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.
11/818,701	06/15/2007	Thomas J. Watson	PA0002526A-U73.12-108KL	2052

12208 7590 02/28/2013
Kinney & Lange, P.A.
c/o CPA Global
P.O. Box 52050
Minneapolis, MN 55402

EXAMINER
STONER, KILEY SHAWN

ART UNIT	PAPER NUMBER
1735	

MAIL DATE	DELIVERY MODE
02/28/2013	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 THOMAS J. WATSON and RAJIV S. MISHRA

Appeal 2011-005965
Application 11/818,701
Technology Center 1700

Before CHUNG K. PAK, CHARLES F. WARREN, and
HUBERT C. LORIN, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

DECISION ON APPEAL

Applicants appeal to the Board from the final rejection of claims 1-7, 12, 13 and 15-20. We have jurisdiction. 35 U.S.C. §§ 6 and 134(a) (2002); 37 C.F.R. § 41.31(a) (2010).

We affirm the decision of the Primary Examiner.

Claim 1 illustrates Appellants' invention of a welded structure, and is representative of the claims on appeal:

1. A welded structure comprising:

a first metal part derived from a devitrified Al-RE-TM alloy having nanometer-sized grain structures and nanometer sized intermetallic phases;

a second metal part derived from the same devitrified Al-RE-TM

alloy having nanometer-sized grain structures and nanometer sized intermetallic phases; and

a friction stir welded joint between the first metal part and the second metal part without leaving coarse microstructures that reduce strength and ductility.

App. Br. 8 (Claim App'x).

Appellants request review of the grounds of rejection under 35 U.S.C. § 103(a) advanced on appeal by the Examiner: claims 1-7 and 15-20 over Deinken,[1] Watson (US 6,974,510 B2), Appellants' acknowledged prior art (APA) (Spec. ¶ 0005), and claims 12 and 13 over Deinken and Watson, as applied to claim 15, further in view of Mahoney (US 6,866,180 B2). App. Br. 3; Ans. 4, 6.

Appellants principally argue the first ground of rejection. Thus, we decide this appeal based on claim 1 with respect to the first ground and on claim 12 to the extent the second ground is argued. 37 C.F.R. § 41.37(c)(1)(vii) (2010).

OPINION

We cannot agree with Appellants that the Examiner erred in concluding that Deinken, Watson and APA would have led one of ordinary skill in the art to weld metal parts derived from Watson's devitrified Al-RE-TM alloys, which Appellants acknowledge are known in the art to have nanometer-sized grain structures and nanometer sized intermetallic phases, by joining the parts with friction stir welding (FSW), which was known to be used to weld aluminum alloy parts as disclosed by Deinken, thus arriving at a welded structure, having high strength and high ductility as

[1] Jay Deinken, *Friction Stir Welding*, Rockwell Science Center (July 20, 1999).

taught by Watson, that is encompassed by product-by-process claim 1. Deinken pp. 7, 8, 11-12, 26-27, 31. Watson col.1 ll.6-12 and 57-60. Ans. 4-5, 8-9, 11-13; App. Br. 3-6; Reply Brs.

We find Deinken would have disclosed to one of ordinary skill in the art that FSW "[c]an weld all Al alloys – including some, such as Al-Li, which cannot be fusion welded." Deinken 31. We find that Deinken would have disclosed that FSW produces plastic flow in the workpiece, thus producing a weld below the melting point in the solid phase which has excellent metallurgical properties in the joint area, including "[f]ine microstructure," "[m]echanical properties as good as, or better than, fusion welds," and "[t]ensile strength approach[ing] the strength of the base material." Deinken 11, 12, 27. We find Watson would have disclosed to one of ordinary skill in the art devitrified Al-RE-TM alloys that have high tensile strength and high ductility, and are used for structural applications in the aerospace industry. Watson col.1 ll.6-12 and 57-60.

We find Appellants acknowledge it was known in the art that

> Al-RE-TM alloys derive their strength properties from nanometer-sized grain structures and nanometer sized intermetallic phases. Accordingly, such alloys are not easily fusion welded due to the fact that the refined microstructures that give these alloys their strengths are destroyed within the melt pool, thereby leaving coarse microstructures that are significantly lower in strength as well as ductility. As such, there is a need for welding techniques that substantially preserve the strengths and ductilites of metal parts derived from Al-RE-Tm alloys.

Spec. ¶ 0005.

The Examiner submits that one of ordinary skill in the art would have reasonably predicted successfully obtaining a welded structure having high

strength and ductility from Watson's devitrified Al-RE-TM alloy parts using Deinken's FSW because Deinken would have taught that FSW can weld all Al alloys and one of ordinary skill in the art would have had good reason to pursue this welding option. Ans. 4-5, 8-9. The Examiner further submits that the welded structure formed by one of ordinary skill in the art following the teachings of Deinken and Watson would not have been expected by one of ordinary skill in the art to form coarse microstructures that reduce strength and ductility because FSW is a grain refining process. Ans. 4, 9, 12; Supp. Ans. 3-4.

Appellants submit that Deinken's statement that FSW can be used with "all Al alloys" does not specify any particular Al alloys, and "does not disclose alloys of nanometer sized grain structures and intermetallic phases," and thus there is no expectation that the grain size would remain the same. App. Br. 4. Appellants further submit that Deinken does not teach the effects of FSW on metallurgical properties. App. Br. 4. Appellants contend that the APA teaches that fusion welding of Watson's devitrified Al-RE-TM alloys result in coarse microstructures with loss of strength and ductility, thus establishing that some Al alloys can be fusion welded and other alloys not. App. Br. 4-5. Appellants thus submit that the unsuccessful fusion welding of Watson's devitrified Al-RE-TM alloys, which alloys did not exist when Deinken was published, suggest that some Al alloys can be welded with FSW and other Al alloys cannot, and there is no evidence that coarse microstructure will not form. App. Br. 5. Appellants further submit that Deinken's disclosure that all Al alloys can be welded by FSW applied only to the conventional "legacy" Al alloys disclosed in Deinken. Reply Br. 1; *see* Supp. Reply Br. 1.

On this record, we agree with the Examiner that, contrary to Appellants' contentions, one of ordinary skill in the art would have had a reasonable expectation that Deinken's FSW can be used with Watson's devitrified Al-RE-TM alloy parts. Indeed, Appellants acknowledge that it was known in the art that fusion welding is ineffective in preserving the metallurgical and mechanical properties of Watson's devitrified Al-RE-TM alloys. Thus, one of ordinary skill in the art would have reasonably tried Deinken's FSW in view of the disclosure therein that FSW can be used with any Al alloys, including alloys that cannot be fusion welded, with the expectation of metallurgically retaining fine grain structure and mechanical properties better than fusion welding, including tensile strength. Thus, one of ordinary skill in the art routinely following the combined teachings of Deinken, Watson and APA would have reasonably arrived at welded structures encompassed by claim 1. *See, e.g.*, *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) ("When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense."); *In re Kahn*, 441 F.3d 977, 985-88 (Fed. Cir. 2006); *In re Sovish*, 769 F.2d at 743 (skill is presumed on the part of one of ordinary skill in the art); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) ("The test for obviousness is . . . . what the combined teachings of the references would have suggested to those of ordinary skill in the art."); *see also, e.g.*, *In re O'Farrell*, 853 F.2d 894, 903-04 (Fed. Cir. 1988) ("For obviousness under § 103, all that is required is a reasonable expectation of success."

(citations omitted)).

We are not persuaded otherwise by Appellants' contentions that the combination of Deinken, Watson and APA is silent with respect to whether welding Watson's devitrified Al-RE-TM alloys with Deinken's FSW would result in a welded joint that has a coarse microstructure that reduces strength and ductility. Indeed, to the contrary, Deinken's disclosure would have reasonably suggested to one of ordinary skill in the art that Al alloys welded with FSW retain fine grain structure and mechanical properties, even if the extent of coarse grain microstructure formation is not disclosed. *See, e.g., In re Skoner*, 517 F.2d 947, 950 (CCPA 1975) ("Appellants have chosen to describe their invention in terms of certain physical characteristics . . . . Merely choosing to describe their invention in this manner does not render patentable their method which is clearly obvious in view of [the reference]." (citation omitted)).

We further find that, as the Examiner points out, Appellants have not supported the contention that the nanometer sized grains of Watson's alloys are unstable above 500 ºF and thus at temperatures generated during FSW. Reply Br. 2; Supp. Ans. 2-5. Thus, Appellants' position is entitled to little, if any, weight. *See, e.g., In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984); *In re Payne*, 606 F.2d 303, 315 (CCPA 1979); *In re Lindner*, 457 F.2d 506, 508 (CCPA 1972).

Turning now to the second ground of rejection, product-by-process claim 12 specifies the rotational rate of a tool of an FSW system. We agree with the Examiner's findings and the Examiner's conclusion based thereon that one of ordinary skill in the art would have used rotational rates for a tool of an FSW system taught by Mahoney in using Deinken's FSW system to

form a welded structure from Watson's devitrified Al-RE-TM alloys, thus arriving at a welded structure encompassed by claim 12. Ans. 7, 12-13 (citing Mahoney col.3 l.62 to col.4 l.10). Appellants submit that Mahoney's process is inapplicable because the surface microstructure of a metal part is modified so that the same can be bent, and thus does not weld two pieces together with FSW. App. Br. 6. We cannot agree with Appellants position because, as the Examiner contends, Mahoney would have disclosed to one of ordinary skill in the art the conditions for rotating the tool of an FSW system to provide an acceptable fine-grained microstructure. Mahoney col.3 ll.62-63. Ans. 7, 12-13.

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in the combined teachings of Deinken, Watson and APA alone and with Mahoney, with Appellants' countervailing evidence of and argument for nonobviousness and conclude, by a preponderance of the evidence and weight of argument, that the claimed invention encompassed by appealed claims 1-7, 12, 13 and 15-20 would have been obvious as a matter of law under 35 U.S.C. § 103(a).

The Primary Examiner's decision is affirmed.

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

AFFIRMED

sld