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D E C I S I O N
of 1 June 2005

Case Number: T 1116/03 - 3.2.4

Application Number: 96939535.9

Publication Number: 0946827

IPC: F02K 1/15

Language of the proceedings: EN

Title of invention:
A hollow nozzle actuating ring

Applicant:
GENERAL ELECTRIC COMPANY

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56, 123(2)

Keyword:
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1116/03 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 1 June 2005

Appellant: (Applicant)
GENERAL ELECTRIC COMPANY
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Schenectady, NY 12345 (US)

Representative:
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 11 June 2003 refusing European application No. 96939535.9 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: M. Ceyte
Members: C. Scheibling
H. Preglau

Summary of Facts and Submissions

I. By its decision dated 11 June 2003 the Examining Division refused the patent application. On 15 August 2003 the Appellant (applicant) filed an appeal. The appeal fee was paid on 18 August 2003. The statement setting out the grounds of appeal was received on 13 October 2003.

II. The Appellant's main request was rejected for lack of clarity (Article 84 EPC), whereas the subject-matter of claim 1 according to the auxiliary request was not considered to involve an inventive step with respect to D1: US-A-5 174 502 when taking into account the capability of a person skilled in the art, all the more because D2: US-A-5 222 360 shows struts to spread loads in light-weight structures in the field of aircraft engines.

III. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 5 filed by facsimile of 18 May 2005 and claims 6 to 8 filed with letter of 12 May 2005.

IV. Claim 1 reads as follows:

"1. A hollow actuating ring (86) for simultaneously pivoting the flaps (50) of an aircraft gas turbine engine nozzle (14), said actuating ring (86) comprising:

a hollow generally annular structure having axially spaced apart coaxial forward and aft walls (110 & 114),

means for supporting the annular structure on the engine nozzle (14) at spaced apart joints (96) around the annular structure,

joining struts (118) axially extending between and structurally joining together said forward and aft walls (110 & 114) and located at the joints (96), characterized by

ring stiffening A-frames (124) for decreasing the effective ring bending length between adjacent joints (96) of at least one of said forward and aft walls (110 & 114), said A-frames being formed between said joining struts (118) and at least one of said forward and aft walls (110 & 114), said A-frames comprising means for spreading out loads transferred from said joining struts (118) to one of said forward and aft walls (110 & 114)."

V. The Appellant mainly argued that D1 does not show implicitly joining struts extending between forward and aft walls as clearly shown in Figure 2. A person skilled in the art knows that to increase stiffness he must increase weight or add an additional ring as shown in D1. There is no reason for a skilled person to decide to use an A-frame, since there are many other possibilities for stiffening the ring structure. D2 just shows a general possibility to strengthen a support ring, but does not disclose the stiffening of a ring structure.

Therefore, the hollow actuating ring according to claim 1 involves an inventive step in comparison with D1 even if taking into account the teaching of D2.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 Claim 1 now on file comprises the features of claims 1 and 3 of the published international application D3: WO-A-98/20245 on which the present European patent application is based, as well as the additional following features:
a) "means for supporting the annular structure on the engine nozzle (14) at spaced apart joints (96) around the annular structure",
b) "joining struts … located at the joints",
c) "said A-frames comprising means for spreading out loads transferred from said joining struts (118) to one of said forward and aft walls";
wherein the feature "ring stiffening A-frames (124) for decreasing the effective ring bending and torsional length (L) of said forward and aft walls (110 & 114)" has been amended to read:
d) "ring stiffening A-frames (124) for decreasing the effective ring bending length between adjacent joints (96) of said forward and aft walls (110 & 114)".

2.2 Feature a) is disclosed in Figures 1, 2, 5 of D3.
Feature b) is disclosed in the description of D3, page 11, lines 30 to 33 and page 12, lines 6 to 8.
Feature c) is disclosed in the description of D3, page 11, lines 3 to 7.
Feature d) is disclosed in the description of D3, page 11, lines 2 and 3, and in claim 1 as published. Although, it is indicated that the considered "length

(L)" is measured between the joining struts and not the joints, the fact that the joints coincide with the struts (feature b)) provides a basis for this amendment.

2.3 Furthermore, the description has been amended to adapt it to the wording of the claims.

2.4 The amendments made fulfil the requirements of Article 123(2) EPC.

3. *Novelty*

Novelty has not been at stake during these proceedings.

4. *Inventive step*

4.1 D1 is considered to be the closest prior art document. D1 discloses a hollow actuating ring (86) for simultaneously pivoting the flaps (54) of an aircraft gas turbine engine nozzle (14), said actuating ring (86) comprising:
a hollow generally annular structure having axially spaced apart coaxial forward and aft walls (Figures 1, 2, 4),
means for supporting the annular structure on the engine nozzle (14) at spaced apart joints (96) around the annular structure, and
joining struts radially extending between and structurally joining together the upper and lower walls with respect to the axis of the engine.

4.2 Thus, the actuating ring according to claim 1 differs from that of D1 in that:

the joining struts are located at the joints and extend axially between and structurally join together the forward and aft walls,
ring stiffening A-frames are provided for decreasing the effective ring bending length between adjacent joints of at least said forward and aft walls, said A-frames being formed between said joining struts and at least one of said forward and aft walls,
said A-frames comprise means for spreading out loads transferred from said joining struts to one of said forward and aft walls.

As specified in D3, one problem faced by designers trying to increase the stiffness of an actuating ring is that the space available for the actuating ring is generally restricted by the aircraft, the internal engine flow path, the nozzle structure and the convergent actuation system. In D1 the actuating ring is provided with an additional circumferentially extending ring in order to increase its stiffness.

4.3 Starting from this closest prior art, the problem to be solved by the invention may be seen in increasing the stiffness of the hollow actuation ring, while avoiding significant weight addition and without the provision of an additional circumferentially extending ring as shown in D1.
This problem is in essence solved by the distinguishing features of claim 1.

4.4 A person skilled in light weight structures knows that providing struts can increase the stiffness of the ring. There is however no hint in the cited prior art, which

could lead him to provide such struts in form of A-frames, since there are many available possibilities of increasing the stiffness, such as providing additional struts around the circumference, a honeycomb structure, or a circumferentially extending ring as shown in D1.

Moreover, although D2 shows a ring structure provided with means for spreading the loads transferred from an inner to an outer ring, D2 does neither deal with the same aircraft engine part, nor with the same technical problem and therefore D2 cannot lead a skilled person to the claimed solution of foreseeing struts in the form of A-frames for spreading the forces introduced at the spaced apart joints around the actuating ring.

Consequently, the subject-matter of claim 1 involves an inventive step with respect to the cited prior art.

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 with the order to grant a patent in the following version:
Description:
pages 1 to 3 filed by facsimile of 18 May 2005
page 4 filed with letter of 12 May 2005
pages 5 to 13 as published in WO-A-98/20245
Claims:
1 to 5 filed by facsimile of 18 May 2005
6 to 8 filed with letter of 12 May 2005
Drawings:
Sheets 1/6 to 6/6 as published in WO-A-98/20245

The Registrar: The Chairman:

G. Magouliotis M. Ceyte