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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HIROSHI AKAMIZU, SHUSHI IKEDA, KOICHI MAKII,
YOICHI MUKAI, and KOICHI SUGIMOTO

Appeal 2011-005556
Application 11/030,100
Technology Center 1700

Before CHUNG K. PAK, BEVERLY A. FRANKLIN, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

PAK, *Administrative Patent Judge*

DECISION ON APPEAL

The named inventors (hereinafter “Appellants”)¹ appeal under 35 U.S.C. § 134(a) from the Examiner’s refusal to allow claims 1, 5 through 8 and 11 through 14. Claims 9 and 10, the other claims pending in the above identified application, stand withdrawn from consideration. We have jurisdiction under 35 U.S.C. § 6(b).

¹ Appellants identify the real party in interest as “Kabushiki Kaisha Kobe Seiko Sho (Kobe Steel, Ltd) of Japan.” (*See* Appeal Brief filed October 12, 2010 (“App. Br.”) at 2.

STATEMENT OF THE CASE

The subject matter on appeal is directed to “[a]n ultra-high strength cold rolled steel sheet having excellent hydrogen embrittlement resistance.” (See Spec. 1, ll. 3-5.) In order to obtain such ultra-high strength cold rolled steel sheet, the Specification, at page 5, states that:

[T]he ultra-high strength steel sheet of the present invention (ultra-high strength steel sheet having tensile strength of 1180 MPa or higher, high capability to elongate and high hydrogen embrittlement resistance) has such a constitution as 0.06 to 0.6% of C, 0.5 to 3% of Si+Al, 0.5 to 3% of Mn, 0.15% or lower of P and 0.02% or lower of S are included in terms of mass percentage, residual austenite structure occupies 3% or higher and bainitic ferrite structure occupies 30% or higher in an areal ratio to the entire structure, wherein a mean grain size of bainite blocks is smaller than 20 μm as determined by comparing observations of the same region of the bainitic ferrite structure by EBSD (electron back scatter diffraction pattern) and SEM, and preferably area occupied by polygonal ferrite structure is in a range from 5% to 50% in terms of an areal ratio to the entire structure.

According to page 10, lines 15-25, of the Specification, the mean grain size of bainite blocks smaller than 20 μm imparts excellent hydrogen embrittlement resistance. This ultra-high strength cold rolled steel sheet having excellent hydrogen embrittlement resistance is said to be produced by keeping a steel containing the above ingredients “at a temperature in a range of A_3 point to $(A_3+20^\circ\text{C})$ for 10 to 600 seconds, then cooled at a mean cooling rate of 3°C/s or more to a temperature not lower than M_s point

and not higher than Bs point, and is kept in this temperature range for 1 to 1800 seconds.” (Spec. 6, ll. 8-13 and 24, ll. 12-17.) The heat treatment temperature in a range of A3 point to (A3+20°C) is “preferably...in a range from 650 to 900°C.” (Spec. 23-24, specifically Spec. 24, ll. 3-5.) The mean cooling rate, for example, can be 30°C/s to cool the heat treated steel to “about 500 to 600°C.” (Spec. 26, ll. 8-15.)

Details of the appealed subject matter are recited in illustrative independent claim 1 reproduced below from the “APPENDIX I (CLAIMS)” in the Appeal Brief:

1. An ultra-high strength cold rolled steel sheet having excellent hydrogen embrittlement resistance, which includes:

0.08 to 0.5% of C;

0.5 to 3% of Si+Al;

0.5 to 3% of Mn;

0.15% or lower of P; and

0.02% or lower of S in terms of mass percentage,

and also includes 3% or higher of residual austenite structure and 77% to 92% of bainitic ferrite structure in terms of an areal ratio to the entire structure,

wherein a mean grain size of bainite blocks is smaller than 20 μm as determined by comparing observations of the same region of the bainitic ferrite structure by EBSP (electron back scatter diffraction pattern) and SEM.

App. Br. 16 (Claims App'x).

Appellants seek review of the following grounds of rejection maintained by the Examiner in the Answer²:

- I. Claims 1, 5 through 8, and 11 through 14 under 35 U.S.C. § 103(a) as unpatentable over the disclosure of Kawano;³
- II. Claims 1, 5 through 7, and 11 through 14 under 35 U.S.C. § 103(a) as unpatentable over the disclosure of Saito;⁴ and
- III. Claims 1, 5 through 8, and 11 through 14 under 35 U.S.C. § 103(a) as unpatentable over the disclosure of Kashima.⁵

(See App. Br. 4, together with Examiner's Answer mailed November 19, 2010 ("Ans.") at 3-18.)

DISCUSSION

Rejections I and III are directed to all of the claims on appeal. With respect to these rejections, Appellants argue claims 1, 5 through 8, and 11 through 14 together. (App. Br. 10-11 and 14.) Therefore, we limit our discussion of Rejections I and III to claim 1, which we select as

² The Examiner has withdrawn some of the rejections set forth in the final Office action mailed April 12, 2010, which are requested for review by Appellants. (Ans. 3-18.)

³ U.S. Patent 6,319,338 B1 issued to Kawano et al. on November 20, 2001.

⁴ Japanese Patent Publication published on February 26, 2003, naming Saito et al. as the inventors.

⁵ European Patent Application 1 365 037 A1 published on November 26, 2003, naming Kashima et al. as the inventors.

representative. Claims 5 through 8 and 11 through 14 stand or fall with claim 1. 37 C.F.R. § 41.37(c)(1)(vii).

Appellants do not dispute the Examiner's finding that Kawano and Kashima individually teach or suggest a high strength, cold rolled sheet having C, Si + Al, Mn, P, and S in proportions that substantially overlap or substantially identical to those of the same components of the high strength, cold rolled sheet recited in claim 1. (*Compare* Ans. 4, 5, 8 and 11 *with* App. Br. 10-14; *see also* Kawano, col. 9, l. 39 to col. 11, l. 55 and col. 12, ll. 30-41, and Kashima, p. 12, paras. 0054-0061.) Nor have Appellants disputed the Examiner's finding that such high strength, cold rolled sheet has a mean grain size of bainite blocks "smaller than 20 μm as determined by comparing observation of the same region of the bainitic ferrite structure by EBSP (electron back scatter diffraction pattern) and SEM," which according to page 10 of the Specification, provides excellent hydrogen embrittlement resistance, as recited in claim 1. (*Compare* Ans. 5, 9, 12 *with* App. Br. 10-14.) Rather, Appellants only contend that Kawano or Kashima does not teach or suggest such a high strength, cold rolled sheet having a 77% to 92% bainitic ferrite structure. (App. Br. 10-14.) According to Appellants at page 11 of the Appeal Brief,:

Bainitic ferrite is a term used in the art to refer to bainite (as in Kawano[or Kashima]) NOT bainite and ferrite. The term "polygonal ferrite" refers to "ferrite" in Kawano[or Kashima]. [(Emphasis original.)]

Thus, the dispositive issue concerning Rejections I and III is: Has the Examiner reversibly erred in finding that Kawano, Saito or Kashima would have suggested such a high strength, cold rolled sheet having a 77% to 92% bainitic ferrite (bainite) structure within the meaning of 35 U.S.C. § 103? On this record, we answer this question in the negative.

As correctly found by the Examiner in the Answer, Kawano and Kashima not only individually describe a high strength, cold rolled sheet having C, Si + Al, Mn, P, and S in proportions that substantially overlap or substantially identical to those of the same components of the high strength, cold rolled sheet recited in claim 1, but also individually describe such high strength, cold rolled sheet as having microstructures inclusive of those recited in claim 1, i.e., 3% or higher residual austenite structure and 77% to 92% of bainitic ferrite structure. In particular, Kawano teaches high strength, cold rolled sheets having a microstructure defined by 3% to 50% retained austenite with the ferrite or bainite as the dominant phase (col. 8, l. 39 to col. 8, l. 15). Kawano also defines the dominant phase of ferrite as including “at least 40% and preferably at least 60%” and exemplifies high strength, cold rolled sheets containing C, Si + Al, Mn, P, and S in proportions within those recited in claim 1 as having microstructures that include 77% to 84% ferrite or 38% to 65% bainite. (Examples 1-8 and 40 of Kawano referred by Appellants at page 10 of the Appeal Brief and col. 8, l. 60 to col. 9, l. 6 of Kawano.) It can be inferred from the above disclosures of Kawano that the term “dominant phase” of ferrite or bainite referred to in

Kawano is at least about 40% and preferably at least 60% of ferrite or bainite, which is inclusive of the “77% to 92% bainite” (bainitic ferrite) structure recited in claim 1. *In re Preda*, 401 F.2d 825, 826-27 (CCPA 1968) (“[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.”) A further suggestion for forming such high strength, cold rolled sheet can also be found in its heat treatment and cooling conditions described at column 13, lines 50-65, of Kawano, which overlap with the heat treatment and cooling conditions for forming the claimed high strength, cold rolled sheet disclosed in Appellants’ Specification as correctly found by the Examiner at page 24 of the Answer.

Similarly, Kashima teaches high strength, cold rolled sheets having a microstructure defined by 3% to 30% retained austenite as the second phase structure, with tempered martensite or tempered bainite as the base phase structure accounting for 50% or more in terms of a space factor relative to the whole structure. (*See Abstract.*) Kashima, at pages 69, 71 and 72, exemplifies such steel sheets having about 72.2 to 98.2% tempered bainite. at Tables 30, 32, and 34. Thus, Kashima would have suggested a high strength, cold rolled sheet having a “77% to 92% bainite” structure in the form of tempered bainite as recited claim 1. *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003) (“In cases involving overlapping ranges, we and our predecessor court have consistently held that even a slight overlap in range

establishes a *prima facie* case of obviousness.”) A further suggestion can also be found in the heating and cooling conditions described by Kashima similar to those described in the Specification as explained by the Examiner at pages 11 and 12 of the Answer.

On this record, Appellants have not shown, much less alleged, that Kawano or Kashima does not provide an enabling disclosure or reasonable expectation of success in forming high strength, cold rolled sheets having the microstructures recited in claim 1. *In re Sasse*, 629 F.2d 675, 681 (CCPA 1980) (“The applicant, however, can then overcome that rejection by proving that the relevant disclosures of the prior art patent are not enabled.”); *In re Longi*, 759 F.2d 887, 897 (Fed. Cir. 1985)(“[A] reasonable expectation of success, not absolute predictability” supports a conclusion of obviousness.) Nor have Appellants shown, much less alleged, that the high strength, cold rolled sheet having a “77% to 92% bainite” structure imparts unexpected results. *See, e.g., Peterson*, 315 F.3d at 1330-31 (“In general, an applicant may overcome a *prima facie* case of obviousness by establishing ‘that the [claimed] range is critical, generally by showing the claimed range achieves unexpected results relative to the prior art range,’” which “standard applies when . . . the applicant seeks to optimize certain variables by selecting narrow ranges from broader ranges disclosed in the prior art.”)

It follows that the Examiner has not reversibly erred in finding that Kawano or Kashima would have suggested a high strength, cold rolled sheet

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having the claimed ingredients and microstructures, including a 77% to 92% bainitic ferrite (bainite) structure, within the meaning of 35 U.S.C. § 103.

Accordingly, for the reasons set forth in the Answer and above, we uphold Rejections I and III.

Having concluded that the Examiner has properly rejected all of the claims on appeal, namely claims 1, 5 through 8, and 11 through 14, based on either Kawano or Kashima, we need not address the remaining rejection directed to less than all of the appealed claims based on Saito. *In re Basell Poliolefine*, 547 F.3d 1371,1379 (Fed. Cir. 2008) (“Having concluded that the Board properly affirmed the rejection of claims 1-52 of the '687 patent based on obviousness-type double patenting in view of the '987 patent, we need not address the remaining issues raised by Basell regarding the §§102(b) and 103(a) rejections, as well as the additional double patenting rejections. Accordingly, the Board's decision is affirmed.”); *Beloit Corp. v. Valmet Oy*, 742 F.2d 1421 (Fed. Cir. 1984) (ITC having decided a dispositive issue, there was no need for the Commission to decide other issues decided by the presiding officer)

SUMMARY

In view of the foregoing, we affirm the Examiner’s decision rejecting all of the claims on appeal under 35 U.S.C. § 103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

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AFFIRMED

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