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**Datasheet for the decision
of 13 October 2009**

Case Number: T 0167/08 - 3.2.01

Application Number: 00204598.7

Publication Number: 1112931

IPC: B64D 29/08

Language of the proceedings: EN

Title of invention:

Aircraft engine and associated aircraft engine cowl

Patentee:

The Boeing Company

Opponent:

Airbus SAS

Headword:

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Relevant legal provisions:

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Relevant legal provisions (EPC 1973):

EPC Art. 56

Keyword:

"Inventive step - yes"

Decisions cited:

T 0176/84

Catchword:

-



Case Number: T 0167/08 - 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 13 October 2009

Appellant: Airbus SAS
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 16 November 2007
rejecting the opposition filed against European
patent No. 1112931 pursuant to Article 102(2)
EPC 1973.

Composition of the Board:

Chairman: S. Crane
Members: J. Osborne
G. Weiss

Summary of Facts and Submissions

- I. The appeal is directed against the decision posted 16 November 2007 rejecting the opposition against European patent No. 1 112 931.
- II. The opposition was based only on the ground of lack of inventive step. During the appeal procedure the appellant relied upon the following state of the art:
- D1: FR-A-2 622 930;
- D2: US-A-4 720 065;
- D3: US-A-3 758 990;
- D4: DE-A-26 02 610;
- D5: US-A-4 433 505;
- D6: US-A-5 921 613;
- D7: FR-A-2 772 342.
- III. At oral proceedings held 13 October 2009 the appellant requested that the decision under appeal be set aside and the patent revoked. The respondent requested that the appeal be dismissed.
- IV. Claim 1 according to the respondent's request (as granted) reads:
- "An aircraft engine (22) having opposite front and rear ends (30,32), extending in a longitudinal

direction between the front and rear ends (30,32) and defining a longitudinal axis (34) that extends between the front (30) and rear ends (32), the aircraft engine comprising:

- a reference portion;
- a cowl (40) that extends arcuately at least partially around the longitudinal axis (34) of the aircraft engine (22) and is operative for covering at least a portion of the reference portion while the cowl (40) is in a close configuration,

wherein the cowl (40) is movably mounted in relation to the reference portion so:

- the cowl (40) is capable of being moved between the closed configuration and an open configuration, and
- the cowl (40) moves both radially away from the longitudinal axis (34) and in the longitudinal direction as the cowl is moved from the closed configuration to the open configuration,

wherein the reference portion comprises an inlet assembly (36) that is positioned proximate the front-end (30) of the aircraft engine (22) and comprises an exterior surface (38) that extends arcuately at least partially around the longitudinal axis (34) of the aircraft engine (22) wherein the cowl (40) is generally rearward of the inlet assembly (36) in the closed configuration,

characterized in that the cowl (40) is movably mounted in relation to the reference portion so that the cowl moves both radially away from the inlet assembly (36) and forward relative to the inlet assembly (36) as the cowl (40) is moved from the closed configuration to the open configuration."

Claims 2 to 12 contain all features of claim 1.

V. The appellant's submissions may be summarised as follows:

The subject-matter of claim 1 does not involve an inventive step in the light of D1 either alone or in combination with the closest state of the art as acknowledged in the patent specification. The only feature of claim 1 which is not known from D1 is that the longitudinal movement is forwards rather than rearwards. Both the patent specification and D1 set out the problem of the weight and encumbrance of fan cowls which are carried on upper, horizontal hinges. It follows that although the teaching of D1 is not directed towards a fan cowl the skilled person faced with the problem of improving fan cowls carried on upper, horizontal hinges would consider its disclosure. He would learn from it that it is possible to move an engine cowl both radially and longitudinally. When applying that teaching to a fan cowl it would be evident that the longitudinal movement would be in the forward direction in order to avoid the pylon which mounts the engine and which is positioned behind the fan cowl. Since the longitudinal movement can only be forward or rearward the choice of the former cannot support an inventive step. Indeed, the application from which the present patent derives originally disclosed movement of the cowl both forwards and rearwards. Moreover, the skilled person is aware from his general technical knowledge that a forward opening would be preferable in view of the self-closing effect of air movement during flight.

Alternatively, the subject-matter of claim 1 is obvious for the skilled person in the light of his general technical knowledge as exemplified by the teaching of D2. As set out above, the problem to be solved was already known. It is established case law that the skilled person when seeking a solution to a problem will not restrict himself to searching in the same technical field but will consider also neighbouring technical fields. For the person skilled in the design of aircraft engine cowls aircraft doors are in such a neighbouring field. Moreover, as a result of the widespread use of air travel visible parts of an aircraft passenger door belong to everyday knowledge. Indeed, similar hinging mechanisms are widely known, as may be seen from D3 to D6. D2 shows that aircraft passenger doors, which close an arcuate surface, employ an identical combination of radial and longitudinal movement as is now being claimed for an aircraft engine cowl. The longitudinal movement is forward because of the resulting self-closing effect during flight.

The subject-matter of claim 1 is also rendered obvious by a combination of the teachings of D1 and D2. The basic teaching of D1 that a core cowl is preferably supported on vertical hinges for longitudinal movement leads the skilled person to apply the teaching of D2.

VI. The respondent's rebuttal was essentially as set out below:

The closest state of the art is acknowledged in the patent specification paragraph [0003], namely a fan cowl having a horizontally extending top edge hinged for upward pivoting. The weight and size of such cowls

renders them difficult to open manually and power operation is heavy. D1 teaches two phases of movement for opening a core cowl. In a first phase the cowl moves radially and longitudinally rearwards in order to take it out of the envelope of the thrust reverser cowl. In a second phase access to the engine is gained by pivoting the cowl upwards about a horizontal hinge. D1 therefore still employs the same movement as is criticised in the present patent specification, with the same resulting disadvantages. It does not disclose a solution to the problem addressed by this patent.

In its second attack on inventive step the appellant relies on assertions regarding the general technical knowledge of the skilled person for which no supporting evidence has been provided. Moreover, aircraft passenger doors and engine cowls are not in neighbouring technical fields since they are each required to provide different functions under widely differing conditions. The skilled person faced with the problem addressed by the present patent therefore would not consider D2. Even if he were to, he would be confronted with a complex mechanism adapted to provide functions which are not required of an engine cowl.

The skilled person would not combine the teachings of D1 and D2 because they are incompatible. Even if he were to do so there still would be no teaching to remove the upward movement from an engine cowl.

Reasons for the Decision

1. An aircraft engine typically is supported on a pylon beneath a wing and is covered in a nacelle which provides a streamlined outer surface and houses also other components. A nacelle comprises an inlet at the forward end and a series of cowls which may be opened in order to provide access for maintenance. A fan cowl may be adjacent and of similar diameter to the inlet to provide a by-pass flow of air whilst a core cowl towards the rear of the engine is somewhat smaller diameter and may be opened for access to the gas generator. A fan cowl conventionally has two C-section portions each hinged along an upper, horizontal edge for pivoting upwardly into an open position. In the patent specification it is explained that such fan cowls can be large, bulky and heavy, are liable to wind damage whilst open and that their height above the ground may render them difficult to reach whilst power operated mechanisms intended to overcome these problems are heavy. The patent relates to an engine having cowls that are relatively easy to open and close. Only inventive step of the subject-matter of claim 1 is at issue.

2. Claim 1 relates to an engine having a cowl which moves forwards during opening. It does not specify a fan cowl. However, in as far as the problem which is addressed in the patent specification arises in fan cowls they do form the closest state of the art for judging inventive step. Such a cowl is disclosed in D7 and acknowledged in the patent specification paragraph [0003] and is essentially as described under point 1 above.

3. The appellant's first attack on inventive step nevertheless is based on the disclosure of D1 alone. In accordance with the appellant's argumentation the cowl in question would be a core cowl and the only feature distinguishing the subject-matter of claim 1 from the disclosure of D1 would be the direction of longitudinal movement, namely forwards instead of rearwards. D1 relates to an aircraft engine mounted on a pylon beneath a wing. More particularly, it relates to a divided core cowl which in its closed position is partly within the rearmost portion of an outer cowl. Each half of the core cowl is mounted on a parallelogram linkage and is opened in two stages. In a first stage the linkage moves the respective half of the core cowl both radially away from the engine and rearwards beyond the rear end of the outer cowl. In the second stage each respective half of the core cowl pivots upwardly around an upper, horizontal hinge. The essential teaching of D1 therefore is that before each half of the core cowl can be pivoted upwardly it must be moved rearwardly out of the outer cowl. If the rearward movement were to be reversed in the way suggested by the appellant the core cowl would remain within the confines of the outer cowl and so could not be opened by upward pivoting. Under these circumstances it is evident that the skilled person has no choice in respect of the direction of longitudinal movement of the core cowl, it must be rearwards as disclosed in D1.
4. In its first alternative approach the appellant begins from the closest state of the art as set out under point 2 above and argues that combining that with the teaching of D1 would result in the subject-matter of claim 1 in an obvious manner.

4.1 D1 refers in its introduction to earlier state-of-the-art documents. One such document (US-A-4 585 189) relates to a cowl which covers not only the gas generator but extends forwardly to form also a fan cowl, thereby offering access to the whole of the engine. The cowl is in the form of two C-section portions supported on horizontal hinges. D1 comments that that cowl is problematic because it is large and necessitates hydraulic assistance for its opening. It is the similarity between that problem and the one facing the skilled person in the present case which in the appellant's view would draw the skilled person's attention to the teaching of D1. The board disagrees with that view, however. The teaching of D1 relates to core cowls which by their very nature are of a smaller diameter than fan cowls. D1 includes reference to fan cowls only because it explains that the earlier state of the art had proposed a core cowl which became undesirably large as the result of being extended to incorporate a fan cowl. That is not tantamount to a statement regarding the size and bulk of the earlier cowl in its capacity as a fan cowl. The skilled person wishing to solve the problem arising with fan cowls therefore would see no cause to study the detailed teaching of D1.

4.2 Even if the skilled person seeking to solve the problem arising with fan cowls were to further consider D1 he would not find a solution to it. As set out above, that problem arises in fan cowls which pivot about an upper, horizontal hinge. The teaching of D1 does not address that problem and, indeed, during the second stage of opening the core cowl also pivots about an upper,

horizontal hinge. Since the pivoting movement is still present in accordance with D1 there is no solution to the problem which arises from that very feature.

Moreover, the parallelogram linkage in accordance with D1 is provided only in order to remove the core cowl from within the confines of the outer cowl and thereby to enable the pivoting movement. No such restriction existed in the closest state of the art and the teaching of D1 therefore would offer no benefit to the skilled person charged with solving the set problem.

5. In a further approach the appellant argues that the skilled person would apply his general technical knowledge as particularly exemplified by D2 to the solution of the set problem. D2 relates to an aircraft passenger door which is mounted on a parallelogram linkage such that when it opens it moves both laterally and longitudinally forwards. Whilst the appellant argues with reference to D3 to D6 that parallelogram linkages are well known it considers that D2 is a particularly relevant example of the art because it is in a neighbouring technical field, the door and an engine cowl both belonging to an aircraft and sharing the feature of being panels in a curved surface.

- 5.1 Neighbouring fields are ones so closely related that the skilled person seeking a solution to a given problem in one would take into account developments in the other, see decision T 176/84 (OJ EPO 1986, 50). This is not applicable to the technical fields of aircraft engine cowls and aircraft passenger doors because they concern components which fulfil widely differing functions under largely different conditions. Moreover, the two components are structurally very

different and the only commonality is in closing a curved surface. The skilled person therefore would not be expected to become aware of D2 and its detailed content need not be considered further.

5.2 However, the board does consider that a parallelogram linkage *per se* does belong to the general technical knowledge of the skilled person. That knowledge would, furthermore, extend to the linkage's particular characteristic, namely permitting parallel relative movement between two elements. However, in moving from the closest state of the art to the subject-matter of claim 1 the skilled person would need to do more than simply replace the existing hinge by the known linkage. He would need to appreciate that the problem could be solved by articulating the cowl in a different manner and in a different direction, an act extending beyond anything to which he would be motivated by his fund of knowledge.

6. In the appellant's final approach D1 is once again regarded as representing the closest state of the art and a combination of that with the disclosure of D2 is argued to render the subject-matter of claim 1 obvious. However, as already set out under point 2 above the disclosure of D1 is such that the skilled person would not consider reversing the direction of longitudinal movement. Moreover, as set out under point 4.1 above the person skilled in the art of engine cowls would not be aware of D2, by virtue of their different technical fields. Even if he were to become aware of D2 and moreover consider it relevant to improving the teaching of D1 there still would be no motivation to remove the upward pivoting of the cowl in D1.

7. On the basis of the foregoing the board finds that the subject-matter of claim 1 cannot be derived in an obvious manner and therefore involves an inventive step (Article 56 EPC 1973). Since claims 2 to 12 contain all features of claim 1 they also define subject-matter which involves an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

A. Vottner

S. Crane