Europäisches Patentamt
Beschwerdekammern

European Patent Office
Boards of Appeal

Office européen des brevets
Chambres de recours

Veröffentlichung im Amtsblatt	Ja/Nein
Publication in the Official Journal	Yes/No
Publication au Journal Officiel	Oui/Non

Aktenzeichen / Case Number / N° du recours : T 644/89 - 3.2.2

Anmeldenummer / Filing No / N° de la demande : 83 108 689.7

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 104 505

Bezeichnung der Erfindung: A canned motor pump
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : F04D 13/06

ENTSCHEIDUNG / DECISION

vom / of / du 11 September 1990

Anmelder / Applicant / Demandeur : Nikkiso Co., Ltd.

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56, and Rules 66(1) and 86(3)

Schlagwort / Keyword / Mot clé : "inventive step - no";
"subsidiary requests newly submitted at the end of the oral proceedings - rejected because filed too late and not unequivocally allowable".

Leitsatz / Headnote / Sommaire

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 644/89 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 11 September 1990

Appellant : Nikkiso Co., Ltd.
No. 43-2 Ebisu 3-chome
Shibuya-ku Tokyo (JP)

Representative : K. Baronetzky
Patentanwälte Dipl.-Ing. R. Splanemann,
Dipl.-Chem. Dr. B. Reitzner,
Dipl.-Ing. K. Baronetzky
Tal 13
D-8000 München 2 (DE)

Decision under appeal : Decision of Examining Division 104 of the European Patent Office dated 6 March 1989 refusing European patent application No. 83 108 689.7 pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : G. Szabo
Members : C. Andries
F. Benussi

Summary of Facts and Submissions

I. European patent application No. 83 108 689.7 filed on 3 September 1983 (publication No. 0 104 505) was refused by a decision of the Examining Division 104 dated 6 March 1989 and dispatched 11 May 1989.

II. The reason given for the refusal was that the subject-matter of Claim 1 did not involve an inventive step in view of the prior art disclosed in the following documents:

D1: EP-A-56 440; and
D2: CH-A-305 818.

III. On 10 July 1989, the Appellant lodged an appeal against this decision, paying the appeal fee on the same date. A Statement of Grounds was filed on 9 September 1989.

IV. In response to communications of the Board, the Appellant filed in various letters new claims and new pages for the description.

Only one request (former main request) remained before the oral proceedings took place.

Claim 1, of the request, reads as follows:

"Canned motor pump having a sufficient dielectric strength at temperatures even at 300°C and intended for pumping hot treating liquids, comprising a canned motor section (52) having an outer wall (114), a rotor assembly (68) and a stator assembly (66) assembled within said outer wall (114), with a gap (102) defined between said rotor assembly (68) and said stator assembly (66); and a pump section (50); with a first heat recovering circuit by which a part

of said treating liquid is supplied between an outlet side of the pump section (50) and a suction side of the pump section (50) via said gap (102), characterized in that a second heat recovering circuit is provided comprising a jacket (116) being mounted on and directly engaging said outer wall (114) the hollow space of which is supplied with a part of said hot treating liquid for feeding back said liquid to the suction side of the pump section (50), further comprising a feeding line (130) communicating with said outlet side of said pump section (50) supplying liquid to a lower portion of said hollow space, and a discharging line (132) communicating with said suction side of the pump section (50) and with a top portion of said hollow space, both lines being integrally provided on the outer circumference of the motor section (52)."

V. During the oral proceedings held on 11 September 1990, the patentability of the above claim was thoroughly discussed. The following arguments were brought forward by the Appellant:

- document D2 could not be considered as the closest prior art, since document D1 was more relevant to the issues of the case;
- the object of the invention is to improve the thermal stability of the motor pump with respect to pump load changes, as well as to avoid heat losses;
- it is essential that the motor temperature is held under a certain critical limit by the pump fluid itself; and
- a skilled person knowing document D1 would, in order to avoid the overheating of the pump motor, reduce the temperature of the pumped liquid or would cool that liquid, rather than to employ the same hot liquid for absorbing excess heat.

VI. At the end of the oral hearing, the Appellant submitted five subsidiary requests, which up to that moment were unknown to the Board.

VII. The Appellant requests that the decision under appeal be set aside and a patent be granted on the following basis (main request):

- Claim 1 filed with letter dated 21/8/90;
- Claims 2 to 8 filed with letter dated 13/8/90;
- Description: pages 1a, 1b, 4, 5 and 13 filed with letter dated 7/5/90;
  pages 2, 3 and 6 to 12 as published;
- Drawings: sheets 1/4 to 3/4 as published; and
  sheet 4/4 filed with letter dated 18 September 1986.

Subsidiarily, the grant of a patent was also requested on the basis of one of five different Claims 1, filed after the discussion had been completed.

Reasons for the Decision

1. The appeal is admissible.

2. **Main request**

2.1 **Amendments**

The Board is satisfied that Claim 1 is sufficiently disclosed in the originally filed application (Article 123(2) EPC).

2.2 **Novelty**

After examination of the cited documents the Board comes to the conclusion that none of them discloses a canned motor pump having all the features as defined in Claim 1.

The subject-matter as set forth in Claim 1, therefore, is to be considered novel within the meaning of Article 54 EPC.

2.3 **Closest prior art**

The canned motor pump according to document D1 reveals the closest prior art. It discloses a pump comprising all the features present in the precharacterising portion of Claim 1, including the fact that it has a sufficient dielectric strength at temperatures even at 300°C. The heat normally generated by such pump can be absorbed by the pumped fluid itself. A branch of such fluid flow may, according to the disclosure, be circulated through an internal or preferably an external conduit from the delivery side of the pump to the motor. To avoid heat losses a thermal insulation around the motor is recommended.

2.4 **Problem and solution**

2.4.1 As put forward by the Appellant, a canned motor pump of the type according to document D1 is used to pump a liquid which in spite of its high liquid temperature also absorbs heat generated by the motor maintaining thereby an optimum operation of the motor under normal circumstances and contributing to the increase of the heat content of the pumped liquid to the required level.

However, sudden extra heat generated in the motor, due for instance to a suddenly increased pump load, might lead to the overheating of the motor (heat-shock) and consequent damage, particularly since the temperature of the pumped fluid is very close to the critical temperature of the insulation winding anyway.

According to the Appellant, the motor pump can, therefore, only be used safely either when the pumped liquids are sufficiently below the critical temperature of the insulation winding or when there is no risk of a sudden increase of the required pump load, corresponding to increasing power and heat generated in consequence in the stator winding.

2.4.2 The technical problem to be solved, therefore, consists in providing a canned motor-pump, with an increased thermal stability, which permits to avoid the overheating of the motor during increased pump load, without having, however, a considerable loss of heat and energy, while keeping the temperature of the liquid to be pumped at a high level.

2.4.3 The problem is solved particularly by the features mentioned in the characterising portion of Claim 1, i.e.

(i) a second heat recovery circuit is provided;

(ii) said circuit comprises a jacket being mounted on and directly engaging said outer wall, the hollow space of which is supplied with a part of said hot treating liquid for feeding back said liquid to the suction side of the pump section;

(iii) said circuit further comprises a specific located feeding and a specific located discharging line; and

(iv) both lines are integrally provided on the outer circumference of the motor section.

2.4.4 The Board has no reason to doubt that the features present in Claim 1, particularly those forming part of the characterising portion of Claim 1 (features (i) and (ii)), solve the above problem. Indeed, by providing a jacket around the motor, and by the features permitting the circulation of the pumped fluid through that jacket, it is possible that heat generated by the motor is transferred to or absorbed in the circulating fluid, which fluid remains in the circuit by its transfer to the suction side of the pump.

2.4.5 The Appellant suggested that due alone to the connection of the feeding line to the lower portion of the jacket, as well as the connection of the discharging line with a top portion of said jacket (feature (iii) as defined above), an increased fluid flow will result in view of differences in density when a "heat shock" occurs in the motor, following an increased pump load.

The Board is, however, of the opinion that such an increased fluid flow is rather the result of the increased pressure difference between the pump outlet and inlet when the pump load increases, instead of the result of the claimed connection. The contribution of this feature (iii) to enhance thermal stability of the motor-pump and to avoid critical temperatures within the motor, therefore, can be minimal in a proper design.

2.4.6 Furthermore, it appears that feature (iv) (as defined above) does not contribute at all to the control of the overheating of the motor, but only helps in avoiding heat loss to the atmosphere.

2.5 Inventive step

2.5.1 If a skilled person tries to avoid the problems arising from a so-called "heat shock", he would first turn to commonly known techniques.

Document D1 already discloses that the heat generated from the motor can be absorbed by the pumped fluid itself during its circulation through the canned motor. Therefore, it is known that the same liquid is able to fulfill the cooling of the motor under normal operating conditions even at elevated temperatures.

It is also known that the heat content of the motor can suddenly increase, so that an undesirable critical temperature will be reached. The existing construction must, therefore, be modified in such a manner that the critical temperature will be avoided. This means that the motor should additionally be cooled. One obvious possibility is to increase the internal cooling (e.g. by a faster flow rate). This is, however, restricted by other conditions such as the very limited size of the gap between the motor rotor and its stator.

When the internal cooling of the motor is insufficient, another obvious alternative is the additional cooling of the outside of the motor by using surrounding jackets, which is commonly known in the technical field of pumps.

On the one hand, document D1 has already indicated the use of the pumped fluid for internal cooling. It is obvious for a person skilled in the art that he can also use the same fluid for cooling on the outside of the motor, particularly in the circumstances of the heat shock when the heat content of the motor is suddenly increased.

On the other hand, it is an additional goal of the present invention to limit heat loss. It becomes, therefore, even more obvious to use the pumped liquid itself for the outside motor cooling when recycling is involved, i.e. the liquid is returned, as suggested in the closest state of the art (cf. page 8, lines 21 to 27), to the suction side of the pump since this would prevent the loss of heat. A person skilled in the art only has to apply the teaching already given in document D1 in relation with the embodiment according to Figure 2 to obtain the same advantages (prevention of heat dissipation of the high temperature liquid; effective heat absorption or cooling; no necessity to use an external conduit).

Features (iii) and (iv), which contribute to a compact motor pump design, are obvious features for a skilled design engineer and cannot be considered by the Board as contributing to an inventive step of the motor pump according to Claim 1, particularly since the Appellant could not convince the Board that these features directly contributed to a better heat-stability of the claimed motor pump. As already explained above (cf. paragraph 2.4.5), an increased fluid flow through the second heat recovering circuit is the result of the increased pressure difference in case of an increased pump load, rather than the result of the specific connection of the lines as defined in Claim 1 (feature iii) utilising some additional difference in density of the fluid due to temperature differences.

2.5.2 A reduction of the pumped fluid temperature or an additional cooling of the pumped fluid might have also solved the problem of a possible overheating of the motor. The Board cannot, however, follow the Appellant when he states that these measures are the only obvious ones. As

outlined above, common general knowledge combined with the teaching of document D1 is sufficient to arrive at the solution represented by motor pumps according to Claim 1.

2.5.3 The subject-matter of Claim 1, therefore, does not involve an inventive step in the meaning of Article 56 EPC, so that Claim 1 is not allowable under Article 52(1) EPC.

3. Subsidiary requests

At the end of the oral proceedings, the Appellant submitted to the Board five different Claims 1 which were intended to form the basis of five subsidiary requests.

The first question to be decided in relation to these claims and subsequently to these requests was whether such claims should be admitted for consideration in this appeal.

As a reason for the late filing of these Claims 1, the Appellant stated that he did not want to overload the Board right from the beginning. The Board could not accept such an argument as a proper justification for the extraordinary lateness of the submissions.

Furthermore, the Board already requested in its Communication dated 15 June 1990 and annexed to the Summons to oral proceedings, an early filing of any amendments (cf. paragraph 3). This was in accordance with instructions published in the "Guidance for appellants and their representatives", published twice in the Official Journal (OJ EPO 6/1981, 176 and 8/1984, 376: paragraph 2.2 "Submission of amendments").

It should also be noted that according to the jurisprudence of the Boards of Appeal, it may refuse to consider alternative claims which have been filed at a late stage, if such claims are not clearly allowable (cf. T 153/85, OJ EPO 1988, 1).

In the present case, it was not directly and unequivocally clear to the Board that these five newly filed Claims 1 could form the basis of an allowable patent. The added features in four of these claims, relating to a canned motor pump, did not impart an inventive step to the existing combination, particularly since these features only related to the temperature of the pumped liquid and/or to the lines connecting the jacket to the pump section, or to a mountable jacket, or to the liquid flow direction in the first and second heat recovering circuits, which according to the Board cannot contribute decisively to the solution of the above stated problem. The fifth filed Claim 1 related to a "use"-claim, which was completely new in the proceedings altogether.

Therefore, the subsidiary requests as put forward at the end of the oral proceedings were excluded from the proceedings for being unacceptable.

Order

For these reasons, it is decided that:

The appeal is rejected.

The Registrar: The Chairman:

S. Fabiani G. Szabo

04195