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Aktenzeichen / Case Number / N° du recours : T 265/85

Anmeldenummer / Filing No / N° de la demande : 80 300 160.1

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Bezeichnung der Erfindung: Fuel atomising arrangements in gas turbine engine
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : F 02C 7/26

ENTSCHEIDUNG / DECISION

vom / of / du 19 March 1987

Anmelder / Applicant / Demandeur : The Garrett Corporation

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence : Fuel atomising/Garrett

EPÜ / EPC / CBE Article 56 EPC

Kennwort / Keyword / Mot clé : "Inventive step - design feature"

Leitsatz / Headnote / Sommaire

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Case Number : T 265/85

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 19 March 1987

Appellant : The Garrett Corporation
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Los Angeles, California 90009 (US)

Representative : Taylor, Duncan Alistair et al.
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Decision under appeal : **Decision of Examining Division 101 of the European Patent Office dated 29.03.1985 refusing European patent application No. 80 300 160.1 pursuant to Article 97(1) EPC**

Composition of the Board :

Chairman : P. Delbecque
Members : C. Wilson
G. D. Paterson

Summary of Facts and Submissions

I. European patent application No. 80 300 160.1, published on 6 August 1980 under publication number 14075, was refused by a Decision of the Examining Division dated 29 March 1985. The Decision was based on Claims 1 and 2 received on 22 September 1984 and Claim 3 received on 23 September 1983.

II. The reason given for the refusal was lack of inventive step as far as Claim 1 was concerned, in view of US-A-2 976 683 and US-A-3 577 965.

III. With his letter of 24 May 1985, the Appellant lodged an Appeal against the Decision of 29 March 1985 and he paid the fee on 28 May 1985. The Statement of Grounds was received on 29 July 1985. The Appellant requests cancellation of the impugned Decision and the grant of a patent based on Claims 1-3 supplied with the Statement of Grounds.

IV. During the written procedure before the Board, the Appellant submitted on 10 May 1986 a new Claim 1 as the basis for the grant of a patent. This claim reads as follows:

1. A gas turbine engine comprising a combustor (34) a turbine (16) driven by exhaust gases from the combustor, and a compressor (14) driven by the turbine and connected to supply compressed combustion and secondary air to the combustor by way of a flow path (26), the flow path (26) including an exchanger (24) for transferring heat from turbine exhaust gases to some of the compressed air supplied to the combustor; and an auxiliary compressor (46, 146) for supplying compressed air to the fuel nozzle (28) for atomising the fuel; characterised in that the auxiliary compressor is a compressor in series in a conduit (32) leading from the flow path (26) upstream of the exchanger

(24) which auxiliary compressor acts only on the air supplied from the compressor (14) to the fuel nozzle and not on the air supplied to the exchanger and on substantially all the compressor discharge air supplied to the combustor and not passing through the exchanger (24); characterised by a pressure sensing device (49, 149) arranged to sense the pressure of the atomising compressed air at the fuel nozzle (28) and a connection (51, 151) from the pressure sensing device (49, 149) to the boost compressor (46, 146) arranged to switch on the boost compressor only when the compressed air at the fuel nozzle (28) is sensed as being at too low a pressure.

Reasons for the Decision

1. The appeal complies with Articles 106-108 and Rule 64 EPC; it is therefore admissible.

2. The precharacterising portion of the new Claim 1 contains features already disclosed, either explicitly or implicitly in US-A-2 976 683, (constituting the nearest prior art document). The characterising portion deals with those features, e.g. a sensing device arranged to sense the pressure of the atomising compressed air at the fuel nozzle, which distinguish the claimed subject-matter from that prior art document. The subject-matter of Claim 1 is therefore novel (Art. 54 EPC).

3. As set out in the European application, the aim of the invention is to maintain the correct fuel atomising under all operating conditions of a gas turbine engine.

That aim is achieved according to the invention in that the auxiliary compressor which is provided for supplying compressed air to the fuel nozzle acts only on the air supplied from the main compressor to the fuel nozzle and not

on the air supplied from the main compressor to the exchanger. Furthermore a pressure sensing device is arranged to sense the pressure of the atomising compressed air at the fuel nozzle, said sensing device being connected to the auxiliary compressor in order to switch it on when the compressed air at the fuel nozzle is sensed to be at too low a pressure.

However, this aim appears to be achieved by the gas turbine fuel system of US-A-2 976 683 by means of an air pick-up tube which as explicitly mentioned (see col. 7, lines 7-10) eliminates the need for additional compressors, apart from a start-up compressor.

The aim of the invention according to the European application, when objectively assessed in the light of this prior art, would therefore appear to be to find an alternative way of maintaining the correct fuel atomising under all operating conditions of the gas turbine engine.

4. One way would appear to be that shown in the gas turbine fuel system according to US-A-3 581 493 in which an air assist (boost) pump is provided in the atomising air feed line from the compressor to the fuel injector. The pump rate of rotation is controlled in response to pressure changes in the line adjacent to the injector. The sensing of the pressure of the fuel nozzle and the control of the air assist pump in accordance with that sensed pressure is thus known. The only difference between the solution of the above problem disclosed in the fuel system according to US-A-3 581 493 and the solution disclosed in the present application would appear to be that, in the prior art, the sensed pressure is used to control the speed of the pump, whereas in the present application it is used to switch on the boost compressor when the sensed pressure is too low.

However, in the view of the Board this difference is merely a design feature. If the main compressor is designed never to generate a high enough pressure to provide satisfactory atomisation in the fuel injector then it will be necessary to run the air assist pump continuously under control of the sensed pressure. If, however, the main compressor is designed to generate sufficient pressure most of the time, then it will only be necessary to switch on the boost compressor occasionally. Such considerations do not require any inventive activity from the person skilled in the art.

Moreover, the fact that US-A-3 581 493 does not relate to a gas turbine system utilising a recuperator has no fundamental influence on the correct fuel atomising which is the aim of the invention. This cited patent therefore gives a clear indication to the person skilled in the art as to how he can solve the posed problem.

5. As no inventive considerations had to be made by the person skilled in the art to arrive at the location of the auxiliary compressor nor at the provision of the control means therefor, the subject-matter of Claim 1 lacks inventive step as required by Article 56 EPC. The claim is accordingly unallowable.

6. Claims 2 and 3 are dependent on Claim 1 and accordingly cannot be allowed either.

Order

For these reasons, it is decided that :

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

The Registrar

F.Klein

The Chairman

P. Delbecque