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Datasheet for the decision of 10 April 2014

Case Number: T 1066/10 - 3.2.01

Application Number: 07101566.3

Publication Number: 1816071

IPC: B64D33/02, B64D41/00, F01D13/02

Language of the proceedings: EN

Title of invention:
Aircraft auxiliary gas turbine engine and method for operating the same

Applicant:
GENERAL ELECTRIC COMPANY

Headword:

Relevant legal provisions:
EPC Art. 56, 123(2), 112(1)(a)

Keyword:
Inventive step - (no) - (main request)
Amendments - intermediate generalisation - (auxiliary request)
Referral to the Enlarged Board of Appeal - (no)

Decisions cited:

Catchword:

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Case Number: T 1066/10 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 10 April 2014

Appellant: (Applicant)	GENERAL ELECTRIC COMPANY 1 River Road Schenectady, NY 12345 (US)
Representative:	Williams, Andrew Richard GPO Europe GE International Inc. The Ark 201 Talgarth Road Hammersmith London W6 8BJ (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 30 October 2009 refusing European patent application No. 07101566.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman: G. Pricolo
Members: C. Narcisi
S. Fernández de Córdoba

Summary of Facts and Submissions

I. The appeal is from the decision of the Examining Division posted on 30 October 2009 revoking European patent No. 07 101 566.3 on the grounds of lack of inventive step (Article 56 EPC).

II. Claim 1 underlying the decision under appeal reads as follows:

"1. A non-aircraft-propelling auxiliary gas turbine engine (10) installable in an aircraft (12), wherein the aircraft has an aircraft-propelling gas turbine engine (14) and has a cabin (16) adapted to be pressurized, wherein the auxiliary gas turbine engine comprises an auxiliary-gas-turbine-engine compressor (18) having an inlet (20), and further comprises an auxiliary gas-turbine-engine combustor (30) and the compressor (18) includes an outlet duct (32) in fluid communication with the combustor (30) wherein the inlet is adapted to receive pressurized air (22) from the cabin characterized in that the inlet (20) is adapted to receive bleed air (23) from the aircraft-propelling gas turbine engine, and the outlet duct of the compressor (18) includes a variable-area bleed valve (34) adapted to bleed air (36) from the outlet duct to the atmosphere (38)."

III. The Examining Division considered that the skilled person, starting from the prior art according to

D1: US-B1-6 283 410, or

D2: GB-A-2 198 228,

both of which disclosed a non-aircraft-propelling

auxiliary gas turbine engine according to the preamble of claim 1, would regard it as obvious to provide the distinguishing feature (a), according to which the inlet was adapted to receive bleed air from the aircraft-propelling gas turbine engine, in view of the teaching of

D3: EP-A-1 574 689, or

D4: US-A-3 965 673,

and to provide also the distinguishing feature (b) according to which the outlet duct of the compressor included a variable-area bleed valve adapted to bleed air from the outlet duct to the atmosphere, in view of the teaching of

D5: JP-A-6117278, or

D6: EP-A-1 186 761.

IV. The applicant filed an appeal, received at the EPO on 8 December 2009, against this decision and paid the appeal fee on the same day. With the statement of grounds of appeal, received at the EPO on 8 March 2010, the appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the claims underlying the decision under appeal, as a main request, or, in the alternative, on the basis of the claims according to the auxiliary request filed with the statement of grounds of appeal. The appellant further requested oral proceedings as an auxiliary measure.

V. In addition to the features of claim 1 according to the main request, claim 1 according to the auxiliary

request includes the following features:

"further including a system having a turbine including an inlet adapted to receive cabin air and an outlet in fluid communication with the inlet of the auxiliary-gas-turbine-engine compressor (18), the system further having a system compressor, mechanically coupled to the system turbine which compressor has an inlet adapted to receive air from the atmosphere and an outlet in fluid communication with the inlet of the auxiliary-gas-turbine-engine compressor (18)."

VI. The arguments of the appellant as set out in the statement of grounds of appeal can be summarized as follows:

Both D1 and D2 taught away from tapping air from the propulsion engine compressors due to the inefficiencies which that brought. The Examining Division considered that it was not indicative of an inventive step to move a step backwards from the prior art by combining the known disadvantageous features of D3 and D4, i.e. utilising bleed air from the main engines, with D1 and D2. However, the invention according to claim 1 of the main request did not represent a technical regression. One objective technical problem that might be envisaged by the skilled person to exist with conventional systems, such as those disclosed by D1 or D2, could be the provision of an auxiliary gas turbine for an aircraft which provided for a back-up in the event of failure of one of the sources of pressurized air, i.e. cabin air or air bled from the main engine compressor, to ensure constant auxiliary power supply. D1 to D3 did not address the problem of maintaining auxiliary power supply in the event of a failure in the system. D4 addressed the problem and taught that a power pack

should be provided to maintain power in the event of system failure.The fact that Dl and D2 did not mention this problem indicated that the skilled person might not even consider altering the disclosures of either document, because he would not be aware of any problem with these systems. However, even if the skilled person were to seek a solution to this problem he would utilise the power pack idea provided by D4.
As regards D5 and D6, neither document disclosed the use of bleed valves in an auxiliary power supply gas turbine of an aircraft.

The additional features introduced in claim 1 according to the auxiliary request were based on the final paragraph of page 4 of the application as filed. They solved the further technical problem of how to deliver a greater mass flow to the inlet of the compressor of the auxiliary gas turbine engine. None of the cited documents disclosed or suggested such a configuration with a view to addressing the above-mentioned further technical problem.

VII. In a communication pursuant to Rule 100(2) EPC, dated 17 May 2013, the Board expressed the preliminary view that the appellant's arguments against the correctness of the appealed decision did not appear to be convincing, and explained in detail its position. Furthermore, the Board explained why it considered justified to exercise its discretion under Article 12(4) of the Rules of Procedure of the Boards of Appeal (RPBA) to not admit the auxiliary request into the appeal proceedings. The Board further pointed out that the amendment made to claim 1 raised issues under Article 123(2) EPC (unallowable intermediate generalisation due to the omission of the feature of the respective outlets of the system turbine and system

compressor having substantially the same pressure) and 83 (sufficiency of disclosure) and 84 (clarity) EPC.

VIII. The appellant replied to the communication with letter dated 29 July 2013. Essentially, the appellant put forward the following submissions:

The application as filed made it clear that the supply of bleed air was not intended as the primary supply of air to the auxiliary gas turbine engine. Therefore, the application as filed contained a clear disclosure of the supply of bleed air addressing a problem of ensuring that the auxiliary gas turbine engine was provided with an alternative (i.e. backup) supply of compressed air to ensure continued operation of the auxiliary gas turbine engine even in the event of a failure of the supply of pressurised cabin air. Furthermore, the provision of the outlet duct of the compressor of the auxiliary gas turbine engine with a variable area bleed valve adapted to bleed air from the outlet duct to atmosphere helped to address surges caused by irregularities in supply of air to the inlet of the compressor. None of the items of prior art was concerned with addressing the issue of overcoming inconsistency in the supply of air to the inlet to the compressor of a non-aircraft-propelling auxiliary gas turbine engine, and its possible consequences (such as surges).

As regards the auxiliary request, it was only introduced after receiving the decision to refuse the application because during the proceedings before the Examining Division the appellant retained the belief that the claims on file met the requirements of the EPC. It was however introduced into the appeal proceedings at the earliest stage possible, i.e. along

with the grounds of appeal.
Furthermore, the features taken from the description represented subject-matter which formed a reasonable basis for amendment and thus were or at least should have been encompassed by the search.
Also, the additional features did not give rise to objections under Article 83, 84 and 123(2) EPC. In particular, as regards the issue of unallowable intermediate generalisation (Article 123(2) EPC) raised by the Board, the omission of the feature of the respective outlets of the system turbine and system compressor having substantially the same pressure, which was disclosed in the application as filed in combination with the additional features introduced in claim 1 according to the auxiliary request, represented omission of a functional statement of the effect of the system turbine and system compressor, rather than omission of a structural feature of the system.

A refusal of the Board of Appeal to admit the Auxiliary Request into the proceedings would appear to represent an unreasonable limitation to the usefulness of any appeal proceedings and would raise a question of whether the Board would not exceed the discretion afforded to it under Article 12(4) RPBA.
It further would raise a question as to precisely in what circumstances was it deemed permissible for the Board of Appeal to refuse to admit into appeal proceedings (for an appeal of a decision of the Examining Division) an auxiliary request containing an amended set of claims. The question was of particular relevance where such an Auxiliary Request was submitted with the grounds of appeal and introduced features into the claims from the description, rather than merely combining one or more claims considered during the Examination proceedings. The appellant accordingly

requested such a question be referred to the Enlarged Board of Appeal in accordance with the provisions of Article 112(1)(a) EPC.

IX. The appellant was summoned to oral proceedings with letter dated 21 January 2014. The oral proceedings took place as scheduled on 10 April 2014.

The appellant did not appear at the oral proceedings, as announced with letter dated 26 March 2014. In accordance with Rule 115(2) EPC, the proceedings were continued without the appellant. The decision of the Board was announced at the end of the oral proceedings in accordance with Article 15(3) RPBA.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request - inventive step*

2.1 It was not disputed by the appellant that each of documents D1 and D2, taken separately, discloses a non-aircraft-propelling auxiliary gas turbine engine according to the preamble of claim 1 and that the subject-matter of claim 1 differs therefrom by the features defined in the characterizing portion and referred to as features (a) and (b) in the decision under appeal, namely:
(a) the inlet is adapted to receive bleed air from the aircraft-propelling gas turbine engine, and
(b) the outlet duct of the compressor includes a variable-area bleed valve adapted to bleed air from the outlet duct to the atmosphere.

2.2 As regards distinguishing feature (a), the examining division stated that its effect is not discussed in the application and that it appears to consist in improving the high-altitude performance of the non-aircraft-propelling auxiliary gas turbine engine (APU) above and beyond what can be achieved by using cabin air. The appellant essentially submitted that the distinguishing feature (a) rather solved the problem of providing for a back-up in the event of a failure of one of the sources of pressurized air, i.e. cabin air or air bled from the main engine compressor, to ensure constant auxiliary power supply. The appellant referred to Figure 1's use of a dashed line to represent the receiving of bleed air (23) from the aircraft-propelling gas turbine engine (14) to the inlet (20) of the compressor (18) of the auxiliary gas turbine engine (10) as clearly implying that the supply of bleed air is not intended as the primary supply of air to the auxiliary gas turbine engine. However, even if it is accepted that the supply of bleed air is not intended as the primary supply of air to the auxiliary gas turbine engine, there is no basis in the application as filed to infer that the supply of bleed air provides an alternative or back-up supply of compressed air. Indeed, for achieving this effect, the two sources of air (cabin air or air bled from the main engine compressor) would need to be alternate sources, each of them taken alone being sufficient for providing the required "constant auxiliary power supply", and the engine being able to switch from the one to the other in case of failure. This construction is neither disclosed in the application as filed, nor is it reflected in the wording of claim 1. In fact, the application as filed is silent about how the two sources of air are exploited (separately, together, or according to a specific control strategy). Accordingly,

there is no basis to consider a technical effect of feature (a) other than that of improving the performance of the APU, as stated by the Examining Division in point 5 of the decision under appeal.

2.3 It might well be, as argued by the appellant, that the alleged invention as defined in claim 1 does not represent a technical regression. However, when reading D2, which the examining division correctly identified as the closest prior art (it is noted that a reasoning analogous to the one that follows could also be made starting from D1, which also represents an appropriate starting point for the assessment of inventive step), the skilled person is taught that the known arrangements in which the air required for operating the auxiliary gas turbine engine is tapped from the compressor of the main propulsion unit has the disadvantage that the main propulsion unit must be operated, especially at high altitudes, at a higher performance level than flying conditions actually call for (see page 1, second paragraph). D2 further teaches that also the known arrangements in which air is drawn exclusively from the atmosphere have disadvantages, in that they necessitate operating the auxiliary gas turbine engine with increasing flight altitude at an increased performance level (see the paragraph bridging pages 1 and 2). The aim of D2 is that of increasing the power output of the auxiliary gas turbine engine compared with that of an auxiliary gas turbine engine arranged to suck air from the atmosphere (see page 2, second and third paragraphs). To achieve this aim D2 proposes to suck air from the aircraft's cabin. The skilled person, faced with the problem of further improving the performance of the auxiliary gas turbine engine according to D2, would obviously consider that the known measure of tapping air from the compressor of

the main propulsion unit would provide a solution to this problem. In fact, as noted above, D2 already refers to this measure and moreover D3 specifically refers to the improved performance resulting from this measure (see in particular paragraph [0024]). Accordingly, the skilled person would consider providing, in addition to the measure of sucking air from the aircraft's cabin, the further measure of tapping air from the compressor of the main propulsion unit (i.e. the above-mentioned feature (a)) in order to solve the above-mentioned problem of improving the performance of the auxiliary gas turbine engine. In doing this, as pointed out by the examining division (see page 4 of the impugned decision, penultimate paragraph), the skilled person would accept the disadvantages of the further measure. In any event, the skilled person would obviously recognize that such disadvantages would be mitigated by the fact that air is not drawn exclusively from the compressor of the main propulsion unit (as in the prior art referred to on page 1 of D2, or in the prior art according to D3) but is also drawn from the cabin.

2.4 The appellant's referred to D4 and submitted that this document teaches that a power pack should be provided to maintain power in the event of system failure. However, since the objective technical problem cannot be seen in how to maintain power in the event of system failure, for the reasons explained above,.this argument is moot.

2.5 As regards distinguishing feature (b) (see points 4 and 6 of the decision under appeal), it is accepted that, although D5 and D6 each disclose bleed valves for bleeding air from a compressor, neither document discloses the use of such bleed valves in an auxiliary

power supply gas turbine of an aircraft. However, an auxiliary power supply gas turbine of an aircraft is still a gas turbine operating in a known fashion, which would therefore be subject to surging as the turbines according to D5 and D6. This point, which was specifically mentioned in the communication of the Board referred to in point VII above, was not disputed by the appellant. Accordingly, it would be obvious to provide, in the gas turbine according to D2 (or as modified in the manner explained above by also providing bleed air from the aircraft propelling gas turbine engine), a variable-area bleed valve adapted to bleed air from the outlet duct of the compressor to the atmosphere to avoid surging in accordance with the teachings of either D5 or D6.

2.6 Accordingly, the arguments of the appellant not being convincing, the findings of the Examining Division as to lack of inventive step must be confirmed.

3. Auxiliary request

3.1 At the oral proceedings the Board has decided not to exercise its discretion under Article 12(4) RPBA to not take into account the auxiliary request.

This request fails for lack of compliance with the requirements of Article 123(2) EPC, for the reasons explained below.

Claim 1 has been amended by introducing additional features taken from the description, where they are disclosed in connection with "*one extension of the first expression of the embodiment of figure 1*" in which "*there is included a system (not shown) for enhancing the use of cabin air provided to the inlet of*

the compressor of the auxiliary gas turbine engine" (see the last paragraph of page 4 of the application as filed).

Accordingly, the additional features introduced in claim 1 are taken from a particular embodiment (said "extension of the first expression of the embodiment of figure 1"). In this particular embodiment, they are disclosed in combination with the feature that the outlets of the system turbine and the system compressor have substantially the same pressure. Omitting this feature from the combination of features of the particular embodiment introduced in claim 1 results in an unallowable intermediate generalisation. In fact, by omitting this feature, claim 1 leaves open whether the pressure at the outlets of the system turbine and of the system compressor are at substantially the same pressure and thus encompasses the possibility that the outlets are at substantially different pressures. Since, however, both outlets are in fluid communication with the inlet of the auxiliary-gas-turbine-engine compressor, different pressures at the outlets would require additional measures, e.g. for equalizing the pressures at said inlet that are not disclosed in the application as filed. Therefore, it is clear that the disclosure of the application as filed is restricted to the possibility that the outlets of the system turbine and of the system compressor have substantially the same pressure. Accordingly, the amendments made to claim 1 introduce new technical information as compared to the disclosure of the application as filed.

3.2 The appellant submitted that the omitted feature represented omission of a functional statement of the effect of the system turbine and system compressor, rather than omission of a structural feature of the

system. This argument cannot be accepted because the desired effect of providing substantially the same pressure at the outlets of the system turbine and of the system compressor cannot be seen solely as a result of the operation of the system turbine and of the system compressor, irrespective of their structure, but is also necessarily linked to structural features thereof. In fact, the indication of the desired result implies that structural requirements, such as inlet diameters, degree of compression, power consumption, etc..., must be met. This means that the indication of the desired result to be achieved with the system necessarily implies the presence of suitable structural features for the system itself.

3.3 The Board notes that the issue of unallowable intermediate generalisation under Article 123(2) EPC was already addressed in the communication (see point VII above), although in the context of the issue of admissibility of the auxiliary request under Article 12(4) RPBA (see point 3.5 of the communication). However the appellant, who was absent at the oral proceedings, could have expected the issue under Article 123(2) EPC to be dealt with by the Board if the issue of admissibility under Article 12(4) RPBA turned out in favour of the appellant. Moreover, the appellant specifically commented on the issue of unallowable intermediate generalisation under Article 123(2) EPC in its reply (see point VIII above). Accordingly, the Board is satisfied that the appellant's right to be heard is met.

4. Request for a referral of a question to the Enlarged Board of Appeal (Article 112(1)(a) EPC)

Since the request of the appellant to refer a question to the Enlarged board of Appeal hinges on the refusal of the Board to admit the auxiliary request into the proceedings pursuant to Article 12(4) RPBA, and since the Board has taken into account the auxiliary request, the question is not material to the present decision. Accordingly, the request must be rejected.

Order

For these reasons it is decided that:

1. The request to refer a question to the Enlarged Board of Appeal is rejected.

2. The appeal is dismissed.

The Registrar: The Chairman:

A. Vottner G. Pricolo

Decision electronically authenticated