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 BGL/Rolls-Royce Corporation
 Capital Center South Tower- Suite 1100
 201 N. Illinois Street
 Indianapolis, IN 46204

EXAMINER

GOLDEN, CHINNESSA T

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PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ADAM L. CHAMBERLAIN, ANDREW J. LAZUR,
and ROBERT J. SHINAVSKI

Appeal 2018-003646
Application 14/210,928
Technology Center 1700

Before TERRY J. OWENS, N. WHITNEY WILSON, and
SHELDON M. MCGEE, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

The Appellant (Rolls-Royce Corporation) appeals under
35 U.S.C. § 134(a) from the Examiner's rejection of claims 1–11 and 20.
We have jurisdiction under 35 U.S.C. § 6(b).

The Invention

The claims are to a ceramic matrix composite and an article made of
the composite. Claim 1 is illustrative:

1. A ceramic matrix composite comprising:
a matrix; and
a fiber preform embedded within the matrix;

wherein the matrix includes a rigidization layer comprising silicon carbide on the fiber preform, an infiltration layer on the rigidization layer, and a barrier layer sandwiched between the rigidization layer and the infiltration layer, the barrier layer comprising silicon nitro-carbide or silicon nitride.

The References

Lamouroux	US 6,068,930	May 30, 2000
Sherwood	US 2006/0004169 A1	Jan. 5, 2006
Gray	US 2006/0147622 A1	July 6, 2006
Lee	US 2007/0128421 A1	June 7, 2007

The Rejections

The claims stand rejected under 35 U.S.C. § 103(a) as follows: claims 1, 2, 4–9, and 20 over Lamouroux in view of Sherwood; claims 3 and 10 over Lamouroux in view of Sherwood and Gray; and claim 11 over Lamouroux in view of Sherwood, Gray, and Lee.

OPINION

We reverse the rejections. We need address only the independent claims (1 and 20). Those claims require a ceramic matrix composite including a barrier layer comprising silicon nitrocarbide or silicon nitride.

Lamouroux makes a ceramic matrix composite whose matrix is formed by chemical vapor infiltrating reinforcing fibers with layers of relatively flexible material alternating with layers of relatively rigid ceramic material (col. 2, ll. 27–32). “[T]he relatively flexible layers are made of one or more materials presenting an anisotropic character and an ability to deform elasticity in shear transversely relative to the layers” (col. 3, ll. 11–14) to deflect cracks reaching those layers (col. 2, ll. 30–31). The exemplary materials of which the relatively flexible layers can be made are “pyrolytic carbon, in particular pyrolytic carbon of the rough laminar type, boron

nitride, boron-doped carbon, and other materials having equivalent properties and capable of being built up by chemical vapor infiltration” (col. 3, ll. 14–19).

Sherwood makes a ceramic matrix composite by coating fibers with a ceramic-forming polymer and curing the polymer to form a ceramic composite, and increasing the density of the ceramic composite by infiltrating the coated fibers with a ceramic-forming polymer which can be a silicon nitrocarbide-forming polymer to form a matrix between the coated fibers, and proceeding through one or more curing and pyrolysis cycles (¶¶ 36, 51). “[T]he fibers may be a non-oxide fiber chosen from the group comprising: silicon carbide, near-silicon carbide, silicon borocarbide, silicon carbonitride, or silicon nitrocarbide (SiNC) fibers” (¶ 38), commercial examples of which include “Sylramic treated to form a boron-nitride (BN) interface” (*id.*).

The Examiner finds that Sherwood’s disclosure that the fibers can be silicon nitrocarbide or SylramicTM treated to form a boron nitride interface “teaches that the silicone [sic] nitro-carbide and boron-nitride are functionally equivalent” (Ans. 16), so “the silicon nitro-carbide of Sherwood meets the disclosed other material having equivalent properties of Lamouroux [(col. 3, ll. 11–19)]” (*id.*). The Examiner concludes that “[i]t would have been obvious to a person of the ordinary skill in the art at the time of the invention to incorporate the silicon nitrocarbide of Sherwood into the barrier layer of Lamouroux in order to increase the density of the composite (page 6, paragraph [0051])” (Ans. 4).

The Examiner does not establish that Sherwood’s disclosure of a silicon nitrocarbide fiber and a boron nitride interface on a SylramicTM fiber

would have indicated to one of ordinary skill in the art that silicon nitrocarbide is functionally equivalent to boron nitride or has properties equivalent to those of boron nitride.

Thus, the Examiner has not set forth a factual basis sufficient to support a conclusion of obviousness of the Appellant's claimed invention. *See In re Warner*, 379 F.2d 1011, 1017 (CCPA 1967) ("A rejection based on section 103 clearly must rest on a factual basis, and these facts must be interpreted without hindsight reconstruction of the invention from the prior art."). Accordingly, we reverse the rejections.

DECISION

The rejections under 35 U.S.C. § 103(a) of claims 1, 2, 4–9, and 20 over Lamouroux in view of Sherwood; claims 3 and 10 over Lamouroux in view of Sherwood and Gray; and claim 11 over Lamouroux in view of Sherwood, Gray, and Lee are reversed.

The Examiner's decision is reversed.

REVERSED