

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen
(D) No distribution

**Datasheet for the decision
of 9 April 2010**

Case Number: T 1431/08 - 3.2.03

Application Number: 03255489.1

Publication Number: 1400765

IPC: F25B 1/047, F04C 29/02,
F04C 29/04

Language of the proceedings: EN

Title of invention:
Screw refrigerating apparatus

Applicant:
KABUSHIKI KAISHA KOBE SEIKO SHO

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56, 123

Relevant legal provisions (EPC 1973):
-

Keyword:
"Inventive step (no)"
"Remittal (no)"

Decisions cited:
-

Catchword:
-



Case Number: T 1431/08 - 3.2.03

D E C I S I O N
of the Technical Board of Appeal 3.2.03
of 9 April 2010

Appellant: KABUSHIKI KAISHA KOBE SEIKO SHO
10-26, Wakinoama-cho 2-chome
Chuo-ku
Kobe-shi
Hyogo 651-8585 (JP)

Representative: Bailey, David Martin
Brookes Batchellor LLP
102-108 Clerkenwell Road
London EC1M 5SA (GB)

Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 21 February 2008
refusing European application No. 03255489.1
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: U. Krause
Members: C. Donnelly
I. Beckedorf

Summary of Facts and Submissions

- I. The appeal lies from the decision of the examining division, posted on 21 February 2008, to refuse European Patent application No. 03255 489.1. Essentially, the examining division held that the subject-matter of claim 1 filed with letter of 19 February 2007 did not involve an inventive step in view of the teachings of EP-A-933603 (D1) in combination with those of ASHRAE Handbook, "Systems and Equipment" 1996, page 34.13 (D7).
- II. Other documents cited by the examining division during the examination procedure were:
- D2: EP-A-778451
D3: US-A-3811291
D4: EP-A-1103296
D5: US-A-4899555
D6: GB-A-1570973
- III. The applicant (hereinafter: the appellant) filed a notice of appeal on 21 April 2008 and paid the fee the same day. The grounds of appeal, together with an amended claim 1, were filed on 19 June 2008.
- IV. In a communication dated 21 January 2010, pursuant to Article 15(1) RPBA annexed to the summons to oral proceedings, the Board informed the appellant of its provisional opinion. In particular, the Board indicated that the subject-matter of claim 1 of 19 June 2008 did not appear to involve an inventive step in view of D7.

V. By letter of 8 March 2010 the appellant resubmitted a complete main request comprising claims 1 to 7, wherein claim 1 corresponded to that of 19 June 2008, as well as filing further auxiliary requests 1 to 5. In the same letter the appellant indicated that it would not be attending the oral proceedings.

VI. Oral proceedings were duly held in absence of the appellant as scheduled on 9 April 2010.

VII. The final requests of the appellant are as follows:

that the decision under appeal be set aside and
1. that a patent be granted on the basis of the main request filed with letter of 8 March 2010, or,
2. alternatively, that the case be remitted to the department of first instance for further prosecution on the basis of one of the sets of claims filed as first to fifth auxiliary requests with letter of 8 March 2010.

VIII. Claim 1 according to the main request reads:

A screw refrigerating apparatus (1) comprising:
a refrigerant circulating passage (1), said refrigerant circulating passage (I) including:
a screw compressor (11); a rotor cavity within said screw compressor (11); a condenser (12); an expansion valve (13); and an evaporator (14), throttle means (15); and a bypass flow passage (II) branching at a part of said refrigerant circulating passage (I) between said condenser (12) and said expansion valve (13), routing through said throttle means (15), and communicating with said rotor cavity, wherein said

throttle means (15) changes refrigerant in liquid state in said bypass flow passage (II) into refrigerant in mixed gas liquid state so that the refrigerant in mixed gas liquid state is led to said rotor cavity, and wherein refrigerant circulating in said refrigerant circulating flow passage (I) contains no lubricant or contains lubricant in an amount of about 1 to 3 wt% with respect to said refrigerant.

Claim 1 according to the first auxiliary request reads:

A screw refrigerating apparatus (1) comprising:
a refrigerant circulating passage (1), said refrigerant circulating passage (I) including:
a screw compressor (11); a rotor cavity within said screw compressor (11), a condenser (12); an expansion valve (13); and an evaporator (14), throttle means (15); and a bypass flow passage (II) branching at a part of said refrigerant circulating passage (I) between said condenser (12) and said expansion valve (13), routing through said throttle means (15), and communicating with said rotor cavity, wherein said throttle means (15) changes refrigerant in liquid state in said bypass flow passage (II) into refrigerant in mixed gas liquid state so that the refrigerant in mixed gas liquid state is led to said rotor cavity, and wherein refrigerant circulating in said refrigerant circulating flow passage (I) contains no lubricant or contains lubricant in an amount of about 1 to 3 wt% with respect to said refrigerant wherein said throttle means (15) comprises a first throttle means (58) and a second throttle means (59), and wherein the screw refrigerating apparatus further comprises;

a fluid lubricated bearing inside said screw compressor;

a bypass flow passage branching at a part of said refrigerant circulating passage between said condenser and said expansion valve, routing through said first throttle means and communicating with said rotor cavity;

a bearing-fluid-filling flow passage branching at a part of said refrigerant circulating passage between said condenser and said expansion valve, routing through said second throttle means, and communicating with said fluid lubricating bearing.

- IX. Essentially the appellant argued that the subject matter of claim 1 is new with respect to D7 since the bypass of the apparatus in D7 does not communicate with the rotor cavity.

Further, the applicant argued that there are no throttle means shown in D7 to change refrigerant in liquid state in said bypass flow passage into refrigerant in mixed gas/liquid state so that the refrigerant in mixed gas/liquid state is led to said rotor cavity.

Thus, the subject-matter of claim 1 according to the main request is new with respect to claim 1.

The subject-matter is also inventive since none of the cited prior art documents describe or suggest the above distinguishing features.

Reasons for the decision

1. The appeal is admissible
2. *Main request - Novelty, Inventive step,*
 - 2.1 The Board considers D7 to be the most relevant prior art since it shows both a bypass taking fluid from the condenser directly to the compressor rotor housing via a valve for lubricating the screw compressor and a refrigerant with either none or a small percentage of lubricant. This document (see in particular figure 12 "Oil injection-free circuit") describes:

a screw refrigerating apparatus comprising:
a refrigerant circulating passage, said refrigerant circulating passage including:
a screw compressor ; a rotor cavity within said screw compressor (implicitly present);
a condenser;
an expansion valve; and
an evaporator, throttle means ; and a bypass flow passage branching from said condenser, routing through said throttle means, and communicating with said rotor cavity, and wherein said throttle means changes refrigerant in liquid state in said bypass flow passage into refrigerant in mixed gas/liquid state so that the refrigerant in mixed gas/liquid state is led to said rotor cavity and wherein refrigerant circulating in said refrigerant circulating flow passage contains no lubricant.
 - 2.2 The appellant argues that there is a further difference in that the bypass of the apparatus in D7 does not

communicate with the rotor cavity. However, D7 states at the left hand column lines 30 to 33:

"fluid injected into the compression chamber is the condensate of the fluid being compressed.....the oil normally injected into the casing is replaced by liquid refrigerant".

Thus, the appellant's arguments are not convincing in this respect.

2.3 As regards the feature: "

"wherein said throttle means changes refrigerant in liquid state in said bypass flow passage into refrigerant in mixed gas/liquid state so that the refrigerant in mixed gas/liquid state is led to said rotor cavity"

the applicant has argued that there is no equivalent throttle means shown in D7. However, the Board does not share this view. The valve placed before the annotation "Liquid injection" in figure 12 must function in the same way as that of the application since it is required to bring the pressure of the fluid in the line leaving the condenser down to that of where the line enters the compressor. The annotation "liquid injection" in figure 12 does not necessarily mean that 100% liquid is injected, but enough liquid is present to provide sealing and cooling by drawing heat of evaporation, as mentioned in the left-hand column, lines 36 and 37, of D7 and as explained in the application as published at paragraph [0023]; the flashing of the refrigerant in the throttle valve would

inevitably lead to the formation of some gas and the requirements of the claim are met. Further, the term "fluid" covers both liquid and gas states and its use in the passage at the left-hand column, lines 30 to 33 of D7, rather than "liquid", indicates that some of the condensate will have been flashed into gas form.

2.4 The subject-matter of claim 1 differs there from in that

- the bypass branches at a part of said refrigerant circulating passage between said condenser and said expansion valve.

This feature is a minor constructional modification since in D7 fluid is directly taken from the condenser and passed to the compressor whereas in the application it is taken "before the expansion valve", a position which includes immediately at the exit of the condenser, the condition of the fluid in both cases is similar.

2.5 Thus, the subject-matter of claim 1 does not meet the requirements of Article 56 EPC since it does not involve an inventive step.

3. *First auxiliary request*

3.1 The first auxiliary request has been amended by the addition of the following features:

and wherein the screw refrigerating apparatus further comprises;

a fluid lubricated bearing inside said screw compressor;

a bypass flow passage branching at a part of said refrigerant circulating passage between said condenser and said expansion valve, routing through said first throttle means and communicating with said rotor cavity;

a bearing-fluid-filling flow passage branching at a part of said refrigerant circulating passage between said condenser and said expansion valve, routing through said second throttle means, and communicating with said fluid lubricating bearing.

3.2 The appellant has explained that the subject-matter of this amendment corresponds to that of originally filed claim 7. Although the Board concurs with this it must be remembered that original claim 7 was an independent claim. As such its subject-matter cannot simply be added to that of a claim based on originally filed independent claim 1 without a clear basis in the description and/or drawings as originally filed. This has not been provided by the appellant.

3.3 However, the first auxiliary request additionally specifies that:

"said throttle means (15) comprises a first throttle means (58) and a second throttle means (59), the second throttle means being arranged in a flow passage connecting the condenser to a fluid lubricated bearing inside the screw compressor"

It must be taken into consideration that claim 1 of the main request, and the corresponding part of claim 1 of

the auxiliary request, define the throttle means as changing refrigerant in liquid state in the bypass flow passage into refrigerant in mixed gas/liquid state so that the refrigerant in mixed gas/liquid state is led to the rotor cavity. Thus, the throttle means is clearly defined as throttling refrigerant fed to the rotor cavity. It is true that in the originally filed description there is an embodiment (figure 9) showing additional throttle means (58,59) feeding refrigerant to the bearings. However, since these additional throttle means do not throttle refrigerant fed to the rotor cavity, they must be distinct from the throttle means defined in claim 1 as filed and cannot form part of them.

3.4 Consequently, there is no basis in the application as filed for the feature that the throttle means throttling refrigerant fed to the rotor cavity comprises further throttle means feeding refrigerant to the bearings.

3.5 Thus, in the absence of any explanation to the contrary, the subject-matter of claim 1 according to the first auxiliary request does not meet the requirements of Article 123(2) EPC.

4. *Auxiliary requests 2 to 5*

4.1 These requests all contain a dependent claim comprising the feature:

"wherein said throttle means (15) comprises a first throttle means (58) and second throttle means (59)" as defined in claim 1 of the first auxiliary request.

For the reasons given above the throttle means (15) already defined as leading to the rotor cavity is not originally disclosed as comprising any further throttle means.

4.2 Thus, all these requests contravene Article 123(2) EPC.

5. The Board would also indicate that the appellant has not provided any arguments concerning inventive step for any of the auxiliary requests. Furthermore, the requests are not converging in that in each case the subject-matter of the respective claim 1 sets off in a new and different direction. Such action is tantamount to delegating responsibility to the Board to determine which aspect of the application should be pursued as the invention and to provide reasoning of its own as to why the requirements of the convention are met.

5.1 For these reasons the Board is not disposed to admit any of the auxiliary requests into the procedure. Consequently, there are no requests which can be remitted to the department of first instance for further examination.

Order

For these reasons it is decided that:

The appeal is dismissed.

Registrar:

Chairman:

A. Counillon

U. Krause