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File Number: T 909/90 - 3.5.2

Application No.: 85 200 856.4

Publication No.: 0 171 094

Title of invention: A method of driving the impeller of a liquid pump

Classification: H02P 7/628

DECISION
of 3 June 1992

Proprietor of the patent: Institut Cerac S.A.

Opponent: KSB Aktiengesellschaft

Headword:

EPC Articles 56 and 104

Keyword: "Inventive step (no)"
"Apportionment of costs (yes)"

Headnote



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Boards of Appeal

Chambres de recours

Case Number : T 909/90 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 3 June 1992

Appellant :
(Proprietor of the patent)

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Representative :

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Respondent :
(Opponent)

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Decision under appeal :

Decision of Opposition Division of the European
Patent Office dated 21 September 1990 revoking
European patent No. 0 171 094 pursuant to
Article 102(1) EPC.

Composition of the Board :

Chairman : R.E. Persson
Members : L. Toernroth
W.J.L. Wheeler

Summary of Facts and Submissions

I. The appellant contests the decision of the Opposition Division revoking European Patent No. 171 094 on the ground that the subject matter of independent Claims 1 and 3 did not involve an inventive step, having regard to the prior art documents:

D1: AT-A-364 252

D2: Proceedings of the Sixth Conference on Fluid Machinery, Budapest, 1979, pages 535 to 544

D3: DE-A1-2 934 076

II. Claims 1 and 3 read as follows:

- "1. A method of driving the impeller (5) of a liquid pump by means of an induction motor (2) to which energy is supplied from a regulatable static inverter, the output frequency of which is controlled dependent on the pressure in the liquid, measured by a pressure sensor (16), characterized in that the pressure sensor is arranged to sense the cavitation state of the impeller (5) and that the inverter output frequency is controlled such that the revolutionary speed of the impeller is maintained at or beneath a cavitation free maximum value."
- "3. A liquid pump for carrying out the method according to Claim 1, including an impeller (5) which is arranged in a pump housing (1) and which is driven by an induction motor (2) and a regulatable static inverter (6) arranged to supply energy to said motor, the output frequency is controlled dependent on the

pressure in the liquid, measured by a pressure sensor (16), characterised in that the pressure sensor is arranged to sense the cavitation state of the impeller and, in the occurrence of cavitation, to produce a control signal which causes the inverter (6) to change its output frequency such that the revolutionary speed of the impeller (5) is maintained at or beneath a cavitation free maximum value."

III. The Appellant requested in his statement of grounds of appeal that the decision of the Opposition Division be set aside and the patent be maintained on the basis of the claims as granted (main request) or on the basis of either the first or the second sets of claims as submitted with the grounds of appeal (first and second auxiliary requests).

Claims 1 and 3 according to the first auxiliary request differ from the Claims 1 and 3 of the revoked patent in that the sensor is arranged "to selectively sense the true cavitation state of the impeller".

Claims 1 and 5 according to the second auxiliary request cover substantially the same subject matter as Claims 1 and 3 according to the first auxiliary request and differ from the latter only in that they are delimited against D1 and "the revolutionary speed of the impeller is constantly maintained at a cavitation free maximum value" (emphasis added).

IV. In a communication to the parties accompanying the summons to oral proceedings the Board expressed the view that none of the requests was allowable.

V. Oral proceedings, which had been requested by the Appellant, were held on 2 June 1992. Despite having been duly summoned, the Appellant failed to appear.

VI. The Appellant's arguments in his statement of grounds of appeal can be summarised as follows:

Document D1 was considered as the closest prior art by the Opposition Division. This document, however, did not relate to a pump driven by an induction motor to which energy was supplied from a regulatable static inverter. Moreover the pressure sensor was not arranged to sense the true cavitation state of the impeller. In fact, in the embodiments of a liquid pump according to D1 the pressure sensor was placed at the pump's output and it detected, therefore, a mean value of the pressure in the output pipe. A deviation of the output pressure from the expected value was taken as an indication of a possible cavitation state of the pump. On the contrary, the contested invention, by relying on a pressure sensor arranged to detect the pressure surges generated within the liquid by imploding cavitation bubbles close to the impeller, detected a true cavitation state and thus allowed the pump to be run at the maximum cavitation free speed.

VII. The Respondent argued essentially as follows:

The terms "true cavitation" and "possible cavitation" used by the Appellant did not find support in the application documents as originally filed. Moreover, they were devoid of any technical meaning since the theory of cavitation allowed a distinction only between incipient cavitation, corresponding to the formation of the first vapour bubbles, and full cavitation, when the vapour completely filled the pump. It was obvious to the skilled person to combine the teaching of D1 with a cavitation sensing device known from D2 to arrive at the subject matter of the contested patent.

VIII. The Respondent requested at the oral proceedings that the appeal be dismissed and that an apportionment of costs incurred in the oral proceedings be ordered in his favour.

Reasons for the Decision

1. The appeal is admissible.

2. Inventive Step

2.1.1 The main issue to be decided is whether the independent claims of the main and auxiliary requests involve an inventive step.

2.1.2 A method for driving the impeller of a rotary liquid pump and a pump for carrying out such method in accordance with the preamble of Claims 1 and 3 as granted are known from D3, which in the opinion of the Board represents the most natural starting point. According to that document the rotational speed of the impeller is controlled to keep the level of the liquid within set limits. Although cavitation is not mentioned in that document, it is obvious that cavitation may occur if the pump is being driven at high speed.

2.1.3 Regarding the question of inventive step the reasoning should, as pointed out in the above communication, start from the technical problem stated in the description, namely the increasing risk of cavitation when one is aiming at driving the pump at maximum speed. The skilled person facing this problem and seeking its solution will be aware of methods for detecting cavitation known from D1 as well as from D2. It seems obvious that he will then prefer the methods disclosed in D2 since these methods are

based solely on measuring pressure effects which are directly related to the fact that cavitation occurs. Further, it goes without saying, and even regardless of D1, that he will use the output signal from the cavitation detector for regulation of the inverter frequency in order to adapt the impeller speed to the desired cavitation free maximum value. He will thereby arrive at a solution in accordance with the independent claims of the main and auxiliary requests (even if construed narrowly in accordance with the arguments of the Appellant).

3. For the above reasons the Board finds that the subject matter of the independent claims of the main and auxiliary requests does not involve an inventive step as defined in Article 56 EPC. Consequently none of the requests is allowable. The Board need not consider whether the auxiliary requests comply with Article 123(2) EPC.

4. Apportionment of costs

- 4.1 As appears from paragraph V above the oral proceedings on 2 June 1992 were appointed at the request of the Appellant. However, although duly summoned the Appellant did not appear at these proceedings which then became quite superfluous, in particular in view of the fact that the Appellant had not commented in writing on the above communication of the Board. Nor had the Appellant in advance informed the Board or the Respondent of his intention not to take part in the oral proceedings. In these circumstances, the Board considers that, for reasons of equity, an apportionment of costs incurred in the oral proceedings should be ordered in favour of the Respondent as requested by him.

Order

For these reasons, it is decided that:

1. The appeal is dismissed.
2. The costs in the appeal procedure shall be apportioned so that the Appellant shall pay to the Respondent the full costs which were incurred by the Respondent's representative in preparing for and attending the oral proceedings.

The Registrar:

The Chairman:

M. Beer

E. Persson