BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS | BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE | CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen

D E C I S I O N
of 16 June 1997

Case Number: T 0655/95 - 3.2.3

Application Number: 90112701.9

Publication Number: 0408979

IPC: B09B 1/00, B63B 35/00

Language of the proceedings: EN

Title of invention:
Method and system for throwing carbon dioxide into the deep sea

Applicant:
Mitsubishi

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes, after amendments)"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0655/95 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 16 June 1997

Appellant: MITSUBISHI JUKOGYO KABUSHIKI KAISHA
5-1, Marunouchi 2-chome Chiyoda-ku
Tokyo (JP)

Representative: Henkel, Feiler, Hänzel & Partner
Möhlstrasse 37
D-81675 München (DE)

Decision under appeal: **Decision of the Examining Division 2.3.0.9.113 of the European Patent Office dated 17 March 1995 refusing European patent application No. 90 112 701.9 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. T. Wilson
Members: F. Brösamle
L. C. Mancini

Summary of Facts and Submissions

I. The Appellant (Applicant) lodged an appeal on 26 May 1995 - paying the appeal fee on the same day - against the decision of the Examining Division of 17 March 1995 to refuse European patent application No. 90 112 701.9. The Statement of Grounds of Appeal was received on 19 July 1995.

The Examining Division had expressed the view that Claims 1 according to the main and auxiliary request underlying its decision lacked inventive step in the light of the following documents:

(D1) "On Geoengineering and the CO_2 Problem", Climatic Change, 1977, pages 59 to 68;

(D2) "Environmental Control Technology for Atmospheric Carbon Dioxide", 1980, pages 521 to 551, particularly page 547;

(D3) WO-A-88/04007 and

(D4) GB-A-2 206 543.

II. The Appellant requested that the decision under appeal be set aside and that the patent be granted on the basis of Claims 1 to 3 which were filed with a letter of 6 March 1996 following the Board's communication pursuant to Article 110(2) EPC.

The independent claims read as follows:

"1. A method for discharging carbon dioxide into the deep sea, consisting of the steps of transporting carbon dioxide in a liquified gas state on the sea by means of ships to a free floating marine float installation located offshore in the deep sea, and discharging the liquefied carbon dioxide into the deep sea through the lower end of a throw-in pipe reaching to a water depth of about 3,000 m the lower end of which is positioned above the sea bed, said pipe provided on a free floating marine float installation unattached to the sea bed and which pipe is always implemented to discharge the liquefied carbon dioxide into the deep sea."

and

"3. A system for discharging liquefied carbon dioxide into the deep sea, comprising a liquefied gas transport ship for transporting liquefied carbon dioxide gas, and a free floating marine float installation unattached to the sea bed in which the liquefied carbon dioxide is transported thereto by means of said transport ship, said marine float installation being provided with a deep sea throw-in pipe reaching to a water depth of about 3,000 m, the lower end of which is positioned above the sea bed and which throw pipe is always implemented to discharge the liquefied carbon dioxide into the deep sea upon transfer thereto from said transport ship."

III. Appellant's essential arguments in view of the above requests can be summarised as follows:

- (D1) and (D2) do not disclose CO_2 transport ships and a marine float installation specifically designed for discharging carbon dioxide into the deep sea as claimed in Claims 1 and 3;

- (D4) discloses in contrast to the refused application a waste disposal ship so that a completely different product from that claimed is handled; moreover a discharge pipe forms part of the ship and requires weight and space of the ship; this pipe has to be lowered before discharging waste to the deep sea and has to be raised thereafter; this procedure is time-consuming;

- a combination of (D2) and (D4) does not achieve the claimed method and system since liquefied CO_2 requires inter alia a pressurised tank of spherical or cylindrical shape which limits the function of the ship in addition to the pipe - storage and its lowering/raising - apparatus; when mounting/dismounting the discharge pipe the ship cannot serve its function, namely transporting material;

- in contrast to the prior art the claimed invention divides the functions of a ship into the transport function and into a discharge function whereby the first function is carried out by a specifically designed ship and whereby the second function is carried out by a free floating marine float installation;

- both installations are specifically designed and interact from time to time, namely when the transport ship is moved to the free floating marine float installation; it is clear that the ship is freed from the discharge pipe and its apparatus for lowering/raising and that no time is lost for installing the discharge pipe since this forms part of the free floating marine float installation, which only serves this purpose;

- due to splitting the functions of transporting and discharging it is possible to combine a fleet of ships with one set of marine float installation so that the investment costs are limited;

- the triple point of the carbon dioxide is not a feature which forms part of the invention since it is only contained in dependent Claim 2;

- summarising, the impugned decision cannot be upheld, since Claims 1 and 3 define subject-matter which is non-obvious in the meaning of Article 56 EPC.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 Claim 1 filed with letter of 6 March 1996 combines the features of originally filed Claims 1 and 2 (3 000 m), column 4, lines 23 to 25 (offshore in deep sea) and Figure 1 as well as Claim 3 (unattached free floating marine float installation with a pipe which is always implemented to the installation), see EP-A1-0 408 979.

2.2 The feature of Claim 2 can be derived from Figure 3, in particular point "F".

2.3 Claim 3 combines the features of originally filed Claims 3 and 2 (3 000 m), Figure 1 (see remark 2.1 above) in combination with column 4, lines 24/25 of EP-A1-0 408 979.

2.4 Claims 1 to 3 are accordingly not open to an objection under Article 123(2) EPC.

3. *Novelty*

3.1 A **free floating** marine float installation always implemented with a discharge pipe is not known from any of documents (D1) to (D4) so that the method according to Claim 1 and the system according to Claim 3 is novel within the meaning of Article 54 EPC. Since novelty was not contested by the Examining Division in its decision to refuse the European application No. 90 112 701.9 this issue needs no further argument.

4. *Inventive step*

4.1 The shortcomings of prior art installations can be seen in transport ships which are equipped with discharge pipes which can be lowered and raised so that carbon dioxide can be discharged to the sea, since it is obvious that the discharge pipes require freight room of the ship and moreover an installation for the pipe-handling. This ship involves therefore extra costs and its use is time-consuming, see (D4), Figures 1 to 3.

Another possibility to discharge liquid carbon dioxide is its transport with the aid of a pipe line, see (D2) page 543 first paragraph or page 547, remark (5) third paragraph.

4.2 The object of the present invention is therefore to provide a method and a system for throwing (discharging) carbon dioxide into the deep sea which are free from the above shortcomings of the prior art.

4.3 This object according to present Claims 1 and 3 is solved by a concept which comprises specifically designed ships, namely for the transport of liquid carbon dioxide only, and a free floating marine float installation located offshore in the deep sea and being unattached to the seabed and being always implemented with a discharge pipe to discharge the liquefied carbon dioxide to the deep sea.

4.4 It is thereby achieved that ships are no longer restricted in their freight room and that no apparatus for lowering/raising the discharge pipe are necessary, which economises costs.

The use of this concept to discharge liquid carbon dioxide to the deep sea is characterized by its low time-consumption as a direct consequence of the permanent availability of the discharge pipe. This also enables the ships to restrict themselves to their proper duties, namely transportation of goods.

4.5 The concept realised according to Claims 1 and 3 is based on an inventive step for the following reasons:

4.5.1 As set out above in combination with the issue of novelty the free floating marine float installation is not known from the prior art which is a first evidence that a skilled person could not follow prior art teachings to solve the object of the present invention.

4.5.2 The basic concept according to Claims 1 and 3 overcomes moreover the above restrictions to the transport ships which no longer require space for a discharge pipe. Due to the permanent availability of the discharge pipe mounted on the free floating marine float installation it is possible to reduce the discharge time of the ships since these are immediately ready to discharge their product respectively to leave the discharge location and to return to the harbour. It is moreover possible that several ships are used in combination with one marine installation.

4.5.3 Contrary to the above solution of the object of the present invention the prior art according to (D1) to (D4) discloses:

- (D1) discloses only the transport of liquid carbon dioxide which is discharged to the deep sea, see pages 64 (remark 3) or 65 paragraphs 3 (directly to the deep sea) or 6 (injection at the proper pressure) as well as page 67 paragraph 3 (specific

weight of carbon dioxide being higher than that of sea water at a depth of 3 000 m) and can be seen as background information;

- (D2) discloses storage of liquid carbon dioxide in the deep sea, see page 532 remark (b) to page 543 line 4 as well as page 547 paragraph 3. It is therefore known to barge liquid carbon dioxide to an offshore region with a depth of 3000 metres and to discharge there the liquid carbon dioxide with the use of a discharge pipe; it is known that in a depth of 3000 metres liquid carbon dioxide is heavier than sea water so that it has a tendency to sink down. The discharge pipe **forms part of the barge** and a floating marine installation as claimed in Claims 1 and 3 is not existent.

- (D3) deals with a problem quite different from the present application since carbon dioxide is **intentionally** produced and afterwards distributed to **consumers** such as hotels, welding facilities.... The only relevancy of this document is the fact that a skilled person is aware from (D3) that carbon dioxide can be liquified, stored in tanks and transported in tanks and consumed **near** the triple point, see page 11 paragraphs 1 and 4 or page 13 paragraph 1. This point is, however, not claimed in the present independent claims, namely Claims 1 and 3. (D3) does not at all address the problems of the present application and cannot even be seen as belonging to a neighbouring technical field;

- (D4) discloses the use of a discharge pipe for discharging flowable articles i.e. waste. The discharge pipe is, however, **linked to the ship** so

that weight and space have to be reserved for the pipe and its handling units not to speak of the time which is necessary for assembling, lowering/raising and disassembling of this discharge pipe. Even if the person skilled in the art were to take this into consideration, it is clear that (D4) cannot serve as a model for the concept claimed in present Claims 1 and 3 since not only are the ships not designed as claimed but a floating marine installation is also not present. The storage room of (D4) is not clearly suitable for transporting liquid carbon dioxide so that it concerns a different technical field.

4.5.4 Under these circumstances even a combination of documents would not render the teachings of Claims 1 and 3 obvious, since the skilled person could not achieve the claimed basic concept, namely provision of specifically designed ships in combination with a specifically designed marine installation, the latter not even being known per se from the prior art.

4.5.5 Claims 1 and 3 define therefore inventive subject-matter within the meaning of Article 56 EPC so that these claims are allowable.

Dependent Claim 2 relates to an advantageous embodiment of Claim 1, and is therefore also allowable.

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:

   - Claims 1 to 3 filed with letter of 6 March 1996,

   - pages 1 to 4, 4a, 5, 6 filed with letter of 6 March 1996,

   - pages 7 to 15 as originally filed and

   - Figures 1 to 5 as originally filed.

The Registrar: The Chairman:

N. Maslin C. T. Wilson