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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte XULONG FU, HAOWEN YU, BRUCE L. CROMER, and
RONALD J. SELENSKY

Appeal 2018-005130
Application 15/119,110
Technology Center 1700

Before ADRIENE LEPIANE HANLON, ROMULO H. DELMENDO, and
SHELDON M. MCGEE, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellant¹ appeals under 35 U.S.C. § 134(a) from the Primary Examiner’s final decision to reject claims 1–19.² We have jurisdiction under 35 U.S.C. § 6(b).

We affirm in part.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42—namely, “Hewlett-Packard Development Company, L.P.” (Application Data Sheet filed August 15, 2016 at 5), which is also identified as: (i) the real party in interest; (ii) a limited partnership (the general or managing partner of which is “HPQ Holdings, LLC”); and (iii) a wholly-owned affiliate of “HP Inc.” (Appeal Brief filed September 15, 2017 (“Appeal Br.”) at 3).

² *See* Appeal Br. 11–25; Reply Brief filed April 11, 2018 (“Reply Br.”) at 4–9; Final Office Action entered July 12, 2017 (“Final Act.”) at 2–11; Examiner’s Answer entered February 23, 2018 (“Ans.”) at 3–19.

I. BACKGROUND

The subject matter on appeal relates to a hybrid media sheet and to a method for its production (Specification filed August 15, 2016 (“Spec.”), Abstract). Representative claim 1 is reproduced from the Claims Appendix to the Appeal Brief, as follows:

1. A hybrid media sheet, comprising:
 - a media substrate;
 - a front barrier layer comprising a first polyolefin applied to a front side of the media substrate;
 - a back barrier layer comprising a second polyolefin applied to a back side of the media substrate;
 - an adhesion promoting subbing layer applied to the front barrier layer; and
 - an ink-receiving layer comprising a water-soluble polymer, *a mordant*, and particles of a metal- or semimetal-oxide applied to the adhesion promoting subbing layer, *wherein the mordant comprises a water-soluble cationic polymer* and wherein the particles of metal- or semi-metal oxide comprise colloidal alumina.

(Appeal Br. 26 (emphases added)).

II. REJECTIONS ON APPEAL

The claims on appeal stand rejected under 35 U.S.C. § 103, as follows:

- A. Claims 1–10, 14, 15, 18, and 19 as unpatentable over Chen et al.³ (“Chen”) and Ohbayashi et al.⁴ (“Ohbayashi”);
- B. Claims 16 and 17 as unpatentable over Chen, Ohbayashi, and Quintens et al.⁵ (“Quintens”); and

³ US 2011/0003097 A1, published January 6, 2011.

⁴ US 2004/0157009 A1, published August 12, 2004.

⁵ US 2001/0024713 A1, published September 27, 2001.

C. Claims 11–13 as unpatentable over Ohbayashi.
(Ans. 3–19; Final Act. 2–11).

III. DISCUSSION

Rejection A

1. Grouping of Claims

Unless separately argued within the meaning of 37 C.F.R. § 41.37(c)(1)(iv), the claims rejected on this ground stand or fall with claim 1, which we select as representative. We address any claim that is argued separately following our discussion of claim 1.

2. The Examiner's Position

The Examiner finds that Chen describes a print medium comprising a photobase substrate, a subbing layer, and a porous ink-receiving layer on the subbing layer, wherein the photobase substrate is formed from a paper having a first polyolefin barrier layer on a first side of the paper and a second polyolefin barrier layer on a second side of the paper (Ans. 3 (citing Chen ¶¶ 30–31 and Abstract)). The Examiner acknowledges that Chen does not disclose the same ink-receiving layer as recited in claim 1 (*id.*). The Examiner finds further, however, that Ohbayashi teaches an ink-jet recording sheet comprising a substrate and a porous layer on the substrate, wherein the porous layer finally produced from a binder, fine particles such as colloidal alumina, and a cationic polymer mordant “meets the claimed ink receiving layer” (*id.* at 3–4 (citing Ohbayashi ¶¶ 96, 98, 141–142)). The Examiner concludes that “[i]t would have been obvious to a person of ordinary skill in the art . . . to combine the ink receiving layer of Ohbayashi with the invention of Chen, and the motivation for combining would be, as Ohbayashi suggested, to provide a recording sheet having high ink

absorbability and excellent drying properties” (*id.* at 4 (further citing Ohbayashi ¶ 2); *see also* Ans. 13 (same)).

3. *The Appellant’s Contentions*

The Appellant does not dispute the Examiner’s findings regarding Chen’s scope and content (Appeal Br. 15–18). Nor does the Appellant contest the Examiner’s finding that the only difference between Chen’s print medium and the claimed hybrid media sheet is that the former does not include a cationic polymer mordant as part of the ink-receiving layer (*id.*).

Rather, the Appellant contends that the subject matter recited in claim 1 would not have been obvious over the prior art references because: (i) the combination of the two references, including Ohbayashi, does not teach an ink-receiving layer that includes a mordant; and (ii) Ohbayashi teaches away from Chen and the claimed subject matter (Appeal Br. 15). Specifically, the Appellant argues that Ohbayashi does not teach a mordant as part of the disclosed porous layer (i.e., the layer that corresponds to the ink-receiving layer recited in the claim) but rather as part of additives that are incorporated in the media as part of a solution that is overcoated on top of the porous layer and discussed separately from the porous layer (*id.* at 15–16 (citing Ohbayashi ¶¶ 97, 115–141, 162–163)). Additionally, the Appellant argues that “Ohbayashi teaches that additives can interfere with the protective nature of the binder with respect to the fine particles” and that “combining additives, such as mordants, in the porous layer results in a layer that tends to crack while drying” (*id.* at 16 (citing Ohbayashi ¶ 27)). The Appellant argues that, therefore, Ohbayashi teaches away from incorporating a mordant into the porous layer (*id.* at 16–17). Furthermore, the Appellant argues that Ohbayashi teaches away from Chen and the claimed subject

matter, which require a polyolefin barrier layer on both sides of the media sheet or substrate, because Ohbayashi teaches that polyester film substrates have problems with creasing and cockling and “[p]olyester is a type of polyolefin” (*id.* at 17–18).

4. *Opinion*

Claim 1. The Appellant’s arguments fail to identify reversible error in the Examiner’s rejection as maintained against claim 1. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011).

Ohbayashi describes an ink-jet recording sheet comprising a substrate (e.g., a non-water absorptive substrate such as a resin-coated paper prepared by coating both sides of a base paper with a polyolefin resinous covering layer) having thereon a porous layer formed by: (a) coating an aqueous, water-soluble coating composition containing a hydrophilic binder (e.g., polyvinyl alcohol) and inorganic particles (e.g., colloidal alumina) on the substrate; (b) drying the coated porous layer; and (c) incorporating a solution containing an additive (e.g., preferably cationic polymer mordants to enhance waterfastness and moisture resistance) into the dried porous layer (Ohbayashi ¶¶ 41–45, 86, 98, 105, 115–117, 141–142). Ohbayashi further teaches that a subbing layer is preferably provided on the ink-receptive side of the substrate to enhance adhesion to the ink-receptive layer (*id.* ¶ 138).

According to Ohbayashi, the finally produced porous layer has “a high void ratio, which minimizes the formation of cracking during production, *even though various additives are incorporated in said porous layer* comprised of hydrophilic binders as well as fine particles” (Ohbayashi ¶ 40 (emphasis added)). Not only does Ohbayashi teach that the disclosed technique for making the porous layer yields a high quality ink-jet recording

sheet, but also that fluctuation of manufacturing quality is minimized and coating uniformity is improved (*id.*). In addition, Ohbayashi teaches that the disclosed technique retains all the advantages of conventional recording systems (e.g., high ink absorbability and excellent drying properties) without the drawbacks of some prior art sheets (e.g., cracking) (*id.* ¶¶ 2, 26–27, 40–41).

Given the collective teachings in Chen and Ohbayashi, we conclude that a person having ordinary skill in the art would have been prompted to substitute Chen’s ink receptive layer with Ohbayashi’s ink-receptive layer, which would include a water-soluble binder, fine particles such as colloidal silica, and an additive such as cationic polymer mordant, motivated by a reasonable expectation of success in obtaining all the advantages and improvements disclosed in Ohbayashi (e.g., high quality recording sheets with improved coating uniformity, high ink absorbability and excellent drying properties, and waterfastness and moisture resistance). *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007) (“[W]hen a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.”).

We discern no persuasive merit in the Appellant’s argument that, in Ohbayashi, an additive such a cationic polymer mordant is separate from the porous layer. To the contrary, the “porous layer is formed by” a sequence of steps—i.e., finally produced—after a solution containing the additive such as a cationic polymer mordant is incorporated “into the porous layer” (Ohbayashi ¶¶ 42–45, 141). As the Examiner explains (Ans. 12), “it is clear that the additives, (i.e., the mordant) are mixed or incorporated in[to] the

porous layer[,]” and “[t]hus, incorporating the cationic mordant in the porous layer is taught in the reference of Ohbayashi.”

We are also not persuaded by the Appellant’s teaching away arguments. “A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re Mouttet*, 686 F.3d 1322, 1333–34 (Fed. Cir. 2012) (quoting *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)).

A person having ordinary skill in the art would have understood that by using Ohbayashi’s technique for producing the porous layer, the problem in the prior art of cracking would be avoided (Ohbayashi ¶¶ 26–27, 40). *Cf. Mouttet*, 686 F.3d at 1334 (“Mouttet fails to cite any reference suggesting that the claimed invention would be unlikely to work”).

The Appellant’s argument that Ohbayashi teaches away from using polyolefin barrier layers because Ohbayashi teaches problems with polyester film substrates in terms of creasing and cockling also lacks persuasive merit. Contrary to the Appellant’s erroneous belief, a polyester is a polymer obtained by condensation polymerization of an acid and a polyol,⁶ and, therefore, is *not* a polyolefin, which is a polymer obtained by addition or coordination polymerization of lower olefins.⁷ More importantly, Ohbayashi explicitly teaches paper coated with polyolefin covering layers and, therefore, does not teach away (Ohbayashi ¶ 117).

⁶ See <https://www.dictionary.com/browse/polyester>.

⁷ See <https://www.dictionary.com/browse/polyolefin>.

For these reasons, we sustain the rejection as maintained against claim 1.

Claim 2. Claim 2, which depends from claim 1, recites “wherein the front barrier layer and the back barrier layer has [sic] a thickness ratio from about 1:1.5 to about 1:3” (Appeal Br. 26). The Appellant further argues that “Chen merely generally teaches a moisture barrier that can have a coat weight that can be the same on each side or can be greater on either the first or the second side” but “does not teach any ratios with respect to the thickness of the coating on the first side or the second side of the paper” (*id.* at 18).

As the Appellant concedes, Chen explicitly teaches that “the moisture barrier layer [i.e., the polyolefin layer] can have a coat weight which is greater on either the first side or second side of the paper compared to its opposing side” (Chen ¶ 31). In addition, Chen explicitly teaches that the “coat weight on any side of the paper substrate [is] about 10 g/m² to 50 g/m²” (*id.*). Furthermore, the Examiner reasonably finds “that a coat weight of a layer directly corresponds to a thickness of the layer” (Ans. 14), and the Appellant does not direct us to evidence or technical reasoning to the contrary (Reply Br. 6–7).⁸ Under these circumstances, Chen’s coat weight (and thus the coating thickness) for each side of the paper substrate may vary individually such that the resulting thickness ratio of the coatings on each side may also vary within the constraints defined by the range of coat weights in an overlapping manner relative to the thickness range recited in claim 2. *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003) (“A *prima*

⁸ See Final Act. 4; Appeal Br. 18–19. Cf. *In re Ahlert*, 424 F.2d 1088, 1091 (CCPA 1970).

facie case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art.”).

Claim 10. Claim 10, which also depends from claim 1, recites “wherein the media substrate comprises raw base paper and has a surface roughness of less than 4 μm ” (Appeal Br. 27). The Appellant further argues that the paper’s surface roughness has not been shown to be recognized in the prior art as a result-effective variable, and, therefore, the Examiner’s optimization theory is not supported (*id.* at 19).

The Examiner also finds, however, that Chen teaches raw paper (e.g., virgin hardwood fiber or virgin softwood fiber-based) that is indistinguishable from that described in the current Specification and that, in addition to sizing agents, fillers may be added in an amount up to 30% by weight (Ans. 14). Given that Chen’s paper material may be identical to that disclosed as suitable in the current Specification and Chen also uses sizing agents and fillers in amounts that overlap the amounts disclosed in the current Specification (*compare* Chen ¶¶ 26–28 *with* Spec. ¶¶ 10–12), it would reasonably appear that Chen’s paper can have a surface roughness that falls within the range recited in claim 10. The Appellant does not contend otherwise, let alone direct us to evidence showing the contrary (Reply Br. 4–7). *See In re Best*, 562 F.2d 1252, 1255 (CCPA 1997) (“Whether the rejection is based on ‘inherency’ under 35 U.S.C. § 102, on ‘prima facie obviousness’ under 35 U.S.C. § 103, jointly or alternatively,[□] the burden of proof is the same, and its fairness is evidenced by the PTO’s inability to manufacture products or to obtain and compare prior art products.”).

Claims 14, 15, and 19. Claim 14 is a method claim that requires, *inter alia*, a step of “coating an ink-receiving layer onto the adhesion promoting subbing layer, the ink-receiving layer comprising a polyvinyl alcohol, a mordant, and particles of a metal- or semimetal-oxide, wherein the mordant comprises a water-soluble cationic polymer” (Appeal Br. 28). The Appellant argues that “the cited references do not teach coating an ink-receiving layer onto an adhesion promoting layer when the ink-receiving layer comprises a mordant during coating” (*id.* at 20).

The Examiner points to various portions of Ohbayashi’s teachings but does not address the Appellant’s argument in a meaningful way (Ans. 17). Therefore, we do not sustain the rejection of method claims 14, 15, and 19.

Claims 16 and 17. The Appellant relies on the same arguments offered in support of claim 1, adding only that Quintens does not cure the perceived deficiencies in the combination of Chen and Ohbayashi (Appeal Br. 21–23). Therefore, we sustain the rejection of these claims for the same reasons discussed above with respect to claim 1.

Claims 11–13. The Appellant relies on the same arguments offered in support of claim 1 (Appeal Br. 23–24). Therefore, we sustain the rejection of these claims for the same reasons discussed above with respect to claim 1.

IV. CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
1–10, 18	103	Chen, Ohbayashi	1–10, 18	
14, 15, 19	103	Chen, Ohbayashi		14, 15, 19
16, 17	103	Chen, Ohbayashi, Quintens	16, 17	
11–13	103	Ohbayashi	11–13	

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Claims Rejected	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
Overall Outcome			1-13, 16-18	14, 15, 19

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

AFFIRMED IN PART