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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte EBEN BAYER and GAVIN McINTYRE¹

Appeal 2017-003940
Application 13/492,230
Technology Center 1600

Before RICHARD M. LEBOVITZ, RICHARD J. SMITH,
and JOHN E. SCHNEIDER, *Administrative Patent Judges*.

SCHNEIDER, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) involving claims to a substrate for growing basidiomycetes which have been rejected for failing to satisfy the written description requirement, as directed to patent ineligible subject matter, and as obvious. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ Appellants identify the real party in interest as Ecovative Design LLC.
Appeal Br. 2.

STATEMENT OF THE CASE

Certain fungi in combination with discrete particles can be used to create composite materials. Spec. 1. The Specification describes a substrate and method for production of mycological materials such that the fungi produce basidiomycete mycelium, but do not produce a basidiocarp also known as a fruiting body or mushroom. *Id.*

Claims 1, 3, 4, and 6–11 are on appeal². Claim 1 is the sole independent claim and reads as follow:

1. A substrate for growing basidiomycete mycelium comprising nutritional particles characterized in providing an accessible carbon source for fungal mycelium and non-nutritional material characterized in that the ratio of said non-nutritional material to said nutritional particles ranges from 16.25:1 to 110:1 and in that said substrate promotes the growth and differentiation of basidiomycete mycelium without supporting the production of a basidiocarp.

The claims stand rejected³ as follows:

Claims 1, 3, 4, and 6–11 have been rejected under 35 U.S.C. § 101 as directed to patent ineligible subject matter.

Claims 1, 3, and 4 have been rejected under 35 U.S.C. § 112, first paragraph for failure to comply with the written description requirement.

² Claims 12–16 are also pending in the present application but have been withdrawn from consideration as being directed to a non-elected invention. Final Act. 2.

³ Claims 1, 3, 4, and 6–11 were rejected under 35 U.S.C. § 112, first paragraph as presenting new matter. Final Act. 3. The Examiner has withdrawn this rejection. Ans. 2.

Claims 1 and 3 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Stoller⁴ in view of Spear⁵ and Matano.⁶

Claims 1 and 4 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Stroller in view of Spear, Tellez-Jurado⁷ and Heinzkill.⁸

PATENT INELIGIBLE SUBJECT MATTER

Issue

The issue with respect to this rejection is whether Examiner correctly concluded that claims 1, 3, 4, and 6–11 are directed to patent ineligible subject matter.

The Examiner finds that under the broadest reasonable interpretation, the claims encompass a combination of natural materials which are not eligible for patent protection. Final Act. 4. The Examiner finds that the recited ratios of components do not represent something significantly more than a natural product in that there is no evidence of record that the recited ratios give the mixture a new emergent property. *Id.* The Examiner finds that the addition of maltodextrin or sugars does not add something significantly more to the claimed composition. *Id.* The Examiner concludes that “the claims as a whole do not recite something markedly different than

⁴ Stoller, US 3,828,470, issued Aug. 13, 1974 (“Stoller”).

⁵ Spear et al., US 2007/0294939 A1, published Dec. 27, 2007 (“Spear”).

⁶ Matano et al., US 8,268,608 B2, issued Sept. 18, 2012 (“Matano”).

⁷ A. Téllez-Jurado et al., *Expression of a heterologous laccase by Aspergillus niger cultured by solid-state and submerged fermentations*, 30 ENZYME AND MICROBIAL TECH. 665–69 (2006) (“Tellez-Jurado”).

⁸ Marion Heinzkill et al., *Characterization of Laccases and Peroxidases from Wood-Rotting Fungi (Family Coprinaceae)*, 64 APPLIED AND ENVIRON. MICROBIOL. 1601–06 (1998) (“Heinzkill”).

the judicial subject-matter eligibility exception of natural products.” Final Act. 5.

Appellants contend that a combination of natural products is not a judicial exception under 35 U.S.C. § 101 in that the combination is a composition of matter which is specifically allowed under Section 101. Appeal Br. 11. Appellants distinguish the Supreme Court’s decision in *Funk Bros. Seed Co. Kalo Inoculant Co.*, 333 U.S. 127 (1948), arguing that the claimed invention in *Funk Bros.* was a aggregation of species whereas the present invention is a novel composition of matter. Appeal Br. 12. Appellants go on to argue that the present invention is not a naturally occurring product and that the Examiner has not shown that the combination occurs in nature. *Id.* at 13–16. Appellants argue that even if the claims were directed to a natural product, the law does not exclude natural products but only abstract ideas, natural phenomenon and laws of nature. *Id.* at 16–17.

Analysis

As stated in *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992):

[T]he examiner bears the initial burden . . . of presenting a *prima facie* case of unpatentability. . . .

After evidence or argument is submitted by the applicant in response, patentability is determined on the totality of the record, by a preponderance of evidence with due consideration to persuasiveness of argument.

Appellants do not persuade us that a preponderance of the evidence fails to support the Examiner’s conclusion that the rejected claims recite subject matter ineligible for patenting under 35 U.S.C. § 101.

35 U.S.C. § 101 states that “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or

any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”

The Supreme Court has “long held that this provision contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable.” *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2354 (2014).

Our reviewing court has summarized the Supreme Court’s two-part test for distinguishing between claims to patent-ineligible exceptions, and claims to patent-eligible applications of those exceptions, as follows:

Step one asks whether the claim is “directed to one of [the] patent-ineligible concepts.” [*Alice*, 134 S. Ct. at 2354]. If the answer is no, the inquiry is over: the claim falls within the ambit of § 101. If the answer is yes, the inquiry moves to step two, which asks whether, considered both individually and as an ordered combination, “the additional elements ‘transform the nature of the claim’ into a patent-eligible application.” *Id.* (quoting *Mayo [Collaborative Servs. v. Prometheus Labs., Inc.]*, 132 S. Ct. 1289, 1297 (2012)).

Step two is described “as a search for an ‘inventive concept.’” *Id.* (quoting *Mayo*, 132 S.Ct. at 1294). At step two, more is required than “well-understood, routine, conventional activity already engaged in by the scientific community,” which fails to transform the claim into “significantly more than a patent upon the” ineligible concept itself. *Mayo*, 132 S.Ct. at 1298, 1294.

Rapid Litigation Mgmt. Ltd. v. CellzDirect, Inc., 827 F.3d 1042, 1047 (Fed. Cir. 2016) (paragraphing added).

In the present case, claim 1 recites a growth medium for basidiomycete mycelium comprising an accessible carbon source and a non-nutritive material having a ratio of non-nutritive particles to nutritive particles of from 16.25:1 to 110:1. Appeal Br. 26 (Claims App’x). The

Specification lists sawdust and cottonseed hulls as examples of nutritive particles which can be used in the practice of the invention. Spec. 2. The Specification also teaches that other seed hulls such as oat hulls, rice hulls and buckwheat hulls are illustrative of non-nutritive materials which can be used. *Id.* All of these material are naturally occurring.

We, therefore, agree with the Examiner that, as to part one of the Supreme Court's test, Appellants' claim 1 is expressly directed to a combination of natural products and are not patent eligible. *See Funk Bros.*, 333 U.S. at 132. (Mixture of naturally occurring bacteria not patentable subject matter).

As to part two of the Supreme Court's test, the ratios recited in the claims do not represent something significantly more than the product of nature. The same is true with respect to the addition of maltodextrin. Appellants have offered no evidence that the claimed combination performs differently than the separate components by themselves or that the ratios of the components imparts properties to the composition that is something significantly more.

We, therefore, agree with the Examiner that, under the Supreme Court's two-part test, claim 1 recites subject matter ineligible for patenting under § 101.

Appellants' arguments do not persuade us to the contrary.

Appellants contend that the judicial exceptions do not address compositions of matter that may be made of natural products. Appeal Br. 11. Appellants distinguish *Funk Bros.* by arguing that *Funk Bros.* is limited to an aggregation of species and not a novel growth medium. *Id.* at 12.

We have considered Appellants' arguments and find the unpersuasive. Naturally occurring compositions, including combinations of naturally occurring materials, have been held to be ineligible for patent protection. *See Funk Bros.*, 333 U.S. at 132.

Appellants attempt to distinguish *Funk Bros.* is also unpersuasive. While the composition in *Funk Bros.* was a combination of species of naturally occurring organisms, the holding is not so limited. More recently, the Supreme Court confirmed the principle that naturally occurring products fall within the 'principle of nature' exception of 35 U.S.C. § 101. *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2117–18 (2013).

Appellants next contend that *Mayo* is not applicable because the present invention is not directed to a law of nature. Appeal Br. 14–15. For the reasons stated above we are not persuaded.

Appellants go on to argue that there is no legal authority for the proposition that natural products are within the exceptions to patentable subject matter. *Id.* at 16–18. This argument is unpersuasive. As demonstrated above, *Funk Bros.* and *Myriad* both stand for the proposition the natural products are an exception to patentable subject matter.

Finally, Appellants contend that the Examiner has not shown that the claimed composition itself exists in nature. Appeal Br. 17–18. Appellants note that no rejection was made under 35 U.S.C. § 102 and that this supports the proposition that the composition is patentable. *Id.*

Again, we are not persuaded. Like the mixture in *Funk Bros.*, the present mixture comprises naturally occurring elements. *Funk Bros.*, 133 U.S. at 129–30. Also, like the inventor in *Funk Bros.*, Appellants have not

shown that the claimed composition exhibits a property different from what the separate components exhibit in nature. *Funk Bros.*, 133 U.S. at 131. Absent such a showing, the combination of naturally occurring components is not patentable. *Id.*

Conclusion of Law

We conclude that a preponderance of the evidence supports the Examiner's conclusion that the pending claims are directed to patent ineligible subject matter.

WRITTEN DESCRIPTION

Issue

The issue with respect to this rejection is whether the Examiner correctly concluded that that claims 1, 3, and 4 do not comply with the written description requirement.

The Examiner finds that the claims call for the combination of nutritive and non-nutritive materials which promote the growth and differentiation of mycelium without supporting production of a basidiocarp. Final Act. 7. The Examiner finds that the Specification only lists a limited number of materials which allegedly meet this criteria and that the Specification provides no guidance as to how to select or identify other materials which perform the recited function. *Id.* The Examiner finds that there is nothing in the Specification to show that the combination of nutritive and non-nutritive materials in the claimed ratios actually possess the claimed property of promoting mycelium growth and differentiation while not supporting basidiocarp production. *Id.* The Examiner concludes that the "disclosed non-nutritional material[s] and nutritional particles are

not representative of . . . all non-nutritional materials and nutritional particles capable of promoting the growth and differentiation of basidiomycete mycelium without supporting the production of a basidiocarp in some unknown ratio.” Final Act. 8.

Appellants contend that there is a presumption that the written description is adequate and that the Examiner has not shown otherwise. Appeal Br. 9–10.

Principles of Law

“In the context of the written description requirement, an adequate prima facie case must . . . sufficiently explain to the applicant what, in the examiner’s view, is missing from the written description.” *Hyatt v. Dudas*, 492 F.3d 1365, 1370 (Fed. Cir. 2007).

[A] sufficient description of a genus instead requires the disclosure of either a representative number of species falling within the scope of the genus or structural features common to the members of the genus so that one of skill in the art can “visualize or recognize” the members of the genus.

Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1350 (Fed. Cir. 2010) (en banc).

Analysis

Appellants have the better argument. The Specification defines nutritional particles on page 1 and gives examples (“nutritional particle or fiber is defined as providing an easily accessible carbon source for the fungal mycelium; this includes simple sugars (dextrose, cellulose, maltose), carbohydrates (maltodextrin, starch}, and lignin”) and gives further examples on page 2. Thus, the nutritional source is defined with sufficient

specificity. The Specification. also defines a non-nutritional source on page 2 (“either offers a carbon source accessible by the fungal mycelium but is less than 20% of the material's total dry mass, or the material offers no nutritional value. This particle or fiber could be carbon deficient, such as the silicon dioxide found in rice hulls, or offer a carbon source that is not accessible by most basidiomycete species.” Further examples of non-nutritional sources are defined on page 3. These are straightforward definitions, i.e, sugars and carbohydrates, and material that is not a carbon source or not a carbon source that can be digested by the fungus. Thus, the genus of both are fully described. The functional limitation of the claim limits the materials to those that promotes the growth and differentiation of basidiomycete mycelium without supporting the production of a basidiocarp.

Conclusion of Law

We conclude that the Examiner’s conclusion that claims 1, 3, and 4 do not satisfy the written description requirement is not supported by a preponderance of the evidence.

OBVIOUSNESS

STOLLER COMBINED WITH SPEAR AND MATANO

Issue

The issue with respect to this rejection is whether a preponderance of the evidence supports the Examiner’s conclusion that claims 1 and 3 would have been obvious over Stoller combined with Spear and Matano.

The Examiner finds that Stoller discloses a composition for growing basidiomycetes comprising nutritive particles and non-nutritive materials where the non-nutritive materials comprise rice hulls. Final Act. 10. The

Examiner finds that Spear discloses a composition for growing basidiomycetes comprising nutritive particles and non-nutritive materials where the composition contains high levels of non-nutritive materials. *Id.* The Examiner finds that Matano discloses the use of rice husks, buckwheat husks or perlite in a composition for growing fungi. *Id.* The Examiner finds that the compositions disclosed in the references is substantially similar to that recited in the present claims with the exception of the amounts of the materials. *Id.* The Examiner finds that it would be a matter of routine optimization to discover the optimum ranges. Final Act. 11. The Examiner concludes that

it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to modify the substrates for growing basidiomycetes or other fungi taught by compositions of Stoller by substituting various other cellulose containing waste material such as buckwheat husks or hulls in the substrate as taught by Matano and in greater amounts as suggested by the teachings of Spear *et al.* for the expected benefit of producing abundant growth of fungi suitable for the production of enzymes or as a valuable and nutritious food source as well as recycling pesky agricultural wastes that clog landfills.

Id.

Appellants contend that the compositions recited in the references support the growth of mushrooms whereas the claimed composition does not. Appeal Br. 18–20. Appellants also argue that Stoller does not teach the recited ratios of materials and that it would not have been obvious to raise the amounts of non-nutritive materials to achieve the recited ratios. *Id.* at 20–21. Appellants contend that the term “promotes the growth and differentiation of basidiomycete mycelium without supporting the production of a basidiocarp” is a functional limitation and not merely a

statement of intended use. Appeal Br. 21. Appellants contend that the functional limitation in claim 1 is not inherent in the substrates taught by the references. *Id.* at 22–23.

Principles of Law

Where . . . the claimed and prior art products are identical or substantially identical . . . the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. . . . [The] fairness [of the burden-shifting] is evidenced by the PTO’s inability to manufacture products or to obtain and compare prior art products.

In re Best, 562 F.2d 1252, 1255 (CCPA 1977).

“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456 (CCPA 1955)

Analysis

We adopt the Examiner’s findings of fact, reasoning on scope and content of the prior art, and conclusions set out in the Final Action and Answer regarding this rejection. We find the Examiner has established that the claims would have been obvious over Stoller combined with Spear and Matano. Appellants have not produced evidence showing, or persuasively argued, that the Examiner’s determinations on obviousness are incorrect. Only those arguments made by Appellants in the Briefs have been considered in this Decision. Arguments not presented in the Briefs are waived. *See* 37 C.F.R. § 41.37(c)(1)(iv) (2015). We have identified claim 1

as representative; therefore, all claims fall with claim 1.⁹ We address Appellants' arguments below.

Appellants contend that the compositions of the references produce basidiocarps and, therefore, do not meet the limitation of claim 1 calling for the production of mycelium without the production of a basidiocarp. We find that argument unpersuasive. As the Examiner points out the claimed composition and that disclosed in the references are very similar, differing only in the ratios of the nutritive and non-nutritive materials. Final Act. 10. Thus, the burden shifts to the Appellants to produce evidence that the composition recited in the art does not possess the same characteristics as the claimed composition. *Best*, 562 F.2d at 1255. Appellants point to nothing in the record to support their contention that the compositions of the prior art would not produce the same result as the claimed composition.

Appellants next argue that Stoller does not teach the claimed ratios of nutritive particles to non-nutritive materials. Appeal Br. 19–21. We are unpersuaded. As the Examiner points out, Spear teaches that higher amounts of non-nutritive materials can be successfully used to promote growth of basidiomycetes. Ans. 7. We agree with the Examiner that it would have been a matter of routine experimentation to discover the optimum ranges. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *Aller*, 220 F.2d at 456.

⁹ While Appellants argued claim 3 separately, Appellants' sole argument is that claim 3 is patentable for the same reasons claim 1 is patentable. Appeal Br. 23. Thus, claim 3 falls with claim 1.

Appellants next argue that the phrase “promotes the growth and differentiation of basidiomycete mycelium without supporting the production of a basidiocarp” is a functional limitation and that the Examiner has not shown that the art meets this limitation. Appeal Br. 21–23.

We have considered this argument and find it unpersuasive. As the Examiner points out:

In order to be limiting, the intended use must create a structural difference between the claimed composition and the prior art composition. In the instant case, the intended use does not create a structural difference, thus, the intended use is not limiting. “The claiming of a new use . . . which is inherently present in the prior art does not necessarily make the claim patentable.” *In re Best*, 195 USPQ 430, 433 (CCPA 1977).

Ans. 6.

As discussed above, given the similarity of the claimed composition and those taught in the art, it is incumbent on Appellants to come forward with evidence that the prior art materials do not possess the claimed attribute.

Conclusion of Law

We conclude that a preponderance of the evidence supports the Examiner’s conclusion that claims 1 and 3 would have been obvious over Stoller combined with Spear and Matano.

STOLLER COMBINED WITH SPEAR, TELLEZ-JURADO, and HEINZKILL

Appellants rely on the arguments addressed above in arguing that claims 1 and 4 would not have been obvious over Stoller combined with Spear, Tellez-Jurado, and Heinzkill. Appeal Br. 23–24. For the reasons

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discussed above, we find these arguments unpersuasive and affirm the rejection of claims 1 and 4.

SUMMARY

We affirm the rejection under 35 U.S.C. § 101.

We affirm the rejection under 35 U.S.C. § 112, first paragraph.

We affirm the rejections under 35 U.S.C. § 103(a).

TIME PERIOD FOR RESPONSE

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