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- (71) Applicant (for all designated States except US): **ROBERT BOSCH GMBH** [DE/DE]; Postfach 30 02 20, 70442 Stuttgart (DE).
- (72) Inventors; and
- (71) Applicants (for US only): **CAPLAN, Mark D.** [US/US]; 16 Deerslayer Lane, Westborough, Massachusetts 01581 (US). **COTE, F. Raymond** [US/US]; 33 County Street, Dover, Massachusetts 02030 (US). **GRAY, Edward H.** [US/US]; 9 Meeting House Road, Rockingham, Vermont 05101 (US).
- (74) Agent: **HONGSERMEIER, Jayson L.**; 100 East Wisconsin Avenue, Suite 3300, Milwaukee, Wisconsin 53202 (US).
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[Continued on next page]

(54) Title: FAN SHROUD WITH COMPLEMENTARY TWO-SIDED RIBBING

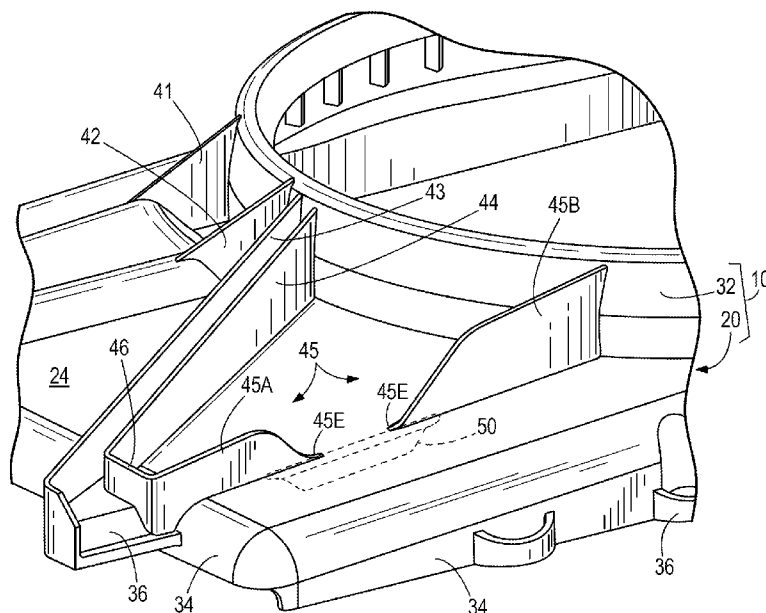


FIG. 1

(57) Abstract: A fan shroud (10) has a panel (20) including a first surface (24) and a second surface (28) substantially opposite the first surface. A first rib (41, 42) extends substantially perpendicularly from the first surface, and the first rib has an area of discontinuity where a height of the first rib is reduced. A second rib (43, 44) extends substantially perpendicularly from the second surface, and the second rib is substantially aligned with the first rib and positioned substantially opposite the area of discontinuity of the first rib.



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/056450

A. CLASSIFICATION OF SUBJECT MATTER
INV. F04D29/52 F04D29/66
ADD.

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)
F04D

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/273038 A1 (NAMAN ROBERT [US] ET AL) 10 November 2011 (2011-11-10) abstract; figures 1,3 -----	1-10,20
X	US 2007/071603 A1 (TAKEUCHI KAZUHIRO [JP] ET AL) 29 March 2007 (2007-03-29) abstract; figures 5,6,9 -----	1-10,20
A	EP 0 926 348 A2 (PAPST MOTOREN GMBH & CO KG [DE]) 30 June 1999 (1999-06-30) abstract; figures 1,3,4,5 -----	1,20



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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27/05/2014

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

de Martino, Marcello

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/056450

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-10, 20

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/056450

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 2011273038	A1	10-11-2011	CN 102971541 A	13-03-2013
			EP 2567098 A2	13-03-2013
			US 2011273038 A1	10-11-2011
			WO 2011138658 A2	10-11-2011

US 2007071603	A1	29-03-2007	CN 1940307 A	04-04-2007
			DE 102006045203 A1	05-04-2007
			JP 4618077 B2	26-01-2011
			JP 2007092562 A	12-04-2007
			US 2007071603 A1	29-03-2007

EP 0926348	A2	30-06-1999	DE 29822121 U1	18-02-1999
			EP 0926348 A2	30-06-1999
			US 6190135 B1	20-02-2001

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10, 20

The special technical features, representing the contribution over the above mentioned prior art, of claim 1 are:

- a panel including a first surface and a second surface and
- a first rib defining an area of discontinuity where a height of the first rib is reduced.

The problem to be solved may be therefore regarded as to provide a first rib that is adapted in height according to the local stiffness requirements of the fan shroud.

2. claims: 11-19

The special technical features, representing the contribution over the above mentioned prior art, of claim 2 are:

- a generally cylindrical barrel portion having an opening configured to receive a fan,
- a plenum portion adjacent the barrel portion and defining an exterior surface and an interior surface opposite the exterior surface and
- a first rib defining a path between the barrel portion and an outer edge of the plenum portion.

The problem to be solved may be therefore regarded as to provide a fan shroud with a barrel portion, a plenum portion and ribs which is thus integral and easy to manufacture.
