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Datasheet for the decision of 20 December 2006

Case Number: T 1022/04 - 3.2.01

Application Number: 00941232.1

Publication Number: 1263628

IPC: B60R 21/04, F16F 7/12

Language of the proceedings: EN

Title of invention:
Modular energy absorbing assembly

Applicant:
Oakwood Energy Management Incorporated

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 123(2)

Keyword:
"Novelty (yes)"
"Amendments - added subject-matter (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1022/04 - 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 20 December 2006 Error! Reference source not found.

Appellant: Oakwood Energy Management Incorporated
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Dearborn, MI 48124 (US)

Representative: W.P. Thompson & Co.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 29 March 2004 refusing European application No. 00941232.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: S. Crane
Members: J. Osborne
G. Weiss

Summary of Facts and Submissions

I. The appeal is directed against the decision posted 29 March 2004 rejecting European patent application 00 94 1232.1 (EP-A-1 263 628), published as WO-A-00/74978.

II. The following state of the art evidence was cited in the search reports:

D1: US-A-4 890 877

D2: EP-A-0 863 056

D3: US-A-3 088 539

D4: US-A-3 933 387.

The examining division was of the opinion that the wording of claim 1 then on file was not clear and found that the subject-matter of the claim was not new with respect to the disclosure of D1.

III. In a reply dated 12 October 2006 to a communication according to Article 110(2) EPC from the board the appellant filed amended claims 1 to 6 and requested that the decision under appeal be set aside and the case remitted to the examining division for further prosecution.

IV. Claim 1 according to the appellant's request reads:

"1. An energy absorber (110) for decelerating an object that impacts the absorber, the absorber comprising:
a base (112);
a plurality of cup-shaped recesses (114) associated with the base (112), each having a floor (116) and a frustoconical wall (118),
wherein the floor (116) of each recess (114) is substantially orthogonal to the impacting force and its wall (118) is substantially parallel to the impacting force in order to maximize energy absorption by the wall (118) over a given distance,
the wall (118) at least partially collapsing and at least some of the recesses (114) becoming at least partially compressed during energy absorption,
whereby the absorber affords a user determinable resistance to impact,
the absorber being vacuum thermoformed from a single sheet of thermoplastic material."

Claims 2 to 6 define features additional to those of claim 1.

V. The appellant's submissions may be summarised as follows:

Claim 1 has been amended to clearly define that the subject-matter is an energy absorber produced by vacuum thermoforming from a single sheet. D1, on the other hand, discloses an energy absorber comprising an assembly of parts. One of those parts alone is not an energy absorber but merely an intermediate product. Furthermore, it is formed from a resin-coated textile

material which would not be suitable for vacuum forming. The energy absorber according to D2 has tubular recesses as opposed to frusto-conical cup-shaped recesses as required by present claim 1. D4 discloses an energy-absorber which requires intermeshing and mutually supporting layers of sheets in which square or rectangular projections are essential.

Reasons for the Decision

1. The application relates to a structure for absorbing energy by deformation and particularly to a construction which may be used to decelerate an object, such as the head of a vehicle occupant when colliding with interior surfaces of the vehicle. In the application as originally filed two forms of structure were proposed. The first structure comprised a lattice of strands which interconnect to define a plurality of cells. The lattice was supported in a channel and oriented such that the lattice would collapse in order to absorb impact energy. The second structure comprised a plurality of cup-shaped recesses whose walls collapse and absorb energy.

Amendments

2. The broadest apparatus claim in the application as originally filed, claim 1, defined a modular energy absorbing assembly comprising a base and an energy absorbing module associated therewith comprising a structure selected from the group consisting of the first structure, the second structure and combinations thereof. Present claim 1 has been restricted whereby

the option of only the first structure has been deleted and the defined features relate only to the second structure.

2.1 In original claim 1 the second structure was defined as comprising "a plurality of recesses formed within the base, each having a floor and a wall defined within the base, wherein the second structure is oriented such that the floor of each recess is substantially orthogonal to the impacting force and its wall is substantially parallel to the impacting force in order to maximize energy absorption by the wall over a given distance, the wall at least partially collapsing and at least some of the cups becoming at least partially compressed during energy absorption". The definition of the second structure in present claim 1 differs from this original definition as follows:

- the recesses which originally were defined as "formed" with the base and having walls "defined within the base" are now defined as merely "associated" with it. However, the specification in the final line of the present claim that the energy absorber is formed from a single vacuum formed sheet of material inherently requires that the walls of the recesses are formed and defined within the base.

- the walls of the recesses are now defined as "frustoconical". This was originally disclosed in page 4, line 15 in the wording "frusto-conical wall defined within the base".

- the absorber is now defined as being "vacuum thermoformed from a single sheet of thermoplastic

material". This was originally disclosed in page 13, lines 4 to 14 in conjunction with figure 13 and page 12, lines 28, 29.

2.2 In original claim 1 the assembly was specified as comprising at least one energy absorbing module comprising a first structure and/or a second structure. The claim further specified that "a selection from the first and second structures, and combinations thereof affords a user-determinable resistance of the assembly to impact". By comparison, present claim 1 merely specifies that the absorber by virtue of comprising a base and a plurality of collapsible cup-shaped recesses "affords a user determinable resistance to impact". It is clear from the application taken as a whole that the 'user' here is not a vehicle occupant whose head impacts the absorber but the designer of the absorber, cf. page 3, lines 7, 8 "various modules offer different degrees of resistance to impact forces, thereby allowing the designer to customize the assembly … ." Whereas not only this and other wording in the description but also original claim 1 gave the impression that the determination of resistance to impact was achievable by selection of structures, present claim 1 requires this of the second structure alone. This is nevertheless consistent with the skilled person's understanding of the original disclosure because it is implicit that even the single structure provides the designer with various possibilities to adapt the energy absorption by selection of such parameters as diameter, wall thickness and spacing of the recesses.

2.3 Claim 2 is based on original claim 6 but differs in that the original specification of "a channel" has been extended to "one or more channels". This was disclosed originally in claim 6 in combination with page 13, lines 12, 13.

2.4 Claim 5 is based on original claim 11 but differs essentially in that the recesses connecting the cup-shaped recesses are rib-shaped. This was disclosed in original page 13, lines 20, 21.

2.5 Claim 6 is new in as far as it has no basis in the originally filed claims. However, the subject-matter of the claim was disclosed in figures 3b and 13c as originally filed.

2.6 Claims 3 and 4 are identical to original claims 8 and 9 respectively.

3. The board concludes from the foregoing that the content of the claims does not extend beyond that of the application as originally filed (Article 123(2) EPC). Moreover, the board finds the claim to be clear, in particular in defining that the subject-matter comprises only one component.

Novelty

4. D1 relates to an energy absorbing structure for use in an automotive door. The panel comprises at least two energy absorbing sheets having a generally planar base and conically-shaped projections extending away from the base. A sheet of generally planar material is interleaved between and adhered to adjacent energy

absorbing sheets. The energy absorbing sheets are manufactured from a textile impregnated with a resin. The sheets are formed by placing impregnated blanks between two halves of a heated mould which forms the recesses and cures the resin.

5. D2 also relates to an energy absorbing assembly for an automotive door. The absorber comprises a base plate having open ended cylindrical tubes formed thereon. The detailed embodiment is of a one-piece moulded plastic construction of a material such as polypropylene, ABS, nylon or similar. The only disclosure of a method of manufacture is of injection moulding and the assembly includes integrally formed mounting brackets.

6. D4 relates to the construction of an energy absorbing core for an automotive bumper. The core comprises multiple layers of thermoformed plastics sheets each having an array of projections such as truncated pyramids. Adjacent sheets are intermeshed in such a way that the projections interlock and the sheets are sealed together to form a layer. Multiple layers are built up to form an energy-absorbing block. There is no disclosure of frusto-conically shaped recesses.

7. D3 relates to an automotive dashboard having lattice-work energy absorbing inserts moulded within a foam pad. No cup-shaped recesses are disclosed.

8. It follows from the foregoing that the subject-matter of claim 1 is new in comparison with the cited prior art. Since claims 2 to 6 contain all features of claim 1 this applies equally to those claims. The ground on which the application was refused therefore

has been overcome and, in accordance with the appellant's request, the board exercises its discretion pursuant to Article 111(1) EPC and remits the case to the department which was responsible for the decision appealed.

9. Without prejudice to the further procedure the board notes that the application has been searched only in the IPC groups for vehicles (B60R) and vibration dampers or shock absorbers (F16F) although, as also mentioned in the description (original page 12, 3rd paragraph), its scope is considerably broader.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance for further prosecution.

The Registrar: The Chairman:

A. Vottner S. Crane