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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TAKESHI NISHIUCHI, TAKAYUKI KANDA, RINTARO ISHII,
FUTOSHI KUNIYOSHI, and TEPPEI SATOH

Appeal 2019-006045
Application 14/911,597
Technology Center 1700

BEFORE BEVERLY A. FRANKLIN, JEFFREY B. ROBERTSON, and
JULIA HEANEY, *Administrative Patent Judges*.

FRANKLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 6–12, which constitute all the claims pending in this application. Claims 1–5 have been cancelled. We have jurisdiction under 35 U.S.C. § 6(b).

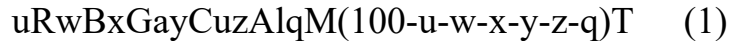
We REVERSE.

¹ We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as Hitachi Metals, LTD. Appeal Br. 2.

CLAIMED SUBJECT MATTER

Claim 6 is illustrative of Appellant's subject matter on appeal and is set forth below:

6. An R-T-B based sintered magnet represented by the following formula (1):



wherein R is composed of light rare-earth element(s) RL and heavy rare-earth element(s) RH, RL is Nd and/or Pr, RH is Dy and/or Tb, T as balance is Fe, and 10% by mass or less of Fe being replaced with Co, M is Nb and/or Zr, and u, w, x, y, z, q and 100-u-w-x-y-z-q are expressed in terms of % by mass;

said RH accounts for 5% by mass or less of the R-T-B based sintered magnet, the following inequality expressions (2) to (6) being satisfied:

$$0.4 \leq x \leq 1.0 \quad (2)$$

$$0.07 \leq y \leq 1.0 \quad (3)$$

$$0.05 \leq z \leq 0.5 \quad (4)$$

$$0 \leq q \leq 0.1 \quad (5)$$

$$0.100 \leq y/(x + y) \leq 0.340 \quad (6)$$

$v = u - (6\alpha + \beta + 8\gamma)$, wherein the amount of oxygen (% by mass) of the R-T-B based sintered magnet is α , the amount of nitrogen(% by mass) is β , and the amount of carbon (% by mass) is γ ; and

v and w satisfy the following inequality expressions (7) to (9):

$$v \leq 29.5 \quad (7)$$

$$0.89 \leq w \leq 0.93 \quad (8)$$

$$-12.5w + 38.75 \leq v \leq -62.5w + 86.125 \quad (9).$$

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Miwa et al. (“Miwa”)	US 2015/0170810 A1	June 18, 2015

THE REJECTION

Claims 6–12 are rejected under 35 U.S.C. §103 as being unpatentable over Miwa.

OPINION

We review the appealed rejections for error based upon the issues Appellant identifies, and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) (cited with approval in *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (“[I]t has long been the Board’s practice to require an applicant to identify the alleged error in the examiner’s rejections.”). Upon review of the evidence and each of the respective positions set forth in the record, we find that the preponderance of evidence supports Appellant’s position in the record. Accordingly, we reverse the Examiner’s rejection on appeal essentially for the reasons set forth in the record by Appellant, and add the following for emphasis.

We refer to the Examiner’s statement of the rejection as set forth on pages 3-5 of the Final Office Action.

As background, Appellant explains that an R-T-B-based sintered magnet including an $R_2T_{14}B$ type compound as a main phase (R is composed of light rare-earth element(s) RL and heavy rare-earth element(s) RH, RL is

Nd and/or Pr, RH is Dy and/or Tb, and T is at least one of transition metal elements and inevitably includes Fe) has been known as a permanent magnet with the highest performance among permanent magnets, and has been used in various motors for hybrid vehicles, electric vehicles and home appliances. Appeal Br. 4. Appellant explains however, in the R-T-B-based sintered magnet, coercivity force H_{cJ} (hereinafter sometimes simply referred to as “ H_{cJ} ”) decreases at a high temperature to cause irreversible thermal demagnetization, and when the magnet is used particularly in motors for hybrid vehicles and electric vehicles, there is a need to maintain high H_{cJ} even at a high temperature. Appeal Br. 4.

Appellant explains that to increase H_{cJ} , a large amount of heavy rare-earth elements (mainly, Dy) have previously been added to the R-T-B-based sintered magnet, but there arose a problem that a residual magnetic flux density B_r (hereinafter sometimes simply referred to as “ B_r ”) decreases, so there has recently been employed a method in which heavy rare-earth elements are diffused from the surface into the inside of the R-T-B-based sintered magnet to thereby increase the concentration of the heavy rare-earth elements at the outer shell part of main phase crystal grains, thus obtaining high H_{cJ} while suppressing a decrease in B_r (see paragraph [0004] at page 2, lines 3-14 in the present application). However, Dy has problems such as unstable supply and price fluctuations, so there is a need to obtain high H_{cJ} while suppressing a decrease in B_r without using heavy rare-earth elements such as Dy as much as possible, i.e., by reducing the amount used as far as possible (see paragraph [0005] at page 2, ll. 15–21 in the Specification). Appeal Br. 4–5.

Appellant states that the present invention (the subject matter of claim 6) has been made so as to solve the above problems, and an object is to provide an R-T-B-based sintered magnet having high B_r and high H_{cJ} while suppressing the content of Dy (see paragraph [0010] at p. 4, ll. 8–12 in the present Specification). Appeal Br. 5.

It is the Examiner's position that Miwa suggests the claimed subject matter of claim 6, and that Appellant's secondary considerations are unpersuasive. *See generally* Final Action and Answer. The Examiner sets forth Table 1 and Table 2 on page 4 of the Answer showing comparisons between Miwa's Sample A1 with Appellant's claim 6.

It is noted that on page 4 of the Answer, the Examiner points out that Sample A1 in Table 2 of Miwa is relied upon in making the rejection, and so Appellant's argument pertaining to other Miwa samples are moot.

Claim 6 not only includes the inequality expressions (2)-(6), but also includes inequality expressions (7), (8), and (9). *See* Claim 6, *supra*.

With particular regard to inequality expression (9), on page 13 of the Appeal Brief, Appellant argues that it is important that the values of v and w are within the range defined by the recited inequality expression (9), as shown in Figure 1 of Appellant's Specification, wherein Figure 1 is an explanatory graph showing ranges of values for v and w satisfying inequality expressions (7), (8), and (9). Spec. 25. Appeal Br. 13.

Appellant emphasizes that Sample A1 of Miwa cited by the Examiner on page 4 of the Final Office Action does not satisfy the range of v and w defined by the inequality expression (9), specifically because $v = 29.9$ and $w = 0.91$, as noted by the Examiner in page 4 of the Final Office Action.

Appeal Br. 14. Appellant states that because w of Sample A1 is 0.91, if Sample A1 were to satisfy the inequality expression (9), Sample A1 would need to have v in the range of 27.4 – 29.3 (which is calculated by applying $w=0.91$ to the inequality expression (9)). However, Appellant explains that v of Sample A1 is 0.6 larger than the upper limit of this calculated range, which is significant. Appeal Br. 14.

Appellant also points out that Miwa does not disclose nor imply that v and w values are controlled to satisfy the range defined by the inequality expression (9). Appeal Br. 14.

Therefore, Appellant submits that claim 1 of the present application is not *prima facie* obvious over Miwa. *Id.*

We are persuaded by the aforementioned line of argument. The Examiner acknowledges that v does not fall within inequality expression (9), but that it is “close” in value. Final Act. 4. Also, in response to the aforementioned argument related to inequality expression (9), on page 12 of the Answer, the Examiner states that the elements critical to the claimed formula substantially overlap the quantities of the same elements in the prior art, and since there is utility over the entire disclosed range, the claimed formula is satisfied by the broader ranges taught in the prior art. The Examiner states that it is also well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, and refers to certain case law therein. Ans. 12. This stated position is nebulous, and inadequately addresses the valid points made by Appellant in connection with the claim element pertaining to inequality expression (9). We agree with Appellant’s reply made on page 5 of the Reply Brief that

Miwa's general disclosure is very broad, and that the formulas recited in the present claims limit the invention to a composition which would not have been obvious from the very broad general disclosure of Miwa.

In view of the above, we reverse the rejection. We need not address the secondary considerations in making this determination.

CONCLUSION

We reverse the Examiner's decision.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
6-12	103(a)	Miwa		6-12

REVERSED