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D E C I S I O N
of 8 March 2005

Case Number: T 1097/03 - 3.2.7

Application Number: 94908673.0

Publication Number: 0682577

IPC: C23C 4/06

Language of the proceedings: EN

Title of invention:

Spray powder for hardfacing and part with hardfacing

Applicant:

KENNAMETAL INC.

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step - (yes after amendment)"

Decisions cited:

-

Catchword:

-



Case Number: T 1097/03 - 3.2.7

D E C I S I O N
of the Technical Board of Appeal 3.2.7
of 8 March 2005

Appellant:

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Representative:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 13 May 2003
refusing European application No. 94908673.0
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: C. Holtz
Members: P. A. O'Reilly
H. E. Felgenhauer

Summary of Facts and Submissions

I. The European application No. 94 908 673.0 was refused by the Examining Division for lack of inventive step.

II. The appellant filed an appeal against the decision of the Examining Division.

III. The prior art documents mentioned in the present decision are:

D2: JP-A-50 45708

D4: "Electroarc processes for the surfacing of composite alloys using refractory compounds" Yu et al. Conference, Iznosostoikie Naplavochnye Mater. Osn. Tugoplavkikh Soedin. (1977), 74-5. Editor: Samsonov, G. V. Publisher: Izd. Naukova Dumka, Kiev, USSR.

D5: WO-A-80/02569

D7: US-A-4 526 618

IV. The Examining Division decided upon claims which corresponded to the claims of the main request as filed with the appeal grounds. The Examining Division considered that the subject-matter of claim 1 of the request did not involve an inventive step in view of D2 and D7 or D4 and D7 and that the subject-matter of claim 10 did not involve an inventive step in view of D4.

V. In a communication accompanying an invitation to oral proceedings the Board set out their provisional opinion. In the provisional opinion the Board considered that the subject-matter of the independent claims of the main request appeared to lack an inventive step at least considering D2 and D7.

VI. Before the oral proceedings the appellant filed two auxiliary requests. During the oral proceedings the Board indicated their view that claim 1 of the main request did not involve an inventive step whereas the independent claims of the first auxiliary request did involve an inventive step. The appellant thereafter made the first auxiliary request into his single request.

VII. The single final request of the appellant is that the decision under appeal be set aside and a patent be granted on the basis of claims 1 - 6 filed with letter of 13 February 2005 entitled first auxiliary request; description pages 1, 2, 3, 6, 10-16 as originally filed, pages 4, 5 as filed with letter of 13 February 2005, page 8 as filed on 8 March 2005, and pages 7, 9, 17 and 18 as filed with letter of 15 January 2002.

VIII. The independent claims of the single request read as follows:

"1. A sintered spray powder for application as a corrosion-resistant hardfacing on a substrate, the sintered powder comprising:

WC in an amount between 75 and 90 weight percent of the sintered powder;

Mo in an amount of between 1.6 and 4.5 weight percent of the sintered powder;
Fe in an amount of between 0.4 and 1.43 weight percent of the sintered powder;
C, other than C combined in WC, in an amount of between 0 and 0.03 weight percent of the sintered powder;
Cr in an amount of between 1.3 and 4.4 weight percent of the sintered powder;
Mn in an amount of between 0 and 0.25 weight percent of the sintered powder;
Co in an amount of between 0 and 0.63 weight percent of the sintered powder;
Si in an amount of between 0 and 0.25 weight percent of the sintered powder;
W, other than W combined in WC, in an amount of between 0.37 and 1.32 weight percent of the sintered powder;
and
the balance nickel, wherein the nickel is present in an amount between 5.2 and 15.7 weight percent."

"5. A part having a surface with a hardfacing on the surface, the hardfacing being formed from sintered spray powder and comprising:

WC in an amount between 75 and 90 weight percent of the sintered powder;
Mo in an amount of between 1.6 and 4.5 weight percent of the sintered powder;
Fe in an amount of between 0.4 and 1.43 weight percent of the sintered powder;
C, other than C combined in WC, in an amount of between 0 and 0.03 weight percent of the sintered powder;
Cr in an amount of between 1.3 and 4.4 weight percent of the sintered powder;

Mn in an amount of between 0 and 0.25 weight percent of the sintered powder;
Co in an amount of between 0 and 0.63 weight percent of the sintered powder;
Si in an amount of between 0 and 0.25 weight percent of the sintered powder;
W, other than W combined in WC, in an amount of between 0.37 and 1.32 weight percent of the sintered powder;
and
the balance nickel, wherein the nickel is present in an amount between 5.2 and 15.7 weight percent."

IX. With regard to the single request the appellant argued essentially as follows:

The skilled person starting from D2 would not consider using one of the alloys manufactured according to D2 for a spray powder as this would mean destroying one of the alloys disclosed as a finished product by grinding it up to form a powder. Also, there is nothing in the cited documents to incite the skilled person to change the composition of D2 and in particular to change the composition in the direction of the ranges specified in the independent claims. As is visible in Table 1 of D2 even small changes in the composition, for instance the amount of molybdenum, can change appreciatively the properties of the alloy.

Reasons for the Decision

1. *Compliance with Articles 84 and 123(2) EPC*

1.1 The Board has convinced itself that the amended claims 1 to 6 satisfy the requirements of Articles 84 and 123(2) EPC.

2. *Inventive step*

2.1 The Board considers that D2 represents the closest prior art document.

The subject-matter of claim 1 is distinguished from the disclosure of D2 in that

(a) the composition is in the form of a sintered spray powder for application as a hardfacing on a substrate,

(b) iron is present in an amount between 0.4 and 1.43 weight percent,

(c) tungsten, other than tungsten combined with tungsten carbide, is present in an amount between 0.37 and 1.32 weight percent.

The subject-matter of claim 5 is similarly distinguished from D2 except that the distinguishing feature (a) concerns "a part having a surface with a hardfacing on the surface, the hardfacing being formed from sintered spray powder".

2.2 In the opinion of the Board the provision of a composition and a surface according to feature (a) of each claim respectively would be obvious for the person skilled in the art. D2 is generally related to alloys. The purpose of the alloy is to provide an improved wear-resistant and corrosion-resistant material. One

particular field of application that is mentioned is rings for mechanical seals. The application in suit is concerned with wear and corrosion resistant surface layers and mentions as technical field wetted parts in slurry pumps and drilling parts (cf. page 6, lines 1 to 8). The technical field and purpose of D2 is thus similar to that of the application in suit. The only embodiment mentioned in D2 produces an alloy in a solid form, i.e. it is not specifically referred to as a sintered spray powder for the formation of surfaces. The Board notes however that the properties of the alloy that are desired, i.e. wear and corrosion resistance, are surface properties of a part. The Board considers therefore that the skilled person would employ the alloy according to D2 also as a surface coating. It is well known that powder spraying is used to form surface coatings as is acknowledged in application in suit. The Board concludes therefore that the skilled person would use this known method for forming surface coatings and thus arrive at the distinguishing feature (a) of each of claims 1 and 5.

- 2.3 Features (b) and (c) represent changes in the composition of the alloy from that disclosed in D2. In particular both iron and free tungsten must be present.

The Board is unable to identify a reason for the skilled person to alter the composition in the specified way. Indeed, some of the prior art documents seem to speak against such a change. In D5 iron is mentioned as an undesired impurity which has negative affects on the toughness, cf. page 3, lines 3 to 4 and page 20, lines 8 to 12. Furthermore in D5, free tungsten is mentioned as something which appears

between the binder as prepared and the binder as finally produced, i.e. it was not an intended constituent, cf. page 20, lines 8 to 11. Also, in D7 the teaching is towards boron to improve abrasion resistance. The Board is also aware, as pointed out by the appellant, that even small changes in composition may have large effects in the properties of alloys.

It can therefore be seen that there may be many paths leading from D2 and that there is no indication that the path which leads to the features (b) and (c) is the one which the skilled person would take. On the contrary, that path has impediments which could cause the skilled person to turn back before reaching the invention as claimed. The Board is thus satisfied that it was not obvious for the skilled person to provide features (b) and (c) in an alloy known from D2.

- 2.4 Therefore, the subject-matter of claims 1 and 5 of the single request involves an inventive step in the sense of Article 56 EPC.

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 the patent with the following documents:

claims: 1 - 6 filed with letter of 13 February 2005 titled first auxiliary request;

description: pages 1, 2, 3, 6, 10 to 16 as originally filed,
pages 4 and 5 as filed with letter of 13 February 2005,
page 8 as filed on 8 March 2005,
pages 7, 9, 17 and 18 as filed with letter of 15 January 2002.

The Registrar:

The Chairman:

G. Röhn

C. Holtz