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EXAMINER	
YANG, JIE	

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Please find below and/or attached an Office communication concerning this application or proceeding.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YOUNG MIN KIM, HA SIK KIM, BONG SUN YOU, and CHANG DONG YIM

Appeal 2020-000583
Application 13/510,989
Technology Center 1700

Before BEVERLY A. FRANKLIN, N. WHITNEY WILSON, and MICHAEL G. McMANUS, *Administrative Patent Judges.*

FRANKLIN, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–6. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[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 Korea Institute of Machinery & Materials. Appeal Br. 2.

CLAIMED SUBJECT MATTER

Claim 1 is illustrative of Appellant's subject matter on appeal and is set forth below:

> 1. A magnesium alloy manufactured by melt casting, the magnesium alloy consisting essentially of, by weight, 1.0% or greater but less than 6.0% of Al, 0.05% to 1.0% of Ca, 0.05% to 1.0% of Y, greater than 0% but not greater than 6.0% of Zn, a balance of Mg, and other unavoidable impurities,
>
> wherein a total content of the Ca and the Y is equal to or greater than 0.1% but less than 1.8% of a total weight of the magnesium alloy such that formation of a combined oxide layer of CaO/Y_2O_3 on a surface of the magnesium alloy is induced.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Toshio	JP 08-269609	Oct. 15, 1996
Sakamoto	JP 06-257478	Sept. 28, 2006
Seong-Ho Ha et al., *Effect of CaO on Oxidation Resistance and Microstructure of Pure Mg*, 49 Materials Transactions 1081–83 (2008).		
Hyeon-Taek Son et al., *The Effects of Yttrium Element on Microstructure and Mechanical Properties of Mg-5 mass% Al-3 mass% Ca Based Alloys Fabricated by Gravity Casting and Extrusion Process*, 49 Materials Transaction 945–51 (2008).		

REJECTIONS

1. Claims 1–5 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Toshio (with English machine translation, hereinafter JP '609) in view of Ha and Son.

2. Claims 1–6 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over JP ’609 in view of Ha and Sakamoto (with English machine translation).

OPINION

For purposes of this appeal, we address separately argued claims, and the remaining claims stand or fall with the argued claims, consistent with 37 C.F.R. § 41.37(c)(1)(iv) (2017). We select claim 1 as representative.

Upon consideration of the evidence and each of the respective positions set forth in the record, we find that the preponderance of the evidence supports the Examiner’s findings and conclusion that the subject matter of Appellants’ claims is unpatentable over the applied art for Rejection 2, but not for Rejection 1. Accordingly, we affirm Rejection 2 but reverse Rejection 1, with the following emphasis.

Rejection 1

We refer to pages 3–6 of the Non-Final Office Action mailed June 1, 2018 regarding the Examiner’s findings pertaining to Rejection 1. Therein, the Examiner relies upon JP ’609 for teaching, *inter alia*, a Mg-Al-Ca based alloy with 0.3–3.0 wt% of Ca. Non-Final Act. 3–5. The Examiner acknowledges that JP ’609 in view of Ha does not specify adding Y as claimed in the instant claims. *Id.* at 4.

The Examiner relies upon Son for teaching, *inter alia*, the effects of Y elements on microstructure and mechanical properties of Mg-based alloy. Non-Final Act. 4. In particular, the Examiner indicates that Son teaches that

adding rare earth metal (REM) and Y in Mg alloy can influence the mechanical properties greatly, and Son provides an example of adding 1 mass% of Y in the Mg alloy. *Id.* at 5. Then, the Examiner concludes that it would have been obvious to add a proper amount of Y in the Mg-based alloy as demonstrated by Son in the alloy of JP '609 in view of Ha in order to improve the properties of the Mg based alloy. *Id.*

Regarding the range of amounts of Ca and Y in claims 1 and 4, the Examiner states that in the absence of evidence to the contrary, the selection of the proportions of elements Ca and Y from the combination of JP'609 and Son in order to meet the claimed equations would appear to require no more than routine investigation by those ordinary skilled in the art. Non-Final Act. 5–6.

Appellant disagrees with the conclusion of obviousness and submits that the above statements by the Examiner are based on impermissible hindsight reasoning. Appeal Br. 4. Appellant argues, *inter alia*, that a particular parameter must first be recognized as a result-effective variable before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618 (CCPA 1977). Appeal Br. 5. Appellant submits that therefore there is no teaching or suggestion in the art to adjust the proportions of elements Ca and Y as claimed. Appellant states that in the instantly claimed invention, when Ca and Y are added in combination, a dense combined oxide layer of CaO/Y_2O_3 is formed on the surface of a solid or liquid Mg alloy, so that the ignition resistance of the Mg alloy is superior, and at the same time, the addition of Ca and Y in combination can advantageously improve

tensile properties by decreasing the fraction and size of the intermetallic compound. Appeal Br. 5–6.

The Examiner responds by stating that Son provides an example of adding 1 mass% of Y in the Mg alloy, and so adding that amount to the composition of JP '609 would meet the claims. Ans. 5. However, we agree with Appellant's position set forth on page 6 of the Appeal Brief that in the example of Son, upon which the Examiner relies regarding the 1 mass% Y, the amount of Ca is 3 mass%, which well exceeds the claimed amount of Ca, and also the claimed total content of the Ca and the Y. Appellant submits that one skilled in the art, in view of Son, would not be motivated to reduce the amount of Ca to lower than 3 wt%. We are persuaded by such argument. Son teaches combining 1 mass% Y with 3 mass% Ca, but not any value less than 3 mass% Ca. Son, Figure 7.

In view of the above, we reverse Rejection 1.

Rejection 2

We refer to the Examiner's statement of the rejection as set forth on pages 6–7 of the Non-final Office Action mailed June 1, 2018, and pages 3–4 of the Final Office Action mailed December 18, 2018, both of which we incorporate herein.

Appellant argues that Sakamoto is cited as disclosing, *inter alia*, a Mg based cast material containing 1–12 mass% Al, 0.2–5.0 mass% Ca, and adding 0.01–5.0 mass% of further alloy elements including Y and Zr, in order to improve the fire-resistant property of the Mg alloy. Appeal Br. 7. Appellant states that the Examiner asserts that it would have been obvious to

have added a proper amount of Y and Zr in the Mg-based alloy as demonstrated by Sakamoto in the alloy of JP ‘609 in view of Ha in order to improve the properties of the Mg based alloy. *Id.* Appellant argues that Sakamoto fails to cure the deficiency discussed with regard to Rejection 1. In particular, Appellant refers to the Declaration under 37 C.F.R §1.132 submitted on May 16, 2018 to demonstrate the criticality of the claimed feature “a total content of the Ca and the Y is equal to or greater than 0.1% but less than 1.8% of a total weight of the magnesium alloy.” Moreover, Appellant submits that there is no suggestion in Sakamoto for one of ordinary skilled person to adjust the proportions of elements Ca and Y. Appeal Br. 7.

With regard to the Declaration evidence, we are unpersuaded by this evidence because the data is not commensurate in scope with the claims. The data in the table at the top of page 3 of the Declaration does not adequately represent the range claimed (total content of the Ca and the Y is equal to or greater than 0.1% but less than 1.8%). We note that the burden rests with Appellants to establish, *inter alia*, (1) that the comparisons are to the disclosure of the closest prior art, and (2) that the supplied evidentiary showing is commensurate in scope with the claimed subject matter. *See In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972). Furthermore, as stated by the Examiner on page 6 of the Answer, JP ‘609 provides examples with 0.3 wt% Ca and 0.5 wt% Ca (Examples 1 and 2 in Table 1 of JP ’609). The Examiner states that Sakamoto teaches adding 0.01–5 wt% Y in the alloy (see claims of Sakamoto). Ans. 6. We agree with the Examiner that when combining 0.01 wt% Y disclosed by Sakamoto with examples of JP ‘609,

the calculated Ca+Y amount is within the claimed range of Ca+Y as recited in Appellant's claims 1 and 4. *Id.*

In view of the above, we affirm Rejection 2.

CONCLUSION

We reverse the Examiner's decision with regard to Rejection 1.

We affirm the Examiner's decision with regard to Rejection 2.

DECISION SUMMARY

In summary:

Claims Rejected	**35 U.S.C. §**	**Reference(s)/Basis**	**Affirmed**	**Reversed**
1–5	103	JP '609, Ha, Son		1–5
1–6	103	JP '609, Ha, Sakamoto	1–6	
Overall Outcome			1–6	

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED