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(54) **Title:** COOLING OF A DEWAR VESSEL WITH ICE FREE COOLANT AND FOR SHORT SAMPLE ACCESS

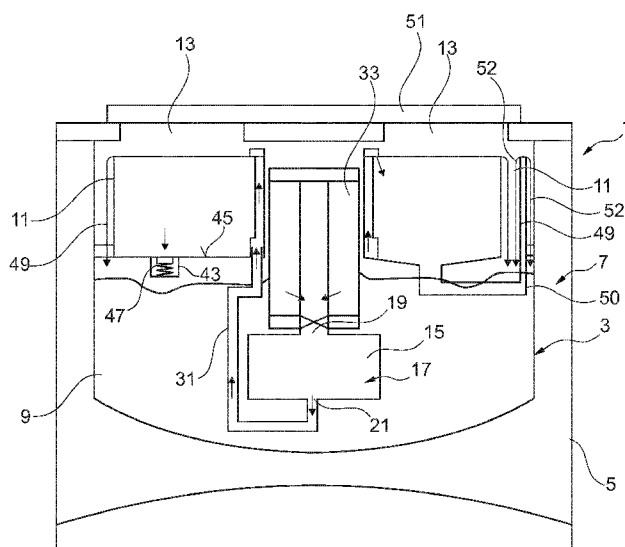


Fig. 1

(57) **Abstract:** The present invention relates to a pump (15) for pumping a coolant (9) within a Dewar vessel (1) and to a corresponding Dewar vessel (1) for storing samples in a coolant (9). The Dewar vessel (1) comprises a thermally insulated reservoir (3) for the coolant (9) and a sample vessel (11) provided separately and arranged in the thermally insulated reservoir (3). The reservoir (3) is connected to the sample vessel (11) in such a way that the level of coolant (9) is constant in the sample vessel (11). Pump (15) may help in keeping the level of coolant (9) in the sample vessel (11) constant. For this purpose the pump (15) comprises a chamber (17) with an inlet (19) and an outlet (21), a closing element (23) and a pressure increasing device (25). Therein, the inlet (19) is connectable to the reservoir (3) and the outlet (21) is connectable to a sample vessel (11) of the Dewar vessel (1). The chamber (17) is adapted to fill with coolant (9) through the inlet (19) by gravity and the closing element (23) is adapted to automatically close the chamber (17) when it is full of coolant (9). The pressure increasing device (25) is adapted to increase the pressure within the chamber (17), after the chamber (17) is closed, until the coolant (9) is released through the outlet (21).

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2013/065788

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.:
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 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.:
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.:

1-6, 14

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.

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. F25D3/10 F25B1/00
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)

F25D F01B G05D F04F F04B F25B

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)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009/129946 A1 (TOUBIA DIDIER [IL] ET AL) 21 May 2009 (2009-05-21) the whole document -----	1-6, 14
A	US 4 566 283 A (BOESE ROLAND [DE]) 28 January 1986 (1986-01-28) paragraphs [0018] - [0063]; figures 1-4 -----	1
A	DE 100 39 214 A1 (INST LUFT KAELETETECH GEM GMBH [DE]) 21 February 2002 (2002-02-21) the whole document -----	1

☐

Further documents are listed in the continuation of Box C.

☒

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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009129946 A1	21-05-2009	US 2009129946 A1	21-05-2009
		WO 2009066292 A1	28-05-2009
US 4566283 A	28-01-1986	NONE	
DE 10039214 A1	21-02-2002	NONE	

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-6, 14

Pump suitable for pumping a coolant within a Dewar vessel
with a pressure increasing device

2. claims: 7-13, 15

Dewar vessel with a thermally insulated reservoir and with a
sample vessel at the top of it for short sample access
