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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/697,726 01/17/2013 Asko Karppi 221105-1975 3335

17951 7590 02/01/2019
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EXAMINER

CALL, DOUGLAS BRYANT

ART UNIT PAPER NUMBER

1732

NOTIFICATION DATE DELIVERY MODE

02/01/2019

ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ASKO KARPPI,
VELI-MATTI VUORENPALO, LEIF ROBERTSEN,
KARI PARVIAINEN, OLLI DAHL,
and KARI VANHATALO

Appeal 2017-010587
Application 13/697,726¹
Technology Center 1700

Before ADRIENE LEPIANE HANLON, BRIAN D. RANGE, and
MICHAEL G. McMANUS, *Administrative Patent Judges*.

HANLON, *Administrative Patent Judge*.

DECISION ON APPEAL

A. STATEMENT OF THE CASE

The Appellants filed an appeal under 35 U.S.C. § 134(a) from an Examiner's decision finally rejecting claims 1–12 and 17–34. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ The real party in interest is said to be KEMIRA OYJ. Appeal Brief dated March 20, 2017 (“App. Br.”), at 2.

Claim 1, the sole independent claim on appeal, is reproduced below from the Claims Appendix to the Appeal Brief. The limitation at issue is italicized.

1. A process for producing microcellulose comprising:
 - subjecting fibrous cellulosic material having fibre length of 0.2-5 mm, lignin content of 5% or less, and hemicellulose content from 3 to 15% by weight to acid hydrolysis at a temperature from 110°C to less than 140°C and at a consistency of at least 8% on dry weight of the fibrous cellulosic material,
 - wherein the amount of added acid is from 0.5 to 1.5% on dry weight of the fibrous cellulosic material,
 - wherein the acid hydrolysis is carried in a reactor comprising a mixer,
 - wherein the produced microcellulose has an average size of 30 – 100 µm,
 - wherein the produced microcellulose is obtained without a subsequent mechanical treatment step; and
 - wherein a yield of the microcellulose is at least 90%.*

App. Br. 13.

The Examiner maintains the following grounds of rejection on appeal:

- (1) claims 1, 2, 4–11, 17, 19–21, 23–26, 29, and 30 under 35 U.S.C. § 103(a) as unpatentable over Frangioni et al.² in view of Obae et al.,³ Nguyen et al.,⁴ Anderson et al.,⁵ Luo,⁶ and Schaible et al.⁷ as evidenced by Hanna et al.⁸;

² WO 2010/131088 A1, published November 18, 2010 (“Frangioni”).

³ WO 02/02643 A1, published January 10, 2002 (WO 643). The Examiner relies on US 2010/0291161 A1, published November 18, 2010 (“Obae”) as evidence of the WO 643 disclosure. The Appellants do not object.

⁴ US 7,037,405 B2, issued May 2, 2006 (“Nguyen”).

⁵ US 6,096,152, issued August 1, 2000 (“Anderson”).

⁶ US 2006/0219376 A1, published October 5, 2006 (“Luo”).

⁷ US 2003/0089465 A1, published May 15, 2003 (“Schaible”).

⁸ US 6,228,213 B1, issued May 8, 2001 (“Hanna”).

(2) claims 3 and 18 under 35 U.S.C. § 103(a) as unpatentable over Frangioni in view of Obae, Nguyen, Luo, Schaible, and Anderson as evidenced by Hanna, and as further evidenced by Hilton;⁹

(3) claims 12, 22, 27, and 28 under 35 U.S.C. § 103(a) as unpatentable over Frangioni in view of Obae, Nguyen, Luo, Schaible, and Anderson as evidenced by Hanna, and further in view of Hanna and Javed et al.;¹⁰

(4) claim 31 under 35 U.S.C. § 103(a) as unpatentable over Frangioni in view of Obae, Nguyen, Luo, Schaible, and Anderson as evidenced by Hanna, and further in view of Prough et al.¹¹ and Gullichsen;¹²

(5) claims 32–34 under 35 U.S.C. § 103(a) as unpatentable over Frangioni in view of Obae, Nguyen, Luo, Schaible, and Anderson as evidenced by Hanna, and further in view of Mak;¹³

(6) claims 1–10, 12, and 17–34 on the ground of nonstatutory obviousness-type double patenting as unpatentable over claims 1, 3, 6, 7, 9–12, 14–17, 20, 24–40, 42–46, 48, and 50 of US 9,469,695 in view of Frangioni as evidenced by Hilton, Schaible, McIlroy et al.,¹⁴ Luo, Gullichsen, Nguyen, and Anderson; and

⁹ US 4,126,706, issued November 21, 1978 (“Hilton”).

¹⁰ Muhammad Asif Javed & Ulf Germgård, *Chlorite & Kraft Reactivity*, 6 *BioResources* 2581–2591 (2011) (“Javed”).

¹¹ US 5,401,361, issued March 28, 1995 (“Prough”).

¹² 6A *Papermaking Science and Technology* A616–A665 (Johan Gullichsen & Hannu Paulapuro eds. 1999) (“Gullichsen”).

¹³ Andrew Tsz-Chung Mak, *Solid-Liquid Mixing in Mechanically Agitated Vessels* (June 1992) (Ph.D. dissertation, University College London) (“Mak”).

¹⁴ US 5,820,830, issued October 13, 1998 (“McIlroy”).

(7) claims 1–12 and 17–34 on the ground of nonstatutory obviousness-type double patenting as unpatentable over claims 1, 2, 4, 12, 13, 15, and 17–33 of US 9,096,692 in view of Frangioni, Luo, Gullichsen, Nguyen, and Anderson.

B. DISCUSSION

1. Rejections (1)–(5)

The Examiner finds that Frangioni discloses an acid hydrolysis process for preparing microcrystalline cellulose (MCC) comprising the steps of:

combining 20 – 22.2 weight percent paper-grade cellulose in water (Table 1) (i.e., consistency) derived from bleached wood pulp from eucalyptus or pine (a hardwood and softwood respectively and also a fibrous cellulosic material) . . . with hydrochloric acid and mixed in a stirred reactor . . . at a temperature of between 90 and 160 degrees Celsius for between 1 hr/40 minutes and 5 hours . . . thereby overlapping the claimed range.

Final Act. 4 (citations omitted).¹⁵ The Examiner also finds that Frangioni teaches an acid range of from about 0.0085 to 23.2%. Final Act. 5.

The Examiner finds that “the process of Frangioni discloses all the process conditions of the instant case while not disclosing the physical and chemical makeup of the raw materials and products.” Ans. 24.¹⁶ The Examiner relies on Nguyen to teach the claimed cellulose consistency (Final Act. 5–6), Obae as evidenced by Hanna to teach the claimed particle size (Final Act. 7–8), Anderson to teach the claimed fiber length (Final Act. 8), and Luo to teach the claimed hemicellulose and lignin contents (Final Act. 8–9).

¹⁵ Final Office Action dated December 14, 2016.

¹⁶ Examiner’s Answer dated June 5, 2017.

The Examiner also finds that “Frangioni is silent on . . . the yield of the MCC.”¹⁷ Final Act. 5. The Examiner, however, finds:

Schaible discloses a process for producing microcrystalline cellulose from bleached or unbleached pulps obtained from softwoods or hardwoods, Kraft processes, sulphite process or steam explosion . . . wherein hydrolysis is conducted on the pulps at an elevated temperature producing MCC with a yield of at least 95% . . . thereby falling within or touching the instantly claimed ranges. Although Schaible does not utilize any additional acid, it is disclosed that the hydrolysis can be sped up by the addition of acids

Final Act. 6 (citations omitted).

The Examiner concludes:

[I]t would have been obvious to one of ordinary skill in the art at the time of the invention *to expect* the MCC yield of Frangioni to fall within the instantly claimed ranges *as suggested by Schaible as the processes of Frangioni, Nguyen and Schaible are similar in nature.*

Final Act. 7 (emphasis added).

The Appellants argue that “[t]he processes of Frangioni, Nguyen and Schaible are so different that it cannot be concluded that yields of one process would be similar to yields in another process.”¹⁸ App. Br. 9 (emphasis omitted). More specifically, the Appellants argue that the hydrolysis steps disclosed in Schaible and Frangioni are different. The Appellants argue that “[i]n Frangioni the temperature is 90-160 °C and hydrolysis time is 2-5 hours. In Schaible the treatment [is] at much higher temperatures 200-235 °C for a shorter time of 4-25

¹⁷ We note that Frangioni discloses that “[t]he production yield of microcrystalline cellulose is typically comprised between 82% and 84%,” which is lower than the claimed yield. Frangioni 8, ll. 15–16.

¹⁸ The Examiner relies on Schaible, not Nguyen, to show that one of ordinary skill in the art would have expected the process of Frangioni to yield an amount of microcellulose within the range recited in claim 1. *See* Final Act. 6; Ans. 26.

min. With these differences, one of skill in the art would not presume that the yields would be similar.” App. Br. 9 (emphasis omitted).

The Appellants’ argument is persuasive of reversible error. In order for Schaible to be probative of the yield expected by or inherent in Frangioni’s process, the Examiner must show that Schaible’s process is substantially the same as Frangioni’s process. In this case, the Examiner summarily finds that the processes are “similar in nature”¹⁹ but does not make any specific factual findings demonstrating that the processes disclosed in Frangioni and Schaible are in fact similar. *See In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992) (examiner bears the initial burden of presenting a prima facie case of unpatentability).

In the Answer, the Examiner finds that “it is known to the ordinary skilled artisan that the use of higher temperatures frequently requires the use of lower reaction times to prevent degradation.” Ans. 27. Nonetheless, the Examiner has failed to establish, in the first instance, that the time and temperature disclosed in Schaible is equivalent to the time and temperature in Frangioni’s process, whereby one of ordinary skill in the art would have expected the two processes to yield substantially the same amount of microcellulose.

In the Answer, the Examiner also finds that “[a]s the process of Frangioni is essentially identical to the instant process, the ordinary skilled artisan would expect similar yields from Frangioni as to the instant case.” Ans. 24.

As correctly pointed out by the Appellants, the Examiner acknowledges that “Frangioni fails to disclose a starting fibrous cellulosic material having at least a 0.2-5 mm fiber length, a ≤ 5 % lignin content, and a 3-15 % hemicellulose

¹⁹ Final Act. 7.

content.” Reply Br. 3 (citing Ans. 5);²⁰ *see also* Ans. 24 (acknowledging that Frangioni does not disclose “the physical and chemical makeup of the raw materials and products” recited in claim 1). Thus, a preponderance of the evidence does not support the Examiner’s finding that Frangioni’s process is essentially identical to the Appellants’ claimed process.

For the reasons set forth above, the obviousness rejection of claim 1 is not sustained.²¹

The Examiner does not rely on the remaining prior art of record to cure the deficiencies in the rejection of claim 1 identified above. Therefore, the obviousness rejections of dependent claims 2–12 and 17–34 also are not sustained. *See In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988) (“Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious.”).

2. Rejection (6)

The Appellants argue:

The claims of [US 9,469,695 (“US 695”)] do not teach or suggest at least the claimed fiber length, lignin content or hemicellulose content of the starting fibrous cellulosic material, and does not teach a microcellulose yield of at least 90% as set forth in claim 1. As discussed above, the cited references also fail to disclose, teach, or suggest the combination of these features with the claimed yield with a reasonable expectation of success.

App. Br. 11.

²⁰ Reply Brief dated August 7, 2017.

²¹ The Appellants also disagree with the Examiner’s finding that Schaible discloses a microcellulose yield within the range recited in claim 1. App. Br. 7–9. Based on our reasons for reversal, it is not necessary to address the Appellants’ argument.

The Appellants' argument is persuasive of reversible error. In the rejection on appeal, the Examiner does not find that the claims of US 695 recite a microcellulose yield within the claimed range. *See* Final Act. 19–21; Ans. 18–20. Rather, the Examiner finds that “[t]he instant invention also claims a process yield when utilizing pure cellulose as the starting material which is disclosed by Schaible who discloses a yield of MCC of at least 95% [0025].” Ans. 19. The Examiner concludes that it would have been obvious to one of ordinary skill in the art “to utilize pure cellulose to obtain the highest product yields.” Ans. 19–20. The Examiner, however, does not explain, in any detail, why modifying the claimed process in US 695 with pure cellulose would have been expected to yield or inherently yields microcellulose within the range recited in claim 1 (i.e., at least 90%). For that reason, rejection (6) is not sustained.

3. Rejection (7)

The Examiner states that “the limitations of the instant claims are met by claims 1, 4, 5, 15, 17–19, 20 and 21 in view of Anderson, Gullichsen and Luo.” Final 22.

The Appellants argue that “the claims of [US 9,096,692 (“US 692”)] do not teach or suggest an MCC yield of at least 90% as set forth in claim 1 of the present application.” App. Br. 12. The Appellants' argument is supported by the record. In the Answer, the Examiner concludes that “the MCC yield is obvious when applying the claims of ‘692 to the instant claims in view of the cited prior art.” Ans. 28. The Examiner, however, does not explain, in any detail, why the claimed yield would have been obvious to one of ordinary skill in the art based on the

claims of US 692 in view of Frangioni, Luo, Gullichsen, Nguyen, and Anderson.²² See *Oetiker*, 977 F.2d at 1445 (examiner bears the initial burden of presenting a prima facie case of unpatentability). For that reason, rejection (7) is not sustained.

C. DECISION

The Examiner's decision is reversed.

REVERSED

²² Notably, in the previous rejections, the Examiner relied on Schaible to demonstrate the obviousness of the claimed microcellulose yield. Rejection (3), however, does not include Schaible.