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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 22

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SEETHARAMAIAH MANNAVA, ALBERT E. MCDANIEL,
WILLIAM D. COWIE and HERBERT HALILA

Appeal No. 97-2596
Application No. 08/319,345[1]

ON BRIEF

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 through 5, which are all of the claims pending in this application.

We REVERSE and enter a new rejection pursuant to 37 CFR

[1] Application for patent filed October 6, 1994.

§ 1.196(b).

BACKGROUND

The appellants' invention relates to a laser shock peened dovetail assembly component. Claim 1 is representative of the subject matter on appeal and a copy of claim 1, as it appears in the appendix to the appellants' brief, is attached to this decision.

The prior art references of record relied upon by the examiner as evidence of obviousness under 35 U.S.C. § 103 are:

Morikawa et al.[2] (Morikawa)	59-70811 (Japan)	April 4, 1984

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

In addition, this panel of the Board will rely upon admitted prior art (see page 5, infra).

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

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[2] In determining the teachings of Morikawa, we will rely on the translation provided by the PTO. A copy of the translation is attached for the appellants' convenience.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellants regarding the § 103 rejection, we make reference to the examiner's answer (Paper No. 19, mailed November 22, 1996) for the examiner's complete reasoning in support of the rejection, and to the appellants' brief (Paper No. 18, filed July 5, 1996) and reply brief (Paper No. 20, filed January 13, 1997) for the appellants' arguments thereagainst.

OPINION

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

Claim 1 is directed to a dovetail assembly component of a gas turbine engine for mounting blades around a rotor disk periphery. One region of the dovetail assembly component is a transition portion between an area of minimum width, in cross section, and a pressure face of the dovetail assembly component and has deep compressive residual stresses imparted by laser

shock peening. The pressure face of the dovetail assembly component is a contact surface between a complementary dovetail blade slot and dovetail blade root. The one region extends inward from a laser shocked surface of the dovetail assembly component along the transition portion of the dovetail assembly component.

The examiner determined (answer, p. 3) that Morikawa "discloses a dovetail assembly" wherein surfaces thereof are shot peened and that Vaccari discloses that laser shock peening is an alternative to shot peening. The examiner then concluded that it would have been obvious to substitute laser shock peening for shot peening in the dovetail assembly of Morikawa.

The appellants argue (brief, pp. 4-5) that Morikawa discloses a fir tree assembly, not a dovetail assembly. We agree. As shown in Figures 2-6 of Morikawa, Morikawa's components include a fir tree assembly not a dovetail assembly. While the substitution of a dovetail assembly for the fir tree assembly may have been obvious to one of ordinary skill in the art at the time the invention was made, such a rejection was not made by the examiner. Since all the limitations of claim 1 are

not taught or suggested by the prior art applied by the examiner, we are constrained to reverse the examiner's rejection of claim 1, and claims 2 through 5 dependent thereon, under 35 U.S.C. § 103.

New ground of rejection

Under the provisions of 37 CFR § 1.196(b), we enter the following new ground of rejection.

Claims 1 through 5 are rejected under 35 U.S.C. § 103 as being unpatentable over admitted prior art in view of Vaccari and Morikawa.

Our review of the section entitled "Description of Related Art" (specification, pp. 2-5) leads us to conclude that one skilled in the art would have taken the following to be admitted prior art. A gas turbine engine wherein the rotor blades have a dovetail root received in dovetail slots of the rotor disk. In addition, it was known that both the dovetail root of the rotor blades and the dovetail slots of the rotor disk were subjected to high stresses and stress risers.

Vaccari discloses that laser shock peening has only recently become a commercially feasible alternative to shot peening for enhancing the fatigue life of metal parts. Vaccari teaches that compared to shot peening, laser shock peening develops at least equivalent residual compressive stress, but to depths two-to-

three times greater. Lastly, Vaccari discloses that potential applications for laser shock peening include the blades, vanes, disks, etc. of turbines.

Morikawa discloses a turbine wherein blades 1 are imbedded into wheel 2 at each cavity by a well-known method. As shown in Figures 2-6, Morikawa uses fir trees as the well-known method of imbedding the blades 1 to the wheel 2. Morikawa teaches to shot peen portions of the wheel (Figures 3 and 4) and the blades (Figures 5 and 6) which are subject to crack generation (see Figure 2) caused by stress generated by centrifugal force and temperature changes.

In applying the test for obviousness,[3] we reach the conclusion that it would have been obvious to one of ordinary skill in the art at the time the appellants' invention was made to subject the surfaces of both the dovetail root of the rotor blades and the dovetail slots of the rotor disk of the admitted prior art to peening as suggested by Morikawa to relieve the high

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[3] 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).

stresses and stress risers and to utilize laser shock peening as the peening technique in view of the teachings of Vaccari of the advantages of laser shock peening over conventional shot peening.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1 through 5 under 35 U.S.C. § 103 is reversed and a new rejection of claims 1 through 5 under 35 U.S.C. § 103 has been added pursuant to provisions of 37 CFR § 1.196(b).

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b)(amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53131, 53197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides that, "A new ground of rejection shall not be considered final for purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellants, 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 proceedings (§ 1.197(c)) as to the rejected claims:

> (1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .
> (2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

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

REVERSED; 37 CFR § 1.196(b)

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

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APPENDIX

1. A dovetail assembly component of a gas turbine engine for mounting blades around a rotor disk periphery, said dovetail assembly component comprising:

a metallic body having at least a portion of said body subject to a stress field due to forces generated by the engine's operation,

at least one stress riser located in said portion that causes stress concentration in said stress field when the rotor is rotating,

at least one region of the component around said stress riser having deep compressive residual stresses imparted by laser shock peening,

said stress riser is a transition portion of the component between an area of minimum width, in cross section, and a pressure face of the component wherein said pressure face is a contact surface between a complementary dovetail blade slot and dovetail blade root formed between adjacent disk posts circumferentially disposed around a centerline axis of the disk, and

wherein said region extends inward from a laser shocked surface of the component along said transition portion of the component.

APPEAL NO. 97-2596 - JUDGE NASE
APPLICATION NO. 08/319,345

APJ NASE

APJ COHEN

APJ CRAWFORD

DECISION: **REVERSED**;
37 CFR § 1.196(b)

Prepared By: Delores A. Lowe

DRAFT TYPED: 30 Apr 98

FINAL TYPED:

Mail copy of translation with decision.