

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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

---

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

---

Ex parte LARRY R. BERSUCH,  
ROSS A. BENSON,  
PATRICK D. SHEAHEN  
and CHARLES M. RODENBERGER

---

Appeal No. 2006-0132  
Application 09/946,627<sup>1</sup>

---

ON BRIEF

---

Before GARRIS, WARREN, and PAK, Administrative Patent Judges.  
PAK, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 28, which are all of the claims pending in the above-identified application.

---

<sup>1</sup> Application for patent filed August 31, 2001.

FACTUAL BACKGROUND AND APPEALED SUBJECT MATTER

The subject matter on appeal "relates to assembly of components using Z-pins..." See the specification, page 1. This appealed subject matter is defined in twenty-eight claims. See the Brief, page 2. Of these claims, claims 1, 3, 7, 11, 13, 18, 22, 23, 27 and 28 are representative and read as follows:

1. A method for bonding a woven preform to a composite component, the method comprising:

(a) providing a woven pi-shaped preform having a base and a pair of spaced-apart legs that extend from the base and define a slot having inner surfaces, the preform being infused with uncured resin; then

(b) placing the base of the preform adjacent a surface of a composite component that is infused with an uncured resin; then

(c) inserting a plurality of pins, the pins extending into the base and into the component after insertion; then

(d) curing the resin in the preform and the resin in the component.

3. The method of claim 1, wherein:

step (c) comprises inserting the pins through the base outside of the legs and through the base between the legs, the pins being inserted through the base between the legs being parallel with the pins being inserted through the base outside of the legs.

7. A method for assembling first and second laminate components, the first component having an uncured resin, the second component having a cured resin, the method comprising:

Appeal No. 2006-0132  
Application No. 09/946,627

(a) providing a woven preform having a base and a pair of spaced-apart legs that extend from the base and define a slot having inner surfaces, the preform being infused with uncured resin; then

(b) placing the base of the preform adjacent a surface of the first component; then

(c) inserting a plurality of pins through a portion of the base between the legs and portions of the base outside of the legs, the pins being parallel to each other and extending into the base and into the first component after insertion;

(d) inserting the second component into the slot; then

(e) curing the resin in the preform and the resin in the first component, the surface of the first component being adhered to the base, at least one surface of the second component being adhered to at least one of the inner surfaces of the slot for retaining the second component within the slot.

11. The method of claim 7, wherein:

step (b) further comprises placing an adhesive between the base of the preform and the surface of the first component.

13. The method of claim 7, further comprising:

adhering at least one over-wrap ply to the preform before performing step (c).

18. The method of claim 16, further comprising:

adhering over-wrap plies to the preform before performing step (c).

22. A method for assembling first and second laminate components, the first component having an uncured resin, the second component having an uncured resin, the method comprising:

Appeal No. 2006-0132  
Application No. 09/946,627

(a) providing a woven preform having a base and a pair of spaced-apart parallel legs that extend from the base and define a slot having inner surfaces, the preform being infused with uncured resin; then

(b) placing an adhesive on a surface of the first component and placing the preform on the adhesive; then

(c) inserting a plurality of pins, the pins extending into the base and into the first component after insertion; then

(d) inserting the second component into the slot; then

(e) placing over-presses that are at least semi-rigid against outer surfaces of the legs and the base of the preform, each of the over-presses being generally triangular in cross-section for distributing a force across the outer surfaces of the preform;

(f) curing the resin in the preform and the resin in the first component, the surface of the first component being adhered to the base, at least one surface of the second component being adhered to at least one of the inner surfaces of the slot for retaining the second component within the slot.

23. The method of claim 22, further comprising:

adhering at least one over-wrap ply to the preform before preforming step (c).

27. A method of stiffening a laminate skin, the skin having an uncured resin, the method comprising:

(a) providing a woven preform having a base and a pair of legs that extends from the base, the preform being infused with uncured resin; then

(b) placing the preform on the skin and a pre-cured member into a slot between the legs;

(c) inserting a plurality of pins, the pins extending into the base and into the skin after insertion; then

Appeal No. 2006-0132  
Application No. 09/946,627

(d) placing over-presses that are at least semi-rigid against outer surfaces of the preform, the over-presses being used for distributing a force across the outer surfaces of the preform; then

(e) curing the resin in the preform and the resin in the skin, the skin being adhered to the base, the legs being at an angle to the base after curing.

28. The method of claim 27, wherein:

the over-presses are generally triangular in cross section, each having a first inner side that contacts on the legs, a second inner side that contacts the base, and an outer side that extends diagonally between the first and second inner sides.

Fourteen section 103(a) rejections are set forth in the Answer. See the Answer in its entirety. The first five rejections are based at least, in part, on a technical paper presented at the International the Society for the Advancement of Material and Process Engineering ("SAMPE") symposium in 2000. See the Answer, pages 4, 7, and 10-13. During prosecution of the application, the appellants submitted the technical paper "in order to leave no doubt that Applicant was complying with 37 CFR [§] 1.56." See the Brief, page 8.

This technical paper is authored by Steven Wanthal, Robin Wippich-Dienhart, and Anne Cenedella, The Boeing Company, St. Louis, Mo., Gerald Mabson and Lyle Deobald, The Boeing Company, Seattle, WA, Steve Owens, Lockheed Martin, Ft. Worth, TX and

Appeal No. 2006-0132  
Application No. 09/946,627

Victor Li and Dave Kane, Northrop Grumman, El Segundo, CA (hereinafter referred to as "Wanthal"). See Wanthal, page 1. The first page of Wanthal states "Copyright © 2000 The Boeing Company, Lockheed martin, Northrop Grumman. Society for Advancement of Material and Process Engineering, with permission." Id. According to the declaration executed by Stephen D. Owens on December 2, 2003 (hereinafter referred to as "the Owens declaration"), Wanthal "was presented at a Closed Session of the Society for Advancement of Material and Process Engineering (SAMPE) in 2000." See page 1. The Owens declaration further states at pages 1 and 2 that:

**I did not attend that particular session**, but have attended other Closed Sessions and am familiar with how these sessions are held.

...

**I do not have any written materials concerning entry to the particular Closed Session where the subject technical paper was given.** However, I am attaching to this declaration a portion of document advertising a recent SAMPE meeting. As shown on the second page, in order to be admitted to a Closed Session, one needs to have certification credentials based on a DD Form 2345 that has been approved by the government, or one must be employed by a company that is in the DoD's quarterly qualified U.S. contractor access list. I am attaching also to this declaration a sample of a DD Form 2345 for a particular individual. **In my experience, about forty to fifty people attend a Closed Session of this nature.** My understanding is that approximately the same number attended the Closed Session during which the subject technical paper was presented. (Emphasis ours.)

Appeal No. 2006-0132  
Application No. 09/946,627

The Owens declaration does not indicate that competing U.S. industries and/or those of ordinary skill in the art (U.S. and Canadian citizens) are unable to obtain certification credentials based on a DD Form 2345. See the Owens declaration in its entirety.

As also indicated at page 2 of the Owens declaration, the so-called "restriction" is printed on the first page of Wanthal, which reads as follows:

This paper contains research findings and technology developments in airframe composites technology that **may** constitute a significant enhancement of the national defense, and to the economic vitality of the United States; therefore access to foreign firms, institutions or persons must be controlled. The provisions of the International Traffic in Arms Regulation (22 CFR pt. 121 et seq.), the DOD Industrial Security Regulation (DOD 5220.22R) and the Department of Commerce Export Regulation (15 CFR pt. 770 et. Seq.) **may be** applicable to this submittal. (Emphasis added.)

This so-called "restriction" does not indicate that the provisions of International Traffic in Arms Regulation, the DOD Industrial Security Regulation and the Department of Commerce Export Regulation relied upon by the appellants are applicable to Wanthal. Nor do the regulations referred to in Wanthal call for exclusion of those U.S. industries (e.g., U.S. defense industries) and/or U.S. citizens interested in the subject matter in question

Appeal No. 2006-0132  
Application No. 09/946,627

from obtaining copies of Wanthal or attending the Closed Session. Indeed, there is no evidence in the record that any U.S. industries or U.S. citizens were ever denied from accessing or distributing the information in Wanthal based on the above regulations. See the record in its entirety.

As is apparent from the record, the declarant has no personal knowledge of the so-called "Closed Session" in question. See the Owens declaration, page 1. Nor is the declarant aware how the information in Wanthal was disseminated. See the Owens declaration in its entirety. As a result of the speculative nature of the declarant's statements in the Owens declaration regarding the so-called "Closed Session" and ambiguity relating to the so-called "restriction", the appellants were required to provide additional information to clarify the facts in this case consistent with 37 CFR § 41.50(d)(2004). See the ORDER dated April 5, 2005. Specifically, we stated at pages 3 and 4 of the ORDER that:

As is apparent from the Owens declaration, the declarant did not attend the Closed Session in question in which the information in the Wanthal et al. reference was disseminated. Nor was there any indication in the Owens declaration that the declarant was informed by all of the individuals (e.g., authors, employers, etc...), including SAMPE, who had access to [information on] the Wanthal et al reference regarding its availability to the general public or contractors in this country. ... Thus, pursuant to 37 CFR §

Appeal No. 2006-0132  
Application No. 09/946,627

41.50(d), it is ORDERED that the appellants:

1) Identify an individual who attended the Closed Session in question on behalf of the declarant's employer and obtain facts from that individual regarding how the information in the Wanthal et al. reference (e.g., in the form of a display, an actual print, etc.) was disseminated at the Closed Session and who disseminated such information in the Closed Session;

2) Determine from the authors (Steven Wanthal, Robin Wippich-Dienhart, Anne Cenedella, Victor Li and Dave Kane) and SAMPE (i) whether and when they disseminated the information in the Wanthal et al reference to anyone with or without a secrecy agreement, (ii) whether and when they published the information in the Wanthal et al. reference, and (iii) whether and when they placed the information in the Wanthal et al. reference in any publicly accessible data bases; and...

The appellants must submit the information (1) and (2) requested above in the form of a declaration or an affidavit. If the appellants are unable to obtain the information (1) and (2), after diligent effort, they must provide a declaration or an affidavit setting forth facts and explanations as to why the information (1) and (2) are unavailable.

Subsequent to this ORDER, the appellants submitted, inter alia, a Reply Brief, along with an additional declaration executed by Scott W. Beckwith on July 5, 2005 (hereinafter referred to as "the Beckwith declaration") and a copy of the SAMPE International Policy and Practice (1996). The Beckwith declaration, at pages 1 through 4, states that:

Since 1998, I have served as the International Technical Director for The Society for the Advancement

Appeal No. 2006-0132  
Application No. 09/946,627

of Material and Process Engineering ("SAMPE"), with key responsibilities over two technical journals (SAMPE Journal and Journal of Advanced Materials), technical conferences, technical symposia and overall society technical guidance. I am familiar with the policies and procedures set by the Board of Directors of SAMPE for "closed session" papers at technical conferences/symposia, including the SAMPE symposium in, on, or about May 22, 2000 ("the May 2000 International SAMPE Symposium & Exhibition") in which the Wanthal paper was presented in a "closed session" on May 22, 2000.

...

The procedures for attending the "closed session" presentations at the May 2000 International SAMPE Symposium & Exhibition, were the same as the policies and procedures set by the Board of Directors for SAMPE in 1996 ... The procedures for Closed Paper Admittance were also published in the Preliminary Program of the May 2000 SAMPE Conference.

...

In order to attend the "closed sessions," including the session in which the Wanthal paper was presented, U.S. and Canadian government employees had to provide photographic identification and proof of employment with their respective government... Those who were not employed by the U.S. or Canadian governments had to provide proof of citizenship, photographic identification, and certification credentials based upon Department of Defense Form 2345 ("DD Form 2345")... The DD Form 2345 could be for the attendee individually, or for the attendee's employer with proof of employment... To the best of my knowledge and understanding, anyone not complying with these rules was not admitted to the "closed sessions."

...

SAMPE also provides copies of the "closed sessions" papers for sale on site during the Symposium days only. It is our policy that approximately twenty copies of each of the papers presented in the "closed sessions" are bound together and sold at the SAMPE conference. In order to purchase the bound, collection of "closed sessions" papers, the purchaser had to provide the same information required to attend the "closed sessions."

Appeal No. 2006-0132  
Application No. 09/946,627

The SAMPE International Policy and Practice provides in relevant part:

TITLE: REQUIREMENTS FOR THE CONDUCT OF RESTRICTED ATTENDANCE SESSIONS

SCOPE: This IPM specifies the requirements and the guidelines for conducting restricted attendance sessions at any SAMPE meeting.

POLICY: SAMPE will abide by governmental requirements that control the dissemination of information. The organizers of the event are responsible for knowing the requirements and satisfying them.

PRACTICE:

A. United States

1. Definition: A restricted attendance session is a session which contains information which falls under the purview of the United States Munitions List, Section 121.01 "International Traffic in Arms Regulations" and Export Administration Regulation (EAR) "Commodity Control List", Section 3.79 and is not classified. The information in a restricted attendance session may only be transferred to United States citizens, Canadian Citizens, resident aliens, or non-U.S./Canadian citizens who have received approval to attend the session from the U.S. Defense Intelligence Agency. A resident alien is a holder of a permanent residency visa.

2. U.S. Policy: The information transmitted in a restricted attendance session shall be limited to proven United States citizens or resident aliens. All attendees at the restricted attendance sessions shall be verified to be United States or Canadian citizens, resident aliens, or non-Defense Intelligence Agency prior to admittance, accord to the provisions of the IPM.

...

d. Processes

i) U.S. citizens, Canadian citizens and resident aliens are required to complete DD form 2345 and to submit it to: Commander, Defense Logistics Services,... If attendee's company is currently certified under the Export Controlled DOD Technical Data Agreement form 2345, they are not required to recertify; however, they must be urged to bring a copy of their firm's certification form to the meeting. They must also bring some proof of company affiliation. A business card will suffice.

ii) Non-U.S./Canadian citizens who wish to attend closed session must submit a request for attendance through their embassy in Washington D.C. to the U.S. Defense Intelligence Agency.

The appellants did not submit the information requested in the ORDER. Nor did the appellants provide facts relating to their unsuccessful diligent efforts in the form of an affidavit or a declaration. Rather, the appellants merely asserted their inability to submit the information requested in the ORDER in the Reply Brief. Specifically, the appellants stated at pages 2 and 3 of the Reply Brief<sup>2</sup> that:

Applicant is unaware at this time of anyone employed by Applicant that attended the Closed Session, and therefore cannot respond to this request.

...

---

<sup>2</sup> Presumably, these statements were made consistent with Rule 1.56 referred to by the appellants at page 8 of the Brief.

Appeal No. 2006-0132  
Application No. 09/946,627

After diligent efforts, Applicant was unable to obtain declarations or affidavits from the Owens' co-authors because at least The Boeing Company did not feel comfortable with their employees making such statements. The only co-author attending the May 2000 SAMPE Conference was Steven Wanthal, who presented the paper in a closed session and is employed by The Boeing Company.

Finally, in spite of ample opportunities to submit additional evidence, the appellants proffer no other evidence to demonstrate that there was either explicit or implicit obligation of confidentiality. Nor was there any evidence that the regulations relied upon precluded a significant segment of the interested public from accessing the information in Wanthal.

Yet, the appellants argued that the Owens and Beckwith declarations were sufficient to establish that Wanthal was not publicly accessible and thus, it is not "prior art" within the meaning of 35 U.S.C. § 102(a) or § 102(b). See the Brief, pages 9-13 and the Reply Brief, pages 1-5. The appellants also argued that the other prior art references relied upon by the examiner would not have suggested the claimed subject matter within the meaning of 35 U.S.C. § 103(a). See the Brief, pages 13-24. The examiner, on the other hand, took the position that Wanthal was qualified as "printed publication" within the meaning of

Appeal No. 2006-0132  
Application No. 09/946,627

35 U.S.C. § 102(b) or was since "known ... by others" in this country before the invention by the applicant within the meaning of 35 U.S.C. § 102(a). See the Answer, pages 28-30 and the Response to the Remand dates October 12, 2005, pages 1-2. Even if Wanthal was not treated as "prior art" within the meaning of section 102(a) or 102(b), the examiner opined that the other prior art references relied upon would have led a person having ordinary skill in the art to the claimed subject matter within the meaning of 35 U.S.C. § 103(a). See the Answer, pages 14-36. This appeal ensued.

EVIDENCE

The prior art references relied upon by the examiner in support of the section 103(a) rejections before us are:

Abildskov (deceased)	4,782,864	Nov. 8, 1988
Hertzberg	4,966,802	Oct. 30, 1990
Boyce et al. (Boyce)	5,800,672	Sep. 1, 1998
Campbell et al. (Campbell)	5,827,383	Oct. 27, 1998
Childress	5,863,635	Jan. 26, 1999
Alston et al. (Alston)	5,868,886	Feb. 9, 1999
Barnes et al. (Barnes)	6,007,894	Dec. 28, 1999
Sloman et al. (Sloman) (Published International Patent Application under PCT)	WO 98/50214	Nov. 12, 1998
Breuer et al. (Breuer)	DE 198 32 441	Jan. 5, 2000

Appeal No. 2006-0132  
Application No. 09/946,627

(Published German Patent Application)

Bersuch et al. (Bersuch), "Affordable Composite Structure for Next Generation Fighters," Lockheed Martin Corporation, Published by Society for the Advancement of Material and Process Engineering with permission, pp. 1-11 (1998).

Sheahen et al. (Sheahen), "Robust Composite Sandwich Structures," Lockheed Martin Tactical Aircraft Systems, Published by the American Institute of Aeronautics and Astronautics, Inc., with permission, pp. 1-12 (1998).

Owens et al. (Owens), "Tension Pull-off and Shear Test Methods to Characterize 3-D Textile Reinforced Bonded Composite Tee-Joints," Composite Structures Theory and Practice, ASTM STP 1383, Editors Grant et al., pp. 398-409 (2000).

Wanthal et al. (Wanthal), "Interlaminar Reinforced Composite Development for improved Damage Tolerance," The Boeing Company, Lockheed Martin, Northrop Grumman, Published by Society for Advancement of Material and Process Engineering with permission, pp. 1-15 (2000).

#### REJECTIONS

The appealed claims stand rejected as follows:

- 1) Claims 1, 2, 4, 6, 16 and 17 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Wanthal and Campbell;
- 2) Claim 3 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Wanthal, Campbell and at least Childress and/or Boyce;
- 3) Claims 18 through 21 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Wanthal, Campbell, at least Bersuch, Sheahen and/or Owens and optionally Alston;
- 4) Claim 27 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Wanthal, Campbell and Barnes;
- 5) Claims 27 and 28 under 35 U.S.C. § 103(a) as unpatentable

Appeal No. 2006-0132  
Application No. 09/946,627

- over the combined disclosures of Wanthal, Campbell and Sloman;
- 6) Claims 1, 2, 4, 5, 16 and 17 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Breuer, Abildskov and Campbell;
  - 7) Claims 3, 7 through 9 and 15 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Breuer, Abildskov, Campbell and at least Childress and/or Boyce;
  - 8) Claims 10 and 27 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Breuer, Abildskov, Campbell at least Childress and/or Boyce, and Barnes;
  - 9) Claims 10, 27 and 28 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Breuer, Abildskov, Campbell, at least Childress and/or Boyce, and Sloman;
  - 10) Claims 11 and 12 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Breuer, Abildskov, Campbell, at least Childress and/or Boyce, and Hertzberg;
  - 11) Claims 13, 14 and 18 through 21 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Breuer, Abildskov, Campbell, at least Childress and/or Boyce, at least Bersuch, Sheahen and/or Owens, and optionally Alston;
  - 12) Claims 22, 25 and 26 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Breuer, Abildskov, Campbell, Hertzberg and Barnes;
  - 13) Claims 22, 25 and 26 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Breuer, Abildskov, Campbell, Hertzberg and Sloman; and
  - 14) Claims 23 and 24 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Breuer, Abildskov, Campbell, Hertzberg, either Barnes or Sloman, at least Bersuch, Sheahen and/or Owens and optionally Alston.

DISCUSSION OF FACTS AND CONCLUSIONS

We have carefully reviewed the claims, specification and prior art, including all of the arguments advanced by both the examiner and the appellants in support of their respective positions. This review has led us to conclude that the examiner's section 103(a) rejections are well founded. Accordingly, we affirm the examiner's decision rejecting the claims on appeal under section 103(a) for essentially the findings and conclusions set forth in the Answer and the Supplemental Answer. We add the following primarily for emphasis and completeness.<sup>3</sup>

To establish a prima facie case of obviousness under section 103, there must be some teaching, suggestion and/or motivation in the applied prior art taken as a whole and/or knowledge generally available to a person having ordinary skill in the art, which would have led that person to the claimed invention, without any

---

<sup>3</sup> For purposes of this appeal, we limit our discussion to claims 1, 3, 7, 11, 13, 18, 22, 23, 27 and 28 consistent with 37 CFR § 41.37(c)(1)(vii)(2004). The appellants' arguments in the Brief are limited to the groups of claims represented by the above-identified claims.

Appeal No. 2006-0132  
Application No. 09/946,627

recourse to the teachings in the appellants' disclosure. See, e.g., Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1629-30 (Fed. Cir. 1996). The knowledge generally available to a person having ordinary skill in the art includes facts admittedly well known in the art. In re Nomiya, 509 F.2d 566, 570-71, 184 USPQ 607, 611-12 (CCPA 1975)(The admitted prior art in the appellants' specification may be used in determining the patentability of a claimed invention.); see also In re Davis, 305 F.2d 501, 503, 134 USPQ 256, 258 (CCPA 1962).

#### REJECTION 1)

As evidence of obviousness of the subject matter defined by claims 1, 2, 4, 6, 16 and 17, the examiner relies on the combined disclosures of Wanthal and Campbell. According to the examiner (the Answer, pages 7-9):

Wanthal discloses a method of bonding a woven pre-form (woven 3-d textile preform, page 2) to a composite component (pre-preg tape) by providing a woven pi-shaped pre-form having a base and a pair of spaced apart legs that extend from the base and define a slot having inner surfaces (pi shaped), the pre-form being infused with uncured resin (resin infused; page 13), placing the base of the pre-form adjacent a surface of a composite component that is infused with an incurred resin (pre-preg; page 13), inserting a plurality of pins extending into the base (Z-pins inserted into the pre-form flange), then curing the resin in the pre-form and the component (co-curing, autoclaved cured; page 13).

Appeal No. 2006-0132  
Application No. 09/946,627

As to the limitation that the composite component is infused with an uncured resin, Wanthal discloses the composite component is a pre-preg tape. Pre-preg tapes are composites with resin permeated throughout the tape, therefore this is considered to be a composite infused with resin (permeated with resin). Additionally, it is well known in the art to either pre-impregnate composite components or to resin infuse the composites. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a method of bonding shown in Wanthal where the composite tape is infused with resin as is a well known alternative to pre-impregnated tape.

As to the limitation that the plurality of pins are inserted into the base and into the component, Wanthal discloses the pins are inserted into the base (pre-form flange) but it is unclear as to whether the pins extend into the component as well (It is noted that the copies of the Wanthal reference that Applicant provided has unclear figures that are too dark to determine whether the pins extend into the component layer). Campbell shows it is known in the art of bonding pre-forms to composite to extend the pins through the pre-form base and the composite component in order to provide structural improvements such as preventing crack propagation (column 2, lines 3-35; column 4, lines 1-10). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of bonding a pre-form to a composite as shown by Wanthal by inserting the pins such that they extend into the base and into the component in order to provide a stronger joint as shown by Campbell.

The appellants do not dispute the examiner's findings above. See the Brief, pages 8-13. Nor do the appellants contest the examiner's determination that the combined teachings of Wanthal and Campbell would have rendered the subject matter defined by

Appeal No. 2006-0132  
Application No. 09/946,627

claims 1, 2, 4, 6, 16 and 17 obvious to one of ordinary skill in the art within the meaning of section 103(a). Id. Rather, the appellants argue that Wanthal is not available as "prior art" because Wanthal is not a "printed publication" within the meaning of Section 102(b) and was not "'known by others' in this country before the invention by the applicant within the meaning of § 102(a)." See, e.g., the Brief, page 12.

We are not persuaded by the appellants' arguments.

35 U.S.C. § 102 (2002) reads in part:

A person shall be entitled to a patent unless

(a) the invention was known ... by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States... .

Although section 102(a) broadly defines prior art as an "invention ... known ... by others," it is interpreted as including only publicly known or publicly accessible information. See Chisum on Patents § 3.05[3] at 3-176 (2001). Consistent with Chisum on Patents, the court in Baron v. Bausch & Lomb Inc., 25 USPQ2d 1641, 1662 (W.D. N.Y. 1992) stated that:

Appeal No. 2006-0132  
Application No. 09/946,627

The phrase "known" has been interpreted to mean publicly known. Public knowledge means that the knowledge is sufficient to enable one with ordinary skill in the art to which the invention pertains to reduce the invention to practice. Private knowledge is not part of the prior art.

Thus, a public presentation at a conference, for example, can constitute prior art within the meaning of section 102(a). See Ecolochem, Inc. v. Southern California Edison Co., 227 F.3d 1361, 1369, 56 USPQ2d 1065, 1071 (Fed. Cir. 2000).

Similarly, in In re Hall, 781 F.2d 897, 898, 228 USPQ 453, 455 (Fed. Cir. 1986), our reviewing court stated that:

The [printed publication] bar is grounded on the principle that once an invention is in the public domain, it is no longer patentable by anyone.... Because there are many ways in which a reference may be disseminated to the interested public, "public accessibility" has been called the touchstone in determining whether a reference constitutes a "printed publication" bar under 35 U.S.C. 102(b).

As is apparent from the above precedents, public accessibility is the key to determining whether the information in question is "prior art" within the meaning of Section 102(a) or 102(b).

Public accessibility connotes public knowledge. Here, as indicated supra, the technical paper in question referred to as "Wanthal" was orally presented at the May 2000 International

Appeal No. 2006-0132  
Application No. 09/946,627

SAMPE Symposium to at least forty to fifty people interested in the art. Twenty copies of this paper (Wanthal) were also said to be sold to those interested in the information therein. A copyrighted date (2000) appears on the front page of the paper (Wanthal), which indicates its publication status. Thus, we concur with the examiner that Wanthal is prima facie available as "prior art" within the meaning of sections 102(a) and 102(b). See, e.g., Massachusetts Institute of Technology v. AB Fortia, 774 F.2d 1104, 1109, 227 USPQ 428, 432 (Fed. Cir. 1985) (A technical paper presented at a conference to all persons interested in the subject matter without restriction is held to be a printed publication within the meaning of section 102(b)).

In reaching this determination, we consider the appellants' arguments that both the oral presentation and the printed document (Wanthal) were not publicly available or accessible due to the restriction set forth in the front page of Wanthal, as well as the credential requirement applied to those attending the symposium. Specifically, we note the appellants' reliance on the specific provisions of the Export Regulations, the International Traffic in Arms Regulation and the DOD Industrial Security Regulation referred to in Wanthal and the SAMPE International Policy and Practice. See the Reply Brief in its entirety. As

Appeal No. 2006-0132  
Application No. 09/946,627

acknowledged by the appellants (the Reply Brief, page 4 and the Brief, page 11), however, these regulations and practice do not preclude a significant segment of the interested public, e.g., defense industries, from obtaining copies of the Wanthal document or accessing the information therein. See also the Response to Remand dated October 12, 2005, pages 1-2. Even assuming Wanthal, for example, contains "information pertaining to classified contracts or programs," it can still be distributed to a significant segment of the interested public after satisfying particular conditions for approval by the Directorate for Security Review, Office of the Assistant Secretary of Defense (Public Affairs).<sup>4</sup> See Alcon Laboratories, Inc. v. Bausch & Lomb, Inc., 52 USPQ2d 1927, 1931 (N.D. Tex. 1999)("[T]he issue [is] whether interested members of the relevant public could obtain the information if they wanted to.")(quoting Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 1569, 7 USPQ2d 1057, 1062 (Fed. Cir. 1988); Friction Division Products Inc. v. E.I. du Pont de Nemours & Co., 658 F.Supp. 998, 3 USPQ2d 1775, 1781 (D. Del. 1987), further proceedings, 693 F.Supp. 114, 8 USPQ2d 1652 (D. Del. 1988), aff'd 883 F.2d 1027, 12 USPQ2d 1575 (Fed. Cir. 1989)(unpublished)("Accessibility to the public interested in the

---

<sup>4</sup> See, e.g., DOD 5220.22-R, C1.1.15 and C1.1.15.1-C1.1.15.4 (Dec. 4, 1985).

Appeal No. 2006-0132  
Application No. 09/946,627

art is the key factor in determining whether a particular paper would be considered a 'printed publication' under the statute . . . The publication requirement may also be satisfied by distributing or making the paper available at a conference where persons interested or skilled in the subject matter were told of the paper's existence and informed of its contents."); Freeman v. Minnesota Mining & Manufacturing Co., 675 F.Supp. 877, 882, 5 USPQ2d 1465, 1467 (D. Del. 1987)("The document need not be formally 'printed' to be printed publication . . . [T]he determination of whether a document is a printed publication requires the court to focus on the unitary concept of 'public accessibility.' The inquiry for the Court is whether there has been public dissemination of the document and whether the information contained in it is accessible to person skilled in or interested in the art."). Indeed, there is no evidence in this record that access to the Wanthal document was ever denied to the interested public.

The regulations also do not preclude a significant segment of the interested public from exploiting the subject matter therein for commercial purposes. None of the regulations relied upon by the appellants prevents attendees of the Closed Session in question or individuals who bought copies of the Wanthal

Appeal No. 2006-0132  
Application No. 09/946,627

document from commercially exploiting the information obtained therefrom. The appellants simply do not have any control over the flow or use of the information provided in the Wanthal document. In fact, the evidence relied upon by the appellants shows that those who attended the Closed Session in question and/or those who bought the copies of the Wanthal document have the same distribution rights as the appellants in accordance with the government regulations referred to above. The appellants proffer no evidence that these government regulations prevented commercial exploitation of the information in Wanthal or denied the interested U.S. public, such as U.S. defense industries, from accessing the information in Wanthal. As such, it cannot be said that the information in the Wanthal document was unavailable to a significant segment of the interested public.

The appellants rely on Northern Telecom Inc. v. Datapoint Corp., 908 F.2d 931, 15 USPQ2d 1321 (Fed. Cir. 1990), Ex parte Kroenert, 144 USPQ 133 (Bd. App. 1960), and Aluminum Co. of America v. Reynolds Metals Co., 14 USPQ2d 1170 (N.D. Ill. 1989). See the Brief, pages 9-13. According to the appellants (id.), these cases support their position that Wanthal is not "prior art" within the meaning of section 102(a) or 102(b). The appellants' reliance on these cases is misplaced.

Appeal No. 2006-0132  
Application No. 09/946,627

In Northern Telecom Inc., four reports prepared as part of a military project were distributed to approximately fifty persons or organizations involved in the same project. These reports either explicitly or implicitly contain a secrecy obligation, i.e., a restrictive notice that precludes reproduction or dissemination. Northern Telecom Inc., 908 F.2d at 936, 15 USPQ2d at 1325. These reports were also housed in a corporate library accessible only to those authorized by the corporation. Id. Our reviewing court held that these reports are not "prior art" within the meaning of section 102 since no one "could have had access to the document by the exercise of reasonable diligence." Id. By contrast, in the present case, an oral presentation on the Wanthal document was given to forty to fifty people at a "Closed Session" accessible to seemingly any and every U.S. and Canadian defense industries and employees (they should all have security credentials). Moreover, as indicated supra, twenty copies of it were said to be sold without any obligation of confidentiality and more copies were available to the interested public upon its compliance with certain government regulations. Indeed, there is no evidence in the record that the government regulations referred to in Wanthal and relied upon by the

Appeal No. 2006-0132  
Application No. 09/946,627

appellants ever precluded the interested public (e.g., defense industries) from obtaining the information in the Wanthal document.

In Kroenert, an "Index of Specification and Standards" numerically or alphabetically listing a military specification was accessible to contractors from a procurement agency. Kroenert, 144 USPQ at 135. Nevertheless, the Board of Patent Appeals found that the military specification itself was not accessible to the interested public. Id. Thus, it held that the military specification was not a "printed publication" within the meaning of section 102(b). Id. In contrast, the present case involves at least twenty copies of the actual document (rather than an index) sold to the interested public without any obligation of confidentiality.

In Aluminum Co. of America, 14 USPQ2d 1171, progress letters were distributed to thirty-three entities under the terms of a contract with a government agency. The letters contained the following notice (id.):

This Document is Subject to Special Export  
Controls and Each Transmittal to Foreign Governments  
or Foreign Nationals May Be Made Only With Prior  
Approval of the Naval Air System Command.

Appeal No. 2006-0132  
Application No. 09/946,627

As acknowledged by the appellants (the Brief, pages 10-11), the court in Aluminum Co. of America, 14 USPQ2d at 1171 conceded that:

at 'first glance' the letters did appear to meet the public accessibility test of publication, by stating that 'thirty-three copies were made and distributed, and not just to government groups ... Thirteen nongovernmental companies and individuals received copies too ... including big competitors like Kaiser and Reynolds ... the export control notice ... did no more than limit access to United States citizens, of whom there are more than 220 million-scarcely the sort of restriction that should ordinarily prevent a document from being classified as a "printed publication" under the statute. In addition, there was no evidence in the record that access was ever denied to anyone who sought it.

Nevertheless, the court found that the letters were not accessible to the public in fact because all the designees treated the letters as confidential and not for further distribution.

In contrast to Aluminum Co. of America, there is no evidence in this case that virtually everyone who received the Wanthal document treated it as confidential. See, e.g., the Owens and the Beckwith declarations in their entirety. As conceded by the appellants, however, Aluminum Co. of America, 14 USPQ2d at 1172 supports the examiner's determination that the restriction of the type relied upon by the appellants does not preclude a significant segment of the interested public from accessing the

Appeal No. 2006-0132  
Application No. 09/946,627

information in the Wanthal document. Indeed, the appellants have not proffered any evidence that access to the Wanthal document was ever denied to the interested public.

Thus, for the reasons set forth in the Answer, the Supplemental Answer and above, it is our judgment that the information in the Wanthal document was publicly accessible, thus triggering the "printed publication" bar under section 102(b) and an invention "known ... by others" under section 102(a). Having determined that Wanthal is available as "prior art" within the meaning of sections 102(b) and 102(a), we adopt the examiner's uncontested obviousness determination as our own. In other words, we concur with the examiner that Wanthal and Campbell would have rendered the subject matter defined by claims 1, 2, 4, 6, 16 and 17 obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103(a).

Accordingly, we affirm the examiner's decision rejecting claims 1, 2, 4, 6, 16 and 17 under section 103(a).

REJECTION 2)

As evidence of obviousness of the subject matter defined by claim 3 under section 103(a), the examiner relies on the combined disclosures of Wanthal, Campbell, and at least Childress and/or

Appeal No. 2006-0132  
Application No. 09/946,627

Boyce. We observe that as indicated supra, the appellants have not disputed the examiner's finding that Wanthal describes using Z-pins to bind a woven pi-shaped pre-form having a base and a pair of spaced apart legs to a composite component. The examiner, however, asserts, "Wanthal discloses [that] the pins are inserted into the base (pre-form flange) but it is unclear as to whether the pins extend into the component as well ...." Compare the Answer, pages 7-8 with the Brief, pages 8-13.

To remedy this deficiency, the examiner relies on the disclosure of Campbell. See the Answer, pages 8-9. As undisputed by the appellants, Campbell teaches the importance of using Z-pins to bond a pre-form base to a composite layer by extending the pins through the pre-form base and the composite layer. Compare the Answer, pages 8-9, with the Brief, pages 8-13. As also undisputed by the appellants, "Campbell shows that the pins through the base outside of the leg portions are parallel to each other (Figures 1, 4, 5, 6 in Campbell)." Compare, e.g., the Answer, page 17 with the Brief, pages 8-13 and 19. We also note that Campbell teaches (column 2, lines 3-16):

This invention results from the realization that a composite stiffener can be more efficiently and more securely attached to a composite skin material by inserting reinforcing pins at the radius region of the stiffener and into the skin material to increase

Appeal No. 2006-0132  
Application No. 09/946,627

the initial failure load of the joint between the stiffener and the skin materials and also by inserting reinforcing pins through the flange portion of the stiffener and into the skin material to resist crack propagation. In addition, the pins reinforce the individual plies of the both the stiffener and the skin material to resist delamination. The pins may be inserted when the stiffener and/or the skin material are in the prepreg stage and then the whole assembly can be co-cured to form a very strong stiffener reinforced assembly....

Further, the appellants do not challenge the examiner's Official Notice that "it is well known in the art to provide pins along the entire bond-line of pre-forms [inclusive of the base portion between the legs of the pi-shaped pre-form taught by Wanthal] in order to reinforce the entire base of the pre-form ...." Compare the Answer, page 11 with the Brief, page 14. Nor do the appellants challenge the examiner's finding that Childress and/or Boyce show parallel reinforcing pins along the entire bond-line consistent with the official notice taken by the examiner. Compare the Answer, pages 10-11, with the Brief, page 14.

Thus, notwithstanding the appellants' arguments to the contrary, we concur with the examiner that one of ordinary skill in the art would have been led to employ parallel reinforcing Z-pins along the bond-line of a pre-form, including a bond-line represented by the base portion between the legs of the woven pi-shape pre-form taught by Wanthal, motivated by a reasonable

Appeal No. 2006-0132  
Application No. 09/946,627

of expectation of successfully reinforcing the bonding of the pre-form to the composite layer.

The appellants' main argument is that Campbell "shows Z-pins, but only in connection with a laminate, not a woven preform" and "does not suggest that the pins between legs would be parallel to the pins outside of the legs required by claim 3." See the Brief, page 14. This argument is not well-taken. It ignores Wanthal's teaching of using Z-pins to bond its woven preforms and composite layers, Campbell's teaching of using parallel Z-pins to reinforce the bonding in general and the examiner's Official Notice regarding the employment of parallel reinforcing pins along the bond-line (such as that taught by Childress and/or Boyce) to improve the bonding. See In re Young, 927 F.2d 588, 91, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991); In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981).

Thus, for the reasons indicated supra and in the Answer, we determine that the prior art references as a whole would have suggested the claimed subject matter within the meaning of 35 U.S.C. § 103(a). Accordingly, we affirm the examiner's decision rejecting claim 3 under section 103(a).

REJECTION 3)

As evidence of obviousness of the subject matter defined by claims 18 through 21 under 35 U.S.C. § 103(a), the examiner relies on the combined disclosures of Wanthal, Campbell, at least Berscuh, Sheahen and/or Owens and optionally Alston. The disclosures of Wanthal and Campbell are discussed above. The examiner recognizes that Wanthal and Campbell do not mention adhering over-wrap plies to pre-form as required by claims 18 through 21. See the Answer, pages 11-12.

To remedy this deficiency, the examiner refers to the disclosures of Berscuh and/or Sheahen and/or Owens and optionally Alston. Id. The examiner finds (the Answer, pages 11-12), and the appellants do not dispute (the Brief, page 15), that:

It is well known in the art of bonding structural composites to adhere over-wrap plies to pre-forms in order to provide a more secure joint. For example, Berscuh (page 9) and/or Sheahen (pages 6-7) and /or Owens (page 404, figure 7) disclose applying composite over-wrap plies on an exterior surface of a woven pre-form. Whether the over-wrap plies are adhered prior to or after the insertion of the pins is well within the purview of one of ordinary skill in the art.... Optionally, Alston shows it is known in the art to provide structural pins either through all the layers of composite (column 4, lines 56-67; figure 2) or to place some layers of composite, insert the pins, and

Appeal No. 2006-0132  
Application No. 09/946,627

then cover with additional layers of composite (column 5, lines 48-60; figure 6).

...

As to claims 20 and 21, it is well known and shown by the references to have the over-wrap plies extend beyond the height of the legs of the pre-form and cured to form a connecting surface (see[,] for example, Sheahen figures, 5,7, 9, and Owens figure 7).

Moreover, we find that Owens, for example, teaches bonding a pi-shape 3D woven textile perform to a skin layer and applying over-wrap plies to further strengthen the bonding and shear strength of the structure in aircraft construction (military airframe structures). See pages 398-424, especially Figure 2. We find that Sheahen teaches joint subcomponents, including three-dimensional woven pi-shape pre-forms and skin components, useful in aircraft construction. See page 6. We find that Sheahen teaches that the woven pi-shape pre-forms can be bonded or bolted to skins and can be co-cured with the skins before applying over-wrap plies. See pages 6-7. We find that Sheahen teaches using Z-pins prior to co-curing the skins and pre-forms. See page 7.

Given the above teachings, we concur with the examiner that the applied prior art references as a whole would have led one of ordinary skill in the art to the subject matter of claims 18 through 21, motivated by a reasonable expectation of successfully

Appeal No. 2006-0132  
Application No. 09/946,627

obtaining a more secure bonding.

The appellants argue that “[n]either Campbell et al. nor Alston et al. teach the use of a woven perform through which Z-pins are inserted.” See the Brief, page 15. In so arguing, the appellants again fail to consider the applied prior art references as a whole as required by section 103(a). Young, 927 F.2d at 591, 18 USPQ2d at 1091; Keller, 642 F.2d at 425, 208 USPQ at 881. That is, the obviousness test is not what the prior art references individually teach, but what their combined teachings would have fairly suggested to a person having ordinary skill in the art. Id. Here, as indicated supra, Wanthal teaches using Z-pins to bond a woven pre-form to a composite layer in aircraft construction. Both Campbell and Alston teach improving the bonding of aircraft parts by appropriately using the Z-pins. Thus, for the reasons indicated above and in the Answer, we concur with the examiner that the prior art references as a whole would have rendered the subject matter defined by claims 18 through 21 obvious to one of ordinary skill in the art.<sup>5</sup>

Accordingly, we affirm the examiner’s decision rejecting claims 18 through 21 under section 103(a).

---

<sup>5</sup> The appellants argue that McKague, Jr. is not available as “prior art” under section 102(e). See the Brief, page 15. However, the examiner no longer relies McKague, Jr. in the rejections set forth in the Answer. See the Answer, pages 11 and 12. Thus, this argument is moot.

Appeal No. 2006-0132  
Application No. 09/946,627

REJECTION 4)

As evidence of obviousness of the subject matter defined by claim 27 under section 103(a), the examiner relies on the combined teachings of Wanthal, Campbell and Barnes. The disclosures of Wanthal and Campbell are discussed above. The examiner appears to acknowledge that Wanthal and Campbell do not mention using over-presses in the claimed manner prior to curing the resin in a pre-form. See the Answer, page 13.

To remedy this deficiency, the examiner takes official notice at page 13 of the Answer that:

It is well known in the art when curing structural laminates to provide over-presses that are at least semi-rigid against the outer surfaces of the pre-form in order to distribute force across the outer surfaces of the pre-form.

Consistent with the official notice, the examiner also finds (id.) that:

Barnes discloses a method of curing a structural member by providing an at least semi-rigid over-press (silicone rubber blocks 221) against the outer surface of a pre-form (body sheet 53) in order to cause the over-press to press the perform against the other structural assembly parts (see figure 25; column 8, lines 30-035, column 9, lines 14-33).

Appeal No. 2006-0132  
Application No. 09/946,627

The appellants do not challenge the examiner's official notice or finding. See the Brief, page 16.

Thus, we concur with the examiner that the applied prior art references as a whole would have rendered the claimed subject matter prima facie obvious to one of ordinary skill in the art within the meaning of section 103(a). From our perspective, one of ordinary skill in the art would have been led to employ over-presses in an appropriate manner for a given structure, including the claimed manner for the structure taught by Wanthal, to obtain improved curing and bonding.

The appellants' principal argument is that neither Campbell nor Barnes teaches the claimed woven pre-form. See the Brief, page 16. In so arguing, the appellants again ignore the combined teachings of the applied prior art references as a whole. Young, 927 F.2d at 591, 18 USPQ2d at 1091; Keller, 642 F.2d at 425, 208 USPQ at 881. As indicated supra, the appellants do not dispute the examiner's finding that Wanthal teaches employing Z-pins and curing a resin to bond the claimed woven pi-shape pre-form to a laminate skin (pre-preg tape) for stiffening purposes, with Campbell's reference to improving the bonding of aircraft structures in general via appropriate use of Z-pins.

Appeal No. 2006-0132  
Application No. 09/946,627

Thus, for the reasons set forth above and in the Answer, we are not convinced that the combined teachings of the applied prior art references would not have suggested the claimed subject matter within the meaning of 35 U.S.C. § 103(a). Accordingly, we affirm the examiner's decision rejecting claim 27 under section 103(a).

REJECTION 5)

As evidence of obviousness of the subject matter defined by claims 27 and 28 under section 103(a), the examiner relies on the combined disclosures of Wanthal, Campbell and Sloman. The disclosures of Wanthal and Campbell are discussed above. The examiner appears to acknowledge that Wanthal and Campbell do not mention using the claimed over-presses in the structure of the type described in Wanthal. See the Answer, pages 13-14.

To account for the claimed over-presses, the examiner takes official notice and makes factual findings relating to Sloman as provided below (the Answer, page 14):

It is well known in the art when curing structural laminates to provide over-presses that are at least semi-rigid against the outer surfaces of the pre-form in order to distribute force across the outer surfaces of the pre-form. For example, Sloman discloses a method of curing a structural member by providing an at least semi-rigid over-press against the outer surface of a pre-form in order to cause the over-press to press the pre-form against the other structural assembly parts (pages 1,3) . . .

The appellants do not challenge the examiner's official notice or factual findings relating to Sloman. See the Brief, pages 16-17.

Thus, given the above circumstances, we concur with the

Appeal No. 2006-0132  
Application No. 09/946,627

examiner that one of ordinary skill in the art would have been led to employ appropriately shaped over-presses conforming to the shape of the outer surfaces of a given pre-form, including a generally triangular shape over-presses conforming to the shape of the outer surfaces of the pre-form of the type discussed in Wanthal, in appropriate locations, motivated by a reasonable expectation of successfully distribution of optimum force across the entire outer surfaces of the pre-form.

In reaching this determination, we consider the appellants' argument that Sloman does not mention any particular shape, much less a generally triangular shape, over-press or pressure intensifier. However, as correctly found by the examiner (the Answer, page 14), Sloman teaches a pressure intensifier (over-press) having a generally triangular shape. See Figure 2 in conjunction with Sloman, page 6. In any event, as indicated supra, the shape of a pressure intensifier or over-press is known to be dependent on the contours of the outer surfaces of a given pre-form since the purpose of the over-press or pressure intensifier is to distribute optimum force on the outer surfaces thereof during curing and bonding.

Thus, for the reasons set forth in the Answer and above, we concur with the examiner that the combined teachings of Wanthal,

Appeal No. 2006-0132  
Application No. 09/946,627

Campbell and Sloman would have rendered the subject matter defined by claims 27 and 28 obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103. Accordingly, we affirm the examiner's decision rejecting claims 27 and 28 under section 103(a).

REJECTION 6)

As evidence of obviousness of the subject matter defined by claims 1, 2, 4, 5, 16 and 17 under section 103(a), the examiner relies on the combined disclosures of Breuer<sup>6</sup>, Abildskov and Campbell. The examiner finds (the Answer, page 15), and the appellants do not dispute (the Brief, pages 18-19), that:

Breuer discloses a method of bonding a pre-form (stiffening profile members 7) to a composite component being infused with uncured resin (column 6, lines 18-27), placing the base of the pre-form adjacent a surface of a composite component that is infused with an uncured resin (column 5, lines 22-40; column 6, lines 65-67), then curing the resin in the pre-form and the component (column 6, lines 65-67).

We find that Breuer exemplifies pre-forms, such as "L-sectional profile members on a contact surface 71' extending substantially

---

<sup>6</sup> The examiner relies on U.S. Patent 6,306,239 B1 issued to Breuer et al. on Oct. 23, 2001 as a substitute for the German Patent referred to in the statement of rejection. The appellants have not challenged the examiner's reliance on the content of Breuer's U.S. patent or the examiner's assertion relating to its English equivalency to Breuer's German patent referred to in the statement of rejection.

horizontally along the surface of the skin member 6," thus forming a pair of legs extending from bases similar to a pi-shape pre-form. See Figure 3, in conjunction with column 6, lines 18-53. We find that the pre-forms described in Breuer are taught to be useful in aircraft construction. See column 1, lines 45. As acknowledged by the examiner (the Answer, page 15), Breuer does not mention a woven pi-shape pre-form and a plurality of parallel Z-pins to reinforce the bonding of the pi-shape pre-form to a composite layer (skin member).

To remedy these deficiencies, the examiner relies on the disclosures of Avildskov and Campbell. See the Answer, pages 15-17. We find that Avildskov teaches at column 2, lines 35-55, in reference to the L-shape profile members (pre-forms) taught by Breuer,

FIG. 1 shows a prior art arrangement for connecting a spar or rib 4 (such as might be used in construction of an airplane wing) to another structural component 8 (such as the skin or covering of an aircraft wing). Placed at the joint of the spar 4 and structural component 8 to hold the two together are a pair of fabric connectors 12 and 16 (shown in cross section in FIG. 1). A portion of each fabric connector 12 and 16 is placed flat against and bonded to the structural component 8 while another portion is placed flat against and bonded to the spar 4 as shown. This connector arrangement provides fairly good strength and load transfer efficiency between the spar 4 and structural component 8 when the two components are moved as indicated by arrows 20 relative to one

Appeal No. 2006-0132  
Application No. 09/946,627

another. However, the strength of the connector is very weak when the two components are moved in the direction indicated by arrows 24 and 28 relative to one another. In particular, such movement would give rise to well known fabric connector peel problems.

We find that Avildskov goes on to teach that the pi-shape woven pre-form illustrated in Figure 3 avoids the problems associated with Breuer's L-shape profile members in aircraft construction. See column 2, lines 56-68 and column 3, lines 43-59. Moreover, as indicated supra, the appellants do not dispute the examiner's finding that Campbell teaches the importance of using Z-pins to bond a pre-form base to a composite layer by extending the pins through the pre-form base and the composite layer. Compare the Answer, pages 8-9, with the Brief, pages 8-13. We note that Campbell teaches an improved method of securing a stiffener member to a skin member in the context of aircraft construction. See column 1, lines 28-53. We find that Campbell teaches at column 2, lines 3-16:

The invention results from the realization that a composite stiffener can be more efficiently and more securely attached to a composite skin material by inserting reinforcing pins at the radius region of the stiffener and into the skin material to increase the initial failure load of the joint between the stiffener and the skin materials and also by inserting reinforcing pins through the flange portion of the stiffener and into the skin material to resist crack propagation. In addition the pins reinforce the individual plies of the both the stiffener and the skin

Appeal No. 2006-0132  
Application No. 09/946,627

material to resist delamination. The pins may be inserted when the stiffener and/or the skin material are in the prepreg stage and then the whole assembly can be co-cured to form a very strong stiffener reinforced assembly . . . .

Given the above teachings, notwithstanding the appellants' arguments to the contrary, we concur with the examiner that one of ordinary skill in the art would have been led to employ reinforcing Z-pins and a pi-shape pre-form in the aircraft part forming method of the type described in Breuer, motivated by a reasonable of expectation of successfully reinforcing the bonding of the improved pre-form taught by Abildskov to the composite layer (skin layer).

In reaching this determination, we note the appellants' argument that "Breuer does not disclose Z-pins nor woven performs" and "Avildskov does not suggest any use of Z-pins." See the Brief, page 18. In so arguing, we determine that the appellants fail to take into account the collective teachings of the applied prior art references. Young, 927 F.2d at 591, 18 USPQ2d at 1091; Keller, 642 F.2d at 425, 208 USPQ at 881.

For the reasons indicated supra and in the Answer, we determine that the factual findings set forth above and in the Answer support obviousness of the claimed subject matter within the meaning of 35 U.S.C. § 103(a). Accordingly, we affirm the

Appeal No. 2006-0132  
Application No. 09/946,627

examiner's decision rejecting claims 1, 2, 4, 5, 16 and 17 under section 103(a).

REJECTION 7)

As evidence of obviousness of the subject matter defined by claims 3, 7 through 9 and 15 under section 103(a), the examiner relies on the combined disclosures of Breuer, Abildskov, Campbell and at least Childress and/or Boyce. The disclosures of Breuer, Abildskov and Campbell are discussed above. The examiner appears to recognize that Breuer, Abildskov and Campbell do not mention inserting Z-pins between two legs of the pi-shape pre-form suggested by Breuer and Abildskov. See the Answer, pages 17-18.

To remedy this deficiency, the examiner refers to the teachings of Childress and/or Boyce. The examiner finds (Answer, page 18), and the appellants do not dispute (the Brief, page 19), that Childress and/or Boyce:

Show[s] that it is known in the art of applying Z-pins for joining composite materials [inclusive of the woven pi-shape pre-form suggested by Breuer and Abildskov], [and] it is known to provide the Z-pins along all the surfaces that touch along the bond line [inclusive of the base portion between the two legs of the pi-shape pre-form suggested by Breuer and Abildskov]. As to the limitation that the pins are

Appeal No. 2006-0132  
Application No. 09/946,627

parallel to each other, all the references show that the Z-pins going through base portions of pre-forms are parallel to each other.

Given the above uncontradicted teachings, we concur with the examiner that one of ordinary skill in the art would have been led to employ the parallel reinforcing Z-pins suggested by Campbell, Childress and/or Boyce on along the bond-line of a structure, inclusive of the base portion between the two legs of the pi-shape pre-form suggested by Breuer and Abildskov, motivated by a reasonable expectation of successfully reinforcing the bonding of the perform to the composite layer. The appellants again argue that the prior art references individually do not teach all of the claimed limitations. See the Brief, page 19. This argument again ignores the proper obviousness test within the meaning of section 103(a) as explained above.

For the reasons set forth above and in the Answer, we concur with the examiner that the applied prior art references as a whole would have rendered the subject matter defined by claims 3, 7 through 9 and 15 obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103(a). Accordingly, we affirm the examiner's decision rejecting claims 3, 7 through 9 and 15 under section 103(a).

Appeal No. 2006-0132  
Application No. 09/946,627

REJECTION 8)

As evidence of obviousness of the subject matter defined by claims 10 and 27 under section 103(a), the examiner relies on the combined disclosures of Breuer, Abildskov, Campbell, Childress and/or Boyce, and Barnes. The disclosures of Breuer, Abildskov, Campbell, Childress and Boyce are discussed above. The examiner appears to acknowledge that these references do not mention using over-presses against the outer surfaces of the legs and base of the pi-shape pre-form. See the Answer, page 19.

To remedy this deficiency, the examiner takes Official Notice at page 19 of the Answer that:

It is well known in the art when curing structural laminates to provide over-presses that are at least semi-rigid against the outer surfaces of the pre-form in order to distribute force across the outer surfaces of the pre-form.

Consistent with the Official Notice, the examiner also finds (id.) that:

Barnes discloses a method of curing a structural member by providing an at least semi-rigid over-press (silicone rubber blocks 221) against the outer surface of a pre-form (body sheet 53) in order to cause the over-press to press the perform against the other structural assembly parts (see figure 25; column 8,

Appeal No. 2006-0132  
Application No. 09/946,627

lines 30-035, column 9, lines 14-33).

The appellants do not challenge the examiner's Official Notice or finding. See the Brief, pages 19-20.

Thus, we concur with the examiner that the applied prior art references as a whole would have rendered the claimed subject matter prima facie obvious to one of ordinary skill in the art within the meaning of section 103(a). From our perspective, one of ordinary skill in the art would have been led to employ overpresses in an appropriate manner for a given structure, including the claimed manner for the specific structure suggested by of Breuer, Abildskov, Campbell, Childress and Boyce, motivated by a reasonable expectation of successfully obtaining an improved curing and bonding.

Accordingly, for the reasons indicated supra and in the Answer, we affirm the examiner's decision rejecting claims 10 and 27 under section 103(a).

REJECTION 9)

As evidence of obviousness of the subject matter defined by claims 10, 27 and 28, the examiner relies on the combined disclosures of Breuer, Abildskov, Campbell, Childress and/or

Appeal No. 2006-0132  
Application No. 09/946,627

Boyce, and Sloman. The disclosures of Breuer, Abildskov, Campbell, Childress and Boyce are discussed above. The examiner appears to acknowledge that these references do not mention using the claimed over-presses. See the Answer, pages 20-21.

To account for the claimed over-presses, the examiner takes Official Notice and makes factual findings relating to Sloman as provided below (the Answer, page 21):

It is well known in the art when curing structural laminates to provide over-presses that are at least semi-rigid against the outer surfaces of the pre-form in order to distribute force across the outer surfaces of the pre-form. For example, Sloman discloses a method of curing a structural member by providing an at least semi-rigid over-press against the outer surface of a pre-form in order to cause the over-press to press the pre-form against the other structural assembly parts (pages 1,3). . . .

The appellants do not challenge the examiner's Official Notice or factual findings relating to Sloman. See the Brief, pages 19-20.

Thus, given the above circumstances, we concur with the examiner that one of ordinary skill in the art would have been led to employ over-presses conforming to the shape of the outer surfaces of a given pre-form, including a generally triangular shape over-presses conforming to the shape of the outer surfaces of the pre-form of the type suggested in Breuer, Abildskov, Campbell, and Childress and/or Boyce, motivated by a reasonable

Appeal No. 2006-0132  
Application No. 09/946,627

expectation of successfully distributing optimum force across the entire outer surfaces of the pre-form, thus obtaining improved curing and bonding.

The appellants appear to argue that none of the applied prior art references teaches the generally triangular shape over-press recited in claim 28. See the Brief, page 20. We do not agree. As pointed out by the examiner (the Answer, page 21)), Sloman illustrates a generally triangular shape pressure intensifier (over-press). See Sloman, Figure 2 in conjunction with Sloman, page 6.

In any event, the appellants ignore the fact that the shapes of over-presses are known to be a function of the shapes of the pre-forms since the whole purpose of using the over-presses is to apply pressure or force against the surface of a given structure. Thus, it is our judgment that the determination of an appropriate shape of an over-press for a given structure is well within the ambit of one of ordinary skill in the art since it is a known result effective variable for distributing optimum force for given structures during curing and bonding. In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

Appeal No. 2006-0132  
Application No. 09/946,627

Thus, for the reasons indicated above and in the Answer, we concur with the examiner that the applied prior art references as a whole would have rendered the subject matter defined by claims 10, 27 and 28 obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103(a). Accordingly, we affirm the examiner's decision rejecting claims 10, 27 and 28 under section 103(a).

REJECTION 10)

As evidence of obviousness of the subject matter defined by claims 11 and 12 under section 103(a), the examiner relies on the combined disclosures of Breuer, Abildskov, Campbell, Childress and/or Boyce, and Hertzberg. The disclosures of Breuer, Abildskov, Campbell, Childress and Boyce are discussed above. The examiner appears to acknowledge that these references do not mention the use of adhesives between the pre-form base and composite layer. See the Answer, page 22.

To remedy this deficiency, the examiner finds (the Answer, page 22), and the appellants do not dispute (the Brief, page 21), that:

Breuer only discloses curing the resin in the parts to provide the bonding between the pre-form and the two components. Hertzberg discloses it is known in the art to provide an adhesive between parts of structural assemblies in order to prevent delamination and provide a stronger bond than the prior art methods of only utilizing the un-cured resin in the parts for bonding when cured (column 1, lines 19-16; column 3, lines 25-31). Hertzberg further discloses that the adhesive is placed between the joined surfaces of the parts of the structural assembly and then the structural assembly is cured (column 2, lines 55-68; column 4, line 47 to column 5, line 8; column 9, line 41).

Given the above uncontradicted findings, we concur with the

Appeal No. 2006-0132  
Application No. 09/946,627

examiner that one of ordinary skill in the art would have been led to employ an adhesive in the structure suggested by Breuer, Abildskov, Campbell and Childress and/or Boyce in the manner discussed above, motivated by a reasonable expectation of successfully providing a stronger bonding between the pre-form base and the composite layer.

The appellants argue (the Brief, page 21) that:

Claim 11 depends from claim 7, thus should be allowed. Moreover, claims 11 and 12 deal with the use of an adhesive located between woven preform and a first component and between the woven preform and the second component. Hertzberg does not disclose any woven performs...

This argument again fails to take into account the collective teachings of the applied prior art references. When, as here, the teachings of the applied prior art references are considered collectively, we determine that the examiner has established a prima facie case of obviousness for the reasons indicated supra. The appellants proffer no sufficient evidence or arguments to rebut the prima facie case.

Thus, for the reasons set forth above and in the Answer, we determine that the evidence of obviousness, on balance, outweighs the evidence of nonobviousness. Accordingly, we affirm the examiner's decision rejecting claims 11 and 12 under section

Appeal No. 2006-0132  
Application No. 09/946,627

103(a).

REJECTION 11)

As evidence of obviousness of the subject matter defined by claims 13, 14, and 18 through 21 under section 103(a), the examiner relies on the combined disclosures of Breuer, Abildskov, Campbell, at least Childress and/or Boyce, at least Bersuch, Sheahen and/or Owens and optionally Alston. The disclosures of Breuer, Abildskov, Campbell, Childress and Boyce are discussed above. The examiner appears to acknowledge that these references do not mention applying over-wrap plies as required by claims 13, 14 and 18 through 21. See the Answer, page 23.

To remedy this deficiency, the examiner refers to the disclosures of Bersuch and/or Sheahen and/or Owens and optionally Alston. See the Answer, pages 23-24. The examiner finds (the Answer, pages 23-24), and the appellants do not dispute (the Brief, page 21), that:

It is well known in the art of bonding structural composites to adhere over-wrap plies to pre-forms in order to provide a more secure joint. For example, Bersuch (page 9) and/or Sheahen (pages 6-7) and /or Owens (page 404, figure 7) disclose applying composite over-wrap plies on an exterior surface of a woven pre-

form. Whether the over-wrap plies are adhered prior to or after the insertion of the pins is well within the purview of one of ordinary skill in the art ... Optionally, Alston shows it is known in the art to provide structural pins either through all the layers of composite (column 4, lines 56-67; figure 2) or to place some layers of composite, insert the pins, and then cover with additional layers of composite (column 5, lines 48-60; figure 6).

. . .

As to claims 20 and 21, it is well known and shown by the references to have the over-wrap plies extend beyond the height of the legs of the pre-form and cured to form a connecting surface (see[,] for example, Sheahen figures, 5,7, 9, and Owens figure 7).

The appellants also do not dispute the examiner's determination that:

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of bonding as shown by Breuer, Abildskov, Campbell by adhering over-wrap plies to the perform as is well known in order to provide a more secure bond and as further exemplified by Bersuch and/or Sheahen and/or Owens<sup>7</sup> and to provide the over-wrap plies either before or after insertion of the pins as would have been well within the purview of one of ordinary skill in the art or optionally as exemplified by Alston.

The appellants only argue (the Brief, page 21) that:

---

<sup>7</sup> We find that Owens, for example, teaches bonding a pi-shape 3D woven textile perform to a skin layer and applying over-wrap plies to further strengthen the bonding and shear strength of the structure in aircraft construction (military airframe structures). See pages 398-424, especially Figure 2. Similarly, we find that Sheahen teaches joint subcomponents, including three-dimensional woven pi-shape pre-forms and skin components, useful in aircraft construction. See page 6. We find that Sheahen teaches that the woven pi-shape pre-forms can be bonded or bolted to skins and can be co-cured with the skins before applying over-wrap plies. See pages 6-7. We find that Sheahen teaches using

Appeal No. 2006-0132  
Application No. 09/946,627

Claims 13, 14 and 18-21 deal with overwrap plies. While a number of references show overwrap plies, none of the references cited ... shows the features claimed in parent claim 7.

Thus, for the reasons indicated supra and in the Answer, we determine that the examiner has established, by preponderance of evidence, a prima facie case of obviousness, which has not been rebutted by the appellants. Accordingly, we affirm the examiner's decision rejecting claims 13, 14 and 18 through 21 under section 103(a).

REJECTIONS 12) and 13)

As evidence of obviousness of the subject matter defined by claims 22, 25 and 26 under section 103(a), the examiner relies on the combined disclosures of Breuer, Abildskov, Campbell, Hertzberg and either Barnes or Sloman. The collective teachings of Breuer Abildskov, Campbell and Hertzberg are discussed above. The examiner appears to acknowledge that these references do not mention using over-presses during curing as required by claims 22, 25 and 26. See the Answer, pages 24-26.

To remedy this deficiency, the examiner takes Official Notice at pages 24 and 25 of the Answer that:

[I]t is well known in the art when curing

---

Z-pins prior to co-curing the skins and pre-forms. See page 7.

Appeal No. 2006-0132  
Application No. 09/946,627

structural laminates to provide over-presses that are at least semi-rigid against the outer surfaces of the pre-form in order to distribute force across the outer surfaces of the pre-form.

The appellants do not challenge the Official Notice taken by the examiner. See the Brief, page 22. Consistent with the Official Notice, the examiner also finds (the Answer, pages 24-26) that:

Barnes discloses a method of curing a structural member by providing an at least semi-rigid over-press (silicone rubber blocks 221) against the outer surface of a pre-form (body sheet 53)... in order to cause the over-press to press the pre-form against the other structural assembly parts (see figure 25; column 8, lines 30-35, column 9, lines 14-33).

...

Sloman discloses a method of curing a structural member by providing an at least semi-rigid over-press against the outer surface of a pre-form in order to cause the over-press to press the pre-form against the other structural assembly parts (pages 1,3).

The appellants do not challenge these findings of fact.

Given these undisputed findings, we concur with the examiner that one of ordinary skill in the art would have been led to employ over-presses conforming to the shape of the outer surfaces of a given pre-form, including a generally triangular shape over-presses conforming to the shape of the outer surfaces of the pre-form of the type suggested in Breuer, Abildskov, Campbell and

Appeal No. 2006-0132  
Application No. 09/946,627

Hertzberg, motivated by a reasonable expectation of successfully distributing optimum force across the entire outer surfaces of the pre-form, thus obtaining improved curing and bonding.

The appellants argue that none of the applied prior art references teaches the generally triangular shape over-press recited in claim 22. See the Brief, page 22. This argument is not well taken. As pointed out by the examiner (Answer, page 26), Sloman illustrates a generally triangular shape pressure intensifier (over-press) in its Figure 2. See also Sloman, page 6.

In any event, the appellants ignore the fact that the shapes of over-presses are known to be a function of the shapes of the pre-forms since the whole purpose of using the over-presses is to apply pressure or force against the surface of a given structure. Thus, it is our judgment that the determination of an appropriate shape of an over-press for a given structure is well within the ambit of one of ordinary skill in the art since it is a known result effective variable for distributing optimum force for curing and bonding given structures. Boesch, 617 F.2d at 276, 205 USPQ at 219.

Thus, for the reasons indicated above and in the Answer, we concur with the examiner that the applied prior art references as

Appeal No. 2006-0132  
Application No. 09/946,627

a whole would have rendered the subject matter defined by claims 22, 25 and 26 obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103(a). Accordingly, we affirm the examiner's decision rejecting claims 22, 25 and 26 under section 103(a).

REJECTION 14)

As evidence of obviousness of the subject matter defined by claims 23 and 24 under section 103 (a), the examiner relies on the combined disclosures of Breuer, Abildskov, Campbell, Hertzberg, Barnes (or Sloman), at least Bersuch, Sheahen and/or Owens and optionally Alston. The collective teachings of Breuer, Abildskov, Campbell, Hertzberg, Barnes and Sloman are discussed above. The examiner appears to acknowledge that these references do not mention applying over-wrap plies as required by claims 23 and 24. See the Answer, pages 27-28.

To remedy this deficiency, the examiner relies on the disclosures of Bersuch, Sheahen, Owens and/or Alston. The examiner finds (the Answer, pages 27), and the appellants do not dispute (the Brief, page 21), that:

It is well known in the art of bonding structural composites to adhere over-wrap plies to pre-forms in order to provide a more secure joint. For example,

Bersuch (page 9) and/or Sheahen (pages 6-7) and /or Owens (page 404, figure 7) disclose applying composite over-wrap plies on an exterior surface of a woven pre-form. Whether the over-wrap plies are adhered prior to or after the insertion of the pins is well within the purview of one of ordinary skill in the art ... Optionally, Alston shows it is known in the art to provide structural pins either through all the layers of a structural composite (column 4, lines 56-67; figure 2) or to place some layers of composite, insert the pins, and then cover with additional layers of composite (column 5, lines 48-60; figure 6).

The appellants also do not dispute the examiner's determination that:

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of bonding as shown by Breuer, Abildskov, Campbell, Hertzberg, Barnes or Sloman by adhering over-wrap plies to the perform as is well known in order to provide a more secure bond and as further exemplified by Bersuch and/or Sheahen and/or Owens<sup>8</sup> and to provide the over-wrap plies either before or after insertion of the pins as would have been well within the purview of one of ordinary skill in the art or optionally as exemplified by Alston.

The appellants only argue (the Brief, page 23) that:

The generally triangular shape is an important feature of claim 22. Claims 23 and 24 deal with over-

---

<sup>8</sup> We find that Owens, for example, teaches bonding a pi-shape 3D woven textile perform to a skin layer and applying over-wrap plies to further strengthen the bonding and shear strength of the structure in aircraft construction (military airframe structures). See pages 398-424, especially Figure 2. Similarly, we find that Sheahen teaches joint subcomponents, including three-dimensional woven pi-shape pre-forms and skin components, useful in aircraft construction. See page 6. We find that Sheahen teaches that the woven pi-shape pre-forms can be bonded or bolted to skins and can be co-cured with the skins before applying over-wrap plies. See pages 6-7. We find that Sheahen teaches using Z-pins prior to co-curing the skins and pre-forms. See page 7.

Appeal No. 2006-0132  
Application No. 09/946,627

wrap plies and depend from claim 22. The combined references do not show the requirement of claim 22 in regard to a triangular shaped over-press. Claims 23 and 24 depend from claim 22, and thus should be allowed.

Thus, for the reasons already indicated above and in the Answer, we determine that the examiner has established, by preponderance of evidence, a prima facie case of obviousness regarding the subject matter defined by claims 23 and 24, which has not been rebutted by the appellants. Accordingly, we affirm the examiner's decision rejecting claims 23 and 24 under section 103(a).

#### CONCLUSION

Based on the totality of the record, including due consideration of the appellants' arguments and evidence, we determine that the preponderance of evidence weighs most heavily in favor of obviousness within the meaning of section 103(a). Accordingly, the decision of the examiner is affirmed.

Appeal No. 2006-0132  
Application No. 09/946,627

TIME PERIOD

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

AFFIRMED

Bradley R. Garris	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
Charles F. Warren	)	APPEALS AND
Administrative Patent Judge	)	INTERFERENCES
	)	
	)	
Chung K. Pak	)	
Administrative Patent Judge	)	

CKP:cam

James E. Bradley  
BRACEWELL & PATTERSON, LLP  
Suite 2900  
711 Louisiana Street  
Houston, TX 77002-2781