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D E C I S I O N
of 11 January 2002

Case Number: T 0728/00 - 3.2.3

Application Number: 93910858.5

**International
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Language of the proceedings: EN

Title of invention:
High density projectile and method of making

Applicant:
Oltrogge, Victor, C.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty (yes)"
"Inventive step - (yes) after amendment"

Decisions cited:
-

Catchword:
-



Case Number: T 0728/00 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 11 January 2002

Appellant: Oltrogge Victor C.
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Decision under appeal: Decision of the Examining Division 2.3.09.015 of
the European Patent Office posted 27 September
1999 corrected on 20 July 2000, refusing European
patent application No. 93 910 858.5 pursuant to
Article 97(1) EPC.

Composition of the Board:

Chairman: C. T. Wilson
Members: F. Brösamle
M. Aúz Castro

Summary of Facts and Submissions

I. With the decision of 27 September 1999, corrected with the decision under Rule 89 EPC dated 20 July 2000, the examining division refused European patent application 93 910 858.5 pursuant to Article 97(1) EPC.

II. Against the above decision of the examining division the applicant-appellant in the following - lodged an appeal on 25 November 1999 paying the fee on the same day and filing the statement of grounds of appeal on 4 February 2000 together with an **Affidavit** of Mr George Krauss essentially dealing with

(D5) US-A-4 784 690

with respect to former claim 5.

III. Following a communication pursuant to Article 11(2) RPBA in which the board set out its provisional opinion in the light of

(D0) US-A-5 088 415 and

(D4) US-A-4 428 295

the appellant filed new claims 1 to 4 together with an amended description and amended drawings.

IV. Claim 1 reads as follows:

"1 A non-toxic projectile of a selected density comprising a composite structure consisting of at least one metal having a density less than that of lead and at least one metal powder having a density greater than

that of lead, said at least one metal powder being uniformly distributed throughout said at least one metal in discrete form and being present in sufficient quantities so that said composite structure has the selected density, and the particles of said at least one metal powder not being alloyed with said at least one metal."

V. With respect to the patentability of the claimed subject-matter the appellant essentially brought forward the following arguments:

- Claim 1 clearly defines a non-toxic projectile which comprises a **composition structure** in that the metal powder(s) is(are) **not alloyed** with the other constituent(s) of the projectile, see originally filed description page 15, lines 35/36 and the above cited Affidavit;
- in contrast to the claimed subject-matter (D5) as understood by a skilled person is based on **an alloy** and not on a **composite structure** in which the particles to be remixed and molded are uniformly distributed in discrete form and remain in their original state;
- under these circumstances the claimed subject-matter is patentably distinguished over (D5); this is also true for (D4);
- (D4) is not based on any metal having a density **less** than that of lead and it would be contrary to the teaching of (D4) to substitute the lead since its objective is to extend the range of the shot; other metals than lead are not suggested in (D4)

so that the suggested flow around particles of a metal powder is restricted to lead;

- the problem of producing a non-toxic projectile is not addressed in (D4); consequently a skilled person would not look to (D4) for a solution to the problem.

VII. The appellant requests to set aside the decision under appeal and to grant a patent on the following basis of the documents filed with letter of 17 December 2001, namely:

- Claims 1 to 4;
- description pages 1, 2, 2a, 3 to 19;
- drawing sheets 1/4 to 4/4 with Figures 1 to 14.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 Claim 1 is based on the features of originally filed claim 31 plus further features derivable for instance from the originally filed description, namely

- a **composite structure** with particles of at least one metal powder **not being alloyed** with at least one metal thereof from page 15, lines 35/36;

- a **selected density** of the projectiles from page 4, lines 9 to 16;
- **uniform distribution** from page 11, line 18, and page 18, line 10, respectively.

From originally filed claim 31 the appellant deleted the following features:

- (a) "high density" and
- (b) to form an article of manufacture "having a density of at least equal to that of lead".

Feature (b) has been replaced by "selected density " clearly derivable from original page 4, lines 9 to 16, dealing with "a target density level".

Feature (a), namely "high density" projectile is not clear in the art. In the present application it is intended to cover density values from 10,50 g/cm³ - see Table V and VII as originally filed - to 16,89 - see Table IV as originally filed. In contrast to these values (D4) covers a range from 13,9 to 18,0 g/cm³, see column 2, lines 17 to 32, in combination with "high density " shot whereas (D5) considers an article of a density of 11 g/cm³ to 14 or 15 g/cm³ - see column 2, lines 31 to 36 - as a "low density " article.

Under these circumstances there is a basis for deleting feature (b) from the independent claim in the interest of clarity.

2.2 Claims 2 and 3 are based on the features of originally filed claims 32 and 33, respectively and the feature of

claim 4 is derivable from originally filed page 15, lines 26 to 36 and Example VIII and IX ("powder metallurgy" clearly being a synonym for "sintered").

2.3 Summarizing, the requirements of Article 123(2) EPC are met.

3. *Novelty*

3.1 Claim 1 defines "a **non-toxic** projectile ... comprising a composite structure ... and the particles ... **not being alloyed** with said at least one metal" (stress added).

3.2 (D4) can be seen as the closest prior art which is clearly based on **lead** since no metal other than lead is disclosed for forming the metal powder flowable under compaction to serve as a binder. The **toxicity** of lead is well known - see opening of the original and amended description - so that the condition of claim 1, namely a **non-toxic** projectile is not fulfilled by (D4) which cannot therefore be novelty destroying with respect to the subject-matter of claim 1.

3.3 This is also true for (D5) which as understood by a skilled person discloses **an alloy** rather than a **composite structure** as claimed, see title of (D5) and column 1, lines 25 to 29, and lines 53 to 55, as well as column 4, lines 14 to 15, of (D5).

In the Affidavit of Mr George Krauss, see page 4, second paragraph, to page 9, line 1, an expert in the technical field of metallurgical and materials engineering, a detailed account of why (D5) does not

disclose a **composite structure**, but rather an alloy of metals, has been given.

- 3.4 The expert emphasized that even though the term "composite structure" may not be employed in the application for which a patent is sought all compositions described therein were directed to two or more entirely different metals with the high melting point metal (higher density metal) dispersed as **discrete particles** with any of the low melting point matrix metal or metals (lower density metal(s)). The diffusivity of all of the constituents at the low melting points would be so low that atomic interdiffusion between the low and high melting point metals **will not occur**. Even though the low melting point metal(s) are molten they will not interdiffuse with for example tungsten or other high melting point metal(s). Contrary to the findings of the first instance even any "slight alloying" under the above conditions would not occur.

The constituents of (D5), essentially tungsten, iron and nickel, treated at temperatures dealt with in column 2, lines 53 to 56, columns 3, lines 26 to 28, and column 4, lines 37/38, namely in the range between 900 to 1400 °C, necessarily form an alloy - see Affidavit page 5, second paragraph - since the constituents were heated enough to interdiffuse with tungsten.

- 3.5 The expert goes on to define a "composite" by reference to a handbook as constituents which are **insoluble** or are **indissolved in each other** thereby clearly

questioning the relevance of (D5) **being based on an alloy**. Finally the expert dealt with binary and ternary phase diagrams of the main constituents of (D5), namely tungsten, iron and nickel, and dealt with equilibrium conditions finally coming to the conclusion that (D5) and its heat treatment would cause equilibrium to be at last approached and would result **in significant alloying** - in contrast to the subject-matter of claim 1 which is a **composite** of two or more parts, one constituent being **uniformly** distributed throughout the other(s) and remaining in discrete form without developing an integrated microstructure with the other(s).

3.6 The Board has no grounds for questioning the arguments advanced in the Affidavit of Mr George Krauss who convincingly explains the differences between the subject-matters of claim 1 and (D5) resulting in that (D5) is also not considered by the Board to be novelty destroying within the meaning of Article 54 EPC.

4. *Inventive step*

4.1 (D0) dealt with in the impugned decision and (D4) **are based on lead** and therefore lead away from the subject-matter of claim 1 which is restricted to non-toxic projectiles.

4.2 The basic object of the invention, see page 2a, first paragraph of the amended description, is to provide for a novel and improved article of manufacture composed of metals and to provide a method of forming the same **over a wide range of densities** to achieve a target density (stress added).

The solution to this object is laid down in claim 1 which avoids the use of lead and its influence on **toxicity** and **density** of the projectile, clearly defining leadfree, non-toxic projectiles. This enables the manufacture of projectiles which have a **lower, equal or higher density** compared to lead so that a producer is free to provide projectiles for a wide range of applications-contrary to (D0) and (D4). The aspects of creating a projectile "**of a selected density**" and of non-toxicity are not solved with the teachings derivable from (D0) and (D4) so that they are not helpful for a skilled person looking for a solution of the above object of the invention even if considered in combination since (D4) is restricted to lead, (see its objective), namely to extend the range of the shot, and does not envisage the use of any metal(s) other than lead to achieve a flow around particles of a metal powder and since (D0) though being aware of toxicity problems of lead, nevertheless uses lead, however encapsulating it with a polymer - contrary to the subject-matter of claim 1.

4.3 In above remarks 3.3 to 3.6 it is set out that (D5) discloses an **alloy of metals** and leads away from the claimed invention. Since claim 1 clearly excludes the existence of an alloy of two or more metals (D5) is also not helpful for a skilled person attempting to achieve a non-toxic projectile comprising a **composite structure**. A skilled person would additionally not envisage any combination of (D5) with further pieces of prior art so that no further considerations are necessary with respect to the issue of inventive step.

4.4 Summarising the above considerations, (D0), (D4) and

(D5), even in combination, would not lead the person skilled in the art, in an obvious manner, to the subject-matter of claim 1, Article 56 EPC. Consequently claim 1 is allowable.

4.5 Claims 2 to 4 as dependent claims are likewise allowable since they concern further embodiments of the subject-matter of claim 1.

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 with the order to grant a patent on the basis of:

Claims: 1 to 4 submitted with letter of 17 December 2001;

Description: pages 1, 2, 2a, 3 to 19 submitted with letter of 17 December 2001;

Drawings: sheets 1/4 to 4/4 submitted with letter of 17 December 2001.

The Registrar:

The Chairman:

A. Counillon

C. T. Wilson