

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* WARREN D. GROSSKLAUS, JR.  
and  
MATTHEW N. MILLER

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Appeal 2007-0164  
Application 10/286,122  
Technology Center 1700

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Decided: January 11, 2007

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Before EDWARD C. KIMLIN, CHARLES F. WARREN, and  
CATHERINE Q. TIMM, *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-19. Claim 1 is illustrative:

1. A method for repairing a stationary shroud of a gas turbine engine, comprising the steps of:

furnishing the stationary shroud that has previously been in service, wherein the stationary shroud is made of a base metal;

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removing any damaged material from a flow-path region of the stationary shroud to leave an initially exposed base-metal flow-path surface; and

applying a base-metal restoration overlying the initially exposed flow-path surface, the step of applying including the steps of

furnishing a source of a structural material that is compatible with the base metal, and

depositing the source of the structural material overlying the initially exposed base-metal flow-path surface of the stationary shroud by laser cladding to form a repaired base-metal flow-path surface.

The Examiner relies upon the following references as evidence of obviousness:

Mehta	US 4,743,733	May 10, 1988
Kerrand	US 5,372,861	Dec. 13, 1994
Dimitrienko	US 5,759,641	Jun. 2, 1998
Jones	US 5,889,254	Mar. 30, 1999
Islam	US 6,269,540 B1	Aug. 7, 2001

Appellants' claimed invention is directed to a method for repairing a stationary shroud of a gas turbine engine. The method entails removing damaged material from the stationary shroud before depositing a structural material in the form of a powder or wire by laser cladding.

The appealed claims stand rejected under 35 U.S.C. § 103(a) as follows:

- (a) claims 1-7, 9, 11-15, 17, 19, and 20 over Mehta in view of Dimitrienko or Islam further in view of Kerrand or Jones;
- (b) claims 10 and 18 over Mehta in view of Islam and Jones; and
- (c) claims 8 and 16 over Mehta in view of Dimitrienko and Kerrand.

We have thoroughly reviewed each of Appellants' arguments for patentability. However, we are in complete agreement with the Examiner that the claimed subject matter would have been obvious to one of ordinary skill in the art within the meaning of § 103 in view of the applied prior art. Accordingly, we will sustain the Examiner's rejections for the reasons set forth in the Answer, which we incorporate herein, and we add the following for emphasis only.

Appellants do not dispute the Examiner's factual determination that:

Mehta et al[.] teach repair of metallic portions of metal articles by a laser cladding process that concurrently applies a powder metal and the laser beam to the surface to be repaired, that was damaged during manufacture, thermal cycling, wear, etc., noting that alternative conventional localized repair means, such as electron beam welding or arc welding, adversely affect properties of materials of construction due to relatively high heat input that results in distortion in affected zones (col. 1, especially ll. 21-31).

Answer 3, last paragraph. As pointed out by the Examiner, Mehta expressly teaches that the disclosed process can be used to repair "aircraft gas turbine engine components" that are damaged "from manufacturing error as well as from operational thermal cycling, wear, part interference, etc." (col. 2, ll. 41-43). In addition, Mehta teaches that "[a]lthough such damage can occur to *stationary* as well as rotating parts, damage is particularly critical in the rotating components because of the stresses generated in operation, during rotation (col. 2, ll. 46-50, emphasis added).

Appellants' principal argument is that neither Mehta, nor any of the cited references, teaches repairing a stationary shroud of a gas turbine engine, as presently claimed. However, we concur with the Examiner that one of ordinary skill in the art would have had the requisite reasonable expectation of success in applying the repair method disclosed by Mehta to stationary shrouds of a gas turbine engine. It is well settled that absolute predictability is not required for a finding of obviousness under § 103, but only a reasonable expectation of success. *In re O'Farrell*, 853 F.2d 894, 903-04, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988). While Appellants contend that “[n]o other portion of the gas turbine engine is repaired in the same manner as the stationary turbine shroud” (principal Br. 6, third paragraph), Appellants have not proffered any objective evidence which establishes that repair methods used on other components of gas turbine engines are not used on the stationary shroud. Manifestly, counsel's arguments in the Brief are no substitute for such objective evidence, and Appellants' have presented no evidence that one of ordinary skill in the art of repairing stationary shrouds in a gas turbine engine would not have considered the laser cladding process of Mehta to be applicable to such stationary shrouds.

Appellants also take issue with the Examiner's reasoning that common sense would have dictated that damaged material from the stationary shroud should be removed before repair. However, the Examiner specifically cited Islam and Dimitrienko for teaching the need to remove or eliminate damaged areas of turbine parts before repairing by laser cladding.

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Moreover, we fully concur with the Examiner's reasoning that the cleaning of substrates before coating procedures was such an old and well-known practice in the coating art that "one of ordinary skill in the art would have expected it to be the exception not to clean off the damaged area and remove damage [sic, damaged] material before applying repair coatings" (Answer 9, second paragraph). We are not persuaded by Appellants' argument that "because removing of material is an expensive process step, what would be 'common sense' is to try to accomplish repair without a separate removal step" (principal Br. 8-9). Certainly, while it may be obvious to try to avoid the expensive preparation step, we find no basis for concluding that it would have been unobvious to make the necessary investment in the preparation step to effect optimum quality.

Regarding claims 10 and 18, we agree with the Examiner that Islam and Jones establish the obviousness of utilizing either powder or wire sources for the coating material. Concerning claims 8 and 16, we also concur with the Examiner that Dimitrienko establishes the obviousness of depositing the powder source before laser treatment.

As a final point, we note that Appellants base no argument upon objective evidence of nonobviousness, such as unexpected results, which would serve to rebut the inference of obviousness established by the Examiner.

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In conclusion, based on the foregoing and the reasons well stated by the Examiner, the Examiner's decision rejecting the appealed claims 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) (2004).

AFFIRMED

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