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(71) Applicant: **3M INNOVATIVE PROPERTIES COMPANY** [US/US]; 3M Center, Post Office Box 33427, Saint Paul, MN 55133-3427 (US).

(72) Inventor: **HAREGOPPA, Gopal, B.**; 3M Center, Post Office Box 33427, Saint Paul, MN 55133-3427 (US).

(74) Agents: **FRANZEN, Rick, L.** et al.; Office of Intellectual Property Counsel, St. Paul, MN 55133-3427 (US).

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Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations*

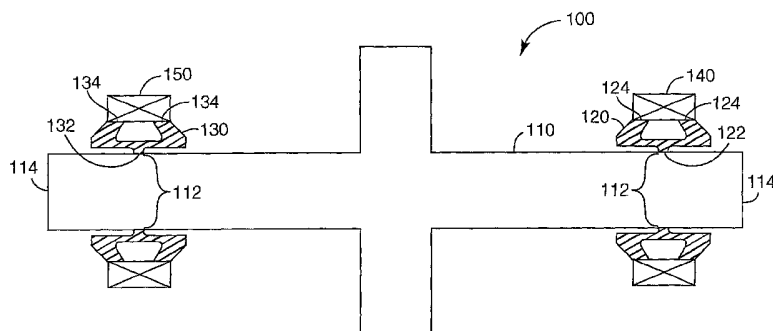
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6 May 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ULTRASONIC HORN MOUNT



(57) Abstract: An ultrasonic welding assembly is disclosed. The assembly includes a vibratory horn and at least one mount securing the horn. The horn has a resonant frequency and the mount has a resonant frequency about the same as the horn. The mount includes an inner portion that holds the horn at a nodal region. The mount also includes an outer surface that is coupled to a support member, for example, a bearing. The mount vibrates in resonance with the horn at the resonant frequency, wherein the vibration amplitude of the outer surface of the mount is generally up to about 15 percent of the vibration amplitude of the inner portion.

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US2004/012334

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B06B3/00

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)

IPC 7 B06B B23K B29C

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 practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 03/070387 A2 (3M INNOVATIVE PROPERTIES COMPANY) 28 August 2003 (2003-08-28) page 4, line 29 - page 5, line 13; figure 2 page 8, line 10 - line 33; figure 4 -----	1-20
X	US 3 350 582 A (ATTWOOD JOHN G ET AL) 31 October 1967 (1967-10-31) column 3, line 5 - line 55; figures 2,4 -----	1-20
X	US 2 866 911 A (RAWDING BURTON R) 30 December 1958 (1958-12-30) column 2, line 3 - line 61; claim 1; figure 1 -----	1-4, 13-16
A	US 6 547 903 B1 (CONDRON JOHN FORD ET AL) 15 April 2003 (2003-04-15) column 18, line 36 - line 48 ----- -/--	5,17

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in 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 document 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)

"O" document referring to an oral disclosure, use, exhibition or other means

"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

27 January 2005

Date of mailing of the international search report

07.02.2005

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Häusser, T

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/012334

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 590 866 A (CUNNINGHAM PATRICK M) 7 January 1997 (1997-01-07) column 4, line 15 - column 5, line 47; figures 2,3 -----	1,13
A	GB 877 966 A (AEROPROJECTS INCORPORATED) 20 September 1961 (1961-09-20) page 8, line 15 - page 9, line 45; figure 5 -----	9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2004/012334

Box 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 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 fee, this Authority did not invite payment of any additional fee.
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.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-8, 13-20

Ultrasound horn system/method with shrink fit mount

2. claims: 9-12

Mount for ultrasound horn with pair of flanges and mount
element

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/012334

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 03070387	A2	28-08-2003	US	2003155403 A1		21-08-2003
			BR	0215556 A		21-12-2004
			EP	1474248 A2		10-11-2004
US 3350582	A	31-10-1967	FR	1473101 A		01-06-1967
			GB	1130441 A		16-10-1968
US 2866911	A	30-12-1958	US	RE25119 E		
US 6547903	B1	15-04-2003	AU	2002320387 A1		30-06-2003
			EP	1455957 A1		15-09-2004
			WO	03051532 A1		26-06-2003
US 5590866	A	07-01-1997	US	5443240 A		22-08-1995
			CA	2130209 A1		10-08-1995
			DE	69515921 D1		04-05-2000
			DE	69515921 T2		26-10-2000
			EP	0667189 A2		16-08-1995
			JP	7213998 A		15-08-1995
GB 877966	A	20-09-1961	DE	1179405 B		08-10-1964