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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))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

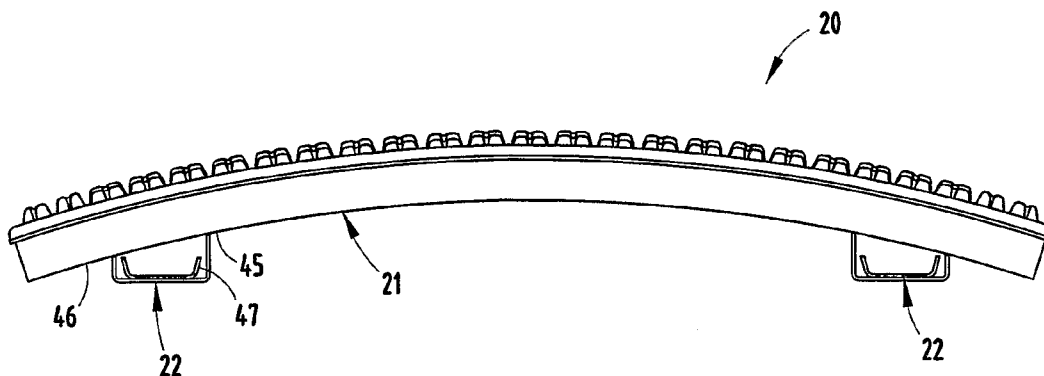
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- with international search report
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT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

(54) Title: BUMPER WITH CRUSH CONES AND ENERGY ABSORBER



(57) Abstract: A tubular bumper beam includes mounts for mounting to a vehicle frame and a crush cone in front of each mount. Each crush cone includes a flange engaging a front wall of the beam and includes a tube section extending through the front wall into engagement with a rear wall of the beam. A thermoformed energy absorber includes ridges engaging horizontal channels in the face and recesses receiving the flanges of the crush cones. The energy absorber is thermoformed to include crush boxes. At least two crush boxes include adjacent side walls having root sections bonded together near their base walls for increased strength. This is accomplished by scricing and cutting back a leading edge of one of the blade-shaped protrusions, such that the scriced leading edge leaves the root regions exposed so that the root regions bond together while the plastic material is hot.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/21661

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B60R 19/34 (2007.01)

USPC - 293/155

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(8) - B60R 19/34,19/03 (2007.01)

USPC - 293/155, 102, 120, 121, 133

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)

PatBase

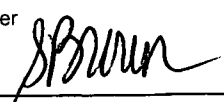
C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US2002/0149214 A1 (EVANS) 17 October 2002 (17.10.2002) entire document	1-4

Further documents are listed in the continuation of Box C.

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|---|---|
| <p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> | <p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p> |
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Date of the actual completion of the international search 04 August 2007	Date of mailing of the international search report 26 SEP 2007
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Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver  PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774
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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 Supplemental Page

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 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.:

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.

Continuation of Box III

Group I, claims 1-4, drawn to a bumper system having a crush cone in front of each mount.

Group II, claims 5-8, drawn to a bumper system with a thermoformed energy absorber positioned against the face.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical features of Group I, a crush cone positioned in front of each mount, each crush cone including a flange engaging the front wall and a tube section extending from the flange through a hole in the front wall into engagement with the rear wall, are not present in Group II; the special technical features of Group II, (claim 5) a thermoformed energy absorber positioned against the face, the energy absorber including a base wall and at least two adjacent crush boxes formed into the base wall, the adjacent crush boxes including a pair of adjacent side walls each having a root section next to the base wall bonded together a distance away from the base wall such that the adjacent side walls reinforce and strengthen each other or (claim 8) providing a base sheet of thermoformable plastic material; heating the sheet; providing a tool having a plurality of blade-shaped protrusions with leading edges for forming a plurality of crush boxes in the base sheet, the crush boxes including a pair of adjacent crush boxes; at least one of the leading edges being scived and cut back along a center area so that when the base wall is being thermally formed by the bladeshaped protrusion, a center root region of adjacent side walls on the pair of adjacent crush boxes formed by the scived leading edge are left exposed by the blade-shaped protrusion and are not cooled by the blade-shaped protrusion; and engaging the tool with the heated sheet, with the blade-shaped protrusions forming a plurality of crush boxes in the sheet, the blade-shaped protrusion with the scived leading edge leaving the root regions exposed so that the root regions bond together while the plastic material is hot, which results in increased strength of the pair of adjacent crush boxes upon cooling of the sheet, are not present in Group I.

Since none of the special technical features of the Group I or II inventions is found in more than one of the inventions, unity is lacking.