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Bezeichnung der Erfindung: Double Vane pump
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement :

ENTSCHEIDUNG / DECISION
vom / of / du 3 October 1989

Anmelder / Applicant / Demandeur : PLENTY LIMITED

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56 EPC

Schlagwort / Keyword / Mot clé : "Inventive step (denied)"

Leitsatz / Headnote / Sommaire

Europäisches
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European Patent
Office

Boards of Appeal

Office européen
des brevets

Chambres de recours



Case Number : T 441/87 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 3 October 1989

Appellant : PLENTY LIMITED
Hambridge Road
Newbury
Berkshire RG14 5TR (GB)

Representative : O.J.R. ALLEN
LLOYD WISE, TREGEAR & CO.
Norman House
105-109 Strand
London WC2R 0AE (GB)

Decision under appeal : Decision of Examining Division 104
of the European Patent Office
dated 20 July 1987 refusing European
patent application No. 83 903 099.6
pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : G. Szabo
Members : R. Gryc
W. Moser

Summary of Facts and Submissions

- I. European patent application No. 83 903 099.6, filed on 28 September 1983, published under publication number 120 058 and claiming the priority of a previous application of 28 September 1982, was refused by a decision of the Examining Division No. 104 dated 20 July 1987 on the basis of Claims 1 and 2 filed on 21 April 1987 and Claims 3 to 10 filed on 25 July 1985.
- II. In its decision, the Examining Division held that, starting from the prior art disclosed in (1) GB-A-834 925, it was obvious for the man skilled in the art to arrive at the subject-matter of the present Claim 1 when taking the teaching of (2) US-A-1 692 473 into consideration.
- III. The Appellant appealed against the decision on 14 September 1987, paid the appropriate fee at the same time and filed a Statement of Grounds on 27 November 1987.

In the Statement of Grounds, the Appellant argues essentially that document (2) is an old publication describing only air compressors that differ significantly from liquid pumps, and that pumps designers would never turn to such an old and technically inadequate design to solve problems arising in the context of modern liquid pumps.
- IV. In a communication dated 5 April 1989, the Board expressed the provisional opinion that no inventive step can be seen in the fact of combining the teachings of citations (1) and (2) to arrive at the invention.
- V. In response, the Appellant requested an oral proceedings which took place on 3 October 1989.

At the hearing, the Appellant told the case history of the invention and repeated the argumentation already given in the above mentioned Statement of Grounds.

The Appellant also pointed out that the problem envisaged in citation (2) is different from the one of the application and that the skilled persons in the art of pumps and in the art of compressors are not the same and that they have no reason to consult the technical field of the other.

VI. The Claims 1 to 3 on file read as follows:

1. A sliding vane rotary pump comprising a set of vanes slidably mounted on a rotor shaft, a rotor surrounding the vane set, the rotor having flats on its inner surface contacted by the outer ends of the vanes associated therewith, and a stator within which the rotor and rotor shaft is positioned characterised in that two sets of the vanes (3, 3') are provided both mounted on the rotor shaft (1), the vane sets being located at spaced longitudinal positions along the shaft's axis, in that two rotors (5, 5') are provided both mounted about the rotor shaft (1), separately and independently of each other, the rotors being located at said spaced longitudinal positions along the shaft's axis and positioned to surround the vane sets, and in that the vanes of each set, the rotors and the rotor shaft co-operate to define therebetween two sets of chambers located at said spaced longitudinal positions along the shaft's axis, the inlet (81) and outlet (82) to one set of chambers being through one side face thereof and the inlet (81') and outlet (82') to the other set of chambers being through the side face thereof adjacent said one side face, so that the inlets and outlets face one another, and a common pump inlet (71) and common pump

outlet (72) at least partially defined by the stator and being located between the chambers, the fluid inflow to and fluid outflow from the chambers thereby being generally parallel to the shaft's axis.

2. A pump as claimed in Claim 1 wherein the common pump inlet and outlet (71, 72) are provided in a centre member (8) which surrounds the shaft (1), and wherein the inlet and outlet diverge smoothly to form the chamber inlets and outlets (81, 81', 82, 82').

3. A pump as claimed in Claim 1 or 2 wherein the vanes (3) of the first vane set are positioned relative to the shaft's axis at about 45° relative to the vanes (3') of the second vane set.

VII. The Appellant requested the grant of a patent either on the basis of the refused claims or, auxiliarily, on the basis of a new Claim 1 resulting from the merging of refused Claims 1 to 3.

Reasons for the Decision

The Appeal is admissible.

A. Main request

1. Formal aspect of the application

The question whether there are any formal objections to the current version of the claims and of the description, needs not be answered since Claim 1 is anyway unallowable on another ground.

2. Novelty

After examination of all the documents covered by the international search report as well as those referred to in the description of the application or introduced later during the further proceedings, the Board is satisfied that none of them discloses a sliding vane rotary pump having in combination all the features as defined in Claim 1.

Since this has never been disputed by the first instance, there is no need for further detailed substantiation of this matter.

Therefore, the subject-matter as set forth in Claim 1 is novel in the sense of Article 54 EPC.

3. The closest state of the art

3.1 According to the description of the application and also to the Statement of the Grounds of Appeal, the most important features of the pump as claimed consist of two side by side disposed pumping units, opposite inlet and outlet ports in the side faces of the units and common pump inlet and pump outlet therebetween.

3.2 A similar embodiment is already disclosed in citation (2). Although the title, the claims and the example detailed in this document refer to a compressor, it is explicitly stated therein that the described construction can also be used as a pump for forcing liquids (cf. page 1, lines 2, 27 and 37-41). The only difference between the subject-matter of Claim 1 and this state of the art is the provision of a rotating sleeve around the vanes according to the invention.

Therefore, among all the citations opposed to the application, this prior art presents the highest degree of similarity of structure with the pump according to Claim 1 and should be considered as the closest state of the art relative to the invention.

4. The problem and its solution

4.1 According to the established jurisprudence of the Boards of Appeal, the technical problem that the invention addresses and solves should be determined in the light of the objectively ruling state of the art, in particular as revealed in the course of proceedings which may be different from the prior art of which the Applicant was aware at the time he filed the application. It follows that the case history of the invention, i.e. the way the invention was made, is irrelevant (cf. Decisions T 24/81, "Metal refining/BASF", OJ EPO 1983, 133 and also T 248/85, "Radiation processing/BICC", O.J. EPO 1986, 261).

4.2 In the light of the prevailing state of the art referred to in paragraph 3, the fact that the outer ends of the vanes of the rotating structure described in citation (2) are in rubbing contact with the inner face of the casing and thus subject to wear as they revolve is regarded as a disadvantage and thereby a technical problem that the invention obviates.

4.3 To solve this problem, the application proposes essentially to interpose sleeves, called "rotors", rotatable within the casing and having internal flat surfaces engaged by the ends of the vanes.

The Board is satisfied that the aforementioned problem is solved by the provision of these additional technical measures recited in Claim 1.

5. Inventive step

5.1 When assessing inventive step, consideration should be given to the question of obviousness of the disclosed solution to the problem as seen by the person skilled in the art and having those capabilities which can be objectively expected of him.

The state of the art to be considered includes not only that in the field of the application but also the state of the art of any relevant neighbouring technical fields. All previous known embodiments must therefore be taken into consideration which offer a suggestion to the skilled person for solving the problem addressed, even if those embodiments were not particularly emphasised (cf. Decision T 24/81, already cited).

5.2 In the present case, the problem and its solution according to the invention as settled above in paragraph 4 with respect to the construction disclosed in citation (2) are already well known from several anticipations cited in the international search report (see in particular GB-A-414 752, page 2, lines 31-36 and GB-A-562 441, page 1, lines 15-36). Moreover, the use of rotating sleeves to surround the vane sets in rotary pumps of the sliding type appears as current practice for the skilled practitioner as shown in most of the numerous citations selected in the search report.

Therefore, when consulting this relevant prior art, the skilled person will immediately find therein the

solution proposed in Claim 1 and by the fact that most of the existing pumping units are equipped with such rotating sleeves which clearly shows a trend in this technical field, he will also be incited to adopt such a specific construction.

- 5.3 As regards the argument of the Appellant that citation (2) is an old one and refers mainly to air compressors, it should be emphasised that neither Article 56 EPC nor Article 54(2) EPC limit retrospectively the period wherein the anticipation should have been made available to the public and, as already stated above, the skilled practitioner is supposed to consult also the art in neighbouring technical fields. The technical field of compressors is very close to and overlaps with the one of pumps and the Appellant has failed to persuade the Board that the manufacturers of pumps have nothing to do with those manufacturing compressors.

Anyhow, as already mentioned above in paragraph 3, clear and explicit references to pumps can be found in citation (2) (cf. page 1, lines 2, 27 and 37-41).

- 5.4 The Appellant also contended that the problems arising on the one hand with pumps and on the other hand with compressors were quite different and that, therefore, the skilled person could not expect to find a solution to his problems with pumps in a document describing an air compressor and vice-versa.

The Board agrees that each technical field relating to pumps or compressors has its own specific problems, but it cannot accept the Applicant's contention as a general rule, i.e. all the problems arising in a technical field should be considered as specific to

this field. In fact, many of the problems in respect of friction, tightness, fluid techniques etc. are common at least to the general field of the rotary fluid machines wherein the driven parts are rotary in their action.

- 5.5 Furthermore, it is also general knowledge for the skilled practitioner that, occasionally, a solution applied in one field to solve a common problem can be transposed into a neighbouring field with advantage.

In the present case, since the problem as determined objectively in paragraph 4 relates mainly to friction and sealing between the outer ends of the sliding vanes and the surface they contact, such a problem is not specific to rotary pumps but is common to each rotating fluid apparatus comprising revolving sets of vanes, including air compressors. Consequently, the person skilled in the art is inclined to solve this common problem in the same way whatever the technical field would be.

- 5.6 For the foregoing reasons, the subject-matter of Claim 1 lacks an inventive step in the sense of Article 56 EPC and, therefore, this claim is not allowable having regard to Article 52(1) EPC.

B. Subsidiary request

6. As a substitute for the subject-matter of present Claim 1, the Applicant proposed the one of refused Claim 3 as referring back to refused Claim 2. This involves the use of a centre member providing "smooth" outlet and inlet divergency, and certain angular positions for the vane sets.

6.1 The embodiment disclosed in citation (2) comprises also a centre member (cf. Figure 3) which surrounds the shaft and wherein the common pump inlet and outlet diverge to form the chamber inlets and outlets.

It is common knowledge to the person skilled in the art, i.e. in fluid techniques, that in order to avoid turbulence and promote laminar flows the alterations in direction of the streams should be "smooth".

Therefore, a combination of the features of Claim 2 with the subject-matter of refused Claim 1 does not bring anything more with respect to inventive step.

6.2 One of the known disadvantages of the rotary vane pumps consists in the pulsations of the output. This has already been studied and, to damp out the pulsations of the outlet flow of double unit pumps, it is already well known to set apart circumferentially, i.e. in-between, the vane sets of the two units mounted in tandem so that the combined output provides a more constant delivery flow. This problem and its solution are known, for example, from citation FR-A-2 353 729 cited in the search report and also from the following handbook: "Hydraulic Handbook, 7th Edition 1979, Trade and Technical Press Ltd, page 95", cited in the course of the examination proceedings. Therefore, these measures belong to the general knowledge of the skilled practitioner.

In the present case, since each set of vanes of the embodiment exemplified in citation (2) comprises four vanes, it appears logical not to set apart at 90° the vane sets as indicated in the above-mentioned handbook, but to mount the same at 45° apart circumferentially when a most regular delivery flow is wanted.

Consequently, the additional measure of refused Claim 3 is not able to bring anything inventive to the subject-matter of refused Claim 1.

6.3 For the foregoing reasons, the same objection of lack of inventive step raised against refused Claim 1 would remain valid against an amended independent claim resulting from the merging of refused Claims 1, 2 and 3 according to the subsidiary request.

Order

For these reasons, it is decided that:

The appeal against the decision of the Examining Division is dismissed.

The Registrar:

The Chairman:

S. Fabiani

S. Fabiani

G. Szabo
G. Szabo

R.G. 11.12.89
W. Riser 13.12.89
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