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D E C I S I O N
of 1 December 1999

Case Number: T 0660/98 - 3.2.4

Application Number: 94304037.8

Publication Number: 0627550

IPC: F02B 37/12

Language of the proceedings: EN

Title of invention:
Turbo-charger

Applicant:
Holset Engineering Company Limited

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 111

Keyword:
"Novelty - yes"
"Remittal to the first instance"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0660/98 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 1 December 1999

Appellant: Holset Engineering Company Limited
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 9 February 1998 refusing European patent application No. 94 304 037.8 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. A. J. Andries
Members: M. G. Hatherly
C. Holtz

Summary of Facts and Submissions

I. On 17 April 1998 the appellant (applicant) lodged an appeal against the examining division's decision, whose grounds were dispatched on 9 February 1998, to refuse for lack of novelty the European patent application No. 94 304 037.8 (publication No. 0 627 550). The appeal fee was paid simultaneously and the statement of grounds of appeal was received on 19 June 1998.

II. The following prior art documents were cited in the examining division's decision:

D1: GB-A-2 059 515

D2: EP-A-0 433 560

D3: WO-A-89/07194

The following prior art document was cited during the appeal proceedings:

D7: US-A-4 075 849

III. In the statement of grounds of appeal the appellant argued that the amended claims filed therewith were clear, novel and inventive. Following comments by the board in a communication and a telephone call, the appellant filed new pages of the patent application.

IV. After adding a reference numeral plainly omitted in error, claim 1 reads as follows:

"A turbo-charger comprising a turbine housing defining

a turbine chamber, an exhaust gas inlet to the turbine chamber, an exhaust gas outlet (3,7;23,18;24,27) from the turbine chamber, a passageway (4,6,8;14,16,20;33) which extends between the inlet and outlet (3,7;23,18;24,27) and bypasses the chamber, a valve (5;15) mounted in the passageway (4,6,8;14,16,20;33), means for controlling the valve (5;15) to selectively open and close the passageway (4,6,8;14,16,20;33), characterised in that:

(i) the passageway (4,6,8;14,16,20;33) comprises an annular portion (8;20;33) which communicates at its upstream end with a chamber (6;16) defined around the valve (5;15) and opens at its downstream end into the outlet (3,7;23,18;24,27) in a direction such that gas issuing from the annular portion (8;20;33) of the passageway (4,6,8;14,16,20;33) is directed substantially parallel to the axis of the turbine in which direction gas flows from the turbine chamber through the outlet (3,7;23,18;24,27);

(ii) the annular portion (8;20;33) of the passageway is located coaxially with and radially outside a first portion (7;23) of the outlet (3,7;23,18;24,27) and opens at a second portion (3;18) of the outlet (3,7;23,18;24,27) downstream of said first portion (7;23);

(iii) the annular portion (8;20;33) of the passageway (4,6,8;14,16,20;33) reduces in radial width towards its downstream end; and

(iv) the first portion (7;23) of the outlet tapers

radially outwards towards the downstream end of the annular portion (8;20;33) of the passageway (4,6,8;14,16,20;33) and the second portion (3;18) of the outlet (3,7;23,18;24,27);

whereby disruption in the flow of gas from the turbine chamber in outlet (3,7;23,18;24,27) is minimised."

V. The appellant requests (see the letter dated 25 November 1999) that the decision of the examining division be set aside and that a patent be granted on the basis of:

Claims: claims 1 to 3 filed with the letter of 25 November 1999.

Description: pages 1, 1a, 2, 3 and 4 filed with the letter of 9 November 1999, and page 5 as originally filed.

Drawings: Figures 1 to 3 (sheet 1/2) filed with the letter of 9 November 1999, and Figures 4 to 9 (sheet 2/2) as originally filed.

The appellant requests oral proceedings if the board proposes to dismiss the appeal.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 All the features of the originally filed claim 1 are to be found in the present claim 1.

2.2 The pre-characterising portion of the present claim 1 and part of its section (i) come from the originally filed claim 1. The rest of section (i) is based on parts of the originally filed claims 2 and 4. Section (ii) is based on the rest of the originally filed claim 2. Section (iii) is based on the rest of the originally filed claim 4. Section (iv) is based on the originally filed claim 3, clarified using Figures 1, 3 and 4 as well as the specific description relating thereto. The clause from the word "whereby" to the end of the claim is based on the originally filed description e.g. the last paragraph of page 1, lines 17 and 18 of page 3, lines 11 and 12 of page 4, and the last line of page 5.

2.3 The present claim 2 is derived from Figure 1 and lines 1 to 9 of the originally filed description. The present claim 3 is derived from Figures 2 and 3 and page 3, line 31 to page 4, line 1 of the originally filed description.

2.4 The present description consists of the originally filed description, adapted to the present claim 1 and to acknowledge the most relevant prior art.

2.5 Sheet 1/2 of the present drawings corresponds to the originally filed sheet except for some minor corrections.

2.6 There is thus no objection under Article 123(2) EPC to the

present version of the application.

3. *The purpose of the present invention*

3.1 Claim 1 states that gas issuing from the annular portion of the passageway is directed substantially parallel to the axis of the turbine in which direction gas flows from the turbine chamber through the outlet. This implies that the gas from the turbine is to flow substantially parallel to the axis of the turbine. The word "parallel" is preceded in each case by the word "substantially" and indeed it is clear that in practice each flow will not be perfectly parallel to the turbine axis e.g. the flow from the turbine will have been disturbed by the rotation of the turbine.

3.2 It is also clear that in practice disruption in the flow of gas from the turbine in the outlet cannot be eliminated, indeed the claim uses only the word "minimised".

3.3 While the board can accept the wording "substantially parallel" and "disruption ... minimised", this wording can be applied to a greater or lesser extent to the arrangements of the prior art.

3.4 It can be argued that Figure 1 of D1 shows the bypass flow leaving the jet nozzle 9 roughly parallel to the turbine axis. The same could be argued of D2, see the axial direction of the end of the bypass duct 31 on Figure 1 and the statement of coaxiality in column 4, lines 40 to 43. Since the flow in the present invention will not be perfectly parallel to the turbine axis but will comprise some helical motion, even D3 (see

Figure 2) with its deliberately helical flow must be considered.

3.5 It has been stated in section 3.2 above that in practice disruption in the flow of turbine gas cannot be eliminated by the present invention but merely minimised. However the disruption by the bypass gas to the flow of gas from the turbine in D1 to D3 seems to be less than in prior art arrangements (e.g. D7) where the bypass gas enters the outlet at right angles to the turbine axis.

3.6 Nevertheless the intention of the present invention is clear, not to achieve a jet pump effect by a deliberate action of the bypass gas on the turbine gas (e.g. as in D1 and D3) but to make the two gas flows parallel. Since however the independent claim is to the turbo-charger itself and this turbo-charger needs to be defined in terms of technical features and not mere intentions, it will be necessary to compare the list of technical features in claim 1 which produce the parallel flows with the technical features disclosed by the prior art documents.

3.7 It seems to the board that - at least at the present stage of the examination of this patent application - D7 is the most appropriate starting point for the assessment of inventive step (since it would not seem logical to start from the turbo-charger of D1 or D3 with a jet pump effect and then deliberately remove this effect).

4. *Comparison of the technical features of claim 1 and the prior art*

4.1 The present claim 1 is divided into two portions using the disclosure of D7, see in particular Figure 4, lines 24 to 32 of column 2 and lines 5 to 16 of column 3.

The passageway 26 (Figure 2) bypassing the turbine chamber is opened or closed by a valve member 66 (Figure 4). Downstream of a head portion 72 of this valve member 66, the bypass gas enters an exhaust chamber 76 and passes through an opening 78 to join the gas that has passed through the turbine and leave the turbine housing 16 through discharge opening 24. Unlike the turbo-charger defined by the present claim 1, the exhaust chamber in the prior art turbo-charger of D7 is not annularly shaped. The bypass gas enters the outlet duct perpendicularly to the flow coming from the turbine (instead of substantially parallel thereto). Thus in no way could it be said about this prior art arrangement that disruption in the flow of gas from the turbine chamber in the outlet is minimised.

4.2 The three different embodiments shown in Figures 1 to 3 of D1 each have bypass passageways but it is only in the embodiment shown in Figure 1 that the bypass passageway 8 comprises a duct 10 which is annular. The quantity of gas flowing through the bypass passageway is controlled by an axially displaceable annular slide 12 that varies the cross-section of jet nozzle 9 (see page 1, lines 59 to 64 and 103 to 106).

While - dependent on the size of the cross-section of jet nozzle 9 - the bypass flow may leave the jet nozzle 9 roughly parallel to the turbine axis, the construction by which this is achieved differs from that set out in the present claim 1. In particular, the

annular slide 12 of D1 does not taper "radially outwards towards the downstream portion of the annular portion of the passageway and the second portion of the outlet". Moreover the purpose of the construction of D1 is to produce a jet pump effect (see lines 37 to 46 of page 1) and thus differs from the purpose of the construction of the present invention which is to minimise disruption in the flow of gas from the turbine chamber.

4.3 The present claim 1 specifies both a chamber around the valve and an annular portion of the passageway but it seems that in D2 the bypass duct 31 downstream of the opening 6 corresponds to the annular portion of the passageway without there being any chamber around the valve (see Figure 1 and column 4, lines 29 to 32). The bypass duct 31 is narrower at its exit than at the start so it could be said to be reducing in radial width towards its downstream end. Because the axial part of the passageway 31 upstream of the outlet is so short and is preceded by a radial part, it seems that the gas issuing from the passageway will be directed diagonally to the axis of the turbine. Therefore despite column 4, lines 40 to 43 ("Die Zumischung des Teilstromes in den Hauptabgasstrom erfolgt koaxial und somit verlustarm am Ende des Bypass-Kanales 31") there will be disruption in the flow of gas from the outlet, moreover the very words "Zumischung am Ende des Bypass-Kanales" implies an interaction. The first portion of the outlet ends at an outward step and therefore does not satisfy the requirement of claim 1 of tapering radially outwards towards the downstream portion of the annular portion of the passageway 31 and the second portion of the outlet.

4.4 It can be seen on Figure 3 of D3 that the bypass channel 8 is not annular. Moreover the gas issuing from the outlets 9 is directed in a screw-like direction, not substantially parallel to the axis of the turbine.

4.5 In its decision the examining division cited only the three documents D1 to D3 as being novelty destroying for the claim 1 then on file. The board has explained why the subject-matter of the present claim 1 is novel over the disclosure of each of these documents D1 to D3 and also over D7. While there are other documents listed in the search report the board cannot see that any of these is novelty destroying.

4.6 Therefore the subject-matter of claim 1 is considered novel within the meaning of Article 54 EPC.

5. *Remittal to the first instance*

Thus the reason for refusal given in the decision does not apply to the present claim 1. However it is still necessary to examine whether the other requirements of the EPC are satisfied and so the board remits the case in accordance with Article 111(1) EPC to the examining division for further prosecution on the basis of the claims, description and drawings specified in the above section V.

The appellant has raised no objection to the board's intention expressed in section 5 of its communication of 18 June 1999 to remit the case. While remittal means that the application is not yet to be granted, it also means that the decision under appeal is being set aside and that the application is not being refused. There is therefore no need

to appoint the oral proceedings requested if the board proposed to dismiss the appeal.

It is pointed out that this conditional request for oral proceedings is a request in the present appeal proceedings and will have no effect in the further proceedings before the examining division.

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 for further prosecution.

The Registrar: The Chairman:

G. Magouliotis C. Andries