

**Internal distribution code:**

- (A)  Publication in OJ  
(B)  To Chairmen and Members  
(C)  To Chairmen  
(D)  No distribution

**Datasheet for the decision  
of 2 January 2012**

**Case Number:** T 1504/10 - 3.2.03

**Application Number:** 04731007.3

**Publication Number:** 1625343

**IPC:** F41H 5/04

**Language of the proceedings:** EN

**Title of invention:**

Flexible penetration-resistant package and use thereof

**Applicants:**

Teijin Aramid GmbH  
F.LLI Citterio S.p.A.

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54, 56

**Keyword:**

"Novelty (yes)"  
"Inventive step (yes)"

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 1504/10 - 3.2.03

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.03  
of 2 January 2012

**Appellants:**  
(Applicants)

Teijin Aramid GmbH  
Kasinostrasse 19-21  
D-42103 Wuppertal (DE)

F.LLI Citterio S.p.A.  
Via C. Cattaneo, 10  
I-20052 Monza (Milano) (IT)

**Representative:**

Heimann, Anette  
CPW GmbH  
Patentabteilung  
Kasinostrasse 19-21  
D-42103 Wuppertal (DE)

**Decision under appeal:**

Decision of the Examining Division of the  
European Patent Office posted 12 March 2010  
refusing European patent application  
No. 04731007.3 pursuant to Article 97(2) EPC.

**Composition of the Board:**

**Chairman:** U. Krause  
**Members:** G. Ashley  
K. Garnett

## Summary of Facts and Submissions

I. This appeal arises out of the decision of the examining division to refuse European patent application EP-A-04 731 007 for lack of inventive step.

II. The decision was posted on 12 March 2010. The appellants (applicants) filed notice of appeal on 6 May 2010, paying the appeal fee on the same day; a statement containing the grounds of appeal was filed on 17 June 2010.

III. Requests

The appellants request that the above decision be set aside and a patent be granted on the basis of the set of claims filed with the grounds of appeal as the main request, alternatively as the auxiliary request, together with amended description pages 1 to 11. Should the Board be considering an adverse decision, oral proceedings are requested.

IV. Claims

Claim 1 of the main request reads as follows:

"1. Flexible penetration-resistant package, comprising

(a) a stack of laminates, the laminates consisting of at least one layer of yarns comprising fibers with a strength of at least 900 MPa as per ASTM D-885, wherein the layer of yarns is bound to at least one polymer continuum having a modulus of elasticity in extension of 5 to 1000 MPa as per

ASTM D-882, and wherein the stack has an outer surface facing the side under attack and an inner surface facing away from the side under attack, and

- (b) a layer of compressible material, the layer arranged either on the inner surface of the stack of laminates or at such a position in the stack between the laminates that from this position the number of laminates toward the outer surface of the stack is at least twice the number of laminates toward the inner surface."

Dependent claims 2 to 26 concern preferred embodiments of the package of claim 1. Claim 27 is directed to the use of the claimed package to make protective clothing.

V. Prior Art

The following documents were cited in the examination proceedings:

- D1: GB-A-2 258 389
- D2: GB-A-1 556 245
- D3: US-A-6 138 275
- D4: WO-A-97/21334

VI. Submissions

The examining division was of the opinion that the claimed subject-matter lacked an inventive step in light of D1. The argument of the examining division was that the claimed package differed from D1 only in that the strength and modulus of elasticity are defined for the yarns and polymer continuum respectively. In the

view of the examining division these parameters could be derived by the skilled person by routine trials and hence could not lead to an inventive step.

The appellants agreed that the first layers of D1 may be considered to be laminates in the sense of the application. However the second layers consist of fibres that are not embedded in a polymeric matrix and hence are not laminates within the definition of claim 1. Consequently, the claimed package differs not only by specifying the parameters of the fibres and matrix, but also in that the layer of compressible material is arranged directly adjacent to a laminate or between the laminates.

The appellants submitted that the application addresses the problem of providing a higher degree of ballistic protection, and this is achieved by the positioning of the compressible material. According to the teaching of D1, the ballistic resistance is improved by providing layers of fibres embedded in a matrix followed by layers of woven or knitted fibres; these layers are backed by sheets of polycarbonate with a compressible foam layer which limit the transmission of the impact shock. Since there is no indication in D1 that the claimed arrangement of layers provides the improved ballistic resistance described in the application, the subject-matter of claim 1 has an inventive step.

### **Reasons for the Decision**

1. The appeal is admissible.

2. Novelty (Article 54 EPC)

2.1 Document D1 discloses a flexible, penetration resistant package that is basically made up of three different sections (see pages 7 and 8 and Figure 4):

First Section (6):

This consists of laminates of high tensile strength fibres that are embedded in a plastic matrix.

Second Section (7):

This is made up of interlocking fibres that are not embedded in a matrix, typically Kevlar fibres that are held together by stitching.

Third Section (8) and (9):

This section is actually made up of two parts, namely a layer of one or more sheets of polycarbonate (8) and a layer of one or more sheets of resiliently compressible closed cell foamed plastics (9).

2.2 The examining division considered that the package of claim 1 differed in that the layers of yarns have a given strength, and that the polymer matrix or continuum has a given modulus of elasticity. However, the example given in D1 for the first layer consists of high density polyethylene fibres in an elastomeric matrix of low density polyethylene, which is sold under the trade mark "Spectra" (D1, page 5, second paragraph). This corresponds to one of the materials used in the present application (see page 3, second paragraph and page 4, fourth paragraph of the application). Consequently the first layer of D1 would have the same

properties as the laminates defined in feature (a) of claim 1.

- 2.3 Claim 1 also defines a second layer, namely that of a compressible material, that is arranged either on the inner surface of the stack of laminates or within the stack.

The examining division considered this feature to be disclosed (page 2, third paragraph of the decision), as D1 refers to "multiple layers of ballistic resistant material and impact absorbing material laminated together within an outer fabric casing" (D1, page 6, first part of "mode of carrying out the invention").

However, according to D1 there are layers of interwoven Kevlar fibres (layer 7) and polycarbonate sheets (layer 8) between the stack of laminates (layer 6) and the compressible material (layer 9). This is not inconsistent with the above statement cited by the examining division or indeed the invention of D1, which involves multiple layers of ballistic resistant and impact absorbing layers, albeit not in the arrangement as defined in claim 1.

- 2.4 The claimed subject-matter is thus novel over D1 because the layer of compressible material is in direct contact with the stack of laminates.

### 3. Inventive Step (Article 56 EPC)

- 3.1 The application in question addresses the problem of increasing ballistic resistance of protective material, and in particular the ability of the material to

withstand multiple shots. Since D1 is also concerned with providing a material that can better withstand multiple shots (page 3, last paragraph), it is an appropriate starting point for assessing inventive step.

3.2 As mentioned above, the claimed package differs from that of D1 in that the layer of compressible material is in direct contact with the stack of laminates, and this is said to have the effect of improving resistance to multiple shots (paragraph bridging pages 1 and 2; page 5, paragraph 4).

3.3 Starting from D1 the objective problem to be solved is also to provide a flexible material having a high degree of ballistic protection against multiple shots.

3.4 The starting point for the invention described in D1 is the ballistic resistant material disclosed in D2. This material has three layers (see Figure 3 of D2 and D1, page 3, second paragraph):

- a) a woven layer of Kevlar;
- b) flexible sheets of polycarbonate;
- c) a backing of compressible foamed plastic material.

Such a material is known as a trauma pack and corresponds to the second and third layers of D1 (see above). The inventors of D1 claim that the ballistic effect of the trauma pack is improved if a projectile first makes contact with a layer of high tensile strength fibres embedded in a plastic matrix before encountering the layers of the trauma pack (see D1, paragraph bridging pages 4 and 5).



There is no indication in D1 that the layer of compressible foamed material could be arranged in contact with the layer(s) of fibres embedded in plastic. There is no reason or incentive for the skilled person to rearrange the layers of the trauma pack, as the material of D1 specifically incorporates the arrangement of layers of the trauma pack of D2. In summary, D1 says, take the trauma pack and put another type of layer in front of it.

3.5 The appellants have discovered that the arrangement defined in claim 1 has a beneficial effect on the ballistic properties of the material, which is demonstrated in the application. The ballistic resistance of the claimed material is measured in terms of the  $v_{50}$  value, which is the velocity at which 50% of the projectiles penetrate and 50% lodge in the target, and hence relates to the ability of the material to withstand multiple shots. Table 1 on page 10 of the application shows that  $v_{50}$  values increase with the presence of the compressible foam layer. Table 2 shows that the compressible layer has little effect on the trauma values, which relate to the degree of penetration of the projectile. Hence the claimed material does not necessarily improve penetration resistance but it does improve the resistance to multiple shots.

3.6 The other cited documents, D2, D3 and D4 do not disclose a layer of compressible material in contact with laminates of high tensile strength fibres embedded in a plastic matrix, hence they do not provide a hint to the solution to the objective problem. Consequently inventive step can be recognised.

4. Since the main request is allowable, there is no need to consider the claims of the auxiliary request, or to appoint oral proceedings.

## **Order**

### **For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the examining division with the order to grant a patent on the basis of
  - a) claims 1 to 27, filed as the main request with the grounds of appeal;
  - b) description pages 1 to 11, filed with the grounds of appeal.

The Registrar:

The Chairman:

D. Hampe

U. Krause