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Datasheet for the decision of 28 January 2009

Case Number: T 1730/06 - 3.2.01

Application Number: 98203002.5

Publication Number: 0909704

IPC: B64C 1/14

Language of the proceedings: EN

Title of invention:
Engine parameter activated airplane exit locking system

Patentee:
The Boeing Company

Opponent:
Airbus SAS

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:
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Case Number: T 1730/06 **-** 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 28 January 2009

Appellant: (Patent Proprietor)	The Boeing Company 100 North Riverside Plaza Chicago, IL 60606-2016 (US)
Representative:	Land, Addick Adrianus Gosling Arnold & Siedsma Sweelinckplein 1 NL-2517 GK The Hague (NL)
Respondent: (Opponent)	Airbus SAS 1 Rond-Point Maurice Bellonte F-31700 Blagnac (FR)
Representative:	Santarelli 14, avenue de la Grande Armée B.P. 237 F-75822 Paris Cedex 17 (FR)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted 16 October 2006 revoking European patent No. 0909704 pursuant to Article 102(1) EPC 1973.**

Composition of the Board:

Chairman: S. Crane
Members: Y. Lemblé
G. Weiss

Summary of Facts and Submissions

I. The appeal of the Patent Proprietors is directed against the decision of the opposition division posted 16 October 2006 to revoke the European patent No. 0 909 704. The patent has been opposed on the ground that its subject-matter lacked an inventive step (Art. 100 a) EPC 1973). In its decision the opposition division held that the subject-matter of claim 1 as granted did not involve an inventive step having regard to the following prior art documents:

E1: US-A-4 915 326
E2: US-A-5 480 109
E3: US-A-3 871 474
E4: US-A-5 111 902.

II. The notice of appeal was filed on 31 October 2006 and the appeal fee paid at the same day. The statement of grounds of appeal was filed on 16 February 2007.

III. In their reply to the notification of the appeal, the Respondents (Opponents) maintained that the subject-matter of claim 1 as granted did not involve an inventive step and additionally referred to the following document

E5: Federal Aviation Administration Advisory Circular AC No: 25.783-1, dated 12 October 1986,

which is mentioned in column 1 of the patent specification.

IV. In the oral proceedings, held 28 January 2009, the Appellants requested that the decision under appeal be set aside and the patent be maintained as granted (main request), or in the alternative that the patent be maintained in amended form on the basis of the claims according to the auxiliary requests I and III to VIII filed with the grounds of appeal on 16 February 2007 or auxiliary request II filed with letter dated 28 December 2008 or auxiliary request VI' filed with letter dated 5 February 2008.

The Respondents requested that the appeal be dismissed.

V. The independent claims 1, 5 and 7 of the patent as granted read as follows:

1. An aircraft locking system (11) comprising:
means (20) for determining whether engines of the aircraft are running;
means (30) for determining thrust lever position;
means for determining whether the aircraft is in an air mode or a ground mode;
means for determining whether a predetermined number of service/entry doors are closed; and
means for generating a lock/unlock signal responsive to the engine-running determining means (20), the thrust lever position determining means (30), and the service/entry door closed determining means.

5. An aircraft locking system (11) comprising:
means (20) for determining whether engines of the aircraft are running;
means (30) for determining thrust lever position;

means for determining whether the aircraft is in an air mode or a ground mode;
means for determining whether a predetermined number of service/entry doors are closed;
means for generating a lock/unlock signal responsive to the engine-running determining means (20), the thrust lever position determining means (30), and the service/entry door-closed determining means, the means for generating the lock/unlock signal including a relay (40) having an energizing coil (38);
and a lock actuator (50) including a solenoid (48) having a first terminal (52) that is electrically connected to the relay (40) and a second terminal (56) that is electrically connected to the engine-running determining means (20), the relay (40) being electrically connected to a first voltage source (44) having a first voltage level, and the engine-running determining means (20) being electrically connected to a second voltage source (44) having a second voltage level when at least one engine is running, the second voltage level being less than the first voltage level, such that the solenoid (48) is electrically connected between the first voltage source (44) and the second voltage source (44) in response to a lock signal.

7. An aircraft locking system (11) comprising:
means (20) for determining whether engines of the aircraft are running;
means (30) for determining thrust lever position,
means for determining whether the aircraft is in an air mode or a ground mode;
means for determining whether all service/entry doors are closed;

means for determining whether a predetermined number of service/entry doors are closed; and
means for generating a lock/unlock signal responsive to the engine-running determining means (20), the thrust lever position determining means (30), the all service/entry door-closed determining means, and the predetermined service/entry door-closed determining means, the lock/unlock signal generating means generating a locking signal when:
at least one engine is running;
a predetermined number of service/entry doors are closed; and
the airplane is in the air mode or all thrust levers are in a take-off position or all service/entry doors are closed.

VI. The submission of the Appellants can be summarized as follows:

In deciding that the subject-matter of claim 1 as granted did not involve an inventive step, the opposition division made an incorrect interpretation of the prior art documents E1 and E2. Firstly, E2 did not relate to an aircraft locking system and, for this reason, should not be considered as the nearest prior art. The only document dealing with an aircraft locking system was document E1. Moreover, E2 did not disclose means for determining whether a predetermined number of service/entry doors are closed. The opposition division also wrongly appraised document E1 in stating that it disclosed the feature of a means for determining whether a predetermined number of service/entry doors are closed. Since neither E1 nor E2 disclosed that feature, the combination of E1 and E2 would also lack

the feature. In conclusion, claim 1 as granted was inventive over E1 and E2. The documents E3 and E4 related to a door locking system for a motor vehicle and were not relevant to the problem of avoiding inadvertent or deliberate operation of an airplane exit opening means during takeoff roll, in-flight, or landing.

VII. The Respondents contested the argumentation of the Appellants and maintained that the claimed invention did not involve an inventive step. They presented three lines of argumentation according to which the subject-matter of claim 1 as granted was, in their opinion, obviously derivable from the prior art, namely a combination of document E2 with the technical knowledge of the person skilled in the art which is illustrated by E5, or a combination of the documents E1 and E2, or a combination of E1 or E2 with E3 and/or E4.
Contrary to the assertion of the Appellants, E2 was a prior art that the person skilled in the art would take into consideration as a starting point for the alleged invention. Indeed, E2 dealt with the problem of preventing the automatic or inadvertent opening of an improperly closed and locked aircraft door (E2, column 5, lines 4-7). Thus, E2 referred to the same technical field and concerned the same problem as the present invention. The aircraft system of E2 comprised a door monitor control arrangement 1-2 having a plurality of sensors 3 which determined the operating status of the fuselage doors 35A, i.e. whether they were properly locked (see column 5, lines 24-49; column 9, lines 1-5), and two devices 55,60 providing data indicative of the operating status of the aircraft including a landing gear control arrangement 55 and a

jet engine monitor arrangement 60, the latter indicating the operating condition of the engine and the position of the thrust control lever (column 8, lines 46-61). These two devices could therefore be construed as a means for determining whether the engines of the aircraft are running and for determining the thrust lever position and a means for determining whether the aircraft is in an air mode or a ground mode. As stated by the opposition division in its decision, the expression "a predetermined number" of doors used in claim 1 covered the possibility of checking the closure of all the aircraft doors. Even the operating status that less than all the doors are closed (case of a door sensor failure mentioned in paragraph [0007] of the patent), was dealt with in E2 (see column 5, lines 51-61). The door monitor control arrangement of E2 was therefore to be considered as a "means for determining whether a predetermined number of service/entry doors are closed". Consequently, the system of claim 1 as granted only differed from that of E2 through the fact that the signals delivered by the system control arrangement were "lock/unlock signals". Starting from E2 as nearest prior art, the skilled person could not ignore document E5, which was published by the Federal Aviation Administration and referred to certification requirements for fuselage doors of aircrafts. E5 stated that is was not considered acceptable to rely solely on cabin pressure (as in E2) to prevent an inadvertent opening of doors in-flight due to door-opening incidents during unpressurized flight, such as during taxiing and landing and that all doors should therefore incorporate features in the locking mechanism that provide positive means for preventing the door from being opened inadvertently by passengers or crew

members. For the skilled person confronted with the problem of adapting the system of E2 to the provisions of the FAA as set out in E5, it would have been obvious to use the control logic of E2 for additionally generating, in case an improperly closed door was detected by the door monitor arrangement, a signal which activated the locking of the doors, thus coming in an obvious manner to the claimed system.

Alternatively, the system of claim 1 was also obvious to a skilled person starting from document E1. This document disclosed an aircraft exit door locking system which was developed in order to prevent inadvertent opening of aircraft emergency exits (column 1, lines 9-17) and which was responsive to three parameters, namely an inertial reference logic, a Pitot system logic and an air/ground logic. Since these parameters were detected and calculated by sophisticated sensors and processors, there was a need for a system which would be more resistant to sensor failure. As E2 was also dedicated to the problem of preventing inadvertent opening of a door, it was an obvious alternative for the skilled person to make the generation of the lock/unlock signals responsive to the control logic and the parameters of E2 instead of the parameters of E1.

Finally, the subject-matter of claim 1 was also rendered obvious by the prior art shown in documents E3 or E4 in combination with documents E1 or E2. Document E3 described a door locking system which is adapted for any type of motor vehicle and in which the generation of a lock signal is output by a control logic upon the occurrence of several conditions, namely that the ignition was on, the engine was running, the door were

closed and the transmission engaged in a moving position (column 1, lines 37-40). In the same way, E4 disclosed a door locking system for motor vehicle in which, in order to prevent the doors from being inadvertently or deliberately operated (column 1, lines 29-30), a series of parameters (like ignition turned-on; transmission shifted away from park or neutral; the closed position of a predetermined number of doors like both front doors: see column 2, lines 3-18 and lines 44-46) are taken into consideration by a logic device 42. For the skilled person, it was obvious to apply the control logic and parameters described in E3 or E4 to a door lock control system of an aircraft as known from E1 or E2.

The Respondents agreed that, if the Board came to the conclusion that claim 1 stood the objection of lack of inventive step, independent claims 5 and 7 would also stand that objection.

Reasons for the Decision

1. The appeal is admissible.

2. *Claim 1 as granted*

Claim 1 as granted refers to an aircraft locking system comprising means for generating a lock/unlock signal. The prime purpose of the claimed locking system is to avoid inadvertent or deliberate operation of an aircraft exit opening during take-of, in flight or landing (see paragraph [0001] of the patent specification). Although this system has been specially developed to lock/unlock the emergency exits of the

aircraft, it is not limited to this use and could also ensure that other components of the aircraft, e.g. escape slides, be locked/unlocked during the flight envelope (see paragraph [0023] of the patent).

The lock/unlock signal is generated by a lock logic 10 which is responsive to three parameters, each of these parameters being taken into account in making a determination of whether the aircraft component, e.g. the aircraft emergency door, be locked or unlocked (paragraph [00012] of the patent specification). Whereas two of the parameters are respectively means 20 for determining whether engines of the aircraft are running and means 30 for determining the thrust lever position, the third parameter consists in determining whether a predetermined number of service/entry doors are closed.

Paragraphs [0008] and [0017] of the patent specification describe how the third parameter can influences the generation of a lock or an unlock signal. In the event of an emergency landing in which an engine remains running and the landing gear remains up, the lock/unlock signal generating means (door logic 18) generates an unlock signal when less than the predetermined number of service/entry doors are closed. This provides an override that permits the emergency exit doors of the aircraft to be unlocked. Because the service/entry doors are monitored and may be operated by crew members or trained flight attendants, the system is responsive to a concerted, intentional action on the part of the flight crew to open two or a predetermined larger number of service/entry doors in an emergency situation, such as the emergency landing

described above, thus ensuring that the exit doors are unlocked in this emergency situation. Having regard to these explanations the Board cannot accept the argument of the Respondents that the term "predetermined number" as used in claim 1 can, in the context of the patent as a whole, be equated to "all".

3. *The prior art*

3.1 In the Board's judgement, document E1 represents the nearest prior art. E1 discloses an aircraft exit door locking system which was developed in order to prevent inadvertent opening of aircraft emergency exits (column 1, lines 9-17). This locking system is responsive to three parameters, namely an inertial reference logic (means 10 for determining the speed of the aircraft), a Pitot system logic (means 20 for determining the Pitot static pressure) and an air/ground logic (means 13 for determining whether the aircraft is in an air mode or a ground mode). The system also comprises a means 7,8 for generating a lock/unlock signal responsive to these parameters 10,20,13.

E1 does not disclose means for determining whether a predetermined number of service/entry doors are closed. E1 also does not suggest that such means could have any influence on the logic decision of whether the aircraft emergency doors be locked or unlocked. Thus, E1 alone cannot lead to the subject-matter of granted claim 1.

3.2 E5, which is already mentioned in column 1 of the patent specification, is a document published by the Federal Aviation Administration. It refers to

certification requirements for fuselage doors of aircrafts and sets forth acceptable means of compliance with the provisions of the Federal Aviation Regulation. The Board agrees with the Respondents that E5 must have been well known to the skilled person before the priority date of the patent.
Among the recommendations mentioned in E5 and cited by the Respondents, there is no mention of the parameters influencing the decision of locking the doors. In particular, there is no suggestion that the number of closed service/entry doors may play a role in deciding whether doors should be locked/unlocked.

3.3 The purpose of the system of E2 is mainly to prevent an excess air pressure from building-up within an aircraft when one or more fuselage doors are not properly locked, thus precluding the door from being blown out of the aircraft fuselage by the pressure differential due to pressurisation (E2, column 2, paragraphs "OBJECTS OF THE INVENTION"). To this aim, E2 proposes an aircraft air supply and exhaust system, which comprises a door monitoring system 1, a device 55,60 providing data indicative of the operating status of the aircraft and an air system control arrangement 4,5,36 arranged to control the air supply and exhaust system. If in a flying configuration, the door monitor arrangement 2 of the door monitoring system 1 determines that a door is not properly closed and locked, for example because of an inadvertent or deliberate opening (see E2, column 5, lines 4-7), then the cabin pressure controller outputs control signals which effectuate the complete opening of the venting valves 10,11 and the closing of the tap air shut-off valve 39 of the air system control

arrangement, causing an immediate depressurisation of the cabin (E2: column 9, lines 3-38).

As conceded by the Respondents, the signals delivered by the air system control arrangement 4,5,36 are not "lock/unlock signals" but signals for controlling the exhaust or venting valves 10,11, the air flow valves 14,15 and the tap air shut-off valves 39 (column 9, lines 1-20). Even if the valve 39 may be shut-off in response to one or more fuselage doors or access hatches not being properly closed, this valve cannot be considered as part of a locking system within the meaning of the claim. According to the mode of operation described in E2, the control signals issued by the air system control arrangement 4,5,36 provide for a continuous variation of the respective valve cross-section (see terms like "cabin temperature controllers 12 and 13", "tap air controller 38", "cabin pressure regulators 8 and 9", "to restrict or shut-off",...). Contrary to the opinion of the Respondents, there is no suggestion in E2 that the logic system of E2 would be suitable for generating a signal for locking/unlocking aircrafts doors.

Besides, the door monitoring arrangement of the system of E2 is indicative of the status of all doors as a whole. There is no indication in E2 that the service/entry doors or a predetermined number of service/entry doors (as compared to all doors) may play any role in the control logic of this system. If the door monitor control arrangement 2 of E2 determines that a door sensor does not work properly or if the same status is not reported by all fuselage doors sensor units, then the monitoring arrangement 2

automatically trips into a safety condition which effectively acts as if at least one fuselage door and/or fuselage access hatch is open (column 5, lines 51-65).

3.4 The Board concludes from the above that the subject-matter of claim 1 is not obvious to a skilled person having regard to the teachings of E2 and E5 or the teachings of E1 and E2. Considering the combination E2/E5 invoked by the Respondents, the Board notes, that E2 was filed at a time (1994) when its inventors were well aware of the requirements of the Federal Aviation Administration which are published in E5 (1986). Thus, considering the problem of preventing the automatic or inadvertent opening of an improperly closed and locked aircraft door (E2: column 5, lines 4-7), the solution proposed in E2 differs from that of claim 1. To argue that the signal delivered by the control system of E2 might be an "lock/unlock signal" is, in the opinion of the Board, inspired by hindsight. The determination of the status of the doors makes only sense in E2, if it is used as a parameter to release the depressurization of the cabin (column 2, lines 41-46).

3.5 Documents E3 and E4 refer to automatic door locking systems for motor vehicles. These systems have mainly been developed in a view to prevent unauthorised door openings from the outside, for example when the vehicle is stopped at a traffic light (E4: column 4, lines 15-21). They are not concerned with the problem of avoiding deliberate or inadvertent operation of an exit door by a passenger of the vehicle. On the contrary, with the door locking systems of E3 and E4 the passengers of the vehicle have always the possibility

to open the doors (E3: column 2, lines 34-39: switch 26; E4: column 1, lines 12-30 and column 4, lines 4-14: switch 10). The Board sees no reason for the skilled person who is confronted with the above mentioned aircraft exit opening problem to apply parameters which are arbitrarily selected among those disclosed in E3 or E4 to a logic device for producing a lock/unlock signal in an aircraft, as known from E1.

3.6 It follows from the foregoing that the subject-matter of claim 1 as granted involves an inventive step. This is also true for the other claims of the patent, which were not objected to by the Respondents.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is maintained as granted.

The Registrar The Chairman

A. Vottner S. Crane