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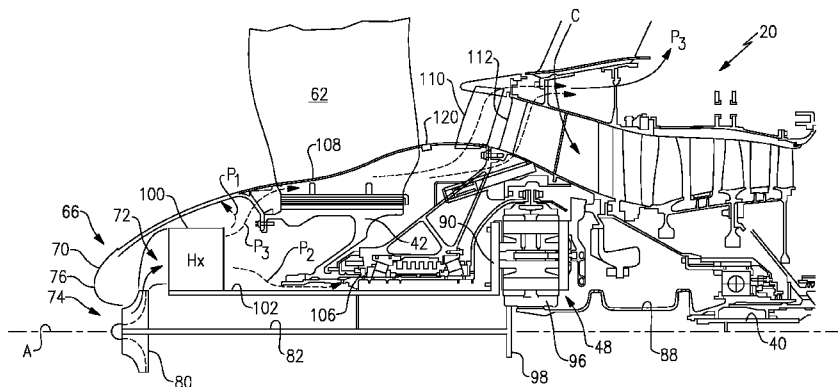
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**FIG. 2**

(57) Abstract: An example turbomachine assembly includes, among other things, a nose cone of a turbomachine. The nose cone provides an aperture that communicates air to an interior of the nose cone.

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**A. CLASSIFICATION OF SUBJECT MATTER****F02C 7/18(2006.01)i, F02C 7/12(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

F02C 7/18; F01D 25/00; B64C 11/14; B23P 11/00; F03D 11/00; F02C 7/00; B21K 25/00; F01D 5/02; F02C 7/12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) &amp; Keywords:nose cone, cone, spinner, aperture, hole, opening, air, steam, gas, vapor, pump, and impeller

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2009-0060748 A1 (LANDA et al.) 5 March 2009 See abstract, paragraphs [0020],[0030], claim 4, and figure 2.	1-4, 12, 13, 15, 19, 20 , 22 5-11, 14, 16-18, 21 , 23
A	US 2010-0226786 A1 (MAHAN, VANCE A.) 9 September 2010 See abstract, claim 1, and figure 2.	1-23
A	US 7306432 B2 (ROCKARTS et al.) 11 December 2007 See abstract, claims 1,14, and figure 1.	1-23
A	US 3901627 A (SULLIVAN, MATTEW A.) 26 August 1975 See abstract, claim 1, and figure 1.	1-23
A	US 2010-0215507 A1 (BREAKWELL, IAN S.) 26 August 2010 See abstract, claim 1, and figure 1.	1-23

 Further documents are listed in the continuation of Box C. See patent family annex.

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009-0060748 A1	05/03/2009	CN 101493070 A CN 101493070 B EP 2034181 A2 EP 2034181 A3 US 8186940 B2	29/07/2009 19/12/2012 11/03/2009 24/10/2012 29/05/2012
US 2010-0226786 A1	09/09/2010	None	
US 7306432 B2	11/12/2007	CA 2562710 A1 EP 1740919 A1 EP 1740919 A4 EP 1740919 B1 JP 2007-532891 A US 2005-0231052 A1 US 2006-0188379 A1 US 7303377 B2 WO 2005-100941 A1	27/10/2005 10/01/2007 16/06/2010 02/10/2013 15/11/2007 20/10/2005 24/08/2006 04/12/2007 27/10/2005
US 03901627 A	26/08/1975	None	
US 2010-0215507 A1	26/08/2010	EP 2221247 A2 GB 0903012 D0 US 8425197 B2	25/08/2010 08/04/2009 23/04/2013