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**Datasheet for the decision
of 19 June 2015**

Case Number: T 0363/13 - 3.2.01

Application Number: 06758208.0

Publication Number: 1874625

IPC: B64D13/08

Language of the proceedings: EN

Title of invention:

SYSTEMS AND METHODS FOR CARGO COMPARTMENT AIR CONDITIONING
USING RECIRCULATED AIR

Patent Proprietor:

The Boeing Company

Opponents:

Airbus Operations SAS/ Airbus Operations Limited/
Airbus Operations GmbH/ Airbus Operations S.L.
Airbus SAS

Headword:

Relevant legal provisions:

EPC Art. 123(2), 123(3)
EPC 1973 Art. 56

Keyword:

Amendments - added subject-matter (no)
Extension of scope of the claims (no)
Inventive step (yes)

Decisions cited:

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 0363/13 - 3.2.01

**D E C I S I O N
of Technical Board of Appeal 3.2.01
of 19 June 2015**

Appellants: Airbus Operations SAS/ Airbus Operations
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
20 December 2012 concerning maintenance of the
European Patent No. 1874625 in amended form.**

Composition of the Board:

Chairman G. Pricolo
Members: Y. Lemblé
O. Loizou

Summary of Facts and Submissions

- I. The appeal of the Opponents is directed against the interlocutory decision of the Opposition Division to maintain European patent No. 1 874 625 in amended form on the basis of the third auxiliary request filed during oral proceedings on 8 October 2012.
- II. In its decision, the Opposition Division held that the amended claims met the requirements of Article 123(2) and (3) EPC and that the subject-matter of the amended claims met the requirements of novelty and of inventive step having regard, inter alia, to the following prior art documents:
- D2: US-A-3 199 578,
D3: US-B-6 306 032.
- III. With its statement setting out the grounds of appeal, the Appellants cited for the first time the following documents:
- D28: DE-C-197 28 595,
D29: DE-C-43 35 152,
D30: Commercial Airliner Environmental Control System-
Engineering Aspects of Cabin Air Quality; Elwood
H. Hunt, Dr. Don H. Reid, David R. Space, and Dr.
Fred E. Tilton; Preliminary paper presented at the
Aerospace Medical Association annual Meeting,
Anaheim, California , May 1995
- D31: Aerospace recommended practice - Air Conditioning
Systems For Subsonic Airplanes; SAE International;
SAE ARP 85, Rev. E, Issued 1943-01; Revised
1991-08; Reaffirmed 2002-06.

IV. Oral proceedings were held before the Board on 19 June 2015.

The Appellants requested that the decision under appeal be set aside and that the patent be revoked.

The Respondent (Patent Proprietor) requested that the appeal be dismissed.

V. Independent claim 1 and independent method claim 9 of the patent as maintained by the Opposition Division read as follows:

1. An environmental control system for an aircraft comprising an air conditioning (A/C) pack system and a cargo compartment recirculation system, the A/C pack system coupled to extract air at an elevated temperature and pressure from a compressor section of a propulsion unit and arranged to condition the extracted air to generate conditioned air having a desired temperature and pressure for admitting to a flight deck and passenger cabin of the aircraft, the cargo compartment recirculation system comprising:
an air moving device (32) fluidly coupled to the cargo compartment (24) and operable to move a volume of air;
an air heating device (46) and an air cooling device (48) fluidly coupled to the compartment;
a recirculation duct (34) arranged to recirculate air through the compartment fluidly coupled to the air moving device and configured to selectively direct at least a portion of the volume of air to the air heating device and the air cooling device;
an inlet valve (52) in fluid communication with the passenger cabin and fluidly coupled to the air heating device (46) and the air cooling device (48), and

further fluidly coupled to the recirculation duct (34);
and

a temperature control system (40) operably coupled to the air heating device (46) and the air cooling device (48) that is configured to control both the air heating device and the air cooling device so as to maintain a predetermined air temperature within the compartment in response to a sensed compartment temperature.

9. A method for controlling an air temperature in an aircraft cargo compartment (24), comprising:
extracting air at an elevated temperature and pressure from a compressor section of a propulsion unit,
conditioning the extracted air to generate conditioned air having a desired temperature and pressure for admitting to a flight deck and passenger cabin of the aircraft,
receiving into an air recirculation system (30) coupled to recirculate air through the cargo compartment conditioned air from the passenger cabin;
receiving into the aircraft cargo compartment a volume of air from the air recirculation system (30) coupled to the cargo compartment;
measuring a temperature of the compartment air volume and comparing the temperature to a preselected set point temperature to generate an error value;
comparing the error value to a predetermined error criterion; and
altering the temperature of the compartment based upon the comparison by heating or cooling the air in the air recirculation system.

VI. The Appellants' submissions can be summarised as follows:

The decision of the Opposition Division was wrong for the reason that the claims as maintained contravened Article 123(2) and 123(3) EPC.

Claim 1 was amended in such a way that it contained subject-matter which extended beyond the content of the application as originally filed (WO-A-2006/105049: D0) for the following reasons:

- a) - claim 1 recited that the air conditioning pack system was "coupled to extract air at an elevated temperature and pressure for a compressor section of a propulsion unit", as mentioned in paragraph [0018] of D0, but did not take over from that paragraph the essential feature that the extracted air came from an "outside air source" that may be "a bleed air system that extracts ...propulsion unit". The omission of that feature which was intimately linked with the added feature, was not permissible;
- b) - the introduction in the claim of the general concept of an "air moving device" without mention that this moving device removed or extracted air from the cargo compartment led to an inadmissible generalisation;
- c) - there was no basis in the application as originally filed for the hand written amendment that the recirculation duct was "arranged to recirculate air through the compartment";
- d) - there was no direct and unambiguous indication in D0 that the cabin air was supplied to an inlet valve of the compartment recirculation system, nor that the air received by the inlet was discharged from the cabin;
- e) - the cargo compartment recirculation system as part of an environmental control system for an aircraft comprising an A/C pack system, as now claimed in

amended claim 1, was obtained by combining the embodiment of Fig. 1 with the embodiment of Fig. 2. However, the features relating to these two embodiments were incompatible and inconsistent, such that the claimed combination was not disclosed as such in the original application D0.

Similar objections applied to independent method claim 9.

Claim 1 and claim 9 were amended in such a way that the extent of protection conferred by granted claims 1 and 9 had been extended. With the introduction of the features referring to an "air conditioning (A/C) pack system" to "generate conditioned air ... for admitting to a flight deck and passenger cabin of an aircraft" claim 1 defined a subject-matter which was different from the cargo compartment recirculation system defined in granted claim 1 (aliud). This shift in the definition of the invention led to an extension of the protection conferred by claim 1 which now encompassed components of the environmental control system which were not present in granted claim 1. This led to the unacceptable situation that third parties which manufactured A/C pack systems and their control systems might be liable for indirect or partial infringement, which was not the case with the granted claims.

The claims as maintained did not involve an inventive step in view of the combination of documents D2/D3. The claimed air conditioning system only differed from the system of document D2 in that the inlet valve 26 was in fluid communication with a passenger cabin instead of directly admitting fresh air from the outside. This feature was known from document D3, and was obvious for

a person skilled in the art who wanted to make an efficient and rational use of conditioned air available in an aircraft.

The subject-matter of claim 1 was also obvious for a person skilled in art when starting from document D3 (see Fig. 1). It was important to note that the cargo compartment of D3 was in fluid communication with the passenger cabin so that air discharged from the cabin was recirculated to the cargo compartment and, if needed, heated by addition of trim air (see air mixer unit 1 and trim air unit 7 as described in column 4, lines 36 to 63). On the other hand, it was also known to cool the air to be supplied to the cargo compartment by means of a heat exchanger (D3: column 2, lines 20-25). The claimed environmental system only differed from that disclosed in Fig. 1 of D3 in that it was arranged to recirculate air through the cargo compartment. The problem to be solved could therefore be formulated as: how to design an air conditioning system for a cargo compartment, which should be more energy efficient. This problem was trivial as shown by documents D30 and D31 and the solution to this problem was disclosed in document D28 or document D29. Applying this teaching to the system of D3 would lead in an obvious manner to the claimed solution.

VII. The Respondent (Patent Proprietor) countered essentially as follows:

The conclusion of the Opposition Division that the amended claims did not violate the requirements of Article 123(2) was correct. There was a clear basis for the amendments in the application as originally filed (WO-A-2006/105049: D0).

The protection conferred by the granted claims had also not be extended by the amendments made in the claims (Article 123(3) EPC).

The environmental control system according to claim 1 and the method for controlling an air temperature in an aircraft cargo compartment according to claim 9 involved an inventive step over the content of the documents D2, D3, D28 to D31 cited by the Appellants. The system described in D2 was not an adequate starting point for the assessment of inventive step.

Reasons for the Decision

1. The appeal is admissible.
2. Admissibility of the amendments under Article 123(2) EPC
 - 2.1 The Board does not agree with the Appellants when they contend that the application as originally filed D0 does not provide a basis for the amendments in the claims.
 - 2.2 Appellants' first objection under the heading a) in point VI above, is that when claim 1 is amended by introducing the feature relative to the air conditioning pack system "coupled to extract air at an elevated temperature and pressure for a compressor section of a propulsion unit" it should also include the supplementary feature of an "outside air source" in the form of "a bleed air system that extracts ...propulsion unit".

The Board disagrees. Basis for the feature of the first paragraph of claim 1 that the A/C pack system is "coupled to extract air at an elevated temperature and pressure from a compressor section of a propulsion unit" is to be found in lines 12-14 and lines 19-22 of page 5 of D0. If the pack system is coupled in this way, then the skilled person knows that the air compressed by the compressor section of a propulsion unit is "outside air" and will recognise that the claimed feature is nothing more than the definition of the allegedly missing bleed air system.

2.3 Appellants' next objection, under b), that the concept of an "air moving device fluidly coupled to ... a volume of air" has been generalised because it no longer mentions that the moving device removes or extracts air from the cargo compartment, is also not justified. First, this wording is fully supported by claim 6 as originally filed, which was taken as a basis for granted claim 1. Secondly, it is implicit from the whole content of claim 1 that the "air moving device" removes or extracts air from the cargo compartment.

2.4 The Appellants' third objection, under c), is that there is no basis in the application as originally filed for specifying that the recirculation duct is "arranged to recirculate air through the compartment". Here also, the Board disagrees. It is immediately clear to the reader of the application as originally filed that the key purpose of the recirculation duct is to provide for the recirculation of air through the cargo compartment. This recirculation is clearly described in paragraph [0022] of D0. Furthermore, the arrows on Figure 2, indicating the flow of air through the system, clearly show that air leaves the cargo compartment, is recirculated through the recirculation

duct, and is returned to the cargo compartment. The duct is even named here a "recirculation duct". Furthermore, the feature that the recirculation duct further comprises a "discharge duct portion that is fluidly coupled to an overboard discharge location", which was allegedly unduly omitted, is not mandatory. Indeed, it concerns only an optional aspect which is the object of dependent claim 8 of D0.

- 2.5 The Appellants' next allegation under d), that the features recited in the paragraph of claim 1 beginning with "an inlet valve ... recirculation duct" find no basis in the application as originally filed, is also erroneous.

These features have a clear basis in original claim 11 which reads: "an inlet valve coupled to a **conditioned air source** [bold character by the Board] and fluidly coupled to the air heating device and the air cooling device, and further fluidly coupled to the recirculation duct". The person skilled in the art will clearly recognise that the "conditioned air source" is the passenger cabin when reading page 6, lines 11-12 and lines 15-16 in connection with the three first line of paragraph [0023] of D0 and Fig. 1 and 2 of D0. If, according to these passages, "the [passenger] cabin 16 is fluidly coupled to a lower lobe cheek region 18 and a cargo compartment 24" and, conversely, the "inlet valve 52 [of the cargo compartment] is [...] configured to receive air from the cheek region 42", one can only conclude that the inlet valve 52 is in fluid communication with the passenger cabin 16.

- 2.6 The Appellants' final objection under (e) is also not valid. A person skilled in the art will readily recognise that the features referring to the environmental control system for an aircraft comprising

an A/C pack system, as shown in Fig.1 of D0, also apply to the cargo compartment recirculation system shown in Fig. 2. The claimed combination of features made on the basis of these two embodiments is neither inconsistent, nor incompatible.

2.7 Similar considerations apply to method claim 9, whereby the Appellants did not present detailed objections in this respect.

2.8 Extension of the protection conferred (Article 123(3) EPC)

For the Appellants, modifying claim 1 such that it is now directed to an "environmental control system" while claim 1 as granted is directed to "cargo compartment recirculation system" amounted to an extension of the protection conferred which contravened Article 123(3) EPC.

The Board does not agree. The question whether a claim has been amended in such a way as to extend the protection conferred is to be distinguished from the question whether the claimed subject-matter remains the same object (*aliud*). Claim 1 as originally granted claimed "X", whereby "X" is a cargo compartment recirculation system. During the Opposition Proceedings, the claim was amended to claim "A comprising B and X", whereby in the present case "A" is an environmental control system for an aircraft and "B" is an air conditioning pack system. The Appellants' contention appears to be that in amending claim 1 from a claim to X, to a claim to A comprising B and X, the scope of protection is broadened such that Article 123(3) EPC is offended. This is not the case. The maintained claim is still limited by the features of

the claim as originally granted. In other words, both claims are still limited by X: that is, the cargo compartment recirculation system and the features thereof. There has therefore been no broadening of the scope of protection. Furthermore, as the maintained claim is further limited by the features of A and B, its scope of protection is narrower than that of claim 1 as granted.

The decision T 1898/07 which was cited by the Appellants refers to a change of the claimed subject-matter from "a liquid composition" to "a package kit containing a syringe pre-filled with liquid composition". The facts of that case differ drastically from those of the present one, because, as explained in point 22 of T 1898/07, the Board considered that the liquid composition was not a feature of the package per se.

Similar considerations apply to independent method claim 9.

3. Inventive step Article 56 EPC

3.1 The Appellants make two different lines of argumentations in respect of inventive step. The first one starts from document D2 as representing the closest prior art whereas the second one starts from document D3.

3.2 D2 describes an air conditioning system for a ground effect machines, like e.g. an hovercraft. Since such machines are always at nearly ground or sea level, fresh air supplied through the filter 35 at the entry of the mixing chamber 15 is at atmospheric pressure (see Fig. 1 of D2). Such an environmental system does not comprise an air conditioning pack system "coupled

to extract air at elevated temperature and pressure from a compressor section of a propulsion unit and arranged to condition the extracted air" as claimed. Moreover, D2 also has only a single internal enclosure 16, rather than a separate passenger cabin and cargo compartment, as required by claims 1 or 9. It is therefore apparent that not only are there significant structural differences between the machine disclosed in D2 and the features of the claims, but D2 is also directed towards a very different purpose or effect. The system of D2 would not work at the flight altitude of a commercial aircraft having a flight deck, a passenger cabin and a cargo compartment in which the claimed environmental control system should be installed. Therefore, the Board shares the view of the Respondent that D2 is not an adequate prior art starting point for assessment of inventive step. Accordingly, the line of argumentation taking D2 as the closest prior art is based on hindsight and fails for this reason.

3.3 In D3, the air for the cargo compartment (freight hold space 4) is obtained by mixing, in a mixing unit 1, fresh air coming from a compressor section of the aircraft propulsion unit (turbine engine) and recycled air that has been extracted as exhaust air from the flight deck and passenger cabin of the aircraft (column 4, lines 36-46). Temperature regulation in the cargo compartment is obtained by adjusting the amount of hot trimming air tapped from the engines by means of trimming air regulating valves TV1 and TV2 branching into the supply air main lines 31,32 (col. 8, lines 22 to 54). There is no cooling device mentioned in connection with air for or from the cargo compartment. There is also no air from the cargo compartment directed to a cooling device. It is absolutely clear

from the content of D3 that the flow of air supplied to the cargo compartment is unidirectional such that all air from that compartment escape overboard through the exhaust air unit 22 (see especially column 6, lines 11 ff. and the passages referring to the non-return flap valves R21-R26 for fire protection). This means that there is no air recirculation in the cargo compartment of D3. Since there is no recirculation duct, there is, *a fortiori*, no duct means to selectively direct a portion of the volume of air to an air heating device or an air cooling device.

- 3.4 The Board does not agree with the Appellants' contention that, starting from D3 as nearest prior art, the claimed subject-matter was obvious in view of the documents D28 to D31. For the Board, these documents filed in appeal proceedings do not justify a different conclusion on the question of inventive step for the following reasons:

D28 discloses an injector air outlet with a sensor for temperature and smoke monitoring in an aircraft fuselage space. A primary supply air inlet 4 receives primary supply air 5 from the aircraft's air distribution duct network, and blows the primary supply air through an injection nozzle 7 into a mixing chamber 3 so as to create a reduced or negative pressure in the mixing chamber. Cabin air 10 is sucked through a secondary air inlet 9 and a secondary air channel 8 into the mixing chamber 3, due to the reduced pressure or suction effect therein. The primary air and secondary air are mixed together and then ejected back into the cabin or cargo hold air (see Fig. 1). There is no heating or cooling for the recirculated air. The content of this disclosure is incompatible with the

teaching of D3 and even if D28 were combined with D3, it would not lead to the claimed subject-matter.

D29 describes an air conditioning system for the passenger cabin of a pressurized aircraft and comprises an air flow recirculation loop into which fresh air or hot trim air may be introduced for temperature regulation. This document relies on the same principles as document D3. For the skilled person, this document is not an incentive to modify the air conditioning system of D3.

Documents D30 and D31 contain general considerations on the impact of air recirculation on the energy efficiency of air conditioning systems. Even if the skilled person would consult these documents, he would not find any hint in respect of the distinguishing features.

- 3.5 Accordingly, the environmental control system of claim 1 and, by analogy, the method of claim 9 are not obvious and involve an inventive step within the meaning of Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



A. Vottner

G. Pricolo

Decision electronically authenticated