

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAMEEL MENASHI

Appeal 2008-1013
Application 10/112,689
Technology Center 1700

Decided: March 31, 2008

Before THOMAS A. WALTZ, CATHERINE Q. TIMM, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134 the final rejection of claims 17-22 and 32-46. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

INTRODUCTION

Appellant discloses a modified carbon product that is useful in fuel cells and gas diffusion electrodes (Spec. 4). The modified carbon product has attached at least one organic group (Spec. 4). The modified carbon product may be used to make a catalytic material by depositing a catalyst on the modified carbon product (Spec. 5).

Claims 17 and 36 are illustrative:

17. A modified carbon product comprising a carbon material having attached at least one organic group and catalyst group, wherein the modified carbon product is formed by attaching at least one organic group to the carbon material to form a modified carbon material and attaching, adsorbing, forming or depositing the catalyst group onto the modified carbon material, wherein said organic group comprises at least one aromatic group or alkyl group.

36. The modified carbon product of claim 17, wherein said carbon material has a t-area of at least $30 \text{ m}^2/\text{g}$.

The Examiner relies on the following prior art references as evidence of unpatentability:

Osswald	3,963,510	Jun. 15, 1976
Yu	6,399,202 B1	Jun. 4, 2002
Hampden-Smith	6,660,680 B1	Dec. 9, 2003

A. S. Arico, V. Antonucci, and L. Pino, *The Role of Pt-Loading, Thermal Treatment and Exposure to Air on the Acid-Base Behavior of a Pt/Carbon Black Catalyst*, Carbon, 26, No. 5, 599-609, 1990.

K. Amine, K. Yasuda, and H. Takenaka, *New Process for Loading Highly Active Platinum on Carbon Black Surface for Application in Polymer Electrolyte Fuel Cell*, *Ann. Chim. Sci. Mat.*, 23, 331-335, 1998.

The rejections as presented by the Examiner are as follows:

1. Claim 36 is rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the Specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.
2. Claims 17-21, 32-34, 36, 37, 42-44 and 46 are rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Arico.
3. Claims 17-22, 32-37, 39, 41-43 and 45 are rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Amine.
4. Claims 17, 18, 20, 32, 33, 36, 39, 42-44 and 46 are rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Osswald.
5. Claims 17-22 and 32-46 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of Yu in view of Hampden-Smith.

Appellant separately argues claims 17, 36, 37, 38, and 40.

OPINION

35 U.S.C. § 112, FIRST PARAGRAPH, REJECTION: WRITTEN
DESCRIPTION

The Examiner finds that Appellant's Specification does not support the unbounded claim 36 feature that the carbon material t-area is "at least 30 m²/g" (Ans. 3 and 5).

Appellant argues that the Examiner has not met the burden of establishing by a preponderance of the evidence that a person skilled in the art would not recognize in Appellant's Specification a description of the claimed t-areas (Br. 10). Appellant contends that the Specification provides numerous examples of carbon products having a t-area above 30 m²/g (Br. 10). Appellant argues that the open upper limit on the t-area is clearly supported by the original Specification and claims, due to the fact no numerical upper limit for the t-area is ever indicated in the Specification or originally filed claims (Br. 11).

We have considered Appellant's arguments and are unpersuaded for the reasons below.

The test for determining compliance with the written description requirement of 35 U.S.C. § 112, first paragraph, is whether the disclosure of the application as originally filed would have reasonably conveyed to one of ordinary skill in the art that the inventor had possession at that time of the later claimed subject matter. *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991). The subject matter of the claims need not be described identically or literally for the application to satisfy the written description requirement of 35 U.S.C. § 112, first paragraph. *In re Kaslow*, 707 F.2d 1366, 1375 (Fed. Cir. 1983). However, the description of the

invention must be sufficiently clear that one of ordinary skill in the art would have recognized from the disclosure that the applicants invented the later claimed subject matter. *In re Wertheim*, 541 F.2d 257, 262 (CCPA 1976). Whether a Specification complies with the written description requirement of 35 U.S.C. § 112, first paragraph, is a question of fact. *Gentry Gallery Inc. v. Berkline Corp.*, 134 F.3d 1473, 1479 (Fed. Cir. 1998); *In re Alton*, 76 F.3d 1168, 1175 (Fed. Cir. 1996). The PTO has the initial burden of presenting evidence or reasoning as to why one of ordinary skill in the art would not have recognized in the Specification a description of the invention as later claimed. *Wertheim*, 541 F.2d at 263-64. Pointing out that the fact that the claims include embodiments outside the scope of the description satisfies the PTO's burden. *Id.*

In the present Appeal, the Examiner found that there is no support for the newly added range because this range is not recited in the original Specification (Ans. 5). As pointed out by the Examiner, because the newly claimed range has no upper limit, it contains values higher than those disclosed in Appellant's examples (Final Office Action 3). For instance, a t-area of 8000 m²/g is within the scope of claim 36, but the highest value disclosed in the original Specification is 660 m²/g (Spec. Table 3; Final Office Action 3). Based on these findings, we determine that the Examiner has submitted reasoning why one of ordinary skill in the art would not have recognized from the original Specification that Appellant was in possession of carbon materials having t-areas of "at least 30 m²/g," for instance, those higher than 660 m²/g. Accordingly, we determine that the Examiner has met the initial burden of establishing that the subject matter of claim 36 lacks written description in the originally filed Specification in violation of 35

U.S.C. § 112, first paragraph. *Wertheim*, 541 F.2d at 263-64. The burden was properly shifted to Appellant to establish support in the written description.

Appellant argues that the Specification discloses in Table 3 the t-areas being as high as 660 m²/g for the unmodified carbon material¹ and the Specification's silence regarding an upper limit on the t-area range provides support for an open-ended range. However, silence is not evidence of support. On the contrary, silence provides evidence that the Specification as originally filed would not have reasonably conveyed to one of ordinary skill that Appellant had possession of unmodified carbon materials having more than a t-area of 660 m²/g. *Wertheim*, 541 F.2d at 262. Appellant has pointed to no other portion of the Specification that supports a t-area value for the unmodified carbon material higher than 660 m²/g.

Moreover, it is not clear if Appellant's Specification provides support for the lower endpoint t-area value of 30 m²/g. Appellant refers to Table 4 on page 39 of the Specification as providing support for the lower endpoint t-area value, but it is not clear if Table 4 provides a t-area value of carbon material within the meaning of the claim.

Accordingly, we sustain the Examiner's § 112, first paragraph, rejection of claim 36 as failing to comply with the written description requirement.

¹ Claim 36 recites "said carbon material" having the particular t-areas. Claim 17 recites that "modified carbon material" is formed by attaching an organic group to carbon material. Accordingly, we determine that the claim phrase "said carbon material" in claim 36 refers to unmodified carbon material.

35 U.S.C. §§ 102/103 REJECTIONS OVER ARICO
CLAIM 17

Appellant argues that a carbon product having organic groups added onto it is a distinctly different product than Arico's carbon product, which has been oxidized but has not had organic groups added to it (Br. 15). Appellant contends that the "attached" feature of claim 17 serves to clarify what the claimed product is (i.e., a carbon material with organic groups attached to it), and is not a method step taken to obtain the product (Br. 15). Appellant argues that the aromatic structure shown in Arico on page 606 is the edge of the carbon black and not an attached aromatic group (Br. 16). Appellant also argues unexpected results (Br. 18).

In as much as the Examiner rests patentability on the product's structure and not the method recited in the claims, we view the Examiner to have construed the claims as product-by-process claims. We agree with that claim construction. This is because of the inclusion of the process clause "formed by attaching at least one organic group ... and attaching, adsorbing, forming or depositing the catalyst group onto the modified carbon material" in claim 17.

Product-by-process claims enable an applicant to claim an otherwise patentable product that resists definition by other than the process by which it is made. *In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985). For this reason, even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. *Id.* If the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process. *Id.* Once the Examiner has

established a prima facie case that applicant's product is the same as or obvious over the prior art product, the burden shifts to applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of the claimed product. *Thorpe*, 777 F.2d at 697-98.

Arico discloses a study of the effect of platinum loading, thermal treatment and exposure to air on the acid-base behavior of a platinum/carbon black catalyst (Arico 599). Arico discloses that thermal treatment of the carbon black catalyst in an inert gas is likely to cause pyrolysis of the acidic groups and formation of the pyrone structure shown on page 606 (Arico 606). The page 606 pyrone structure shows a series of aromatic rings connected together with the surface functionality resonating between two different chemical structures with slightly different oxygen functionalities (Arico 606).

Appellant does not dispute that Arico's pyrone structure is an organic group containing at least one aromatic group within the meaning of claim 17. Nor is there any question that a catalyst (i.e., platinum) is attached to Arico's carbon material. Accordingly, the burden was properly shifted to Appellant to prove that Arico's product does not necessarily possess the characteristics of the claimed product (i.e., Appellant's product is different than Arico's product). *Thorpe*, 777 F.2d at 697-98.

Appellant has proffered no objective evidence that Arico's disclosed product is different than Appellant's claimed product. Rather, Appellant merely argues that Arico's carbon product is "distinctly different" than Appellant's product because Appellant's product has a separate organic group attached to it (Br. 15). Appellant attempts to establish a difference in the products by arguing the process used to make the product, instead of the

product's structure produced by the process. The patentability of product-by-process claims rests on the product structure itself, not the process.

Thorpe, 777 F.2d at 697.

Moreover, the structure shown on page 606 of Arico is not carbon black, per se, as argued by Appellant (Br. 16). Rather, Arico's structure is a modified carbon black having an organic group (i.e., the oxygen containing aromatic ring and pyrone structure) attached to it. Appellant has not proffered any objective evidence that demonstrates that Arico's modified carbon black is "distinctly different" from Appellant's broadly claimed modified carbon product comprising a carbon material having an aromatic and/or alkyl organic group, and a catalyst group attached to the carbon material. Accordingly, Appellant has not established that the claimed product is distinctly different from Arico's product.

Appellant attempts to rebut the Examiner's rejections based on inherency under §§ 102/103 by arguing unexpected results (Br. 18). Appellant lists a variety of "unexpected results and/or benefits" of the claimed product, such as producing thinner electrolyte membranes (Br. 18). However, a rejection based on anticipation (i.e., § 102) cannot be overcome by showing unexpected results. *In re Malagari*, 499 F.2d 1297, 1302 (CCPA 1974). Rather, to overcome a rejection based on inherency the Appellant must show that the prior art product does not necessarily or inherently possess the characteristics of the claimed product (i.e., the claimed product is different than the prior art product). *In re Best*, 562 F.2d 1252, 1255 (CCPA 1977). *See also, In re Fitzgerald*, 619 F.2d 67, 70 (CCPA 1980). Appellant's burden of proof is the same whether the

Appeal 2008-1013
Application 10/112,689

inherency rejection is based on inherent anticipation under § 102 and/or prima facie obviousness under § 103. *Best*, 562 F.2d at 1255.

Appellant has not carried the burden of rebutting the Examiner's prima facie case that Arico's carbon product anticipates or would have rendered obvious Appellant's claimed carbon product. *Thorpe*, 777 F.2d at 697-98.

Accordingly, based on the record before us with due consideration of Appellant's evidence of unexpected results, we sustain the Examiner's §§ 102/103 rejections of claim 17-21, 32-34, 42-44, and 46 over Arico.

CLAIM 36

Appellant argues that the Examiner has not shown how Arico's original carbon has the claimed t-area and that it is reduced by coating, such that the burden has not shifted to Appellant to show otherwise (Br. 19). Appellant also advances the same arguments made previously with regard to claim 17 (Br. 19).

Appellant discloses that the t-area is a measure of the micropore-free surface areas (Spec. 36). We understand such disclosure to mean that the t-area measures the surface area of the carbon that does not contain micropores.

The Examiner indicates that Arico discloses carbon black having a surface area of 950 (Arico 599), which is very high for carbon black and similar to Appellant's disclosed carbon blacks on pages 36 and 46 of the Specification (Ans. 5). The Examiner indicates that Arico's original carbon appears to have the claimed t-area, which is reduced by coating (Ans. 4).

Arico discloses that water may condense in (i.e., coat) the micropores of the catalyst (i.e., carbon black with platinum) thereby blocking the micropores (i.e., the condensed water increases the micropore-free surface area (t-area) by blocking the micropores) (Arico 607).

Based on these findings, we determine that a prima facie case has been established that Arico's disclosed carbon material reasonably appears to possess a t-area within the claimed range. *Thorpe*, 777 F.2d at 697-98, citing *In re Best*, 562 F.2d 1252, 1255 (CCPA 1977). Though Appellant argues that the Examiner has not shown that the "original carbon" material possesses the t-area, we do not construe the "carbon material" of claim 36 as limited to only the "original" carbon material. Rather, as indicated *supra* in Footnote 1, the "carbon material" of claim 36 is construed as including both the modified and unmodified carbon material. Therefore, contrary to Appellant's argument, the burden was properly shifted to Appellant to show that Arico's carbon product does not possess the claimed characteristics. *Id.*

Appellant failed to provide any evidence that Arico's carbon material does not possess the claimed t-area; Appellant's burden has not been carried.

With regard to the arguments made previously regarding claim 17, we are unpersuaded for the same reasons noted in our discussion of the §§ 102/103 rejections of claim 17 over Arico.

For the above reasons, we sustain the Examiner's §§ 102/103 rejections of claim 36 over Arico.

CLAIM 37

Appellant argues that the Examiner incorrectly alleges that a diazonium group per se is not required and that the product is not limited by

the process by which it was made (Br. 20). Appellant further advances the same arguments made previously regarding claim 17 (Br. 20).

With regard to the arguments made previously regarding claim 17, we are unpersuaded for the same reasons noted in our discussion of the §§ 102/103 rejection of claim 17 over Arico.

Regarding the “diazonium salt reaction” feature of claim 37, we agree with the Examiner that such is a process limitation that indicates a process for attaching an organic group to the carbon material. However, it is the product limitations that determine patentability of a product-by-process claim. *Thorpe*, 777 F.2d at 697. As with claim 17, the Examiner has established a prima facie case that the carbon product of claim 37 is disclosed by Arico. Accordingly, the burden was properly shifted to Appellant to prove that Arico’s carbon product does not possess the claimed characteristic (i.e., that the diazonium salt reaction affects the attachment of the organic groups so as to produce carbon product different from Arico’s carbon product) *Thorpe*, 777 F.2d at 697-98.

Appellant has provided no evidence that the diazonium salt reaction produces a carbon product different from Arico’s carbon product. Appellant has not fulfilled the burden. *Id.*

For the above reasons, we sustain the Examiner’s rejections of claim 37 under §§ 102/103 over Arico.

35 U.S.C. §§ 102/103 REJECTIONS OVER AMINE CLAIM 17

Appellant argues that even if Amine’s carboxylic functionality may be considered an alkyl group (i.e., organic group) as the Examiner finds, it is

removed from the carbon black by exchange with a platinum complex such that it is not part of the final product (Br. 21). Appellant argues that the claimed product with organic groups attached to it is distinctly different than Amine's carbon product that has been merely oxidized (i.e., nothing has been added to Amine's carbon black) (Br. 21-22).

The Examiner's rejection over Amine indicates that the carboxylic functionality provides an alkyl group to Amine's carbon material (Ans. 4). The Examiner does not respond to Appellant's argument that the carboxylic functionality is removed by exchange with a platinum complex. We understand the Examiner's rejection to be that the carboxylic functionality inherently supplies an alkyl group to Amine's carbon black.

The Examiner bears the initial burden of establishing a prima facie case. *In re Spada*, 911 F.2d 705, 707 n. 3 (Fed. Cir. 1990). *See also, In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). Rejections based on inherency require the examiner to provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. *Ex parte Levy*, 17 USPQ2d 1461, 1464 (BPAI 1990).

The Examiner has not provided any technical reasoning or a basis in fact to support the assertion that a carboxylic functionality inherently provides an alkyl group to Amine's carbon product. Accordingly, the Examiner has not satisfied the burden of establishing a prima facie case that Appellant's claimed carbon product is unpatentable.

Accordingly, we cannot sustain the Examiner's §§ 102/103 rejections of claims 17-22, 32-35, 37, 39, 41-43, and 45 over Amine.

35 U.S.C. §§ 102/103 REJECTIONS OVER OSSWALD

Appellant argues that Osswald discloses a heavy metal laking agent for attaching an organic dye to carbon black (Br. 28-29). Appellant contends that the organic dye in Osswald is attached to the heavy metal, not the carbon black (Br. 29). Appellant contends that Osswald does not disclose modifying carbon black with an organic group, then adding a metal catalyst, as claim 17 requires (Br. 29).

Claim 17 recites that a modified carbon product is formed by attaching at least one organic group to the carbon material and then “attaching, adsorbing, forming or depositing the catalyst group on to the modified carbon material.” In other words, the organic group is attached to the carbon material to form a modified carbon material, and the catalyst is attached to the modified carbon material.

In contrast, Osswald discloses that the organic dye (i.e., the organic group) is attached to the carbon black (i.e., carbon material) by a laking agent (e.g., aluminum sulfate or a heavy metal) (Osswald, col. 1, ll. 41-43). That is, the organic group is attached to the carbon via a metal. The Examiner’s rejection indicates that a metal catalyst is added after the addition of the organic group, however, the Examiner does not point to any teachings in Osswald that substantiate such a finding. Moreover, Osswald does not disclose the metals having any catalytic property.

If the Examiner’s finding is that Osswald’s metals inherently have catalytic properties, the Examiner has failed to provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art so as to satisfy the burden of establishing the inherency of

Appeal 2008-1013
Application 10/112,689

the catalytic properties. *Ex parte Levy*, 17 USPQ2d 1461, 1464 (BPAI 1990).

For the above reasons, we determine that the Examiner has not established a prima facie case that Osswald discloses the claimed modified carbon material. *Thorpe*, 777 F.2d at 697-98. Accordingly, we cannot sustain the Examiner's §§ 102/103 rejections of claims 17, 18, 20, 32, 33, 36, 39, 42-44, and 46 over Osswald.

OBVIOUSNESS-TYPE DOUBLE PATENTING OVER YU IN VIEW OF HAMPDEN-SMITH

CLAIMS 17 AND 40

Regarding claim 17, Appellant argues that Yu's claims do not teach or suggest a modified carbon product that has both an attached organic group and a catalyst group (Br. 23). Appellant contends that there is no motivation for combining the teachings of Yu's modified carbon product with Hampden-Smith that discloses oxidized carbon blacks that are combined with a metal catalyst (Br. 24). Appellant argues that the Examiner is improperly trying to combine Yu's claimed carbon product with Hampden-Smith's catalyst, instead of combining Hampden-Smith's catalyst with Yu's carbon product (Br. 24).

Regarding claim 40, Appellant argues that the Examiner has not explained how the claimed fluorinated organic group is obvious over Yu in view of Hampden-Smith (Br. 27).

We have considered all of Appellant's arguments and are unpersuaded for the reasons below.

Yu claims a modified carbon product comprising a carbon product having attached at least one hydrophobic organic group and at least one hydrophilic organic group (Yu, claim 1). Yu further discloses that the hydrophobic organic group is a fluorine-containing group (Yu, claim 10).

Hampden-Smith discloses an electrocatalyst powder having hydrophilic groups on the electrocatalyst powder (i.e., the electrocatalyst powder has both the hydrophilic groups and the catalyst) (Hampden-Smith, col. 40, ll. 10-18). Hampden-Smith further discloses that the primary particles (i.e., carbon) may be modified by forming hydrophobic or hydrophilic groups on the surface of the primary particles (Hampden-Smith, col. 15, ll. 40-60).

Contrary to Appellant's arguments, we conclude, from these disclosures, that it would have been obvious to combine Hampden-Smith's catalyst with Yu's claimed carbon product having organic hydrophobic and organic hydrophilic groups in view of Hampden-Smith's disclosure of combining a catalyst with carbon particles modified to have hydrophilic and/or hydrophobic functionalities. Moreover, we find that Yu claims using an organic fluorine-containing group as recited in Appellant's claim 40.

Furthermore, we do not find that the Examiner proposes to combine Yu's modified carbon with Hampden-Smith's catalyst as argued by Appellant. Rather, the Examiner proposes combining Hampden-Smith's catalyst with Yu's modified carbon.

Accordingly, we sustain the Examiner's obviousness-type double patenting rejection of claims 17-22, 32-35, and 39-46 over claims 1-19 of Yu in view of Hampden-Smith.

CLAIMS 36, 37, AND 38

Appellant argues that the Examiner has not shown where the t-area feature of claim 36, the diazonium salt reaction feature of claim 37, and the sulfonic acid group feature of claim 38 are taught or suggested by the combination of Yu in view of Hampden-Smith (Br. 26-27). We agree.

The Examiner's obviousness-type double patenting rejection is silent regarding the features of claims 36-38 (Ans. 4). In the "Response to Arguments" section of the Answer, the Examiner, for the first time, indicates a rationale for determining that Yu's claims include the t-areas of claim 36: the "claims of Yu are not restricted as to [*sic a*] t-value, so all are encompassed" (Ans. 6). However, the Examiner has not proffered any inherency rationale grounded in a basis in fact and/or technical reasoning to support such a finding that Yu's claims to a modified carbon product inherently possess the t-area values or the organic groups. *Levy*, 17 USPQ2d at 1464. Accordingly, the Examiner has not met his burden of establishing that claims 36-38 would have been obvious over Yu's claims to a carbon product as modified by Hampden-Smith.

We cannot sustain the Examiner's obviousness-type double patenting rejection of claims 36-38 over Yu in view of Hampden-Smith.

DECISION

We sustain the Examiner's § 112, first paragraph, rejection of claim 36 as failing to comply with the written description requirement.

We sustain the Examiner's §§ 102/103 rejections of claims 17-21, 32-34, 36, 37, 42-44, and 46 over Arico.

Appeal 2008-1013
Application 10/112,689

We do not sustain the Examiner's §§ 102/103 rejections of claims 17-22, 32-37, 39, 41-43 and 45 over Amine.

We do not sustain the Examiner's §§ 102/103 rejections of claims 17, 18, 20, 32, 33, 36, 39, 42-44 and 46 over Osswald.

We sustain the Examiner's obviousness-type double patenting rejection of claims 17-22, 32-35, and 39-46 over Yu in view of Hampden-Smith.

We do not sustain the Examiner's obviousness-type double patenting rejection of claims 36-38 over Yu in view of Hampden-Smith.

The Examiner's decision is affirmed-in-part.

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-IN-PART

tf/ljs

MARTHA ANN FINNEGAN, ESQ.
CABOT CORPORATION
157 CONCORD ROAD
BILLERICA, MA 01821-7001