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14/209,052	03/13/2014	Jeremie J. Albert	13-1380-US-NP	1928
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Miller, Matthias & Hull LLP/ The Boeing Company			FABULA, MICHAEL A	
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JEREMIE J. ALBERT, RICHARD R LAVERTY,
JONATHAN W. GABRYS, and RUSSELL F. GRAVES

Appeal 2020-001067
Application 14/209,052
Technology Center 3600

Before JENNIFER D. BAHR, CHARLES N. GREENHUT, and
WILLIAM A. CAPP, *Administrative Patent Judges*.

GREENHUT, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant appeals from the Examiner's decision to reject claims 1–3, 5–9, 11–15 and 20.¹ *See* Non-Final Act. 1. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies “The Boeing Company” as the real party in interest. Appeal Br. 3.

CLAIMED SUBJECT MATTER

The claims are directed to an integrated armor for hypervelocity impacts. Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A structural armor for a space structure formed by a process comprising:
 - a) providing an angular member core, the angular member core having a plurality of front and rear nodes;
 - b) bonding a front armor facesheet to the front nodes of the angular member core; and
 - c) bonding a rear armor facesheet to the rear nodes of the angular member core, the rear armor facesheet being offset from the front armor facesheet.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Wadley	US 2009/0286100 A1	Nov. 19, 2009

REJECTIONS

Claims 1–3, 5, 6, 8, 9, 11–15, and 20 are rejected under 35 U.S.C. §§ 102(a)(1) and 102(a)(2) as anticipated by or, in the alternative, under 35 U.S.C. § 103 as obvious over Wadley. Non-Final Act. 3.

Claims 7 is rejected under 35 U.S.C. § 103 as being unpatentable over Wadley. Non-Final Act. 8.

OPINION

Claim Grouping

All claims except for claim 7 are argued as a group for which claim 1 is representative for purposes of both rejections against it under 37 C.F.R. § 41.37(c)(1)(iv). Appellant argues both the anticipation and obviousness rejection against claim 1 under the same subheading. However, different standards apply to the differing grounds of rejection, as discussed below.

Anticipation

In the anticipation rejection the Examiner relies on the acknowledged prior art embodiment discussed in the “Background of the Invention” section of Wadley. Non-Final Act. 4 (citing Wadley paras. 3–9). To the extent the Examiner relies on any aspect of Wadley’s disclosure concerning Wadley’s preferred embodiment, the Examiner does so only as evidence of what the structure having *bonded* facesheets relied upon by the Examiner for purposes of anticipation is, with the understanding that this structure has an otherwise generally identical geometric structure to Wadley’s improved extruded version.² Appellant’s remarks address only the disclosure of Wadley relating to Wadley’s purportedly improved extruded monolithic panels and not the version having the bonded facesheets relied upon by the Examiner. Appeal Br. 6–7 (citing Wadley paras. 12, 13, 15, 74, 75, Figs. 14A, B). Accordingly, the Examiner’s finding that the acknowledged prior

² See MPEP § 2131.01(II) and cases cited therein for a discussion of relying on additional evidence to show inherent characteristics of the subject matter relied upon in an anticipatory reference.

art embodiment discussed in the “Background of the Invention” section of Wadley anticipates the claimed subject matter is uncontroverted. Appellant contends that the portions of Wadley cited by Appellant teach away from using bonded face sheets. Appeal Br. 6–7. “A reference is no less anticipatory if, after disclosing the invention, the reference then disparages it. Thus, the question whether a reference ‘teaches away’ from the invention is inapplicable to an anticipation analysis.” *Celeritas Techs. Ltd. v. Rockwell Intl. Corp.*, 150 F.3d 1354, 1360 (Fed.Cir.1998).

For the foregoing reasons, we sustain the Examiner’s anticipation rejection.

Obviousness

Although 37 C.F.R. § 41.50(a)(1) provides that an affirmance of the rejection of a claim on any grounds suffices to constitute a general affirmance of the rejection of that claim, we address the Examiner’s alternative obviousness rejection against claim 1 for the sake of completeness. *See, e.g., In re Wagenhorst*, 64 F.2d 780, 782 (CCPA 1933) (“It being made the statutory duty of the Board of Appeals ‘to review and determine upon the validity of the adverse decisions of examiners,’ it would seem that this duty is not fully performed without a review of all adverse decisions by the Examiner.”) (cited with approval in *In re Nielson*, 816 F. 2d 1567, 1571 (Fed. Cir. 1987)).

As mentioned above, Appellant argues Wadley teaches away from the bonded-facesheet embodiment upon which Wadley expressly sought to improve. Appeal Br. 6–7. A bright-line rule prohibiting an examiner’s reliance on prior-art admissions in patent publications would make little

sense. “Rigid preventative rules that deny factfinders recourse to common sense . . . are neither necessary under our case law nor consistent with it.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). As a practical matter, holding references necessarily teach away from that which they acknowledge as prior art at the time of their filing would seemingly be overcome by the simple practice of having examiners cite an *even older* reference primarily disclosing that acknowledged prior art itself. A requirement to uncover such references would seem to pose an administrative burden having little substantive benefit because those older references would essentially be cumulative for the subject matter for which the examiner relies upon them. Neither applicants nor examiners are encouraged to rely on cumulative references in the course of patent prosecution. *See, e.g.*, MPEP § 2120(I). Our reviewing court’s predecessor rejected the notion that, when formulating a rejection, the PTO cannot propose to omit the structure which the inventor in a cited prior-art reference regarded as her contribution to the art. *See In re Umbarger*, 407 F.2d 425, 430 (CCPA 1969). Just because purportedly “better alternatives” may exist in the prior art it “does not mean that an inferior combination is inapt for obviousness purposes.” *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012). The better rule, and the proper one, is that references should be considered on a case-by-case basis, *in their entirety, and in context*, for that which they fairly teach *those of skill in the art*. *See* MPEP § 2123(I).

There is no dispute that Wadley expressly recognizes the problems associated with facesheet bonding in prior-art panels. Appeal Br. 6–7 (citing Wadley para. 12). However, teaching away is a question that must be considered *not* from the perspective of Wadley, or any specific inventor for

that matter, but from the perspective of *one skilled in the art*. Wadley may present good reasons to favor Wadley’s design over that of the prior art. However, this does not necessarily mean that, when considering Wadley in its entirety, and in the context of the knowledge generally available to the skilled artisan, Wadley’s comments concerning the inferiority of prior-art panels in comparison to Wadley’s own panel would necessarily render it nonobvious to make and use the conventional prior-art panels at all. For example, the skilled artisan may be reluctant to quickly depart from convention in an industry such as defense where property and human life and safety may be at stake. *See, e.g.*, Wadley claim 78 (“tank armor plating structure or a land, air, space or water vehicle/craft to provide land, air, space or water vehicle/craft plating structure”). In making the teaching away argument Appellant focuses only on Wadley’s disclosure of overcoming one specific problem associated with prior-art panels. Appellant does not provide any evidence or analysis of Wadley *as a whole and in the context of the art* to demonstrate that Wadley’s disclosure in this regard would render the manufacture and use of conventional structures nonobvious. Appellant merely points to Wadley’s preferred embodiment and the advantages Wadley attributes to it. Appeal Br. 6–7. Skilled artisans typically consider both the benefits lost and gained in making engineering decisions. *See Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n. 8 (Fed. Cir. 2000). Even if, after considering all relevant factors, that inquiry results in a determination that the conventional embodiment having bonded facesheets is, in certain circumstances, *less preferable* to the extruded monolithic version promoted by Wadley, that fact alone does not necessarily mean the less preferable embodiment is nonobvious. Ans. 3 (citing MPEP

§§ 2145(X)(D)(1), 2141.02(VI)), 5; *see also* Non-Final Act. 4 (citing, *inter alia*, *Merck & Co. v. Biocraft Laboratories*, 874 F.2d 804, 807 (Fed. Cir. 1989)); and MPEP § 2123. Furthermore, even if Wadley could be said to “teach away” from the embodiment Wadley improved upon, “there is no rule that a single reference that teaches away will mandate a finding of nonobviousness.” *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006). On the totality of the record presently before us, the evidence and reasoning in support of obviousness outweighs the evidence and arguments against. Accordingly, we sustain the obviousness rejection of claims 1–3, 5, 6, 8, 9, 11–15, 20.

Claim 7

Appellant’s argument with regard to claim 7 is:

The Examiner simply avers that Wadley renders such structure obvious, even though Wadley lacks any suggestion of the latter claim elements.

As noted previously, in order to support an obviousness rejection, MPEP §2143.03 requires “all words in the claim to be considered”

Appeal Br. 9.

Contrary to Appellant’s assertion, the Examiner provided an entire page of analysis concerning the line and a half of text comprising claim 7. Non-Final Act. 9. Because Appellant did not address the substance of the Examiner’s analysis in this regard, neither do we. “Filing a Board appeal does not, unto itself, entitle an appellant to *de novo* review of all aspects of a rejection.” *See Ex Parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) (citations omitted). “[T]he Board will not, as a general matter,

unilaterally review those uncontested aspects of the rejection.” *Id* at 1075–76 (citations omitted). Appellants have not contested with specificity any of the Examiner’s findings nor apprised us of any flaws in the Examiner’s reasoning or legal conclusions. Arguments must address the Examiner’s action. 37 C.F.R. § 41.37(c)(1)(iv) (“The arguments shall explain why the examiner erred as to each ground of rejection contested by appellant.”). The Board will not advocate for Appellants by scouring the record to see if the Board can identify some flaw in the Examiner’s findings of fact, articulated reasoning, or legal conclusions. *See, e.g., Halliburton Energy Services, Inc. v. M-I LLC*, 514 F.3d 1244, 1250 n.2 (Fed. Cir. 2008) (“A skeletal ‘argument[,]’ really nothing more than an assertion, does not preserve a claim. . . . Judges are not like pigs, hunting for truffles buried in briefs.”) (citation omitted). Because Appellant does not address the Examiner’s position regarding this rejection the Examiner’s findings and reasoning stands uncontroverted. Any arguments of error in the examiner’s rejection that could have been made by the appellant have been waived by failing to address the grounds of rejection set forth by the Examiner. *See Hyatt v. Dudas*, 551 F.3d 1307, 1312, 1314 (Fed. Cir. 2008) (“[A] ‘ground of rejection’ . . . is not merely the statutory requirement for patentability that a claim fails to meet but also the precise reason why the claim fails that requirement.” “[T]he applicant can waive appeal of a ground of rejection.”). Accordingly, we sustain the Examiner’s rejection of claim 7.

DECISION

The Examiner's rejections are affirmed.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1-3, 5, 6, 8, 9, 11-15, 20	102(a)(1), 102(a)(2), 103	Wadley	1-3, 5, 6, 8, 9, 11-15, 20	
7	103	Wadley	7	
Overall Outcome			1-3, 5-9, 11-15, 20	

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED



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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Application Number: 14/209,052

Filing Date: 13 Mar 2014

Appellant(s): Albert et al.

Frank B. McDonald (Reg. No. 28,738)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 7/29/2019.

(1) Grounds of Rejection to be Reviewed on Appeal

Every ground of rejection set forth in the Office action dated 3/28/2019 from which the appeal is taken is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

The following ground(s) of rejection are applicable to the appealed claims.

- 35 U.S.C. 102(a)(1) and 102(a)(2) rejection or, in the alternative, 35 U.S.C. 103 rejection of claims 1-3, 5, 6, 8, 9, 11-15, and 20 in view of US 2009/0286100 to Wadley et al.
- 35 U.S.C. 103 rejection of claim 7 in view of US 2009/0286100 to Wadley et al.

(2) Response to Argument

A. On pages 6-7 of the Appeal Brief, Appellant alleges that Wadley teaches away from bonding the facesheets to the angular member core as required by the product-by-process of independent claim 1 and the method of independent claim 9.

MPEP 2145(X)(D) states:

A prior art reference that "teaches away" from the claimed invention is a significant factor to be considered in determining obviousness; however, "the nature of the teaching is highly relevant and must be weighed in substance. **A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use.**" *In re Gurley*, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994)

MPEP 2141.02 (VI) states:

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)

As outlined in the Non-Final Office Action of 3/28/2019, Wadley teaches that the state of the prior art is to bond facesheets to an angular core member to form a sandwich structure (See paragraph [0003] of Wadley). Wadley also teaches a particular geometry of sandwich panel structure comprising two facesheets and an angular member core as seen in the Figures (See Figs. 1C, 2B, 3, 6A, 14B of Wadley). While Wadley describes the use of monolithic manufacturing to improve upon the state of the prior art bonding methods by eliminating possible delamination/debonding of the multi-piece construction of the facesheets and core member, the geometry of the Figures, namely two facesheets and an angular member core having a pyramidal lattice structure sandwiched in between the facesheets, is never taught to be novel to the improved method of formation by monolithic manufacturing. Paragraph [0008] of Wadley teaches that pyramidal lattice trusses are known in the prior art and paragraph [0019] states that the truss-based sandwich structures created by monolithic manufacturing are actually limited in overall size as compared to the prior art because of the limits of the current extrusion technology. Taking all of the teachings of Wadley as a whole, pyramidal lattice structures forming angular member cores were known and the process of forming a space structure sandwich structure by bonding two facesheets to an angular member core were known. Wadley therefore includes all the features of the presently claimed application save for explicitly stating that a sandwich panel which is bonded, also has the pyramidal latticework core member. Since Wadley teaches that the Figures are directed to a structure only differentiated from the prior art by the process of manufacturing, it is implicit that an equivalent structure was already made or could be made through the known process of bonding in the prior art, hence the finding that the claim is anticipated by Wadley taken as a whole. In the alternative rejection rationale, it was noted that one of ordinary skill in the art at the time of the invention would have been able to form the same

structure shown in the Figures of Wadley through the well-known method of bonding the facesheets to the angular core member. In view of the aforementioned case law, while monolithic construction is taught to be an improvement over the prior art bonding method, taking Wadley as a whole, both the geometry and the bonding method are still already known and therefore would have been available and obvious to one having ordinary skill in the art at the time the invention was filed.

On page 7 of the Appeal Brief, Appellant alleges that criticality of bonding in the present application is irrelevant because the claims are drawn to bonding rather than monolithic manufacturing. This argument is not persuasive as Appellant is attempting to present Wadley, as a whole, as incapable of anticipating or rendering obvious a product formed by bonding or a method of forming by bonding because they also teach a process of monolithic construction. Examiner utilized Appellant's own disclosure to invalidate this argument by showing that the present application actually recites monolithic construction and bonding constructions as being functionally equivalent. While Wadley does teach that monolithic construction is preferred, bonding is still clearly taught and rendered obvious by Wadley.

On page 7 of the Appeal Brief, it is also alleged that Wadley is utterly devoid of any recitations that anticipate, or, in the alternative, suggest, either the product by process of claim 1 or the method of claim 9. This argument is unclear in view of the arguments that Wadley teaches away from the present invention already made. For Wadley to teach away from "X", it is necessary to teach "X" first. The argument that Wadley is both teaches away from "X" and is simultaneously devoid of "X" is therefore not supported by fact.

On the remainder of pages 7-8 of the Appeal Brief, Appellant alleges that dependent claims 2, 3, 5, 6, 8, 11-15, and 20 stand or fall with independent claims 1 and 9. As outlined

above, Appellant's arguments with respect to claims 1 and 9 are rebutted such that claims 2, 3, 5, 6, 8, 11-15, and 20 remain rejected.

B. On pages 8-9, Appellant alleges that because Wadley fails to disclose the particular materials (i.e. Inconel) or cross-sectional shape (i.e. hollow circular cross-section) that the limitations of claim 7 would therefore be non-obvious to one of ordinary skill in the art at the time the invention was filed. First, Appellant does not provide any criticality for the particular shape and/or material in the originally filed disclosure and case law has held that both changes in shape and changes in material are both obvious matters of design choice in the art. Second, Appellant has neither argued nor provided evidence that Inconel and/or the particular cross-sectional shape are unknown in the art or would have provided an unexpected result if utilized in combination with Wadley. The Appellant's arguments are therefore deemed unpersuasive and the rejection is maintained.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Michael A. Fabula/
Examiner, Art Unit 3647

Conferees:
/TIEN Q DINH/
Supervisory Patent Examiner, Art Unit 3647

/Eric Nicholson/
RQAS

Requirement to pay appeal forwarding fee. In order to avoid dismissal of the instant appeal in any application or ex parte reexamination proceeding, 37 CFR 41.45 requires payment of an

appeal forwarding fee within the time permitted by 37 CFR 41.45(a), unless appellant had timely paid the fee for filing a brief required by 37 CFR 41.20(b) in effect on March 18, 2013.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Jeremie J. Albert

Serial No.: 14/209,052

Confirmation No.: 1928

Filed: March 13, 2014

Art Unit: 3647

For: Integrated Armor For Hypervelocity Impacts

Examiner: Michael Fabula

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
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P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Pursuant to the Notice of Appeal filed June 3, 2019, Appellant respectfully submits this Appeal Brief in accordance with 37 C.F.R. §41.37.

This paper is being timely filed; i.e. without requirement of an extension of time.

TABLE OF CONTENTS

This Appeal Brief contains the following items in the order set forth below (37 C.F.R.

§41.37(c)):

- I. REAL PARTY IN INTEREST (37 C.F.R. § 41.37(c)(1)(i))
- II. RELATED APPEALS, INTERFERENCES, AND TRIALS (37 C.F.R. § 41.37(c)(1)(ii))
- III. SUMMARY OF CLAIMED SUBJECT MATTER (37 C.F.R. § 41.37(c)(1)(iii))
- IV. ARGUMENT (37 C.F.R. § 41.37(c)(1)(iv))
- V. CLAIMS APPENDIX (37 C.F.R. § 41.37(c)(1)(viii))

I. REAL PARTY IN INTEREST

The real party in interest is The Boeing Company. The assignment of rights in the above-identified patent application to The Boeing Company is recorded in the United States Patent and Trademark Office (“USPTO”) at Frame 032431 of Reel 0612.

II. RELATED APPEALS, INTERFERENCES, AND TRIALS

There are no related appeals, interferences, or trials before the Board or judicial proceedings known to Appellant, Appellant's legal representatives or assignees, which are related to, or which may directly affect or be directly affected by, or have a bearing in or on the Board's decision, in the pending appeal.

III. SUMMARY OF CLAIMED SUBJECT MATTER

Pursuant to a *Final Office Action* dated November 15, 2018, followed by Appellant's Response to the *Final Office Action* along with a Request for Continued Examination, both filed January 4, 2019, all pending claims 1-3, 5-9, 11-15, and 20 were rejected in a *Non-Final Office Action* of March 28, 2019. During subject prosecution, claims 4, 10, and 16-19 were canceled; none of the claims were ever withdrawn from consideration.

The subject matter of Appellant's rejected independent claim 1 is a product-by-process for forming a structural armor of a space structure. The process includes providing an angular member core having a plurality of front and rear nodes, and bonding a front armor facesheet to the front nodes of the annular member core. Thereafter, the process includes bonding a rear armor facesheet to the rear nodes of the angular member core, with the rear armor facesheet being offset from the front armor facesheet.

The claimed structure and product-by-process steps for making the structure are as reflected in FIGS. 3, 4 and 7, and as described in Paragraphs [0022], [0025] and [0040] through [0042] of Appellant's specification.

The subject matter of Appellant's rejected independent claim 9 relates to a method of protecting a space structure from an impact with an object moving at hypervelocity speed. The method includes forming a structural armor by providing an angular member core, with the angular member core having a plurality of front and rear nodes. The method further includes the step of bonding a front armor facesheet to the front nodes of the angular member core, and then bonding a rear armor facesheet to the rear nodes of the angular member core, with the rear armor facesheet being offset from the front armor facesheet. Finally, the method consists of affixing the structural armor to a portion of a space structure, with the space structure then being less vulnerable to loss upon receiving a penetrating impact from an object moving at hypervelocity speed on the front armor facesheet of the structural armor.

The method of claim 9 is as displayed in various aspects of FIGS. 4, 7 and 8, and is as described in paragraphs [0025], as well as paragraphs [0040] through [0044], of Appellant's specification.

IV. ARGUMENT

Claims 1-3, 5, 6, 8, 9, 11-15, and 20 are patentable because a *prima facie* case of anticipation under 35 USC 102 (a) (1) and 102 (a) (2), or, in the alternative, obviousness under 35 USC § 103, cannot be established by the reference asserted against those claims by the Office. Accordingly, Appellant respectfully submits that all rejections of claims 1-3, 5, 6, 8, 9, 11-15, and 20 are erroneous and must be reversed.

A. The Rejections under 35 U.S.C. § 102 as anticipated by Wadley, or, in the alternative, under 35 U.S.C. § 103 as obvious under US 2009/0286100 to Wadley et al. (hereinafter “Wadley”), Must be Reversed

Per above, claims 1-3, 5, 6, 8, 9, 11-15, and 20 stand rejected as being alternatively anticipated or obvious under *Wadley*. See the *Non-Final Office Action* of March 28, 2019, pages 2-8.

First, with respect to Appellant’s independent claims at issue, claims 1 and 9, Appellant has specifically claimed “bonding” as Appellant’s means of attaching its respective front and rear armor facesheets to its angular member core. Appellant has support for this limitation, as noted above.

In this prosecution, Appellant has already noted that *Wadley* specifically teaches against bonding, especially at paragraph [0012], warning that “Facesheet-core interface bond failure may be a key failure mode for lattice-based sandwich structures.” As such, Appellant has further noted that *Wadley* teaches avoidance of bonding by providing a monolithic structure at the outset, then extruding the structure to selectively remove material along a first path, and then machining along a second path to selectively remove material, e.g. *Wadley*’s paragraph [0015].

In fact, *Wadley* absolutely does not teach or describe Appellant’s claimed product-by-process steps of making a structural armor to protect a space structure from impact with an object moving at hypervelocity speed. *Wadley*’s focus is to start with a monolithic block to minimize steps; e.g. see the two-step manufacturing process noted in his paragraph [0013]. *Wadley*’s *specific* extrusion process is described in detail, beginning at paragraph [0074], and as shown in Figure 14A. After starting with an extrusion billet and ramming the billet through an extrusion

die 1518 to form truss-based structure 1503 (described in paragraph [0075] and shown in Figure 14B), *Wadley* achieves the final form of his structure by machining via electro-discharge and drilling, and including laser drilling, waterjet cutting, chemical dissolution, or any other suitable operation effective to finish forming his monolithic truss structure 1503, which includes face sheets 1504, truss units 1505, and nodes 1506.

As such, *Wadley* clearly does not anticipate Appellant's product-by-process and method claims. Moreover, *Wadley* also does not render obvious Appellant's claims, but instead *teaches away from* Appellant's claims, which involve bonding separate front and rear armor facesheet elements to Appellant's angular member core, contrary to *Wadley's* teaching. Thus, as Appellant's rejected claims are neither anticipated nor rendered obvious by *Wadley*, Appellant's claims therefore stand allowable over *Wadley*.

In explaining his rejections, the Examiner states that the patentability of Appellant's presently claimed bonding method is not persuasive as there is no "criticality" to the bonding recited in Appellant's own disclosure, citing paragraphs in Appellant's specification referencing that the angular core member is "bonded or otherwise coupled" (*Non-Final Office Action of March 28, 2019, page 10*). Appellant submits that the central issue is not criticality, but rather only whether the claimed bonding steps distinguish over the prior art; in this case, *Wadley*. To the extent that the recitation "bonded or otherwise coupled" positively includes the concept of bonding, Appellant submits that the referenced language provides requisite support for Appellant's claimed product-by-process and method claims, which include "bonding" steps.

Finally, the Examiner has stated that *Wadley* actually discloses Appellant's claimed bonding steps, when in fact *Wadley* only states that *his* approach may be superior to any manufacturing process that may involve bonding. In fact, *Wadley* is utterly devoid of any recitations that anticipate, or, in the alternative, suggest, either of Appellant's product-by-process of independent claim 1 or Appellant's method of independent claim 9.

With respect to Appellant's rejected dependent claims 2, 3, 5, 6, 8, 11-15 and 20, *Wadley* fails to anticipate or render obvious the latter dependent claims, because each of those claims depends from at least one of Appellant's independent base claims 1 and 9. As such, each of Appellant's dependent claims 2, 3, 5, 6, 8, 11-15, and 20 is fully allowable over *Wadley*.

In order to anticipate a claim, MPEP §2131 requires that a single prior art reference must disclose *each and every* limitation of the claim. Moreover, “[a] claim is anticipated only if each and every element as set forth in the claims is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051 (Fed. Cir. 1987). Appellant submits that *Wadley* fails to satisfy this standard for reasons provided hereinbelow.

On the other hand, in order to support an obviousness rejection, MPEP §2143.03 requires “all words of a claim to be considered” and MPEP §2141.02 requires consideration of the “[claimed] invention and prior art as a whole.” Further, the Board of Patent Appeals and Interferences has confirmed that a proper, post-*KSR* obviousness determination still requires the Office to make “a searching comparison of the claimed invention – including all its limitations – with the teaching of the prior art.” *See, In re Wada and Murphy*, Appeal 2007-3733, citing *In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995). In sum, it remains well-settled law that an obviousness rejection requires at least a suggestion of *all* of the claim elements. The rejections of claims 1-3, 5, 6, 8, 9, 11-15, and 20 as obvious under *Wadley* fail to meet this standard, as *Wadley* does not disclose each and every limitation of the rejected claims.

In conclusion, *Wadley* fails to meet the requirements set forth under *35 USC 102*, or, *alternatively* under *35 USC 103*. As such, Appellant believes all of the above rejected claims 1-3, 5, 6, 8, 9, 11-15, and 20 stand fully allowable, and that none are either anticipated nor rendered obvious by *Wadley*. Indeed, with respect to obviousness as applied to each of the rejected claims, the Examiner appears to have established obviousness without identifying any equivalent elements, or without finding motivational basis, as required.

As such, Appellant avers that the rejections of claims 1-3, 5, 6, 8, 9, 11-15, and 20 are factually and legally unsupported as articulated in the *Non-Final Office Action* of March 28, 2019, and as such must be reversed.

B. The Rejection of Claim 7 under 35 U.S.C. § 103, as being unpatentable over *Wadley*, Must be Reversed

Claim 7 stands rejected as being rendered obvious under *Wadley*. *See Non-Final Office Action*, pages 8-9.

Notwithstanding that the Examiner admits that *Wadley* fails to suggest a plurality of angular members which comprise hollow Inconel having a circular cross-sectional shape, the Examiner simply avers that *Wadley* renders such structure obvious, even though *Wadley* lacks any suggestion of the latter claim elements.

As noted previously, in order to support an obviousness rejection, MPEP §2143.03 requires “all words in the claim to be considered”, and MPEP §2141.02 requires consideration of the “[claimed] invention and prior art as a whole.” Moreover, the Board of Patent Appeals and Interferences has confirmed that a proper post-*KSR* obviousness determination requires the office to make “a searching comparison of the claimed invention-including all its limitations, with the teaching of the prior art. See *In re Wada & Murphy*, Appeal 2007-3733, citing *In re Ochiai*, 71 F3d 1565, 1572 (Fed. Cir. 1995). In sum, it remains well-settled law that *an obviousness rejection requires at least a suggestion of all claim elements* (Emphasis intended).

Appellant submits that the obviousness rejection of Appellant’s claim 7 over *Wadley* fails to meet this standard. Thus, the obviousness rejection of claim 7 must be reversed.

C. Conclusion

In light of the foregoing, the Appellant respectfully submits that all of the appealed rejections of pending claims 1-3, 5-9, 11-15, and 20 are without sufficient factual and legal merit, and should therefore be reversed by the Patent Trial and Appeal Board.

Dated: July 29, 2019

Respectfully submitted,

By: /Frank B. McDonald/
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V. CLAIMS APPENDIX

1. (Previously Presented) A structural armor for a space structure formed by a process comprising:

- a) providing an angular member core, the angular member core having a plurality of front and rear nodes;
- b) bonding a front armor facesheet to the front nodes of the angular member core; and
- c) bonding a rear armor facesheet to the rear nodes of the angular member core, the rear armor facesheet being offset from the front armor facesheet.

2. (Previously Presented) The structural armor of claim 1, wherein the plurality of nodes comprises a plurality of front nodes, each front node abutting the front armor facesheet at an acute node angle, and a plurality of rear nodes, each rear node abutting the rear armor facesheet at an acute node angle.

3. (Previously Presented) The structural armor of claim 2, wherein the angular member core comprises a plurality of angular members, wherein each angular member connects a front node to a rear node.

4. (Canceled)

5. (Previously Presented) The structural armor of claim 3, wherein the acute node angle comprises 60 degrees.

6. (Original) The structural armor of claim 3, wherein the plurality of angular members comprises four angular members.

7. (Original) The structural armor of claim 3, wherein the plurality of angular members comprise hollow Inconel with a circular cross-sectional shape.

8. (Original) The structural armor of claim 1, wherein the structure comprises a space structure, and wherein the front armor facesheet, the rear armor facesheet, and the angular member core are configured as a load-bearing component of the space structure.

9. (Previously Presented) A method of protecting a space structure from an impact with an object moving at hypervelocity speed, the method comprising:

1) forming a structural armor by:

a) providing an angular member core, the angular member core having a plurality of front and rear nodes;

b) bonding a front armor facesheet to the front nodes of the angular member core:
and

c) bonding a rear armor facesheet to the rear nodes of the angular member core, the rear armor facesheet being offset from the front armor facesheet; and

2) affixing the structural armor to a portion of a space structure;

wherein the space structure is less vulnerable to loss upon receiving a penetrating impact from the object moving at hypervelocity speed on the front armor facesheet of the structural armor.

10. (Canceled).

11. (Previously Presented) The method of claim 9, wherein receiving the penetrating impact from the object on the front armor facesheet of the structural armor comprises receiving the penetrating impact from the object on the front armor facesheet at a position aligned with a front node such that the debris impacts the front node after exiting the front armor facesheet.

12. (Previously Presented) The method of claim 9, wherein receiving the penetrating impact from the object on the front armor facesheet of the structural armor comprises receiving the penetrating impact from the object on the front armor facesheet at a position aligned with a beam of an angular member such that the debris impacts the beam after exiting the front armor facesheet.

13. (Previously Presented) The method of claim 9, wherein receiving the penetrating impact from the object on the front armor facesheet of the structural armor comprises receiving the penetrating impact from the object on the front armor facesheet at a position aligned with a valley associated with a rear node such that the debris impacts the valley associated with the rear node after exiting the front armor facesheet.

14. (Previously Presented) The method of claim 9, wherein receiving the penetrating impact from the object on the front armor facesheet of the structural armor comprises receiving the penetrating impact from the object on the front armor facesheet at a position aligned with an aperture of the angular member core such that the debris traverses the aperture of the angular member core after exiting the front armor facesheet.

15. (Previously Presented) The method of claim 9, wherein a spread angle is approximately equivalent to or greater than the acute node angle.

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Canceled)

20. (Previously Presented) The method of claim 9, further comprising:
coupling the structural armor comprising the front armor facesheet, the angular member core, and the rear armor facesheet to a plurality of components of the space structure, wherein the structural armor and the plurality of components are configured as load-bearing components of the space structure.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/209,052	03/13/2014	Jeremie J. Albert	13-1380-US-NP	1928
122219	7590	03/28/2019	EXAMINER	
Miller, Matthias & Hull LLP/ The Boeing Company			FABULA, MICHAEL A	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

bmatthias@millermatthiashull.com
patentadmin@boeing.com
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Office Action Summary**Application No.**

14/209,052

Applicant(s)

Albert et al.

Examiner

MICHAEL A FABULA

Art Unit

3647

AIA (FITF) Status

Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 1/4/2019.
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) Claim(s) 1-3,5-9,11-15 and 20 is/are pending in the application.
5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) Claim(s) ____ is/are allowed.
- 7) Claim(s) 1-3,5-9,11-15 and 20 is/are rejected.
- 8) Claim(s) ____ is/are objected to.
- 9) Claim(s) ____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) The specification is objected to by the Examiner.
- 11) The drawing(s) filed on ____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) All b) Some** c) None of the:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. ____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date _____.
- 3) Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 4) Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/4/2019 has been entered.

Response to Amendment

3. This action is in response to the amendment filed on 1/4/2019, wherein:
Claims 1-3, 5-9, 11-15, and 20 are currently pending; and
Claims 1-3, 9, and 15 have been amended.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

(a)(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

Claim Rejections - 35 USC § 103

5. This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C.

102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

6. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. **Claim(s) 1-3, 5, 6, 8, 9, 11-15, and 20 is/are rejected under 35 U.S.C. 102(a)(1) and 102(a)(2) as anticipated by or, in the alternative, under 35 U.S.C. 103 as obvious over US 2009/0286100 to Wadley et al.**

9. Re: Claim 1. It is first noted that the use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain." *In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). It has also been held that a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. *Merck & Co. v. Biocraft Laboratories*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), *cert. denied*, 493 U.S. 975 (1989). See also *Upsher-Smith Labs. v. PamLab, LLC*, 412 F.3d 1319, 1323, 75 USPQ2d 1213, 1215 (Fed. Cir. 2005).

Wadley describes the state of the prior art of sandwich panel structures with low density cores with solid factsheets in the Background of the Invention (paragraphs [0003]-[0009]). Wadley teaches that conventionally, the sandwich panels are formed by joining the face sheets to the core through methods such as brazing, adhesives, brazing, diffusion bonding, soldering, and resistance/electron/laser welding (paragraphs [0003] and [0012]). Wadley then goes on to describe a novel improvement in the construction of the prior art sandwich panels: monolithic material construction. Wadley teaches that the monolithic construction improves upon the prior art in that it removes the possibility of debonding between the facesheets and core since they are formed from the same singular piece of material and that corrosion is reduced for the same reason. However, Wadley makes no mention throughout the disclosure that the particular shape, materials, size, orientation, or end use of the sandwich panels are differentiated from the prior art; only that the prior art bonding process is replaced by monolithic manufacturing.

Taking the Wadley reference as a whole, one of ordinary skill in the art would recognize that Wadley teaches that it is known to form a structural armor for a space structure through the

process of providing an angular member core having a plurality of front and rear nodes and then to bond both a front and rear armor facesheet to the respective front and rear nodes of the core. A sandwich panel having the same geometry as shown in the Figures of Wadley but formed through conventional bonding methods is therefore implied. Wadley therefore is argued to anticipate the claim of a structural armor (3) for a space structure (see Wadley, claims 78 and 96) formed by providing a front armor facesheet (11); providing a rear armor facesheet (11) offset from the front armor facesheet (11); and providing an angular member core (12,13,14) having a plurality of nodes (13), each node (13) abutting the front armor facesheet (11) or the rear armor facesheet (11) and providing a junction for a plurality of angular members (14) intersecting at an acute node angle (angle at node 13 between members 14 and front or rear facesheets 11 in Fig. 1C; angle W1 in Fig. 6A) of 55-65 degrees (See angle W1 in Fig. 6A; see also paragraph 0086, noting "web inclination angle of 60° as designated by arrow W1"; See also Figures 1C, 2B, wherein the Examiner notes that the drawings in Wadley show the angular members 14 and the facesheets 11 forming equilateral triangles which would mean the interior angles between each would be about 60 degrees; and see Fig. 14B and paragraph 0104 again noting "web inclination angle of 60°") from the front armor facesheet (11) or rear armor facesheet (11), wherein the front armor facesheet (11), the rear armor facesheet (11), and the angular member core (12, 13, 14) are capable to provide load-bearing capability (See Abstract; paragraphs 0004, 0006, 0008, 0010, 0011, 0012, 0020, 0059, 0092, 0093, 0101, each discussing "load carrying capacity" or the performance of nodes when subjected to "loads" or for transferring "loads") for the space structure (See Wadley, Figures 1C, 2B, 3, 6A). Wherein, conventional bonding methods are used to bond the front and rear armor sheets to the nodes of the core rather than forming a monolithic construction.

Arguendo, Wadley does not anticipate the claimed product-by-process, as outlined above, one of ordinary skill in the art would have readily recognized the structure as taught by Wadley in the Figures and have known about the conventional bonding techniques taught by the same. One of ordinary skill in the art could therefore easily form an equivalent structure as shown by Wadley through the known techniques of conventional bonding outlined above. The claimed invention is therefore at least rendered obvious if not anticipated.

10. Re: Claim 9. As outlined above with respect to claim 1, Wadley anticipates and/or renders obvious a structural armor for a space structure, product-by-process as claimed. The structural armor is also taught to have the angular member core configured to include a plurality of nodes at the end of each of each angular member which consist of front nodes and rear nodes, again as outlined above with respect to claim 1. As outlined in claims 78 and 96, Wadley teaches that the structural armor is affixed to a space structure which necessitates the step of affixing. With regards to the space structure being less vulnerable to loss upon receiving a penetrating impact from the object moving at hypervelocity speed on the front armor facesheet of the structural armor, Wadley teaches receiving a penetrating impact from the object moving at hypervelocity speed on a front armor facesheet (11) of a structural armor (3) and conically distributing debris from the penetrating impact outward at a spread angle of 55-65 degrees (See angle W1 in Fig. 6A; see also the angles of about 60 degrees between the equilateral triangles formed by the nodes in Fig. 13A and in Fig. 14B) or greater to a rear armor facesheet (11) of the structural armor (3) through an angular member core (12,13,14) disposed between the front armor facesheet (11) and the rear armor facesheet (11) which would reduce direct penetration through the sandwich panel thereby making the space structure, to which the panel is attached, less vulnerable.

11. Re: Claim 2. Wadley further discloses that the plurality of nodes (13) includes a plurality of front nodes (13), each front node abutting the front armor facesheet (11) at an acute node angle (60 degree node angle taught by Wadley is an acute angle), and a plurality of rear nodes (13) at an acute node angle (60 degree node angle taught by Wadley is an acute angle), each rear node abutting the rear armor facesheet (11).

12. Re: Claim 3. Wadley further discloses that the angular member core comprises a plurality of angular members (See Figures), wherein each angular member (14) connects a front node (13) to a rear node (13).

13. Re: Claim 5. Wadley discloses that the acute node angle includes 60 degrees.

14. Re: Claim 6. Wadley discloses that the plurality of angular members (14) includes four angular members (14). (See Wadley Figures 1C, 2B; the Examiner notes that the drawings in Wadley show that four angular members (14) come together at each node (13).

15. Re: Claim 8. Wadley discloses that the structure includes a space structure (see Wadley, claims 78 and 96), and that the front armor facesheet (11), the rear armor facesheet (11), and the angular member core (12,13,14) are configured as a load-bearing component of the space structure.

16. Re: Claim 11. Wadley discloses that receiving the penetrating impact from the object on the front armor facesheet (11) of the structural armor (3) includes receiving the penetrating impact from the object on the front armor facesheet (11) at a position aligned with a front node (13) such that the debris impacts the front node (13) after exiting the front armor facesheet (11).

17. Re: Claim 12. Wadley discloses that receiving the penetrating impact from the object on the front armor facesheet (11) of the structural armor (3) includes receiving the penetrating impact from the object on the front armor facesheet (11) at a position aligned with a beam of an

angular member (14) such that the debris impacts the beam after exiting the front armor facesheet (11).

18. Re: Claim 13. Wadley discloses that receiving the penetrating impact from the object on the front armor facesheet (11) of the structural armor (3) includes receiving the penetrating impact from the object on the front armor facesheet (11) at a position aligned with a valley (space between members 14 nearest a rear node 13) associated with a rear node (13) such that the debris impacts the valley associated with the rear node after exiting the front armor facesheet (11).

19. Re: Claim 14. Wadley discloses that receiving the penetrating impact from the object on the front armor facesheet (11) of the structural armor (3) includes receiving the penetrating impact from the object on the front armor facesheet (11) at a position aligned with an aperture (gap between members 14 nearest front facesheet 11) of the angular member core (12, 13,14) such that the debris traverses the aperture of the angular member core (12,13,14) after exiting the front armor facesheet in).

20. Re: Claim 15. Wadley discloses that the spread angle is approximately equivalent to or greater than the acute node angle.

21. Re: Claim 20. Wadley discloses coupling the structural armor (3) including the front armor facesheet (11), the angular member core (12,13,14), and the rear armor facesheet (11) to a plurality of components of the space structure, wherein the structural armor (3) and the plurality of components are configured as load-bearing components of the space structure.

22. **Claims 7 is rejected under 35 U.S.C. 103 as being unpatentable over US 2009/0286100 to Wadley et al.**

23. Re: Claim 7. Claims 1-3 are anticipated and/or rendered obvious by Wadley as outlined above. However, Wadley does not specifically disclose that the plurality of angular members (14) include hollow Inconel with a circular cross-sectional shape. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the angular members from hollow Inconel, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

In re Leshin, 125 USPQ 416. See also Balias Liquidating Co. v. Allied Industries of Kansas, Inc. (DC Kans) 205 USPQ 331. It would have been obvious to one skilled in the relevant art at the time of the invention to form the angular members from a known material like hollow Inconel in order to achieve the predictable result of providing a structural member of high strength and of light weight, as balancing high strength with a reduction of weight is a prime motivation in all space structures.

In addition, it would have been an obvious matter of design choice to make the cross sections of the angular members of whatever form or shape was desired or expedient. A change in form or shape is generally recognized as being within the level of ordinary skill in the art, absent any showing of unexpected results. In re Dailey et al., 149 USPQ47. It would have been further obvious to one skilled in the relevant art at the time of the invention to make the cross sections of the angular members of a circular shape in order to achieve the predictable result of providing structural members that maximize strength with a minimal amount of matter.

Response to Arguments

24. Applicant's arguments filed 1/4/2019 have been fully considered but they are not persuasive.

25. On pages 6-8 of Applicant's Remarks, it is alleged that Wadley does not anticipate the claimed structures because the invention of Wadley teaches away from the claimed bonding of the facesheets to the core member in favor of the monolithic construction. The argument is not persuasive as Wadley, while teaching a preferred construction method, still clearly elaborates on the state of the art wherein the presently claimed structures formed through bonding are anticipated and/or rendered obvious. Furthermore, the argument that the presently claimed bonding method is patentable is not persuasive as there is no criticality to the bonding recited in Applicant's own disclosure. In the very same paragraphs ([0025] and [0041]) to which the Applicant points to show support for bonding, it is recited that the angular core member is "bonded or otherwise coupled" and that "It should also be appreciate[d] that the 'coupling' may include created the front armor facesheet 306, rear armor facesheet 308, and the angular member core 304 out of **a single piece of material.**" The Applicant's claim amendments have been addressed through the amended rejections above and in view of the unpersuasive arguments, the rejections are maintained.

Conclusion

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL A FABULA whose telephone number is (571)270-7772. The examiner can normally be reached on Monday - Friday 9:30AM-6:00PM EST.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, TIEN Q DINH can be reached on 5712726899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael A. Fabula/
Examiner, Art Unit 3647

/Richard R. Green/
Primary Examiner, Art Unit 3647