

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte SEETHARAMAIAH MANNAVA

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Appeal No. 1997-2075  
Application No. 08/362,362<sup>1</sup>

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ON BRIEF

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Before COHEN, NASE, and CRAWFORD, Administrative Patent Judges.  
NASE, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1 to 5 and 9 to 20. Claims 6 to 8, the remaining claims pending in this application, have been objected to as depending from a non-allowed claim.

We AFFIRM.

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<sup>1</sup> Application for patent filed December 22, 1994.

BACKGROUND

The appellant's invention relates to an on the fly method of laser shock peening a gas turbine engine part. An understanding of the invention can be derived from a reading of exemplary claim 1, which appears in the appendix to the appellant's brief.<sup>2</sup>

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Fishter et al. (Fishter) 25, 1983	4,411,730	Oct.
Duley et al. (Duley) 1990	4,972,061	Nov. 20,

Vaccari, "Laser shocking extends fatigue life," American Machinist, pages 62-62, July 1992

Claims 1 to 5 stand rejected under 35 U.S.C. § 103 as being unpatentable over Vaccari in view of Duley.

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<sup>2</sup> However, we regard the following phrases from claim 1 as being somewhat confusing: "between relatively constant periods" and "with the pulses around laser beam spots formed by the laser beam on the surface."

Claims 9 to 20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Vaccari in view of Duley and Fishter.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the final rejection (Paper No. 11, mailed May 31, 1996) and the examiner's answer (Paper No. 16, mailed January 13, 1997) for the examiner's complete reasoning in support of the rejections, and to the appellant's brief (Paper No. 15, filed November 4, 1996) for the appellant's arguments thereagainst.

#### OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. See In re Young, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991) and In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). Moreover, in evaluating such references it is proper to take into account not only the specific teachings of the references but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968).

**Claims 1 to 5**

In accordance with 37 CFR § 1.192(c)(7), we have selected claim 1 as the representative claim from the appellant's grouping of claims 1 to 5 to decide the appeal on this rejection under 35 U.S.C. § 103. See page 7 of the appellant's brief.

With regard to the teachings of Vaccari and Duley, the examiner found (final rejection, pp. 2-3) that

Vaccari discloses a method of laser shock peening a turbine engine part including firing a pair of stationary pulsed laser beams at portions of two sides of a turbine blade to vaporize material at the portions' surfaces to create regions having deep compressive residual stresses and flowing a curtain of water over the surface. Overlapping beam spots are used to laser shockpeen larger surfaces.

Vaccari does not disclose moving the part while the beams are firing.

Referring to col. 2 lines 42-45, lines 59-60, and col. 2 line 65 through col. 3, lines 4, Duley shows that it was known in the art to perform similar laser beam treatment on large surfaces of parts by continuously moving the part while firing the laser beam, where the part is moved and the beam fired to produce more than one row of overlapping linearly aligned offset beam spots.

The appellant has not contested the above-noted factual findings of the examiner.

After ascertaining the teachings of Vaccari and Duley, the examiner determined (final rejection, pp. 2-3) that

[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to use the part moving processes shown by Duley with the laser shock peening process of Vaccari to allow large parts to be rapidly laser shockpeened over their entire surface.

The appellant has contested (brief, pp. 8-15) the above-noted obviousness determination made by the examiner. However, we find the appellant's arguments to be unpersuasive for the following reasons.

First, the appellant argues (brief, pp. 13-15) that Duley is non-analogous art. We do not agree. The test for non-analogous art is first whether the art is within the field of the inventor's endeavor and, if not, whether it is reasonably pertinent to the problem with which the inventor was involved. In re Wood, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979). A reference is reasonably pertinent if, even though it may be in a different field of endeavor, it logically would have commended itself to an inventor's attention in considering his problem because of the matter with which it deals. In re Clay, 966 F.2d 656, 659, 23 USPQ2d 1058, 1061 (Fed. Cir. 1992). In the present instance, we are informed by the appellant's originally filed specification that the invention is particularly directed to laser shock peening of continuously moving parts with a laser. As set forth above, Duley teaches that

it was known in the art to perform similar laser beam treatment on large surfaces of parts by continuously moving the part while firing the laser beam, where the part is moved and the beam fired to produce more than one row of overlapping linearly aligned offset beam spots and thus falls at least into the latter category of the Wood test, and logically would have commended itself to an artisan's attention in considering the appellant's problem. Thus, we conclude that Duley is analogous art.

Second, the appellant argues (brief, pp. 8-13) that (1) there is no motivation to combine Vaccari and Duley, (2) the examiner has used impermissible hindsight to combine Vaccari and Duley, and (3) Vaccari and Duley teach away from each other. We do not agree.

In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a case of obviousness. See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). A case of obviousness is established by presenting evidence that the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed

combination or other modification. See In re Lintner, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). Furthermore, the conclusion that the claimed subject matter is obvious must be supported by evidence, as shown by some objective teaching in the prior art or by knowledge generally available to one of ordinary skill in the art that would have led that individual to combine the relevant teachings of the references to arrive at the claimed invention. See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Rejections based on § 103 must rest on a factual basis with these facts being interpreted without hindsight reconstruction of the invention from the prior art. The examiner may not, because of doubt that the invention is patentable, resort to speculation, unfounded assumption or hindsight reconstruction to supply deficiencies in the factual basis for the rejection. See In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968).

In this case, it is our view that the claimed invention would have been suggested by the combined teachings of the applied prior art, not impermissible hindsight. It is clear

to us that the references themselves provide the teachings supporting the conclusion that the appellant's combination would have been obvious. In that regard, we note that while Vaccari teaches a method of laser shock peening a turbine engine part by overlapping beam spots, Vaccari does not specifically teach how to accomplish this result. In our view, one of ordinary skill in this art<sup>3</sup> would have formed overlapping beam spots in one of the following three ways: (1) by moving the parts past a stationary laser, (2) by moving the laser past a stationary part, or (3) by moving both the parts and the laser. Since Vaccari does not specifically teach how to overlap the beam spots, it is our opinion that an artisan would have consulted other known methods of treating parts with overlapping laser beams such as taught by Duley. Thus, based upon the combined teachings of Vaccari and Duley, we

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<sup>3</sup> An artisan is presumed to know something about the art apart from what the references disclose (see In re Jacoby, 309 F.2d 513, 516, 135 USPQ 317, 319 (CCPA 1962)) and the conclusion of obviousness may be made from "common knowledge and common sense" of the person of ordinary skill in the art (see In re Bozek, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969)). Moreover, skill is presumed on the part of those practicing in the art. See In re Sovish, 769 F.2d 738, 743, 226 USPQ 771, 774 (Fed. Cir. 1985).

conclude that the examiner's determination of obviousness of the claimed subject matter was correct.

As to the specific question of "teaching away," our reviewing court in In re Gurley, 27 F.3d 551, 553, 31 USPQ2d 1130, 1331 (Fed. Cir. 1994) stated:

A reference may be said to teach away when a person of ordinary skill, upon [examining] the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.

We agree with the examiner's analysis set forth on pages 8-9 of the answer that the references do not teach away from each other or from the claimed invention. In fact, as set forth above, it is our view that the combined teachings of Vaccari and Duley would have suggested the claimed invention.

For the reasons stated above, the decision of the examiner to reject claim 1 under 35 U.S.C. § 103 is affirmed. In accordance with 37 CFR § 1.192(c)(7), claims 2 to 5 fall with claim 1. Thus, it follows that the decision of the examiner to reject claims 2 to 5 under 35 U.S.C. § 103 is also affirmed.

**Claim 9**

With respect to dependent claim 9, the examiner found (final rejection, pp. 3-4) that

Vaccari in view of Duley discloses the invention substantially as claimed, including not painting the part and forming a recast layer as claimed (page 62, col. 3, lines 8-9) but does not show removal of the recast layer.

Referring to col. 1, lines 62-65 and col. 2, lines 28-31, Fishter teaches that recast layers cause premature cracking and should be removed.

The examiner determined (final rejection, p. 4) that

[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to remove the recast layer to prevent premature cracking as taught by Fishter.

The appellant argues (brief, p. 16) that the above-noted obviousness determination made by the examiner is in error since Vaccari teaches against forming a recast layer. We do not agree. We agree with the examiner's analysis set forth on pages 10-11 of the answer that Vaccari does not teach away from forming a recast layer. In this regard, we agree with the examiner, that considering Vaccari's teachings as a whole, that Vaccari teaches both a preferred embodiment which

utilizes a black paint coating to prevent a recast layer from forming and an alternative nonpreferred embodiment in which the black paint coating is omitted and a recast layer forms on the surface.<sup>4</sup>

For the reasons stated above, the decision of the examiner to reject claim 9 under 35 U.S.C. § 103 is affirmed.

**Claims 10 to 15 and 20**

In accordance with 37 CFR § 1.192(c)(7), we have selected claim 10 as the representative claim from the appellant's grouping of claims 10 to 15 and 20 to decide the appeal on this rejection under 35 U.S.C. § 103. See page 7 of the appellant's brief.

With respect to dependent claim 10, the examiner further determined (final rejection, p. 4) that

it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the

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<sup>4</sup> One is not taught away from a nonpreferred embodiment by a preferred embodiment. See In re Susi, 440 F.2d 442, 446, n. 3, 169 USPQ 423, 426, n. 3 (CCPA 1971).

laser shock peening method of Vaccari on the edges of turbine blades to improve their fatigue life since it was known in the art that the edges of such blades were subject to high fatigue.

The appellant argues (brief, pp. 17-18) that the above-noted obviousness determination made by the examiner is in error since there is nothing in Vaccari, Duley and Fishter which teaches or suggests laser shock peening of edges of turbine blades.

The appellant's argument is unpersuasive since the examiner is not relying solely on Vaccari, Duley and Fishter in rejecting claim 10. As set forth by the examiner on page 11 of the answer, in addition to the applied prior art the examiner is relying on the knowledge that it was well-known that engine blade edges were subject to high fatigue.<sup>5</sup> In view of this well-known knowledge, we agree with the examiner that it would have been obvious to an artisan to laser shock peen those engine blade edges for the self evident advantage of reducing fatigue.

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<sup>5</sup> The appellant has not contested the examiner's application of this well-known knowledge.

For the reasons stated above, the decision of the examiner to reject claim 10 under 35 U.S.C. § 103 is affirmed. In accordance with 37 CFR § 1.192(c)(7), claims 11 to 15 and 20 fall with claim 10. Thus, it follows that the decision of the examiner to reject claims 11 to 15 and 20 under 35 U.S.C. § 103 is also affirmed.

**Claims 16 to 19**

In accordance with 37 CFR § 1.192(c)(7), we have selected claim 16 as the representative claim from the appellant's grouping of claims 16 to 19 to decide the appeal on this rejection under 35 U.S.C. § 103. See page 8 of the appellant's brief.

With respect to dependent claim 16, the examiner further determined (final rejection, p. 4) that

[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to extend the beam spots beyond the edge of the part to ensure complete coverage of the part, as a matter of simple geometry.

The appellant argues (brief, pp. 18-19) that the above-noted obviousness determination made by the examiner is in error since there is nothing in Vaccari, Duley and Fishter which teaches or suggests to extend the beam spots beyond the edge of the turbine blade.

The appellant's argument is unpersuasive since the examiner is not relying solely on Vaccari, Duley and Fishter in rejecting claim 16. As set forth by the examiner on page 12 of the answer, in addition to the applied prior art the examiner is relying on simple geometry to establish how one skilled in the art would have applied overlapping laser spots as taught by Vaccari along an edge of a turbine blade. In view of this simple geometry, we agree with the examiner that it would have been obvious to an artisan to extend the beam spots beyond the edge of the turbine blade to obtain full coverage on the blade.

For the reasons stated above, the decision of the examiner to reject claim 16 under 35 U.S.C. § 103 is affirmed. In accordance with 37 CFR § 1.192(c)(7), claims 17 to 19 fall with

claim 16. Thus, it follows that the decision of the examiner to reject claims 17 to 19 under 35 U.S.C. § 103 is also affirmed.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1 to 5 and 9 to 20 under 35 U.S.C. § 103 is affirmed.

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

AFFIRMED

IRWIN CHARLES COHEN	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
JEFFREY V. NASE	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
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	)	
MURRIEL E. CRAWFORD	)	
Administrative Patent Judge	)	

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APPEAL NO. 1997-2075 - JUDGE NASE  
APPLICATION NO. 08/362,362

APJ NASE

APJ COHEN

APJ CRAWFORD

DECISION: **AFFIRMED**

Prepared By: Gloria Henderson

**DRAFT TYPED:** 20 May 99

**FINAL TYPED:**