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D E C I S I O N
of 13 January 2000

Case Number: T 0154/97 - 3.2.3

Application Number: 87401367.5

Publication Number: 0250322

IPC: B22F 3/12

Language of the proceedings: EN

Title of invention:

Method for producing an elongated sintered article

Patentee:

Sumitomo Electric Industries Limited

Opponent:

Vacuumschmelze GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step - obvious combination of known features"

Decisions cited:

-

Catchword:

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Boards of Appeal

Chambres de recours

Case Number: T 0154/97 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 13 January 2000

Appellant: Sumitomo Electric Industries Limited
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office dated 8 November 1996,
posted on 9 January 1997, revoking European
patent No. 0 250 322 pursuant to Article 102(1)
EPC.

Composition of the Board:

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

Summary of Facts and Submissions

I. In the oral proceedings of 8 November 1996 the opposition division revoked European patent No. 0 250 322, the following documents inter alia having being cited:

(D1) US-A-3 325 888 and

(D2) EP-B1-073 128.

The written decision was posted on 9 January 1997.

II. Against the above decision the proprietor of the patent - appellant in the following - lodged an appeal on 7 February 1997 paying the fee on the same day and filing the statement of grounds of appeal on 9 May 1997.

III. Following the board's communication pursuant to Article 11(2) RPBA oral proceedings were held on 13 January 2000 in which the appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of claims 1 to 20 filed on 7 December 1999 (**main request**), by way of auxiliary request on the basis of claims 1 to 20 filed as **first auxiliary request** in the oral proceedings, by way of further auxiliary request on the basis of claims 1 to 20 filed as **second auxiliary request** in the oral proceedings.

IV. Claims 1 of the main, first and second auxiliary request read as follows:

main request:

"1. Method for producing an elongated sintered article, whose longitudinal dimension is longer than 100 times a cross sectional dimension thereof, characterised by the steps including mixing unsintered ceramics powders at least one thereof having a particle size of less than one micron, filling the mixture of powders containing no organic binder in a metal pipe, carrying out plastic deformation of the powder filled pipe section, and then heating the plastically deformed pipe so as to sinter the mixture of powders within the pipe at a temperature which is higher than its sintering temperature."

first auxiliary request:

"1. Method for producing an elongated sintered article, whose longitudinal dimension is longer than 100 times a cross sectional dimension thereof, characterised by the steps including filling unsintered ceramics powder containing no organic binder in a metal pipe, carrying out plastic deformation of the ceramics powder filled pipe so as to reduce the pipe section, and then heating the plastically deformed pipe so as to sinter the powder material within the pipe at a temperature which is higher than its sintering temperature."

second auxiliary request:

"1. Method for producing an elongated sintered article, whose longitudinal dimension is longer than 100 times a cross sectional dimension thereof, characterised by the steps including mixing unsintered Si or W carbide powders, filling the mixture of powders containing no organic binder in a metal pipe, carrying out plastic deformation of the powder filled pipe so as to reduce the pipe section, and then heating the plastically deformed pipe so as to sinter the mixture of powders within the pipe at a temperature which is higher than its sintering temperature."

V. The opponent - respondent in the following - requested that the appeal be dismissed.

VI. In support of their above requests the parties essentially brought forward the following arguments:

(a) appellant

main request

- the particle size "of less than one micron" of claim 1 can be derived from Examples 2, 6, 7, 8 and 9 of the patent specification since in these examples an average particle size of 0.8 and 0.5 micrometer is disclosed;

first auxiliary request

- in claim 1 it is prescribed that the pipe is sintered at a temperature "which is higher than

its sintering temperature" so that this claim is formally in order;

- (D1) and (D2) both relate to the technical field of electronics, namely to superconductors, whereas claim 1 relates to mechanical applications in which hardness and enhanced cohesion of the elongated sintered article have priority;
- contrary to claim 1 (D1) teaches a twofold heat treatment i.e. presintering and final sintering while (D2) excludes the application of heat so that even a combination of both documents cannot directly lead to the teaching of claim 1;
- the final heating step according to claim 1 safeguards tenacity of the sintered article and is simpler to be carried out than a twofold heating according to (D1);
- since a heat treatment is not envisaged in (D2) there existed a prejudice to be overcome by the claimed invention;

second auxiliary request

- claim 1 of this request is restricted to carbides of Si and W which restriction fully meets the requirements of Articles 123(2) and (3) EPC;
- the claimed carbides achieve hardness of the sintered article;
- (D1) and (D2) singly or in combination do not

render obvious the subject-matter of claim 1 since they are not based on the achievement of a higher hardness of the article but on a different problem to be solved, namely enhanced electrical conductivity of the elongated sintered article.

(b) respondent

main request

- the examples laid down in the patent specification do not disclose a range of particle sizes and the upper limit of one micron thereof is also not derivable from Examples 2, 6, 7, 8 and 9 of the patent specification; since for instance Example 2 is based on 20 wt% of a metal, namely Co, this example is anyhow contrary to claim 1 prescribing ceramics powders;

first auxiliary request

- the wording of claim 1 does not restrict the article to non-electrical applications so that (D1) and (D2) are relevant documents at least for the issue of inventive step;
- ductility of the sintered article is not defined in the patent specification so that this property cannot serve as a prejudice against the consideration of (D1) and (D2) and cannot be seen as a crucial issue in the patent specification; stressing the hardness of the sintered article of claim 1 from the side of the appellant is nothing other than an attempt to create a non-existing

technological barrier towards the teachings of (D1) and (D2);

- from (D2) the interrelationship between ductility/hardness and any heat treatment of the powder/sintered article was clearly known to a skilled person so that it is a simple adjustment to the wished properties of the final article whether or not a heat treatment is envisaged in a specific case;
- (D1) does not only teach a twofold heat treatment but according to column 1, lines 69 to 71, also a single heat treatment; what is missing in (D1) is the feature that the powders to be sintered are ceramics powders;
- the wording of claim 1 "including mixing unsintered ceramics powders..." does not limit the claim to ceramic powders only, metallic powders could also be used; if at all novel over (D1) claim 1 is not based on an inventive step since ceramic powders per se are clearly known from (D2), for instance Nb (N,C) or NbC;

second auxiliary request

- claim 1 is an aliud with respect to all previous requests of the appellant; again claim 1 is not restricted to mechanical applications;
- the restriction of claim 1 to carbides of Si or W is arbitrary and it cannot be seen which problem should be solved with the specific ceramics powder

of claim 1 so that the existence of an inventive step has to be denied.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. *Amendments*

2.1 Claim 1 is based on the feature that the particle size of the unsintered ceramics powder is "less than one micron".

2.2 It has to be observed that this technical information cannot unambiguously be derived from Examples 2, 6, 7, 8 and 9 of EP-B1-0 250 322 in such generality since whereas specific particle sizes of 0.5 or 0.8 micron are disclosed, this is always in combination with a specific powder composition. Example 2 for instance, contrary to claim 1, contains a metal powder, see cobalt content of 20 wt% of Example 2.

2.3 From EP-B1-0 250 322 there is moreover no **range** of particle sizes disclosed, rather two specific particle sizes according to the above examples. The information "less than one micron" is therefore seen as an unallowable generalization of specific values into a range of values.

2.4 Under these circumstances "less than one micron" of

claim 1 constitutes an extension of the original disclosure within the meaning of Articles 123(2) and 100(c) EPC so that this claim is not admissible.

First auxiliary request

3. *Novelty*

(D1) is restricted to metal powders of Nb and Sn and the application of ceramics powders is not unambiguously derivable from this document. The subject-matter of claim 1 is therefore novel since not all of its features are derivable from this document.

It should be added that in (D2) a heating step is missing so that this document is also not novelty-destroying with respect to the subject-matter of claim 1.

4. *Inventive step*

4.1 Claim 1 has to be interpreted as a method claim whose claimed article, namely an elongate sintered article is not restricted to any specific application such as mechanical, optical, electronic or electrical.

4.2 The properties "hardness" and "ductility" are moreover not specified in claim 1 so that it provides no basis for arguing that the method of claim 1 leads to a harder or less ductile or more coherent elongated article than the prior art to be considered. The preconditions for the existence of a technical prejudice do not therefore exist.

4.3 From (D1), see column 1, line 69 to column 2, line 5, it is known to reduce a presintered pellet to powder form and then fill a ductile metal tube with this powder; the filled tube is then plastically deformed and heated at temperatures of 950 to 1100°C.

Irrespective of the history of the above powder whether presintered or not the starting point is a powder; since a powder per se has to be seen as "unsintered" there appears to be no difference with respect to the method steps laid down in claim 1. However, (D1) does not relate to ceramics but to metallic powders.

4.4 The wording of claim 1, namely "including filling unsintered ceramics powder..." does, however, **not restrict** claim 1 to **ceramics** powders only, but rather offers the possibility to add powders of a different nature e.g. metal powders as in (D1).

4.5 It has to be assessed whether or not inventive endeavour was necessary for a skilled person to extend the teaching of (D1) to ceramics powders to achieve the subject-matter of claim 1.

4.6 Since claim 1 is not restricted to properties such as hardness/ductility/cohesion, these properties cannot serve as a basis for creating a distinction between the claimed subject-matter and (D1) and/or (D2).

4.7 From (D2) the application of ceramics powders, in particular carbides or nitrides of niobium, as the powder used for sintering an elongate article is clearly known; from (D2) the interrelationship between hardness/ductility and any heat treatment of a powder

or sintered article is moreover known by the information that heat treatment leads to a loss of ductility or in other words to an increase in cohesion and hardness.

4.8 (D1) and (D2) have therefore in common the technical field of producing sintered articles from powders and the knowledge of how the properties of a sintered article can be influenced by heat treatment. Under these circumstances the board cannot see any obstacle to combining the teachings of (D1) and (D2) to achieve the method of claim 1 since the only step to be carried out by a skilled person is to replace totally or in part the metal powder according to (D1) by ceramic powders.

4.9 Summarizing, claim 1 does not define non-obvious subject-matter within the meaning of Article 56 EPC so that this claim is not valid.

4.10 Appellant's argument that (D1) is restricted to presintering **and** final sintering is not supported by the facts since (D1) deals with an example which is based on a single heat treatment, see above remarks 4.2 and 4.3.

Since (D1) has to be seen as a document which teaches a single heat treatment it is evident that the method according to claim 1 is not simpler to be carried out with respect to the teaching of (D1).

Finally it has to be observed that it is not justified to derive from (D2) a technical prejudice against the application of heat since it is simply an adjustment to

wished properties whether in any specific case ductility or hardness and cohesion have priority and since the means to achieve the one or the other property are clearly derivable from (D2), namely the application or non-application of heat.

Second auxiliary request

5. Claim 1 of this request has been restricted to carbides of Si or W as ceramics powders. Since this claim 1 is narrower than claim 1 of the first auxiliary request its subject-matter is novel. It is clearly admitted that claim 1 is not open to an objection under Article 123(2) and (3) EPC so that the board is insofar in agreement with the appellant.

The crucial issue to be decided is inventive step i.e. the question whether or not a specific type of ceramic powder can render the subject-matter of claim 1 non-obvious.

In the technical field in which hardness of a sintered article prevails, e.g. cutting tools, it is known to make use of carbides, also known as "hard metals".

The restriction of claim 1 to carbides has therefore to be seen as a feature forming part of the normal considerations of a skilled person in the technical field of powder metallurgy so that claim 1 is not the result of an inventive step, but rather the result of normal technical usage. Claim 1 does not therefore meet the requirements of Articles 56 and 100(a) EPC and is not valid.

The board supports the findings of the respondent that choosing specifically the carbides of Si or W as ceramics powders is arbitrary and that the appellant did not bring forward convincing arguments with respect to the problem to be solved by the application of these carbides. Under these circumstances it has not to be decided whether or not the subject-matter of claim 1 is an aliud with respect to former requests and whether or not carbides were/could be searched by the EPO or the respondent.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

N. Maslin

C. T. Wilson