

From the INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Applicant's or agent's file reference SNECMA9768		Date of mailing (day/month/year) 03 August 2015
FOR FURTHER ACTION See paragraph 2 below		
International application No. PCT/FR2015/051214	International filing date (day/month/year) 07 May 2015	Priority date (day/month/year) 21 May 2014
International Patent Classification (IPC) or both national classification and IPC B64C 11/06(2006.01)i		
Applicant SNECMA		

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/	Date of completion of this opinion	Authorized officer
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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed.
 - a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a)).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
 - a. (means)
 - on paper
 - in electronic form
 - b. (time)
 - in the international application as filed
 - together with the international application in electronic form
 - subsequently to this Authority for the purposes of search
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	1-10	YES
	Claims		NO
Inventive step (IS)	Claims	1-10	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims		NO
2. Citations and explanations :			
see Supplemental Box			

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

[1] **Box V**

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

[1.1] Reference is made to the following documents:

D1	WO 2011/069981 A1 (SNECMA [FR]; BOSTON ERIC JACQUES [FR]; BOURU MICHEL ANDRE [FR]; JABLON) 16 June 2011 (2011-06-16)
D2	FR 2 993 919 A1 (SNECMA [FR]) 31 January 2014 (2014-01-31)
D3	FR 2 992 346 A1 (SNECMA [FR]) 27 December 2013 (2013-12-27)
D4	FR 2 641 251 A1 (GEN ELECTRIC [US]) 6 July 1990 (1990-07-06)
D5	GB 1 163 752 A (EDGAR ALLEN AEREX LTD) 10 September 1969 (1969-09-10)

[1.2] D1, which is considered the prior art closest to the subject matter of claim 1, discloses, using the terminology of claim 1 (cf. figure 2 - see also the citation in the description, page 2):

a hub (17) for an unshrouded propeller (7) having variable-pitch blades (15) for a turbine engine, comprising two parallel annular flanks (20, 21) between which rings (23) are arranged, said rings being angularly distributed in a uniform manner about a longitudinal axis (A) of the hub, being connected to the annular flanks (20, 21), and comprising recesses (24) configured to receive bearings (29) having radial axes (B) rotatably guiding blade roots of said propeller, said rings (23) being connected in pairs by connecting means (33, 26, 27) arranged between the annular flanks (20, 21) and comprising reinforcement partitions (26, 27) which are substantially radial relative to the longitudinal axis (A) of the hub.

Consequently, the subject matter of claim 1 differs from this known hub in that at least some of said reinforcement panels (42, 44, 46) are connected to said annular flanks (34). The subject matter is thus novel (PCT Article 33(2)).

The problem addressed by the present invention can be considered that of improving the stiffness of the hub against ovalization of the rings, by providing partitions having reduced mass.

The solution to this problem as proposed in claim 1 of the present application is considered to involve an inventive step (PCT Article 33(3)), for the following reasons: although the problem of ovalization is well known, neither document D1 nor the other cited documents (which are farther than D1 from the subject matter of the invention) propose making the stiffening of the ring more effective by including partitions additionally connected to the flanks and therefore extending particularly in a direction having at least one longitudinal component (even if it is a structure that is quite a bit more expensive to produce).

[1.3] Claims 2 to 10 are dependent on one or more independent claims directed to subject matter that is, as indicated above, considered novel and inventive, and as such said claims likewise meet the requirements in respect of novelty and inventive step (PCT Article 33(2) and (3)).