UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/387,134	04/28/2009	Eugene Y. Ivanov	020324 254P2 CON	9107

33805 7590 02/14/2013

WEGMAN, HESSLER & VANDERBURG
6055 ROCKSIDE WOODS BOULEVARD
SUITE 200
CLEVELAND, OH 44131

EXAMINER	
LUK, VANESSA TIBAY	
ART UNIT	**PAPER NUMBER**
1733	

MAIL DATE	DELIVERY MODE
02/14/2013	PAPER

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

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte EUGENE Y. IVANOV

Appeal 2012-001423
Application 12/387,134
Technology Center 1700

Before TERRY J. OWENS, LINDA M. GAUDETTE, and DONNA M. PRAISS, *Administrative Patent Judges*.

GAUDETTE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's decision[1] finally rejecting claims 1-4 and 8-12 under 35 U.S.C. § 103(a) as unpatentable over Lo (US 6,328,927 B,1 issued Dec. 11, 2001) in view of Kohsaka (US 6,200,694 B1, issued Mar. 13, 2001) and claims 1-6 and 8-13 under 35 U.S.C. § 103(a) as unpatentable over Suzuki (US 6,582,535 B1, issued Jun. 24, 2003) in view of Kohsaka alone, or further in view of Lo.[2] We have jurisdiction under 35 U.S.C. § 6(b).[3]

For the reasons explained below, we AFFIRM the rejection of claims 1-3, 5, 6, and 8-13 under 35 U.S.C. § 103(a) as unpatentable over Suzuki in view of Kohsaka alone, or further in view of Lo. Because we recognize our conclusion is based on facts and reasons which differ substantially from those advanced by the Examiner, we denominate the affirmed rejection as a NEW GROUND OF REJECTION pursuant to 37 C.F.R. § 41.50(b). We REVERSE the rejection of claim 4 under 35 U.S.C. § 103(a) as unpatentable over Suzuki in view of Kohsaka alone, or further in view of Lo, and the rejection of claims 1-4 and 8-12 under 35 U.S.C. § 103(a) as unpatentable over Lo in view of Kohsaka.

The invention relates to methods for making high purity sputter targets. (Spec. [0002].) Claim 1 is representative of the invention and is reproduced below from the Claims Appendix to the Appeal Brief:

> 1. Method of preparing a W sputter target comprising:
>
> a) providing a powder consisting essentially of W particles having a particle size of less than about 100 microns and a purity of at least 5Ns;

[1] Final Office Action mailed Dec. 10, 2010
[2] Appeal Brief filed Jul. 5, 2011 ("App. Br.")
[3] An oral hearing was held before this Board Panel on Feb. 5, 2013.

> b) pressure consolidating said particles at heated temperature conditions of from about 1,000°C to 2,000°C to form a plate having a density of greater than about 95 % of the theoretical density; and
>
> c) thermomechanically rolling the plate material so that it has a density of above about 97.5 % of the theoretical density by hot rolling said plate at a temperature of about 1400°C to 1700°C resulting in a thickness reduction of greater than about 40%.

Lo discloses "the combination of [a] HIPing process with a small particle size starting [tungsten] powder produces a highly dense tungsten sputter target," (col. 2, l. 66-col. 3, l. 1) i.e., "99% density can be achieved" (*id.* at col. 2, l. 65). Lo states that a CIP step may be conducted prior to the HIP step. (*Id.* at col. 2, l. 55.)

Suzuki discloses hot pressing tungsten powder to achieve a density of 93% or more (col. 3, ll. 1-4), followed by HIP to achieve a density of 99% or more (*id.* at ll. 11-13). The hot pressing is performed at a temperature of 1600 ºC (1873 ºK) or more and pressure of 200 kg/cm^2 (19.6 MPa) or more. (*Id.* at col. 2, ll. 25-27.) The HIP treatment is performed at a temperature of 1700 ºC (1973 ºK) or more and pressure of 1000 kg/cm^2 (98.1 MPa) or more. (*Id.* at col. 2, ll. 25-27.)

Kohsaka discloses a method wherein a mixture of Mo and W is sintered, such as by hot pressing, and then subjected "to a HIP treatment or to [] a hot working operation [such] as . . . [hot] rolling." (Col. 7, ll. 39-48.) According to Kohsaka, "[t]he hot press ought to be carried out under the conditions of heating temperature of not less than 1973K and planar pressure of not less than 20 MPa." (*Id.* at ll. 48-51.) "The HIP treatment is advantageously carried out under the conditions of heating temperature of not less than 1773K and pressure of not less than 150 MPa." (*Id.* at ll. 55-57.) The temperature of the hot working, e.g., hot rolling, is "not less than 1673K, preferably not less than 1873K" and "the ratio of

reduction by rolling ought to be not less than 50% for the purpose of raising the relative density of the target beyond 98%." (*Id.* at col. 9, ll. 14-15, 19-22.) Kohsaka discloses the sinter destined to undergo hot working "ought to possess a relative density of not less than 90%." (*Id.* at col. 8, ll. 28-30.)

The Examiner finds Lo and Suzuki each disclose the invention as claimed in appealed claim 1 with the exception of a hot rolling step. (Ans. [4] 5, 7-8.) The Examiner finds Kohsaka discloses a process for producing tungsten sputtering targets which utilizes a hot working operation such as hot rolling following "conventional powder metallurgy techniques (e.g., sintering, HIP, compaction, etc.)" to increase the density of the final target "to a value of 98% or higher." (*Id.* at 5, 8.) The Examiner determines it would have been obvious to one of ordinary skill in the art at the time of the invention to have added a hot rolling step to the processes of Lo and Suzuki based on Kohsaka's disclosure that hot rolling enhances the density of a target formed by conventional powder metallurgy techniques. (*Id.* at 5-6, 8.)

As pointed out by Appellant, Kohsaka discloses the use of *either* a hot rolling step *or* a HIP treatment following hot pressing. (App. Br. 11.) The evidence of record does not support the Examiner's finding that Kohsaka discloses or suggests hot rolling following a HIP treatment. Thus, the Examiner's fact finding is insufficient to support the Examiner's determination that it would have been obvious to one of ordinary skill in the art to modify the processes of Lo and Suzuki to add an additional step of hot rolling after the HIP treatments. However, we find Kohsaka teaches that, following a hot pressing treatment to achieve a density of not less than 90%, either hot rolling or HIP can be employed to further increase density beyond 98%. (*See* Kohsaka col. 8, ll. 62-66.) Accordingly, we

[4] Examiner's Answer mailed Aug. 22, 2011.

determine it would have been obvious to one of ordinary skill in the art at the time of the invention to have substituted Kohsaka's hot rolling step for the HIP treatment in Suzuki's process based on Kohsaka's indication that hot rolling can be used in place of HIP to provide the predictable and achievable result of increasing the density of a hot pressed tungsten powder having a density of not less than 90% (e.g., Suzuki's hot pressed tungsten powder having a density of 93% or more) to 98% or more. *See Rolls-Royce, PLC v. United Techs. Corp.*, 603 F.3d 1325, 1338 (Fed. Cir. 2010); *In re Kubin*, 561 F.3d 1351, 1359 (Fed. Cir. 2009) (quoting *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 421 (2007) ("Where a skilled artisan merely pursues 'known options' from a 'finite number of identified, predictable solutions,' obviousness under § 103 arises.")); *cf. In re Mayne*, 104 F.3d 1339, 1340 (Fed. Cir. 1997) (substitution of one known element for a known equivalent is prima facie obvious).

Appellant suggests Kohsaka teaches away from hot pressing prior to hot rolling, arguing "*Kohsaka* criticizes hot pressing." (App. Br. 10 (citing Kohsaka col. 8, ll. 28-38).) Kohsaka discloses that when a hot pressing technique is used to obtain the sinter "the possibility of Mo and W reacting with the carbon mold will arise when the temperature is raised to a level at which necessary densification is attained" (col. 8, ll. 35-38). We do not view this cautionary statement as a teaching away from using hot pressing prior to hot rolling since Kohsaka expressly teaches hot pressing can be used before either HIP or hot rolling to produce a high density target (*see* Kohsaka col. 7, ll. 39-48 *supra* p. 3). *Cf. Syntex (U.S.A.) LLC v. Apotex, Inc.*, 407 F.3d 1371, 1379-80 (Fed. Cir. 2005) ("A statement that a particular combination is not a preferred embodiment does not teach away absent clear discouragement of that combination.").

Appellant argues "*Suzuki* . . . also casts doubt that hot rolling techniques would enhance sputtering performance." (App. Br. 7.) In the background section of Suzuki referenced by Appellant, Suzuki discusses prior art methods wherein rolling techniques were said to result in the undesirable formation of large crystal grains. (Suzuki col. 1, ll. 32-45.) We agree with the Examiner that "one of ordinary skill in the art would [have] recognize[d from Kohsaka's disclosure] that rolling methods are available that seek to cure the deficiencies of the prior art referred to by Suzuki." (Ans. 12.)

Appellant also relies on unexpected results in support of nonobviousness. We agree with the Examiner's criticisms of this evidence (*id.* at 18-19), and emphasize that, although secondary considerations such as unexpected results must be taken into account, they do not necessarily control the obviousness conclusion. *See Sud-Chemie, Inc. v. Multisorb Techs., Inc.*, 554 F.3d 1001, 1009 (Fed. Cir. 2009) ("[E]vidence of unexpected results and other secondary considerations will not necessarily overcome a strong prima facie showing of obviousness"); *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1372 (Fed. Cir. 2007).

CONCLUSION

We AFFIRM the rejection of claims 1-3, 5, 6, and 8-13 under 35 U.S.C. § 103(a) as unpatentable over Suzuki in view of Kohsaka alone, or further in view of Lo. Because we recognize our conclusion is based on facts and reasons which differ substantially from those advanced by the Examiner, we denominate the affirmed rejection as a NEW GROUNDS OF REJECTION pursuant to 37 C.F.R. § 41.50(b).

We REVERSE the rejection of claim 4 under 35 U.S.C. § 103(a) as unpatentable over Suzuki in view of Kohsaka alone, or further in view of Lo.

Claim 4 requires hot rolling following hot isostatically pressing. The applied prior art does not disclose or suggest hot rolling following a HIP treatment.

We REVERSE the rejection of claims 1-4 and 8-12 under 35 U.S.C. § 103(a) as unpatentable over Lo in view of Kohsaka. Lo discloses a HIP treatment but does not disclose or suggest a hot pressing step. The Examiner's rejection over Lo in view of Kohsaka is based on a finding that Kohsaka discloses or suggests hot rolling following a HIP treatment. The evidence of record does not support this finding.

37 C.F.R. § 41.50(b) provides that an appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

> *(1) Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .
> (2) *Request rehearing*. Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

AFFIRMED-IN-PART;
37 C.F.R. § 41.50(b)

bar