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**Datasheet for the decision
of 18 July 2024**

Case Number: T 0503/23 - 3.3.05

Application Number: 17187909.1

Publication Number: 3287540

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C22C38/54, C21C7/00

Language of the proceedings: EN

Title of invention:

CR-MN-N AUSTENITIC HEAT-RESISTANT STEEL AND A METHOD FOR
MANUFACTURING THE SAME

Patent Proprietor:

Tianjin New Wei San Industrial Co., Ltd.

Opponent:

LKGlobal UK Ltd.

Headword:

Cr-Mn-N steel/Tianjin

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - (yes)

Decisions cited:

Catchword:



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Chambres de recours

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Case Number: T 0503/23 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 18 July 2024

Appellant: LKGlobal UK Ltd.
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Respondent: Tianjin New Wei San Industrial Co., Ltd.
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 23 January 2023 rejecting the opposition filed against European patent No. 3287540 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	E. Bendl
Members:	G. Glod
	O. Loizou

Summary of Facts and Submissions

I. The opponent's (appellant's) appeal lies from the opposition division's decision rejecting the opposition to European patent No. 3287540.

II. The following documents cited in the impugned decision are of relevance here.

D1: EP 2 980 253 A1

D6: US 5 019 332 A

D7: US 2015/0034037 A1

D11: Comparative experiments 17 August 2022

D12: ASM Specialty Handbook, Heat-Resistant Materials, 1997, pages 3 to 12.

III. Claim 1 of what is now the main request reads as follows.

" 1. The Cr-Mn-N austenitic heat-resistant steel, comprising, in weight percentage:

- carbon 0.30% to 0.45%,*
- silicon 0.80% to 1.50%,*
- manganese 3.00% to 4.80%,*
- phosphorus less than 0.02%,*
- sulphur less than 0.02%,*
- chromium 23.00% to 26.00%,*
- nickel 6.50 to 7.00%,*
- molybdenum less than 0.20%,*
- niobium less than 0.30%,*
- tungsten less than 0.40%,*
- vanadium less than 0.12%,*
- nitrogen 0.40 to 0.50%,*
- zirconium less than 0.08%,*
- cobalt less than 0.08%,*

- *yttrium* *less than 0.08%,*
- *boron* *less than 0.10%,*
- *with the balance iron."*

The method claims 2 and 3 directly or indirectly incorporate the subject-matter of claim 1.

- IV. The appellant's arguments, where relevant to this decision, can be summarised as follows.

The requirements of Article 56 EPC were not met.

The features differentiating the subject-matter of claim 1 from alloy 23-8N shown in Table I of D6 were taught in D7 (paragraph [0062]). The ranges claimed for Mo and V could not be considered different from the values explicitly disclosed in D6, given the level of experimental accuracy. The subject-matter of claim 1 was obvious in view of D6 in combination with D7.

D1 was another suitable starting point for the question of inventive step. The austenitic steel alloy of claim 1 of D1 only differed from the claimed steel in respect of the amount of tungsten. It would have been obvious for a skilled person to seek to use less tungsten, which is expensive, in the alloy mixture of D1, thereby arriving at the claimed subject-matter.

- V. The respondent's arguments are reflected in the Reasons given below.

- VI. At the end of oral proceedings of 18 July 2024 the requests were as follows.

The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the patent be maintained in amended form on the basis of what is now the main request, previously filed as auxiliary request 1 and submitted on 19 August 2021; or in the alternative on the basis of one of auxiliary requests 2 to 11. Auxiliary requests 2 and 3 had been submitted on 19 August 2021, auxiliary requests 4 and 5 on 18 August 2022 and auxiliary requests 6 to 11 with the reply to the appeal.

Reasons for the Decision

1. Article 56 EPC
 - 1.1 The respondent contested the admissibility of D6 and D7. However, the boards of appeal cannot exclude on appeal submissions correctly admitted by the opposition division in exercising its discretion (Case Law of the Boards of Appeal of the EPO, 10th edition, 2022, V.A. 3.4.4). There is no reason to acknowledge that the opposition division would have exercised its discretion incorrectly.
 - 1.2 The invention relates to a Cr-Mn-N austenitic heat-resistant steel.
 - 1.3 The appellant considered D6, and in particular austenitic alloy 23-8N (Table I), to be a good starting point for the question of inventive step.
 - 1.4 The problem to be solved by the present patent is to provide a Cr-Mn-N austenitic heat-resistant steel with

a high strength at high temperatures, a high thermal conductivity and a low thermal expansion coefficient (see paragraph [0005] of the patent).

- 1.5 It is proposed to solve the problem by a Cr-Mn-N austenitic heat-resistant steel according to claim 1 characterised at least in that it comprises 0.80% to 1.50 wt% silicon, 23 to 26 wt% chromium, 6.50 to 7.00 wt% nickel and 0.40 to 0.50 wt% nitrogen.
- 1.6 There is no data showing that the problem is not successfully solved. Rather the contrary: D12 (page 6, middle column, penultimate paragraph) indicates that the heat resistance of alloy 23-8N is poor, and strength is low at high temperatures. Therefore, the board sees no need to define the problem in less ambitious terms.
- 1.7 The proposed solution is not obvious. D7 does not relate to austenitic steel (paragraph [0064]), or to steel comprising 0.30 to 0.45 wt% carbon (see claim 1 and paragraph [0062]). There is no reason why the skilled person trying to solve the posed problem would turn to D7, and even if they did D7 does not teach a nickel content of 6.50 to 7.00 wt%.

The plate sample 23-8N described in paragraph [0062] of D7 is a comparative example. Even if the skilled person realised that the austenitic alloy 23-8N of D6 could vary within the ranges given in D7, there is still no teaching that the alloy 23-8N as disclosed in D7 would make it possible to solve the posed problem.

Furthermore, and importantly, the alloy 23-8N of D7 does not contain nitrogen, which is important for austenite formation, in the claimed range (0.40% to 0.50%). The question of whether the amounts of vanadium

and molybdenum disclosed in D6 (0.12% and 0.21% respectively) anticipate the ranges of vanadium and molybdenum present in claim 1 (less than 0.12% and less than 0.20% respectively) is therefore not relevant and can be left unanswered.

- 1.8 The subject-matter of claim 1 and of claims 2 and 3, which directly or indirectly refer to claim 1, is not obvious in view of D6 in combination with D7.
- 1.9 D1 was another starting point used by the appellant. D1 discloses in claim 1 an austenitic stainless-steel alloy comprising, by weight, about 22% to about 28% chromium; about 3.5% to about 6.5% nickel; about 1% to about 6% manganese; about 0.5% to about 2.5% silicon; about 0.5% to about 1.5% tungsten; about 0.2% to about 0.8% molybdenum; about 0.2% to about 0.8% niobium; about 0.3% to about 0.6% carbon; about 0.2% to about 0.8% nitrogen; and a balance of iron.
- 1.10 The problem to be solved by the present patent has been outlined under item 1.4 above.
- 1.11 It is proposed to solve the problem by a Cr-Mn-N austenitic heat-resistant steel according to claim 1 characterised at least in that it comprises less than 0.2 wt% molybdenum and less than 0.4 wt% tungsten.
- 1.12 There is no data showing that the problem is not successfully solved. Rather the contrary: D11 indicates improved thermal and mechanical properties of the claimed composition compared to a composition according to D1. Therefore, the board sees no need to define the problem in less ambitious terms.

- 1.13 The proposed solution is not obvious. There is no particular reason, apart from hindsight, for the skilled person to reduce both tungsten and molybdenum in the composition of D1, since both are clearly taught as beneficial to corrosion resistance (paragraph [0028] of D1). If one of these elements were to be decreased, then the other would have to be increased. Tungsten is also included for hot workability of the steel. A reduction of its amount below the lower limit taught in D1 (0.5%) would therefore clearly contradict the teaching of D1.
- 1.14 The subject-matter of claim 1 and of claims 2 and 3, which directly or indirectly refer to claim 1, is not obvious in view of D1 either.
- 1.15 The requirements of Article 56 EPC are met.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent in amended form on the basis of the claims of the main request previously filed as auxiliary request 1 with the submissions dated 19 August 2021 and a description to be adapted.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated