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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* GARY E. GEORGESON  
and KENNETH H. GRIESS

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Appeal 2019-004934  
Application 15/367,337  
Technology Center 1700

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Before MICHAEL P. COLAIANNI, GEORGE C. BEST, and  
DEBRA L. DENNETT, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134(a) the final rejection of claims 1–10.<sup>1</sup> We have jurisdiction over the appeal. 35 U.S.C. § 6(b).

We AFFIRM.

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<sup>1</sup> 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. 1).

## STATEMENT OF THE CASE

Appellant's invention is directed to systems and methods for repairing structures comprised of composite materials, such as a carbon fiber/epoxy composite (Spec. 1:4–5). According to the Specification, composite materials are increasingly used in aircraft structures because they provide increased strength and rigidity along with reduced weight and parts count (*id.* at 1:7–10). The Specification describes repair systems and methods which are said to shorten the time it takes to repair an aircraft's composite structure (*id.* at 1:15–2:5).

Claims 1 and 7 are representative of the subject matter on appeal (emphasis added):

1. A composite structure comprising:

a parent structure having a depression, said parent structure being made of fiber-reinforced composite material;

an insert in said depression, said insert being made of fiber-reinforced composite material; and

*a patch bonded by an adhesive to one side of said parent structure and one side of said insert, said patch being made of fiber-reinforced composite material, wherein said patch comprises a central portion and a multiplicity of pre-stressed members that extend outwardly from an outermost portion of said central portion of said patch, wherein said central portion of said patch is directly bonded to said one side of said insert by the adhesive therebetween, and each of said multiplicity of pre-stressed members is directly bonded to opposing portions of said one side of said parent structure by the adhesive therebetween, each pre-stressed member of said multiplicity being in a flexed state with a potential to deform toward an unflexed state in the event that a strength of the bond between that pre-stressed member and an opposing portion of said one side of said parent structure becomes zero.*

7. A composite structure comprising:

a parent structure having a depression, said parent structure being made of fiber-reinforced composite material;

an insert in said depression, said insert being made of fiber-reinforced composite material; and

*a patch bonded by an adhesive to one side of said parent structure and one side of said insert, said patch being made of fiber-reinforced composite material, wherein said patch comprises a central portion and a multiplicity of pre-stressed members that extend outwardly from an outermost portion of said central portion of said patch and are separated by slits, wherein said central portion of said patch is directly bonded to said one side of said insert by the adhesive therebetween, and each of said multiplicity of pre-stressed members is directly bonded to opposing portions of said one side of said parent structure by the adhesive therebetween and has the property that at least a portion of the pre-stressed member will deform toward an unflexed state in the event that a bond strength between said portion of said pre-stressed member of said multiplicity and an opposing portion of said one side of said parent structure changes from a non-zero value to zero.*

Appeal Br. 14, 15–16 (Claims App.).

The Examiner maintains the following rejections:

1. Claims 1, 2, 4, 5, 7, and 8 are rejected under 35 U.S.C. § 103 as unpatentable over Lindgren et al. (US 8,568,545 B2; issued Oct. 29, 2013, “Lindgren”), in view of Hyman (US 4,100,712; issued July 18, 1978), and further in view of Grosskrueger et al. (US 6,656,299 B1; issued Dec. 2, 2003, “Grosskrueger”) (Final Act. 2–5; 6–9).

2. Claims 3 and 9 are rejected under 35 U.S.C. § 103 as unpatentable over Lindgren, in view of Hyman, Grosskrueger, and

further in view of Cologna et al. (US 4,820,564; issued Apr. 11, 1989, “Cologna”) (Final Act. 5–6; 9–10).

3. Claims 6 and 10 are rejected under 35 U.S.C. § 103 as unpatentable over Lindgren, in view of Hyman, Grosskrueger, and further in view of Buckland (US 3,855,881; issued Dec. 24, 1974) (Final Act. 6; 10).

Appellant offers separate arguments in support of independent claims 1 and 7 (Appeal Br. 7–12). These arguments are substantially similar and will be discussed together below.

#### FINDINGS OF FACT & ANALYSIS

After review of the respective positions provided by Appellant and the Examiner, we affirm the Examiner’s prior art rejections under 35 U.S.C. § 103 for the reasons presented by the Examiner and add the following for emphasis.

A. Rejections of claims 1, 2, 4, 5, 7, and 8 as unpatentable over the combination of Lindgren, Hyman, and Grosskrueger.

1. Claims 1 and 7

With respect to claims 1 and 7, the Examiner’s findings and conclusions regarding Lindgren, Hyman, and Grosskrueger are located on pages 2–5 and 6–9 of the Final Office Action.

Figure 1 of Lindgren, reproduced below, illustrates a sectional view of a laminated composite structure in which an area to be removed from the

structure (indicated by the dashed lines) includes undesired dented or degraded areas:

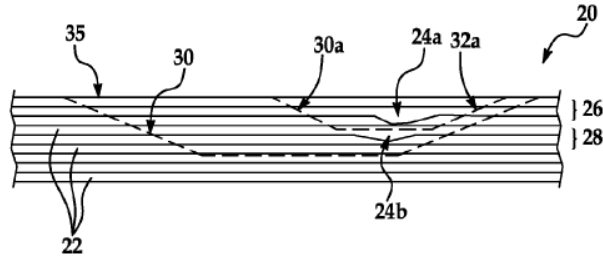


FIG. 1

Lindgren's figure 1 illustrates composite structure 20 in which one or more volumes 30, 30a of material may be removed to eliminate dented or degraded areas 24a, 24b (Lindgren 2:61–64; 3:28–52).

Figure 2 of Lindgren, reproduced below, illustrates a completed restoration in which material has been removed and replaced by a bonded patch:

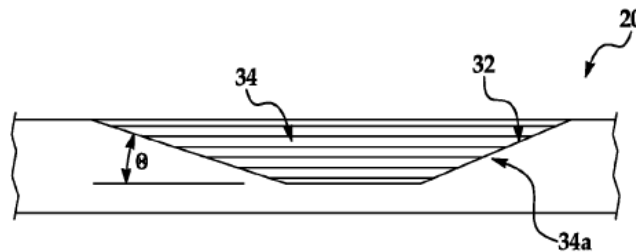


FIG. 2

Lindgren's figure 2 illustrates composite structure 20 in which volume 30, shown in Lindgren's figure 1, is removed and replaced by pre-formed composite patch 34 bonded to composite structure 20 (*id.* at 2:65–67; 3:56–62).

The Examiner finds, *inter alia*, that Lindgren's composite structure 20 (i.e., the claimed "parent structure") and composite patch 34 (i.e., the claimed "insert") teach each component of the subject matter of claims 1 and

7, with the exception of the claimed “patch” and its requisite features (Final Act. 2–3, 6–7).

The Examiner finds that Hyman teaches or suggests the remaining component missing from Lindgren (*id.* at 3, 7–8). Figure 1 of Hyman, reproduced below, illustrates a side view of a hole repair kit:

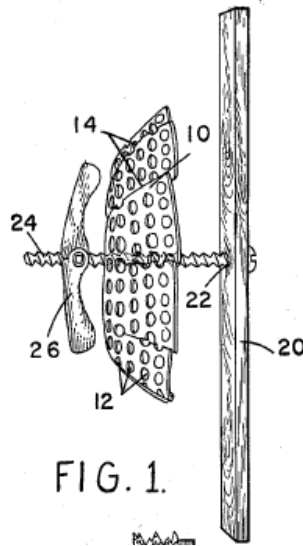


Figure 1 of Hyman illustrates, *inter alia*, slightly flexible aluminum plate 10 with apertures 12 and partial radial slits 14 (Hyman 2:20; 2:35–45).

Hyman's figure 4, reproduced below, illustrates a central sectional view through a hole in a wall, which has been repaired by use of a repair kit:

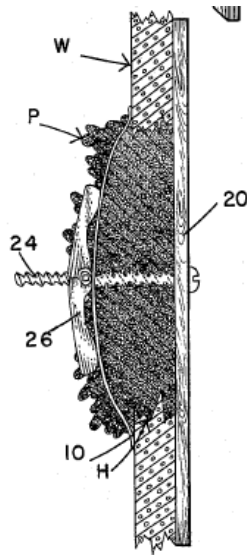


FIG. 4.

Figure 4 of Hyman illustrates wall W and the repair of hole H through use of aluminum plate 10 with paste P, which are compressed by toggle nut 26 and reaction member 20 using bolt 24 (*id.* at 2:25–27; 2:45–68).

The Examiner finds that

Hyman teaches *a patch* bonded by an adhesive – element P – to one side of *the parent structure*, and one side of *an insert* – part of adhesive P within the hole – wherein *the patch* comprises a central portion and a multiplicity of pre-stressed members . . . that extend outwardly from an outermost portion of the central portion of *the patch*, wherein the central portion of *the patch* is directly bonded to the one side of *the insert* by the adhesive therebetween, and each of the multiplicity of pre-stressed members is directly bonded to opposing portions of the one side of *the parent structure* by the adhesive therebetween



. . . , wherein each of the pre-stressed members of the multiplicity is in a flexed state.

(Final Act. 4, 7–8 (emphases added)).

The Examiner determines that it would have been obvious to a person of ordinary skill in the art at the time of the invention to have provided Lindgren’s structure with Hyman’s patch to provide support to the repaired area (*id.* at 4, 8).

Appellant argues that Hyman’s aluminum plate 10 neither discloses nor suggests the claimed “patch” because paste P is actually a patch (Appeal Br. 9). Appellant argues that, without Hyman’s paste P, aluminum plate 10 cannot close or cover the hole H seen in wall W (*id.* (citing Hyman, Fig. 4)). According to Appellant, the Examiner clearly erred because aluminum plate 10 “is placed inside of the repaired composite material and is not even visible when the repair has been completed” (Appeal Br. 11).

Appellant’s arguments are misplaced because they fail to address the Examiner’s interpretation of the claim term “patch.”

“During examination ‘claims . . . are to be given their broadest reasonable interpretation consistent with the specification, and . . . claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art.’” *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). The best source for understanding a technical term is the specification from which it arose, informed, as needed, by the prosecution history. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005). Dictionary definitions may be used in tandem with the specification and prosecution to enlighten the broadest

reasonable interpretation of a claim term. *In re Trans Tex. Holdings Corp.*, 498 F.3d 1290, 1299 (Fed. Cir. 2007).

Our review of the Specification reveals that it does not provide any special meaning for the claim term “patch.” Furthermore, the *Webster’s New World College Dictionary* defines “patch” as “a piece of material applied to cover or mend a hole or tear or to strengthen a weak spot.”<sup>2</sup> Accordingly, “patch,” construed in the absence of a special meaning from the Specification and understood by the plain meaning of that word, encompasses any material capable of (i) covering or mending a hole or (ii) strengthening a weak spot. Therefore, in the context of a structural component, the dictionary definition further supports the Examiner’s position that a “patch” encompasses Hyman’s aluminum plate 10, which covers hole H seen in wall W,<sup>3</sup> while strengthening wall W’s weak spot (*see* Hyman, Fig. 4). Thus, we agree with the Examiner that Hyman’s aluminum plate 10 discloses or suggests the claimed “patch” within the meaning of claims 1 and 7. *See In re Danly*, 263 F.2d 844, 847 (CCPA 1959) (holding that, “[r]egardless of the terminology used by the reference, claims are obvious where the prior art discloses or suggests the claimed structure”).

Appellant argues that Grosskrueger’s repair method of filling a recess with an adhesive potting compound is distinguished from the method of forming the structure recited in claims 1 and 7 (Appeal Br. 9–10). In particular, Appellant contends that Lindgren places a composite patch in a

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<sup>2</sup> *Webster’s New World College Dictionary* (2014) available at <https://www.yourdictionary.com/patch>.

<sup>3</sup> Contrary to Appellant’s position that a patch must be seen post-repair, we agree with the Examiner that “there is no requirement that ‘a patch’ is visible when the repair is completed” (Ans. 14).

depression, whereas Hyman fills hole H with paste P and uses aluminum plate 10 to support the paste during drying (*id.* at 10). According to Appellant, neither Lindgren nor Grosskrueger discloses a patch having the claimed structure, wherein a central portion of the patch is bonded to an insert in a depression of the parent structure, the patch having pre-stressed flexible members bonded to the parent structure (*id.*).

Appellant's arguments are not persuasive because the Examiner does not rely on Grosskrueger to teach a method of repair or the claimed structure (*see* Ans. 13). Rather, the Examiner finds that Grosskrueger teaches a fiber-reinforced composite patch for use in aircraft (Final Act. 4, 8). The Examiner correctly concludes that it would have been obvious to one of ordinary skill at the time of the invention to have formed Hyman's patch out of fiber-reinforced composite material because selecting a known material based on its suitability for its intended use is an obvious design choice (*id.*).

Furthermore, Appellant's arguments attack Lindgren, Hyman, and Grosskrueger individually instead of addressing what the combined teachings of the applied prior art would have suggested to the ordinarily skilled artisan. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) ("Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.").

Appellant argues that Lindgren fails to suggest that insert 34 in the depression requires the additional support from Hyman's aluminum plate 10 (Appeal Br. 11). Appellant contends that it would not have been obvious to have adhered Hyman's aluminum plate 10 and paste P to Lindgren's

composite patch 34, which is “made of composite material, to reinforce an already repaired composite structure” (Reply Br. 2).

However, “if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). In *Dystar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006), our reviewing Court stated:

[A]n implicit motivation to combine exists not only when a suggestion may be gleaned from the prior art as a whole, but when the “improvement” is technology-independent and the combination of references results in a product or process that is more desirable for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient. Because the desire to enhance commercial opportunities by improving a product or process is universal—and even common-sensical—we have held that there exists in these situations a motivation to combine prior art references even absent any hint of suggestion in the references themselves. In such situations, the proper question is whether the ordinary artisan possesses knowledge and skills rendering him *capable* of combining the prior art references.

Appellant does not explain why adhering Hyman’s aluminum plate 10 and paste P to Lindgren’s composite patch 34 would have been beyond the level of skill in the art or yield unpredictable results. *See KSR*, 550 U.S. at 417 (“If a person of ordinary skill in the art can implement a predictable variation, and would see the benefit of doing so, § 103 likely bars its patentability.”). Hyman explicitly discloses that aluminum plate 10

“remains permanently in position and thus maintains support of the repaired area of the wall” (Hyman 3:15–17). In our view, one of ordinary skill in the art would have viewed Hyman’s teaching as a reason to make Lindgren’s composite structure 20 more desirable because it is stronger.

Appellant argues that Hyman’s through-hole repair kit is non-analogous art to Lindgren’s depression repair (Appeal Br. 12). In particular, Appellant contends that it would not have been obvious to add Hyman’s aluminum plate 10, which is designed to flex for passage through a through-hole to Lindgren’s structure having no through-hole (*id.*).

We are not persuaded by these arguments because each of the relied-upon references are either in the field of Appellant’s endeavor or are reasonably pertinent to the particular problem with which the Appellant was concerned. *See In re Kahn*, 441 F.3d 977, 986–87 (Fed. Cir. 2006); *see also In re Oetiker*, 977 F.2d 1443, 1447 (Fed. Cir. 1992). The Examiner has made reasoned findings establishing that Lindgren and Hyman are each directed to repairing inconsistencies in wall-like structures (Ans. 15). For the reasons set forth in the Answer, we are not persuaded by Appellant that any of the allegedly non-analogous features would have been viewed by one of ordinary skill in the art as reasons not to combine Lindgren’s and Hyman’s teachings.

On this record, we sustain the Examiner’s § 103 rejections of claims 1, 2, 4, 5, 7, and 8.

B. Rejections of claims 3 and 9 as unpatentable over the combination of Lindgren, Hyman, Grosskrueger, and Cologna.

With regard to claims 3 and 9, the Examiner’s findings and conclusions regarding Lindgren, Hyman, Grosskrueger, and Cologna are located on pages 5–6 and 9–10 of the Final Office Action.

Appellant’s arguments regarding claims 3 and 9 also rely on the same unpersuasive arguments made regarding claims 1 and 3 (Appeal Br. 12–13).

On this record, we sustain the Examiner’s § 103 rejections of claims 3 and 9.

C. Rejections of claims 6 and 10 as unpatentable over the combination of Lindgren, Hyman, Grosskrueger, and Buckland.

With regard to claims 6 and 10, the Examiner’s findings and conclusions regarding Lindgren, Hyman, Grosskrueger, and Buckland are located on pages 6 and 10 of the Final Office Action.

Appellant’s arguments regarding claims 6 and 10 also rely on the same unpersuasive arguments made regarding claims 1 and 7 (Appeal Br. 13).

On this record, we sustain the Examiner’s § 103 rejections of claims 6 and 10.

## CONCLUSION

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1, 2, 4, 5, 7, 8	103	Lindgren, Hyman, Grosskrueger	1, 2, 4, 5, 7, 8	

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
3, 9	103	Lindgren, Hyman, Grosskrueger, Cologna	3, 9	
6, 10	103	Lindgren, Hyman, Grosskrueger, Buckland	6, 10	
<b>Overall Outcome</b>			1-10	

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

AFFIRMED