UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAE-HO MOON,
O-HYUN BAEK, and JEONG-SEON KING

Appeal 2006-2934
Application 10/385,754[1]
Technology Center 2800

Decided: November 13, 2007

Before ANITA PELLMAN GROSS, JEAN R. HOMERE,
and SCOTT R. BOALICK, *Administrative Patent Judges*.

BOALICK, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) from the final rejection of claims 1-10 and 21-46, all the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] Application filed March 12, 2003. Application 10/385,754 is a division of 09/835,349, filed April 17, 2001. The real party in interest is Samsung Electronics Co., Ltd.

STATEMENT OF THE CASE

Appellants' invention relates to a bubble-jet type ink-jet printhead having a simplified structure with little crosstalk between the nozzles that also is self-cleaning and prevents adhesion of foreign material and ink to the heating elements. (Spec. [0002], [0007] through [0011].)

Claim 1 is exemplary:

A bubble-jet type ink jet printhead, comprising:

a substrate;

a nozzle plate perforated by a plurality of nozzles, said nozzle plate being separated by a predetermined distance from the substrate, each of said plurality of nozzles being formed about a central axis;

a plurality of walls closing the predetermined distance between the substrate and the nozzle plate and forming a single common chamber between the substrate and the nozzle plate;

a plurality of resistive layers disposed in said single common chamber, each resistive layer encircling a corresponding central axis passing through a center of a corresponding nozzle;

a plurality of pairs of wiring layers formed on the substrate, each pair of wiring layers being connected to a respective one of the resistive layers and extending outside the common chamber; and

a plurality of pads disposed outside the common chamber on the substrate and electrically connected to respective ones of said plurality of wiring layers, said single common chamber being coextensive with the plurality of nozzles and the plurality of resistive layers.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Scheu	US 4,513,298	Apr. 23, 1985
Abe	US 4,914,562	Apr. 3, 1990
Kaufman	US 5,847,737	Dec. 8, 1998
Moritz, III	US 6,042,222	Mar. 28, 2000
Tachihara	US 6,280,020 B1	Aug. 28, 2001
Nakamura	JP 04-216940 A	Aug. 7, 1992

Claims 1-3, 8, and 36 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Abe.

Claims 4 and 5 stand rejected under 35 U.S.C. § 103(a) as being obvious over Abe and Kaufman.

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being obvious over Abe and Tachihara.

Claim 7 stands rejected under 35 U.S.C. § 103(a) as being obvious over Abe and Nakamura.

Claim 9 stands rejected under 35 U.S.C. § 103(a) as being obvious over Abe.

Claim 10 stands rejected under 35 U.S.C. § 103(a) as being obvious over Abe and Moritz.

Claims 21-35, 39, 42, 43 and 46 stand rejected under 35 U.S.C. § 103(a) as being obvious over Abe and Kaufman.

Claims 37 and 38 stand rejected under 35 U.S.C. § 103(a) as being obvious over Abe and Scheu.

Claims 40, 41, 44, and 45 stand rejected under 35 U.S.C. § 103(a) as being obvious over Abe, Kaufman, and Scheu.

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the Briefs and the Answer for their respective details. Only those arguments actually made by Appellants have been considered in this decision. Arguments that Appellants did not make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2004).[2]

ISSUES

1. Whether Appellants have shown that the Examiner erred in rejecting claims 1-3, 8, and 36 under 35 U.S.C. § 102(b). The issue turns on whether Abe teaches each and every limitation of the claims.

2. Whether Appellants have shown that the Examiner erred in rejecting claims 4-7, 9-10, 21-35, and 37-46 under 35 U.S.C. § 103(a). That is, given the teachings of the prior art, have Appellants shown that the differences between the claims and the prior art are sufficient to render the claimed subject matter unobvious to a person skilled in the art at the time the invention was made?

[2] Except as will be noted in this opinion, Appellants have not presented any substantive arguments directed separately to the patentability of the dependent claims or related claims in each group. In the absence of a separate argument with respect to those claims, they stand or fall with the representative independent claim. *See* 37 C.F.R. § 41.37(c)(1)(vii).

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

1. Abe describes a thermal ink jet recording apparatus that ejects ink through a plurality of nozzles without the need for separators between the nozzles. (Col. 1, ll. 8-11.) As shown in Figs. 4 and 5, Abe teaches a recording head 105 that includes a base 161 that is connected to and disposed above a plate 151. (Col. 6, ll. 7-9.) A reservoir 167 is centered about an opening 153 in the plate 151, and a filter 171 covers the opening 153. (Col. 6, ll. 10-12.) Substrates 174, 177 are connected to the base 161 and separated from each other to form a gap 211. (Col. 6, ll. 12-14.) The gap 211 is disposed over the reservoir 167, and a portion of each substrate 174, 177 extends over the reservoir 167 in forming the gap 211. (Col. 6, ll. 14-15; Abstract.) A plurality of electrodes 181 and heating elements 184 are formed on the substrates 174, 177, and the substrates 174, 177 are adhesively bonded to the base 161. (Col. 6, ll. 18-21; col. 6, ll. 66-65; col. 7, ll. 5-6.) The substrates 174, 177 may be made from silicon plate, alumina plate, and glass plate. (Col. 11, ll. 8-9.) A voltage source 187 is electrically connected to electrodes 181 and heating elements 184. (Col. 6, ll. 23-25.)

2. Abe teaches that a nozzle plate 194 having an upper step portion 201 and a lower step portion 197 is disposed on top of and connected to

substrates 174, 177. (Col. 6, ll. 25-28.) Rows of nozzles 207 are formed in the upper step portion 201 of nozzle plate 194 such that each nozzle 207 is above a heating element 184. (Col. 6, ll. 32-36.)

3. An embodiment of Abe teaches that a heat regenerating layer 351 made of SiO_2 is deposited on substrates 174, 177 in order to provide chemical and thermal resistance and to provide heat generating and dissipating properties. (Col. 11, ll. 9-14; Figs. 13(a), 13(b), 14(a), 14(b).) Layer 351 is disposed between substrates 174, 177 and heating element 184. (Figs. 13a, 13b.) An auxiliary electrode 359 is formed so as to cover electrode 181 and serves to prevent electrode 181 from being electrochemically eluted. (Col. 11, ll. 44-48; Fig. 13(a).) In another embodiment, an insulating layer 363 is provided to cover a film 355 that is disposed on heating element 184. (Col. 12, ll. 11-31; Figs. 14(a), 14(b).) In another embodiment, an insulating film 383 is disposed about the center of heating element 184 to eliminate cavitation damage to the heating element 184. (Col. 15, ll. 11-20; Fig. 19(f).)

4. Kaufman describes a filter for an ink jet printhead that uses a gate or gates to allow ink to pass but inhibit debris from passing to the nozzle. (Col. 1, ll. 5-6; Col. 2, ll. 53-56.) In one implementation, a dam 34 forms the filter element. (Col. 4, ll. 47-55; Fig. 4.) In another implementation, posts 24 and pillars 36, which may be of any shape, form the gates. (Col. 4, ll. 56-63; Fig. 4.) Kaufman teaches that the

dam 34 may extend from adjacent the chip layer 16 towards, but not to, the nozzle layer 12 in order to form a gate 26 between the top of the dam 34 and the nozzle layer 14. (Col. 5, ll. 11-16; Fig. 5C.) Kaufman also teaches that the dam 34 may extend from adjacent the nozzle layer 14 toward, but not to, the chip layer 16 to form a gate 26 between the bottom of the dam 34 and the chip layer 16. (Col. 5, ll. 33-37; Fig. 5E.)

5. Moritz describes an ink jet printhead having a center feed construction and an alternative embodiment (not shown) having an edge feed construction. (Col. 4, ll. 17-25, 54-57; Figs. 3, 4.)

6. Scheu teaches a protective passivation structure for a thermal ink jet printhead. (Col. 2, ll. 61-63; Fig. 1.)

PRINCIPLES OF LAW

On appeal, all timely filed evidence and properly presented arguments are considered by the Board. *See In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984).

In the examination of a patent application, the Examiner bears the initial burden of showing a prima facie case of unpatentability. *Id.* at 1472. When that burden is met, the burden then shifts to the Applicant to rebut. *Id.*; *see also In re Harris*, 409 F.3d 1339, 1343-44 (Fed. Cir. 2005) (finding rebuttal evidence unpersuasive). If the Applicant produces rebuttal evidence of adequate weight, the prima facie case of unpatentability is dissipated. *In*

re Piasecki, 745 F.2d at 1472. Thereafter, patentability is determined in view of the entire record. *Id.* However, on appeal to the Board it is an Appellant's burden to establish that the Examiner did not sustain the necessary burden and to show that the Examiner erred -- on appeal we will not start with a presumption that the Examiner is wrong. *See In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) ("On appeal to the Board, an applicant can overcome a rejection [for obviousness] by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.") (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)).

Anticipation is established when a single prior art reference discloses expressly or under the principles of inherency each and every limitation of the claimed invention. *Atlas Powder Co. v. IRECO Inc.*, 190 F.3d 1342, 1347 (Fed. Cir. 1999); *In re Paulsen*, 30 F.3d 1475, 1478-79 (Fed. Cir. 1994).

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, and (3) the level of skill in the art. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 127 S. Ct. at 1734 ("While the

sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls."). The Court in *Graham* further noted that evidence of secondary considerations, such as commercial success, long felt but unsolved needs, failure of others, etc., "might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." 383 U.S. at 18.

In *KSR*, the Supreme Court emphasized "the need for caution in granting a patent based on the combination of elements found in the prior art," 127 S. Ct. at 1739, and discussed circumstances in which a patent claim might be determined to be obvious. In particular, the Supreme Court reaffirmed principles based on its precedent that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR*, 127 S. Ct. at 1739.

"To facilitate review, this [obviousness] analysis should be made explicit." *KSR*, 127 S. Ct. at 1741 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness")). However, "the analysis 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." *Id.* The Court noted that "[u]nder the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *KSR*, 127 S. Ct. at 1741.

The Court also noted that "[c]ommon sense teaches . . . that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* at 1742. "A person of ordinary skill is also a person of ordinary creativity, not an automaton." *Id.*

During examination of a patent application, a claim is given its broadest reasonable construction consistent with the specification. *In re Prater*, 415 F.2d 1393, 1404-05 (CCPA 1969). "[T]he words of a claim 'are generally given their ordinary and customary meaning.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal citations omitted). The "ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at 1313.

ANALYSIS

Appellants contend that the Examiner erred in rejecting claims 1-10 and 21-46. Reviewing the documents of record and the findings of facts cited above, we do not agree.

<u>Issue 1 (Anticipation):</u>

Regarding claim 1, Appellants first argue that the Examiner erred by finding that the base 161 of Abe corresponds to the claimed "substrate" because Abe designates elements 174 and 177 as substrates. (App. Br. 13; Reply Br. 2-5.) The Examiner found that the term "substrate" may be

interpreted broadly enough to read on element 161 of Abe. (Ans. 11-12.) Appellants reply that the term "substrate" may not be construed so broadly. (Reply Br. 3-5.)

The Specification does not provide any particular definition for the term "substrate." We do not find the Examiner's interpretation of the claim term "substrate" as "an underlying support" (Ans. 12) to be unreasonable, and the Examiner's interpretation is not inconsistent with the Specification. In short, we see no reason to limit the interpretation of the claim term substrate to the narrow definition proposed by the Appellants.

Even if we were to agree with the Appellants' argument regarding the interpretation of the claim term "substrate," however, Abe would still anticipate claim 1. As Appellants admit (App. Br. 13), Abe teaches substrates 174, 177. These substrates 174, 177 correspond to the "substrate" recited by claim 1.[3] In addition, we do not believe it would be unreasonable to interpret the combination of base 161 and substrates 174, 177 together as the "substrate" recited by claim 1.

Therefore, we conclude that Abe discloses a substrate, as claimed.

Appellants next argue that the Examiner erred in finding that the electrodes 181 of Abe are disposed on base 161 of Abe because Abe instead discloses that the electrodes 181 are disposed on a substrate 174 and connected to heating elements 184. (App. Br. 13-14; Reply Br. 5.) The

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[3] In addition, we note that a "single common chamber," as claimed, is disclosed by Abe and is formed between the substrates 174, 177 (corresponding to the claimed "substrate"), the lower step portion 197 of the nozzle plate 194 (the sides of which correspond to the claimed "plurality of walls"), and upper step portion 201 of the nozzle plate 194 of Abe (corresponding to the claimed "nozzle plate"). (FF 1-2.)

Examiner found that the term "on" may be interpreted broadly enough to encompass the wiring layers 181 of Abe being disposed "on" element 161, even though they are not in direct physical contact. (Ans. 12.) Appellants reply that the claim term "formed on" requires direct physical contact. (Reply Br. 5.)

We agree with Appellants on the narrow point that the electrodes 181 are not formed on base 161 because they are not in direct physical contact. However, this does not change the outcome because electrodes 181 are in direct physical contact with substrates 174, 177, and therefore are formed on substrates 174, 177. (FF 1.) As discussed previously, either the substrates 174, 177 alone or the combination of the substrates 174, 177 and the base 161 together correspond to the claimed "substrate." Therefore, we conclude that Abe discloses wiring layers formed on a substrate, as claimed.

Appellants finally argue that Abe does not disclose the claimed plurality of pads connected to resistive layers via electrodes. (App. Br. 14.) However, the Examiner correctly found that Abe teaches a plurality of bond pads connected to wiring layers 181. (Ans. 12-13; FF 1.) Therefore, we conclude that Abe discloses a plurality of pads connected to wiring layers, as claimed.

Accordingly, we conclude that the Examiner did not err in rejecting claim 1 under 35 U.S.C. § 102(b). Claims 2-3, and 8 were not argued separately, and fall together with claim 1.

With respect to claim 36, Appellants further argue that there is no insulating layer disposed between substrate 174 and heating element 184 of Abe because the heating element 184 is disposed directly on substrate 174.

(App. Br. 22-23.) The Examiner found that "layers" 174 and 177 are made of insulating materials and are disposed between the "substrate" 161 and heating element 184. (Ans. 4, 19.)

As discussed with respect to claim 1, we agree with the Examiner that the claim term "substrate" is broad enough to encompass base 161. We also agree with the Examiner that elements 174, 177 are made of insulating materials and are disposed between elements 161 and 184 as shown in Figure 5 of Abe. (FF 1.)

Even if we were to agree with Appellants that the claimed substrate is met by substrates 174, 177 of Abe rather than by the base 161 alone, claim 36 is still anticipated. In particular, Abe discloses an embodiment with an insulating layer 351 disposed between substrates 174, 177 and heating element 184. (FF 3.) As discussed previously, either the substrates 174, 177 alone or the combination of the substrates 174, 177 and the base 161 together correspond to the claimed "substrate."

Therefore, we conclude that Abe discloses an insulating layer disposed between the substrate and the resistive layers, as claimed.

Accordingly, we conclude that the Examiner did not err in rejecting claim 36 under 35 U.S.C. § 102(b).

<u>Issue 2 (Obviousness):</u>

Regarding claims 4 and 5, the Examiner articulated a reason to combine the references, finding that one of ordinary skill in the art would have combined Abe with Kaufman to filter contaminants from the ink. (Ans. 5; FF 4.) In their pre-*KSR* Briefs, Appellants argue that there is no

motivation to combine Abe with Kaufman because Abe does not provide a suggestion that would lead a person of ordinary skill in the art to Kaufman. (App. Br. 14-15; Reply Br. 6-7.) This argument is foreclosed by *KSR*.

In addition, with respect to claim 5, Appellants argue that Kaufman does not disclose or suggest a rib-type dam extending from a bottom surface of the nozzle plate toward the substrate. (App. Br. 15-17.) Appellants further argue that Kaufman teaches away from a rib-type dam protrusion extending from a bottom surface of the nozzle plate toward the substrate because, according to Appellants, in each of the embodiments taught by Kaufman "the dam 34 does not reach or contact the nozzle layer 12 [sic 14] or the clip [sic chip] layer 16." (App. Br. 16.) We do not agree.

The Examiner correctly found that Kaufman discloses this feature. (Ans. 14-15; FF 4.) In particular, by teaching that the dam 34 extends from adjacent the nozzle layer 14 towards, but not to, the chip layer 16 to form a gate 26 (FF 4.) and by teaching that the posts and pillars which form gates may be of any shape (FF 4.), Kaufman suggests a rib-type dam protrusion extending from a bottom surface of the nozzle plate toward the substrate, as claimed.

Regarding claim 10, Appellants argue that Moritz does not teach a center feed ink supply and an edge feed ink supply and, in any event, the meaning of these terms is unclear. (App. Br. 17.) However, the Examiner correctly found that Moritz does teach these features. (Ans. 15-16; FF 5.) In addition, the Examiner articulated a reason to combine the references and correctly found that the terms "center feed" and "edge feed" are not only

well known in the art (Ans. 15-16.), but also are known in the art as equivalents (Ans. 7, 16; FF 5.).

Appellants also argue that there is no motivation found within Abe to combine Abe and Moritz. Again, this argument is foreclosed by *KSR*.

Claim 21 was argued on the same basis as claim 4 (App. Br. 18-19.), and we find that Appellants have not shown error in the rejection of claim 21 for the same reasons discussed with respect to claim 4.

Claim 42 was argued on the same basis as claim 5 (App. Br. 19.), and we find that Appellants have not shown error in the rejection of claim 42 for the same reasons discussed with respect to claim 5.

With respect to claim 29, Appellants argue that the Examiner did not show where Kaufman disclosed a cross-talk prevention structure. (App. Br. 19-20.) Appellants further argue that if the Examiner meant to read the claimed cross-talk prevention structure on the dam of Kaufman, the rejection is still improper because the Examiner did not point to where Kaufman states that the dam is a cross-talk prevention structure. (App. Br. 19-21.)

The Examiner articulated a reason to combine the references and found that the dam of Kaufman and the claimed cross-talk prevention structure have identical structures. (Ans. 17-18.) For example, claim 30, which depends from claim 29, recites that the cross-talk prevention structure comprises a dam. In the absence of evidence to the contrary, since Kaufman's structure is the same as that disclosed by Appellants, it is assumed to function in the same manner as Appellants' structure. Therefore, we discern no error in the Examiner's findings with respect to claim 29.

Appellants also argue that there is no motivation found within Abe to combine Abe and Kaufman (App. Br. 21.) but, as discussed above, this argument is foreclosed by *KSR*.

Claim 46 was argued on the same basis as claims 5, 21, and 42 (App. Br. 21-22.), and we find that Appellants have not shown error in the rejection of claim 46 for the same reasons discussed with respect to claims 5, 21, and 42.

With respect to claims 37-41 and 43-45, Appellants argue that there is no layer disposed between substrate 174 and heating element 184 of Abe because the heating element 184 is disposed directly on substrate 174. (App. Br. 22-23.) As discussed with respect to claim 36, we agree with the Examiner that Abe discloses an insulating layer as claimed and, even under Appellants' interpretation, Abe discloses an embodiment with the claimed insulating layer (FF 3.).

Appellants also argue that Abe does not disclose a protection layer over heating elements 184 and teaches away from such a protection layer. (App. Br. 23.) The Examiner found that Scheu teaches a protective layer (Ans. 9; FF. 6.) and further found that Abe alone teaches a protective layer (Ans. 19; *see also* FF 3.). We agree with the Examiner's findings. Moreover, other embodiments of Abe teach both an insulating layer and a protective layer. (FF 3.)

Although Appellants state at pages 8-12 of the Appeal Brief that each of claims 6, 7, 23, 26, 28, and 30-33 is separately grouped, no separate arguments in accordance with our rules have been presented for any of these claims. In addition, no separate arguments in accordance with our rules

have been presented for claim 9, which was grouped with claims 1-3 and 8 (App. Br. 7.), for claim 22, which was grouped with claim 21 (App. Br. 9.), for claims 24-25, which were grouped with claim 23 (App. Br. 9.), for claim 27, which was grouped with claim 26 (App. Br. 10), for claim 34, which was grouped with claim 32 (App. Br. 11-12.), and for claim 35, which was grouped with claim 33 (App. Br. 12.).

Accordingly, we conclude that the Examiner did not err in rejecting claims 4-7, 9-10, 21-35, and 37-46 under 35 U.S.C. § 103(a).

CONCLUSION OF LAW

Based on the findings of facts and analysis above, we conclude that:

(1) The Examiner did not err in rejecting claims 1-3, 8, and 36 for anticipation under 35 U.S.C. § 102(b).

(2) The Examiner did not err in rejecting claims 4-7, 9-10, 21-35, and 37-46 for obviousness under 35 U.S.C. § 103.

DECISION

The rejection of claims 1-10 and 21-46 is affirmed.

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

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