

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

IN RE: DAVID JOHN FULTON,
Appellant

2020-1384

Appeal from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in No. 12/789,280.

Decided: December 8, 2020

JOSEPH ROGER WILLIAMS, JR., Richards Rodriguez &
Skeith LLP, Austin, TX, for appellant.

WILLIAM LAMARCA, Office of the Solicitor, United
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appellee Andrei Iancu. Also represented by MARY L.
KELLY, THOMAS W. KRAUSE, FARHEENA YASMEEN RASHEED.

Before DYK, TARANTO, and STOLL, *Circuit Judges*.

STOLL, *Circuit Judge*.

David John Fulton appeals from the final decision of
the Patent Trial and Appeal Board affirming the rejection
of certain claims in U.S. Patent Application No. 12/789,280
under 35 U.S.C. § 103. The rejected claims cover methods

of making a low-carbohydrate baked food product using egg-bound water and psyllium fiber instead of traditional flour. Because substantial evidence supports the Board's determination of obviousness, we affirm.

BACKGROUND

Sugar consumption is associated with a variety of health conditions, including obesity, diabetes, and heart disease. Conventionally, digestible starch in flour acts to bind or glue the fiber and protein components of baked foods when wetted. As a high-calorie digestible carbohydrate, however, starch can have a significant impact on blood glucose levels once consumed. By contrast, fiber-based flour does not quickly digest to glucose and does not require insulin to metabolize.

To address the need to reduce digestible starch consumption from baked foods, the '280 application describes and claims methods for making low-starch, high-fiber baked food products using controlled wetting, or hydration, of mucilaginous hydrocolloids such as psyllium. The application recognizes that replacing starch of traditional baking methods with partially wetted hydrocolloids and fiber allows for a significant reduction in glucose production and insulin secretion. The disclosed methods use liquid predominantly from eggs or other protein or fat source (i.e., bound water) along with a limited amount of free water to allow the dry ingredients to be mixed, shaped, and molded as traditional dough. The application also identifies certain problems with wheat glutes found in traditional flour and discusses the advantages of gluten-free baking.

Claim 22 is representative of the claims at issue in this appeal:

22. A method for producing a baked food product, comprising:

mixing dry components together to form a dry mix, wherein said dry mix comprises a fiber component

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and baking soda, wherein said fiber component constitutes about 30% to 65% by weight of said dry mix, wherein said fiber component is substantially free of digestible carbohydrate, *wherein said fiber component comprises psyllium fiber comprising ground psyllium husk, ground psyllium seed, or a mixture thereof, and wherein said fiber component is the only fiber component in said dry mix;*

mixing liquid components together to form a liquid mix, wherein said liquid mix comprises a liquid protein component and a fat component, wherein said liquid protein component comprises egg white or fresh whole egg;

blending said dry mix with said liquid mix to form a dough, wherein said dry mix or said liquid mix or both comprise one or more additives selected from the group consisting of processing aids, emulsifiers, leavening agents, flavoring agents, sweeteners, bracers, colors, preservatives and acidulants, *wherein proper hydration of said fiber is achieved by maintaining a fiber-to-water weight ratio in a range of 1:0.6 to 1:3 in said dough, wherein water from egg white or fresh whole egg or both provides over 90% of total water in said dough, and wherein said dough has a digestible starch content of 2% or less by weight and a digestible carbohydrate content of 4% or less by weight;* and

baking said dough without the use of yeast to allow an internal network to encapsulate hot gases released during the baking process to inflate said dough into a baked food product selected from the group consisting of a bread or muffin.

J.A. 27–28 (emphases added to disputed claim limitations).

After several exchanges between Mr. Fulton and the Examiner during seven years of prosecution, the Examiner

issued a final rejection of claims 22, 25–27, 30–33, 36, 39–43, and 45–50.¹ The Examiner rejected these claims under 35 U.S.C. § 103 as obvious in view of the combination of three prior-art references: Woestelandt², Zohoungbogbo³, and Malby⁴.

Woestelandt discloses a gluten-free bakery product made with 30–70% by weight gluten-free wheat flour and 30–70% by weight eggs. Woestelandt 2. Woestelandt explains that gluten-free products made by conventional methods using water and gluten-free flour would crumble because the water would not sufficiently bind the ingredients. *Id.* at 1, 3. Woestelandt addresses this problem by using egg as a binder, which doubled the volume of the dough. *Id.*

Zohoungbogbo discloses a flour comprising at least 50% protein, less than 15% carbohydrates (preferably less than 5%), and 35–50% plant fibers. Zohoungbogbo, Abstract; *see also id.* at col. 2 ll. 7–10. Zohoungbogbo teaches that its low-carbohydrate flour can be used as a substitute for wheat flour in the preparation of dietetic foods such as pasta, bread, bread sticks, bakery products, and pastries. *Id.* at Abstract, col. 1 ll. 18–21, col. 2 ll. 54–58, col. 3 ll. 44–45.

¹ Mr. Fulton asserts on appeal that “independent claims 22, 32, and 40 rise and fall together.” Appellant’s Br. 4. Though he addresses dependent claim 45 separately, he asserts that “the dependent claims (25–27, 30–31, 33, 36, 39, 40–41, 43, and 45–50) rise and fall with the independent claims.” *Id.* at 4–5.

² EP 0 642 737 A1. All citations to Woestelandt in this opinion are to the English translation cited by the Board.

³ U.S. Patent No. 6,322,826.

⁴ Patent Pub. No. U.S. 2007/0275121 A1.

Malby discloses a gluten-free bread made from eggs and gel-forming plant material such as psyllium fiber. Malby ¶¶ 14, 17. Malby teaches that varying the solid-to-liquid ratio of a mixture including psyllium affects whether a bread is “very light” and “highly porous” or “compact” and “finely-pored.” *Id.* ¶ 19. Malby also teaches that the use of psyllium eliminates both the need for “energetic agitation” of the mixture and the traditional fermentation step, i.e., proving or raising, before placing the final mixture in the oven for baking. *Id.* ¶¶ 19–20, 25.

The Examiner found that Woestelandt teaches most of the limitations of claim 22, but that because Woestelandt “discloses using whole wheat flour, which is known to contain about 11% fiber,” it does not “specifically disclose a low starch flour that has 30–65% fiber” as required by claim 22. J.A. 557. The Examiner found that Zohoungbogbo discloses a low-carbohydrate flour “that may be used as a substitute for wheat flour in preparing dietetic food products such as bread and other bakery products.” *Id.* The Examiner further found that a person of ordinary skill in the art would have substituted Woestelandt’s whole wheat flour with Zohoungbogbo’s low-carbohydrate flour when preparing a dietetic baked food product having a low-starch content. Based on the fiber and water contents of the food compositions reported in the two references, the Examiner calculated the fiber-to-water weight ratio of the resulting bakery product of “modified Woestelandt” to be 1:0.64 to 1:0.91, which falls within the claimed range. J.A. 558.

The Examiner next found that though neither Woestelandt nor Zohoungbogbo discloses psyllium fiber, Malby teaches this claim limitation. Specifically, the Examiner cited Malby’s disclosure of the “remarkable ability of psyllium fiber to swell and rapidly form mucilage on addition of water,” whereby the “water content of the mucilage formed can be highly varied while maintaining the viscous gel rheology.” *Id.* (citing Malby ¶ 17). The Examiner concluded that it would have been obvious to use psyllium

fiber as the plant fiber in modified Woestelandt “to obtain the benefits of varied water content that is needed in making baked products of different textual characteristics, and to simplify and economize the manufacturing process by eliminating an energetic agitation step, in baked products made without proving or fermentation” as expressly taught by Malby. J.A. 558–59.

The Board affirmed the Examiner’s rejection of claims 22, 25–27, 30–33, 36, 39–43, and 45–50. *Ex parte Fulton*, No. 2018-008840, slip op. at 14 (P.T.A.B. July 26, 2019) (*Decision*). As to claim 22, the Board concluded that the record supported the Examiner’s finding of a motivation to combine Woestelandt and Zohoungbogbo. The Board also rejected Mr. Fulton’s argument that because psyllium fiber behaves unpredictably when combined with water, a skilled artisan would have lacked a reasonable expectation of success in substituting Malby’s psyllium fiber in Woestelandt’s process (as modified by Zohoungbogbo). The Board found that Malby demonstrates that hydrating psyllium fiber was known and could be controlled to vary the texture and consistency of the bread, and that in light of the advantageous properties of psyllium disclosed in Malby, a skilled artisan would have been motivated to use psyllium. As to the recited fiber and water content limitations in claim 22, the Board concluded that “Malby’s disclosure demonstrates the water content of a psyllium/water mixture is a result-effective variable, the optimum ranges of which would have been discoverable through routine experimentation.” *Id.* at 11 (citing *In re Applied Materials, Inc.*, 692 F.3d 1289, 1297 (Fed. Cir. 2012)).

Finally, the Board concluded that the record supported the Examiner’s rejection of claim 45. Claim 45 depends from claim 22 and further recites “before baking said dough, partially wetting the fiber component, but not to the extent that the fiber component reaches a gel stage.” J.A. 32. The Board found that Woestelandt’s process of mixing a gluten-free flour with egg without adding free

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water was “substantially identical to [Mr. Fulton’s] process of providing water mainly from a protein source (e.g., eggs) so fibers of a dough are hydrated mainly by bound water.” *Decision*, slip op. at 13. Mr. Fulton filed a request for rehearing, which the Board denied.

Mr. Fulton appeals. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A).

DISCUSSION

We review the Board’s legal determinations de novo, *In re Elsner*, 381 F.3d 1125, 1127 (Fed. Cir. 2004), and its fact findings for substantial evidence, *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). Substantial evidence is “such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” *OSI Pharm., LLC v. Apotex Inc.*, 939 F.3d 1375, 1381 (Fed. Cir. 2019) (quoting *Consol. Edison Co. v. N.L.R.B.*, 305 U.S. 197, 229 (1938)). Obviousness is a question of law based on underlying findings of fact. *Id.* at 1382 (citing *In re Kubin*, 561 F.3d 1351, 1355 (Fed. Cir. 2009)). “An obviousness determination requires finding that a person of ordinary skill in the art would have been motivated to combine or modify the teachings in the prior art and would have had a reasonable expectation of success in doing so.” *Id.* (quoting *Regents of Univ. of Cal. v. Broad Inst., Inc.*, 903 F.3d 1286, 1291 (Fed. Cir. 2018)). “Whether a person of ordinary skill in the art would have been motivated to modify or combine teachings in the prior art, and whether he would have had a reasonable expectation of success, are questions of fact.” *Id.* (quoting *Regents of Univ. of Cal.*, 903 F.3d at 1291)).

Substantial evidence supports the Board’s finding that a person of ordinary skill in the art would have modified Woestelandt in view of Zohoungbogbo and Malby to arrive at a baked food product containing psyllium-fiber flour. Woestelandt discloses a bread product made from essentially the same ingredients as the claimed invention,

including egg as a binder and water source, except that it uses wheat flour instead of a low-carbohydrate, psyllium-fiber flour. Woestelandt 2. Zohoungbogbo discloses a baking flour composed of 35–50% plant fibers and advantageously less than 5% carbohydrates, and teaches that its low-carbohydrate, plant-fiber flour is a desirable substitute for wheat flour to prepare low-carbohydrate dietetic baked goods. Zohoungbogbo, Abstract, col. 1 ll. 18–21, col. 2 ll. 7–10, 54–58, col. 3 ll. 44–45. These teachings support the Board’s determination that a skilled artisan would have found it obvious to substitute the wheat flour in Woestelandt with the plant-based flour in Zohoungbogbo in preparing a low-carbohydrate dietetic baked product.

Moreover, though neither Woestelandt nor Zohoungbogbo specifically discloses the use of psyllium as a plant fiber, Malby discloses a gluten-free bread made with egg and psyllium fiber. Malby’s teachings regarding the beneficial properties of psyllium support the Board’s finding that an ordinarily skilled artisan would have substituted the plant fiber in Woestelandt (as modified by Zohoungbogbo) with psyllium plant fiber for the reasons suggested by Malby. Furthermore, Malby’s teaching that varying the solid-to-liquid ratio of a mixture including psyllium affects whether a bread is light and porous or compact and finely pored supports the Board’s finding that hydration of psyllium is a result-effective variable, and thus that the limitation “a fiber-to-water weight ratio in a range of 1:0.6 to 1:3” would have been discovered with routine experimentation. Malby ¶ 19; *see also Applied Materials*, 692 F.3d at 1295 (“[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.” (quoting *In re Aller*, 220 F.2d 454, 456 (CCPA 1955))); *In re Boesch*, 617 F.2d 272, 276 (CCPA 1980) (“[D]iscovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art.” (citations omitted)). Thus, the Board did not err in

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concluding that it would have been obvious to optimize compositions comprising psyllium fiber to obtain a baked food product with a desired texture and consistency as claimed.

On appeal, Mr. Fulton challenges several of the Board's factual findings. For instance, Mr. Fulton contends that Zohoungbogbo does not teach or suggest a gluten-free flour and, thus, a skilled artisan would not have used Zohoungbogbo's fiber-based flour as a substitute for Woestelandt's gluten-free wheat flour. In particular, Mr. Fulton explains that each of Zohoungbogbo's examples are of a flour composition containing wheat gluten or wheat germ. He also argues that while Zohoungbogbo "mentions a wide variety of potential flour *ingredients*, it does not describe or suggest the desirability of making any gluten-free *flour* with any of these ingredients." Appellant's Br. 24 (citation omitted).

Contrary to Mr. Fulton's argument, Zohoungbogbo discloses the use of rice germ as one source of protein other than wheat gluten. Zohoungbogbo col. 2 ll. 35–40. The Board agreed with the Examiner that Zohoungbogbo discloses protein sources other than gluten, including rice, and Mr. Fulton does not dispute that rice flour is gluten-free. Moreover, his argument regarding the gluten content of Zohoungbogbo's flour also misses the mark, as the point of the Examiner's combination was to substitute Zohoungbogbo's low-carbohydrate, plant-fiber-based flour in place of Woestelandt's wheat flour. Although Zohoungbogbo's specific working examples may not have used gluten-free flour, the evidence supports the Board's finding that Zohoungbogbo's teachings as a whole would have motivated skilled artisans to make this substitution.

Mr. Fulton also contends that Woestelandt and Malby teach "incompatible" baking techniques, and that a person of ordinary skill would not have substituted Malby's psyllium for the plant fiber in Woestelandt (as modified by

Zohoungbogbo). Appellant’s Br. 32. In his view, there is no evidence that the beneficial properties of psyllium disclosed in Malby, which used large quantities of free water, could be achieved using the egg-bound water technique of Woestelandt. Mr. Fulton further contends that Malby “denies that the[] processing efficiencies [of using psyllium] could be achieved using the egg-only procedure taught in Woestelandt.” *Id.* at 31–32 (citing Malby ¶ 25).

We disagree. The Board found that Mr. Fulton had not cited “any evidence or persuasive technical reasoning demonstrating that substituting Malby’s psyllium fiber for the plant fiber in Zohoungbogbo’s flour would alter the fiber-to-water ratio the Examiner ha[d] determined.” *Decision*, slip op. at 11. On appeal, Mr. Fulton likewise fails to cite anything in the record that undermines the Board’s factual findings that the benefits taught by Malby would apply in the asserted combination. As the Examiner and the Board recognized, Malby teaches that egg can be used as a primary source of water in a psyllium-fiber mixture. Although Malby discloses examples using varying amounts of free water, it does not require the use of free water to obtain psyllium’s benefits. Malby ¶¶ 27–35. Moreover, in citing Woestelandt, Malby merely explains that agitation may be required for certain mixtures containing egg; it does not disparage the use of egg in a psyllium-fiber mixture. *See id.* ¶ 25.

Lastly, substantial evidence supports the Board’s findings as to claim 45. Mr. Fulton argues that claim 45 would not have been obvious in view of Woestelandt because Woestelandt does not mention any “gel stage.” The Board found, however, that Woestelandt’s use of bound water from egg instead of free water allows its flour fibers to be hydrated in a controlled fashion, thus satisfying the limitation of partially wetting the fibers without those fibers reaching a gel stage. Though Mr. Fulton contends that the Board erred in relying on the teachings in Mr. Fulton’s ’280 application to support its findings, the Board was

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merely explaining that Woestelandt's process and the claimed process were substantially identical. The Board did not rely on hindsight in its finding.

CONCLUSION

We have considered Mr. Fulton's remaining arguments but find them unpersuasive. Accordingly, the decision of the Board is affirmed.

AFFIRMED

COSTS

No costs.