fiberglass cloth 190 is secured by tie-down straps on the panels. The air between the standoff structure 180 and cloth 190 forms a thermal insulation for the upper half of the cylinder, cf meaning (1) mentioned above.

Document D1 does not therefore disclose a vessel or cylinder covered with thermal insulation and a cladding, cf feature (f) of claim 1 and feature (g) of claim 15. It may be noted that, if the temperature of a cylinder should be maintained, it would not make sense to use a cylinder covered with thermal insulation and a cladding in the gas supply system of document D1, since the skid heaters would be positioned on an *insulated* cylinder.

The subject-matter of claims 1 and 16 of the main request is therefore new with respect to document D1.

3.3.2 For completeness' sake the following is noted.

Document D3 relates to a fuel feed device for gas engines including a disposable gas cartridge for domestic use. It does not relate to a high flow rate, ultra high purity gas vaporization and supply system. The gas cartridge is not suitable for carrying large quantities of a liquefied gas (cf paragraph [0014] of the published version of the application as filed, wherein a quantity of over about 2000 lbs is mentioned). This document concerns a different technical field as that of the present application.

For these reasons alone the subject-matter of claims 1 and 15 of the main request is new with respect to document D3.

The gas supply system of document D3 includes a thermally insulated cartridge case (cf column 4, lines 54 to 59, claim 1 and figure 2) and an electric heater that is built in the cartridge case (cf column 5, lines 1 to 3), and not attached on the gas cartridge.

3.4 Inventive step

Document D1 discloses (see column 3, lines 6 to 63, and figure 1) a cylinder plus skid assembly and a method for providing gas, with all the features of the preamble of claims 1 and 15 of the main request, respectively.

Since the invention of document D1 is to provide a skid having built-in heating elements (see point 3.1 above) it would go against the teaching of this document to mount the heating elements on an outer surface of the cylinder as specified in feature (g) of claim 1 and in feature (h) of claim 15.

Consequently, the subject-matter of claim 1 of the main request is not obvious to the person skilled in the art and therefore involves an inventive step. This holds mutatis mutandis for the subject-matter of claim 15 of the main request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of the following documents:

Claims, Numbers:

1 to 15 filed on 28 January 2015 as main request;

Description, pages:

1 to to 15 filed on 28 January 2015;

Drawings, sheets:

1/4 to 4/4 as originally filed.

The Registrar:

The Chairman:



D. Meyfarth

M. Poock

Decision electronically authenticated