

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FLORIBERTUS CORNELIS HERMANUS MOKVELD

Appeal 2008-1935
Application 10/221,018
Technology Center 1700

Decided: May 23, 2008

Before CHARLES F. WARREN, PETER F. KRATZ, and
CATHERINE Q. TIMM, *Administrative Patent Judges*.
KRATZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's refusal to allow claim 1.¹ We have jurisdiction pursuant to 35 U.S.C. § 6.

¹ Appellant's claim for a patent has been twice rejected.

Appellant's invention is directed to a ballistic vest including a stack of flexible unidirectional (UD) layers containing poly(p-phenylene-2,6-benzobisoxazole) (PBO) as-spun fibers. The as-spun PBO (AS-PBO) fibers have a tensile modulus of less than 1300 cN/dtex. Appealed claim 1 is reproduced below:

1. Ballistic vest comprising a stack of flexible unidirectional (UD) layers in which the unidirectional layers contain poly(p-phenylene-2,6-benzobisoxazole) (PBO) fibers and in which the fibers in a unidirectional layer run substantially parallel and are positioned at an angle of more than zero degrees relative to fibres in an adjacent layer, wherein the PBO fibres are as-spun PBO fibres having a tensile modulus of less than 1300 cN/dtex, and wherein the stack of UD layers containing the as-spun PBO fibres exhibits greater energy absorption (Eabs) at a lesser areal density as compared to an identical stack of UD layers containing after-treated PBO fibres having a tensile modulus of greater than 1300 cN/dtex.

The Examiner relies on the following prior art references as evidence in rejecting the appealed claims:

Cordova	6,003,424	Dec. 21, 1999
Lyons	6,526,862 B1	Mar. 4, 2003

Claim 1 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the combined teachings of Cordova and Lyons. We affirm. Our reasoning follows.

Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) any secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). “[A]nalysis [of whether the

subject matter of a claim is obvious] need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR Int’l Co. Teleflex, Inc.*, 127 S. Ct. 1727, 1741 (2007). *See DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1361 (Fed. Cir. 2006)(“The motivation need not be found in the references sought to be combined, but may be found in any number of sources, including common knowledge, the prior art as a whole, or the nature of the problem itself.”). Arguments not made in the Briefs are considered to be waived. *See* 37 C.F.R. § 41.37(c)(vii) (2006).

In the Appeal Brief and the Reply Brief, Appellant does not dispute the Examiner’s determination that:

Cordova et al. discloses a ballistic vest comprising a stack of flexible unidirectional layers (col. 4 lines 50-56, col. 11 line 48) in which the unidirectional layers that may contain an array of different fibers including poly(p-phenylene-2,6,-benzobisoxazole) (PBO) fibers (col. 6 lines 60) and in which the fibers in a unidirectional layer run substantially parallel and are positioned at an angle of more than n zero degrees relative to fibers in an adjacent layer (col. 11 lines 35-49), characterized in that the fibers have a modulus of less than 1300 cN/dTex (col. 3 lines 5-7).

Answer 3; Non-final Office Action dated 09/07/2006, pp. 2-3

In this regard, we note that Appellants acknowledge the prior art disclosure of clothing (anti-ballistic vests) made from PBO fibers using a stack of UD layers of parallel running fibers, wherein adjacent layers of the

stack includes fibers positioned at a 90 degree angle to each other (Specification 1).²

Hence, the principal difference of Appellant's claimed vest over the non-argued vest of Cordova or the acknowledged prior art vest is the claimed requirement for a particular type of PBO fiber; that is, AS-PBO fibers.

Moreover, there is no dispute, on this appeal record, that Lyons discloses the prior art commercial availability and use of AS-PBO fibers for body armor, including vests that have anti-ballistic properties (col. 1, ll. 13-15, col. 2, ll. 32-42 and 55-67). However, Lyons prefers using a quasi-isotropic oriented fiber fabric rather than stacked fabric plies (col. 2, ll. 55-62). Hence, Appellant basically maintains Lyons does not describe the use of a stack of unidirectional layers of fibers, as here-claimed. Thus, the principal argued difference between a vest according to Appellant's claim 1 and a vest according to Lyons is the here-claimed stacked UD layers for the arrangement of the AS-PBO fibers.

Thus, it is abundantly clear from a reading of the applied references together with the acknowledged prior art that AS-PBO fibers were commercially available and recognized as one type of prior art PBO fiber

² It is axiomatic that admitted prior art in an Applicants' Specification may be used in determining the patentability of a claimed invention and that consideration of the prior art cited by the Examiner may include consideration of the admitted prior art found in an Applicants' Specification. *In re Nomiya*, 509 F.2d 566, 570-571 (CCPA 1975); *In re Davis*, 305 F.2d 501, 503 (CCPA 1962); *In re Hedges*, 783 F.2d 1038, 1039-1040 (Fed. Cir. 1986).

that is useful in making anti-ballistic garments, such as a vest. Moreover, the record reflects and common sense dictates that one of ordinary skill in the art would have recognized that AS-PBO fibers and post spun treated (non-as spun) PBO fibers of a higher modulus; that is, (HM) type of PBO fibers, represent the two general type of PBO fibers that were commercially available at the time of the invention (Specification 1; Lyons, col. 2, ll. 63-67). Finally, from the prior art of record taken collectively, we conclude that one of ordinary skill in the art would have been familiar with several methods of employing useful fibers, including AS-PBO and HM-PBO fibers in forming an anti-ballistic fabric, including woven fabric of a quasi-isotropic orientation or fabric made of stacked UD layers with fibers in adjacent layers positioned at an angle to each other.³

Given the above factual determinations and conclusions drawn therefrom, we agree with the Examiner that the collective teachings of the applied prior art, considering the admitted prior art of record, would have rendered Appellant's claimed vest *prima facie* obvious to one of ordinary skill in the art. In this regard, one of ordinary skill in the art would have recognized that AS-PBO fibers were available and useful in forming anti-ballistic vests as taught by Lyons. Thus, an ordinarily skilled artisan would have recognized AS-PBO fibers as an available PBO fiber for use in forming

³ “The person of ordinary skill in the art is a hypothetical person who is presumed to be aware of all the pertinent prior art. *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986). See *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (“[T]he absence of specific findings on the level of skill in the art does not give rise to reversible error ‘where the prior art itself reflects an appropriate level and a need for testimony is not shown.’”).

the UD layered PBO vest suggested by Cordova and the admitted prior art. Looked at another way, one of ordinary skill in the art would have recognized the *prima facie* obviousness of forming the AS-PBO containing-vest of Lyons using stacked UD layers according to the teachings of Cordova and the admitted prior art as an alternative fabric assembly method to the quasi-isotropic oriented assembly described by Lyons. Moreover, we agree with the Examiner that the claim requirement concerning energy absorption would have been a vest property or characteristic that resulted from such an obvious modification of the vest suggested by Cordova, the admitted prior art, or Lyons (Ans. 4).

Appellant's arguments and assertions of unexpectedness respecting the claimed product as set forth in the Appeal Brief and the Reply Brief are not persuasive in either challenging the presentation of a *prima facie* case of obviousness or rebutting the *prima facie* case of obviousness made, on this record. In this regard, much of Appellant's argumentation about cut resistance versus anti-ballistic properties with regard to Lyon's teachings respecting vests made from AS-PBO fibers are off the mark in assessing the obviousness of the use of AS-PBO fibers in making a vest using stacked UD layers as taught by Cordova and the admitted prior art. Lyon discloses that both prior art AS-PBO fiber-containing vests and AS-PBO fiber-containing vests made according to their method have anti-ballistic properties (Abstract, col. 1, l. 13 – col. 2, l. 67, col. 4, ll. 5-38, col. 5, l. 20-col. 6, l. 64) together with cut resistance properties (col. 2, ll. 65-67).

The back and forth discussion between Appellant and the Examiner respecting the absence of or a possibility of a correlation between cut-resistance and anti-ballistic properties is not found to be dispositive as to the

obviousness question before us. In particular, one of ordinary skill in the art would have found a reasonable suggestion of and direction toward making a vest using AS-PBO fibers corresponding to Appellant's claimed vest arising from the collective teachings of the applied prior art. This is particularly so given the admitted prior art, which prior art suggests that PBO fibers in general (which include AS-PBO fibers, as one of the two types of prior art PBO fibers identified on the record before us) would have been useful in making anti-ballistic vests using stacked UD layers. Such vests would have been reasonably expected to also exhibit at least some cut resistance based on the teachings of Lyons given the angled orientation of the fibers in adjacent layers of the stacked UD layers. Thus, we find no technical gap that requires bridging with a span that requires skill beyond the capability of one of ordinary skill in the art. Rather, an ordinarily skilled artisan would have readily arrived at the claimed subject matter with the exercise of routine skill based on the collective teachings of the prior art before us .

Finally, concerning the alleged unexpectedness of the anti-ballistic properties of the claimed vest considering alleged conventional wisdom (App. Br. 8 and 9), we note that Appellant has not specifically addressed the Specification evidence concerning this matter in the Appeal Brief and/or Reply Brief, much less satisfactorily established how such evidence establishes unexpected results for the claimed product that is adequate to rebut the strong *prima facie* case of obviousness presented. In particular, we note that the Specification experiments and asserted generally known teaching reported (Specification 2-3) do not furnish sufficient detail concerning the vests made and the tests conducted to assess the value of the

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conclusions reached and the applicability thereof to vests according to the appealed claim.

Indeed, the energy absorption per surface unit (Eabs) for the allegedly comparative vest made of Zylon (HM) UD packs reported in Table 3 of the Specification appears to be generally higher than the Eabs for the alleged inventive vests made of Zylon (AS) UD packs, as reported in Table 2 of the Specification. Such reported results appear to run contrary to the asserted higher energy absorption for the claimed vests made from AS-PBO fibers. After all, it is well settled that the burden rests with Appellant to establish that the asserted results presented as being associated with the claimed invention are unexpected, the comparisons are with the closest prior art and commensurate in scope with the claimed subject matter. *See In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972). We determine that Appellant has not met this burden.

Based on the totality of the record, including due consideration of Appellant's arguments and the Specification evidence, to the extent relied upon in this appeal, we determine that the preponderance of evidence weighs most heavily in favor of an obviousness determination for the claimed subject matter. Accordingly, we affirm the Examiner's obviousness rejection of claim 1 for the reasons stated in the Answer and above.

ORDER

The decision of the Examiner to reject claim 1 under 35 U.S.C. § 103(a) as being unpatentable over the combined teachings of Cordova and Lyons is affirmed.

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

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AFFIRMED

tc

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