

NOTE: This disposition is nonprecedential.

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

LYTONE ENTERPRISE, INC.,
Appellant

v.

AGROFRESH SOLUTIONS, INC.,
Appellee

2022-2269

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2021-00451.

Decided: July 12, 2024

CASEY KRANING, Fish & Richardson P.C., Wilmington, DE, argued for appellant. Also represented by NITIKA GUPTA FIORELLA; JOHN A. DRAGSETH, Minneapolis, MN.

RAYMOND NIMROD, Quinn Emanuel Urquhart & Sullivan, LLP, New York, NY, argued for appellee. Also represented by JEFFREY GERCHICK, JARED WESTON NEWTON, Washington, DC.

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Before LOURIE, BRYSON, and REYNA, *Circuit Judges*.

LOURIE, *Circuit Judge*.

Lytone Enterprise, Inc. (“Lytone”) appeals from the final written decision of the U.S. Patent and Trademark Office Patent Trial and Appeal Board (“the Board”) holding that claims 3 and 11 of U.S. Patent 6,897,185 (“the ’185 patent”) are unpatentable for obviousness over the asserted prior art. *AgroFresh Sols., Inc. v. Lytone Enter., Inc.*, No. IPR2021-00451 (P.T.A.B. July 25, 2022), J.A. 1–42 (“*Decision*”). For the following reasons, we *affirm*.

BACKGROUND

This appeal pertains to an *inter partes* review (“IPR”) in which AgroFresh Solutions, Inc. (“AgroFresh”) challenged claims 1–9 and 11–15 of the ’185 patent, which recite tablet formulations for counteracting the ethylene response in plants that is involved in the ripening of fruits, the senescence of flowers, and the abscission of leaves. Lytone disclaimed claims 1, 2, 4–10, and 12–15 shortly before the petition was filed; thus IPR was instituted only as to dependent claims 3 and 11. Claim 3 depends indirectly from claim 1 through claim 2 as follows:

1. An effervescent tablet dosage comprising an agent for blocking the ethylene binding site in plants and an effervescent ingredient, in admixture with one or more acceptable carriers and/or excipients.
2. The tablet dosage of claim 1, wherein the agent for blocking the ethylene binding site in plants is selected from the group consisting of cyclopropene, 1-methylcyclopropene, 3,3-dimethylcyclopropene, methylenecyclopropane, diazocyclopentadiene, trans-cyclooctene, cis-cyclooctene, and 2,5-norbornadiene, the derivatives thereof, and the mixtures thereof.

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3. The tablet dosage of claim 2, wherein the agent for blocking the ethylene binding site in plants is 1-methylcyclopropene.

'185 patent, col. 6, ll. 11–23 (emphases added). Claim 11 depends from claim 1 and further recites that the agent for blocking the ethylene binding site in plants is released in a gaseous form. *Id.* at col. 6, ll. 48–50.

Only the second and third grounds of unpatentability that AgroFresh raised in its petition are relevant to this appeal. In Ground 2, AgroFresh asserted that claims 3 and 11 would have been obvious over a Japanese patent application (“Hisano”)¹ in view of a U.S. patent (“Daly”)². In Ground 3, AgroFresh asserted that claims 3 and 11 would have been obvious over Daly in view of Hisano.

Hisano teaches an “effervescent tablet preparation for keeping cut flower freshness . . . comprised of carbonate and water-soluble solid acid.” J.A. 810. The tablet, which is placed in the water of the fresh-cut flowers, can further include a non-chlorine-based component such as silver thiosulfate (“STS”) or an ethylene suppression agent. *Id.* at 810–11. Daly is also directed to blocking the ethylene receptor sites of plants. *Id.* at 815. Daly notes that STS was a known compound for such a purpose, but that it had a “serious waste disposal problem” and thus that there was a “great desire” to find an alternative to STS. *Id.* at 816. Daly teaches that 1-methylcyclopropene (“1-MCP”) is an effective blocking agent and that it may be stabilized via molecular encapsulation in cyclodextrin. *Id.* at 816–17. As Daly explains, the resulting powder comprising the “caged” 1-MCP may be activated by “simply adding water” to release the 1-MCP from its cyclodextrin cage. *Id.* at 817.

¹ Hisano *et al.*, translation of Japanese Patent Application Publication No. H6-183903; J.A. 810–13.

² U.S. Patent 6,017,849; J.A. 815–26.

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In its Final Written Decision, the Board found that AgroFresh had established the unpatentability of claims 3 and 11 on both grounds. Lytone appealed.

We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A) and 35 U.S.C. § 141(c).

DISCUSSION

We review the Board’s legal determinations *de novo*, *In re Elsner*, 381 F.3d 1125, 1127 (Fed. Cir. 2004), and the Board’s factual findings for substantial evidence, *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). A finding is supported by substantial evidence if a reasonable mind might accept the evidence as adequate to support the finding. *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938).

An obviousness inquiry begins with an assessment of the differences between the asserted prior art and the challenged claims. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17 (1966). Here, Lytone conceded that the asserted references Hisano and Daly disclose each and every limitation of the challenged claims. *Decision* at 19 (“Patent Owner does not dispute that the combination of Hisano and Daly teaches the claim limitations recited in claims 3 and 11.”).³ In particular, as Lytone concedes, over a year before the ’185 patent was filed, a product known as EthylBloc came onto the market. In Lytone’s own words: “EthylBloc uses a ‘caged’ form of 1-MCP, in which each individual gas molecule of 1-MCP is molecularly encapsulated (or

³ Despite that concession, in its appeal brief, Lytone asserted that: “Neither reference, alone or in combination, discloses the claimed invention.” Appellant’s Br. at 8. Because of its concession before the Board, that argument is waived. *Microsoft Corp v. Biscotti, Inc.*, 878 F.3d 1052, 1074–75 (Fed. Cir. 2017). And Lytone has presented no clear argument on appeal to otherwise support such a position.

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trapped) inside a cyclodextrin carrier molecule. The result is a powder that can be dissolved in solvents to release the 1-MCP gas.” Appellant’s Br. at 4–5 (citations omitted). Lytone further concedes that “1-MCP falls in the category of ethylene-receptor blocking agents.” *Id.* The only difference between the EthylBloc product described in Daly and the subject matter of the challenged claims is that the claims recite an effervescent tablet while Daly’s EthylBloc is a powdered solid. Thus, the only alleged discovery disclosed in the ’185 patent is simply “that caged 1-MCP could be incorporated into an effervescent tablet.” *Id.* at 6. Hisano teaches effervescent tablets, as well as their use for promoting plant freshness via incorporation of an ethylene-blocking agent. That ethylene-blocking agent is then freed upon contact with water, much like Daly’s caged 1-MCP. *See Decision* at 14–16.

On appeal, Lytone raises issues pertaining only to the sufficiency of the Board’s analyses of motivations to combine and reasonable expectations of success in formulating Daly’s caged 1-MCP, which was expressly taught to be a useful ethylene-blocking agent for promoting plant freshness, into Hisano’s effervescent tablets, which were expressly taught to be useful for delivering an ethylene-blocking agent for promoting plant freshness. In particular, Lytone asserts that the Board impermissibly based its obviousness findings on an obvious-to-try rationale and failed to sufficiently evaluate reasonable expectation of success. We address each argument in turn.

I

Lytone asserts that the Board erred in its analysis of whether or not a person of ordinary skill in the art would have had a motivation to combine the teachings of Hisano and Daly to arrive at the claimed invention. In particular, Lytone contends that the Board legally erred by allegedly relying solely on an “obvious-to-try” theory to reach its conclusions of obviousness.

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The Board used the word “try” three times in its analysis. It first stated that “the ordinarily skilled artisan would have looked at Hisano as an analogous reference and would have been *motivated to try* scaling up its smaller-scale solution of effervescent tablets for delivery on a larger scale than single flower vases.” *Decision* at 25 (emphasis added). It next explained that “Daly’s teaching of using a cyclodextrin cage-stabilized and powdered version of 1-MCP to inhibit ethylene binding in plants would have *motivated the skilled artisan to try* this stabilized version in Hisano’s effervescent tablet preparation because of the benefits of effervescent ingredients for dissolution and dispersion, to treat plants on a larger scale.” *Id.* at 26 (emphasis added). It thereafter noted that it was persuaded that “the skilled artisan would have viewed [a] disclosure in Daly as *an invitation to try* use of an effervescent compound as taught by Hisano.” *Id.* at 28 (emphasis added).

Those uses of the word “try” do not establish legal error. Indeed, *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), confirmed that obvious-to-try rationales may be relied upon to support obviousness. *Id.* at 421 (“[T]he Court of Appeals [] conclude[d], in error, that a patent claim cannot be proved obvious merely by showing that the combination of elements was obvious to try.” (cleaned up)). As explained by the Supreme Court:

When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.

Id. at 421. Such is the case here.

Lytone argues that the obvious-to-try solution was not “predictable” because “caged 1-MCP technology was new,

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and there was no evidence that a skilled artisan would have reasonably expected the proposed Hisano-Daly combination would result in a tablet that actually released 1-MCP gas.” Appellant’s Br. at 23. We disagree. Obviousness has never required “absolute predictability of success.” *In re O’Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988). Rather, “all that is required is a reasonable expectation of success.” *Id.* at 904. And, as the Board held, “1-MCP, as among a finite number of known compounds, would have been the substitution of one known element, STS, for another, 1-MCP, that yields predictable results.” *Decision* at 22. That combination led to the anticipated success, which was not a product of innovation, but of ordinary skill and common sense. *See KSR*, 550 U.S. at 417 (describing the unpatentability of “the predictable use of prior art elements according to their established functions”).

Moreover, the Board’s analysis was not limited to the three sentences that include the word “try.” Rather, as the Board discussed at length, it further found:

that the artisan would have been motivated to combine the teachings of Hisano and Daly because of 1) Daly’s teaching that STS is problematic for use in inhibiting ethylene in plants due to difficulties in silver waste byproduct disposal, leading to “a great desire among postharvest physiologists to find alternatives to STS”; 2) Daly’s teachings that cyclopropene and its derivatives, including 1-MCP, are “commercially acceptable replacement[s] for STS” and that powder complexes provide advantages over compressed gases for safety and control; and 3) Hisano’s teaching that an ethylene suppressing agent could be delivered via an effervescent tablet, which when dissolved in water, creates “generated carbonic acid gas [that] will promote assimilation action, which will be effective for cultivating, and preserving the freshness of, the cut flowers (plants).”

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Decision at 26–27 (citations omitted).

The Board also correctly noted that nothing in Hisano teaches away or provides reasons to not combine its effervescent tablets with Daly’s caged 1-MCP, finding that: “Hisano makes no statements restricting its use to cut flowers and [instead] suggests broader application including use of alternative ethylene suppression agents including STS with effervescent tablets.” *Id.* at 24.

The Board further directly addressed Lytone’s contention that Hisano “does not contemplate inclusion of a gaseous agent within the tablet” and that “every freshness preserving agent disclosed in Hisano is a local-acting solid or liquid, not a gas.” *Decision* at 22. As the Board correctly explained, an obviousness inquiry must consider “the inferences that the skilled artisan would have drawn from the totality of the teachings of the art at the time of the invention.” *Id.* at 23–24. It then held that “because Daly suggested the molecularly encapsulated 1-MCP could be made in powder form, which is the form Petitioner suggested for use in the proposed obviousness combination, we are not persuaded by Patent Owner’s arguments regarding concerns [that] the skilled artisan would have had about working with 1-MCP gas that is released into the atmosphere where the atmosphere becomes the treatment medium as opposed to a liquid medium.” *Id.* at 25 (citations omitted). We too are not persuaded by Lytone’s arguments that the Board’s conclusions regarding incorporating the caged 1-MCP into Hisano’s effervescent tablets were not supported by substantial evidence. *See, e.g.*, J.A. 811, 816; *Decision* at 20, 26.

We thus see no error in the Board’s analysis of motivations to combine and find its underlying factual findings to be supported by substantial evidence.

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Lytone next asserts that the Board legally erred by allegedly refusing to consider if the proposed prior art combinations would have worked for the alleged intended purpose of treating plants on a large scale. *See Decision* at 39–40; *see also id.* at 24, 33–35. AgroFresh responds that the Board properly found that the claimed invention is not limited to treating large quantities of plants and that the claims do not require a particular effectiveness level or other measure of ethylene-blocking to be achieved. Appellee’s Br. at 42–43. We agree with AgroFresh.

The Board held that the skilled “artisan would have had a reasonable expectation of success in making the subject matter of claims 3 and 11, which do not recite a specific amount of release of active agent or require application to large-scale crops.” *Decision* at 39–40. Similarly, the Board correctly noted that “[c]laims 3 and 11 recite a tablet dosage containing an effervescent ingredient and an agent ‘for blocking the ethylene binding site in plants,’ but require no effectiveness level or other measure of the blocking action to be achieved.” *Id.* at 24; *see also id.* at 39–40 (incorporating that holding into its Ground 3 analysis).

Lytone nevertheless argues that the record does not support a finding that 1-MCP would have been effectively released once tableted. We disagree. Daly expressly teaches that the “application or delivery methods of [the 1-MCP] active compounds can be accomplished by simply adding water to the molecular encapsulation agent complex.” J.A. 817; *see also Decision* at 15–16. And, as explained by the Board, record evidence established that effervescent tablet preparations allowed for improved control over the release of active ingredients through dissolution and dispersion. *Decision* at 19–20. Lytone also admitted that “[t]ablets can be metered easily and, when exposed to water, dissolve rapidly, which allows the caged 1-MCP to release into the atmosphere without any manual mixing.” Appellant’s Br. at 6. The Board’s finding that a person of ordinary skill in the art would have had a

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reasonable expectation of success was therefore supported by substantial evidence.

Lytone also argues that the Board refused to consider evidence or various arguments regarding reasonable expectation of success. In particular, Lytone maintains that the Board erred by disregarding a non-prior art reference, U.S. Patent 6,762,153 (“the ’153 patent”),⁴ as contemporaneous evidence of non-obviousness. The ’153 patent, which was allegedly filed by a predecessor of a petitioner-in-interest, states that:

1-[M]ethylcyclopropene release from larger quantities of powder can be very slow and incomplete, sometimes taking days. This is especially true for the large quantity of powdered complex needed to treat full-scale fruit storage rooms. Stirring the powder/water mixture does not appreciably speed up 1-methylcyclopropene release when large quantities of the complex are involved.

J.A. 1698.

According to Lytone, the Board erred by disregarding that teaching as well as our holding in *Arctic Cat Inc. v. Bombardier Recreational Products Inc.*, 876 F.3d 1350 (Fed. Cir. 2017), that an unclaimed concern or risk may be relevant to a finding that a skilled artisan might have been dissuaded from pursuing a particular route of inquiry. *Id.* at 1362–63. We disagree.

The Board did not ignore the ’153 patent. Rather, it noted that Lytone had failed to cite case law requiring it to “hold the actions of a predecessor of a petitioner in interest against the petitioner.” *Decision* at 23. That is, the Board expressly declined to treat the disclosures in the ’153 patent as admissions that a person of ordinary skill in the art

⁴ J.A. 1697–1702.

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would have doubted that caged 1-MCP could be effectively released from the proposed tableted dosage form. We see no error in that holding.

Moreover, the Board need not have provided an additional express explanation why that non-prior-art disclosure was insufficient to refute the weight of evidence supporting its conclusion of obviousness. *Novartis AG v. Torrent Pharms. Ltd.*, 853 F.3d 1316, 1328 (Fed. Cir. 2017) (“The Board is not required to address every argument raised by a party or explain every possible reason supporting its conclusion.” (cleaned up)); *see also Shoes by Firebug LLC v. Stride Rite Children’s Grp., LLC*, 962 F.3d 1362, 1371 (Fed. Cir. 2020) (“[I]t is not for us to second-guess the Board’s assessment of the evidence.” (quoting *Velandier v. Garner*, 348 F.3d 1359, 1378 (Fed. Cir. 2003))).

Lytone misunderstands *Arctic Cat* in asserting otherwise. *Arctic Cat* evaluated a jury verdict finding that a defendant had not established obviousness by clear and convincing evidence. The court first held that “[e]vidence suggesting reasons to combine cannot be viewed in a vacuum apart from evidence suggesting reasons not to combine.” 876 F.3d at 1363. The court then held that, where the reference that had been relied upon to support a motivation to combine further disclosed reasons not to combine, and where there was “testimony confirming the potential problems” described in that prior art reference, “a jury could find a skilled artisan would not have been motivated to combine” the asserted prior art “to arrive at the claimed combination.” *Id.* But here, Lytone asks us to review a Board decision finding that AgroFresh established by a preponderance of the evidence that a person of ordinary skill in the art would have had a reasonable expectation of success in arriving at the claimed combination. And unlike in *Arctic Cat*, the primary references that were relied upon to establish that element of obviousness do not teach the alleged concerns that Lytone suggests.

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Moreover, mere contradictory evidence is insufficient to overturn a finding of fact. *Velandar*, 348 F.3d at 1378–79 (“If the evidence will support several reasonable but contradictory conclusions, we will not find the Board’s decision unsupported by substantial evidence simply because the Board chose one conclusion over another plausible alternative.”). Even if that were not the case, the cited disclosure in the ’153 patent would be insufficient to do so, as the alleged concern is only (1) that the release process may be “slow” and “incomplete,” yet, as the Board recognized, the claims do not require a particular level or efficiency of release, *see Decision* at 33 (holding that “no effectiveness or release level is recited”) and (2) that those properties are “particularly true for the large quantity of powdered complex needed to treat full-scale fruit storage rooms,” yet the claims do not require a particular scale of application, *id.* at 40 (holding that the claims do not “require application to large-scale crops”).

We thus see no error in the way in which the Board addressed or weighed the evidence of record.

In view of the above, we affirm the Board’s determination that AgroFresh established by a preponderance of the evidence that claims 3 and 11 would have been obvious in view of the asserted prior art.

CONCLUSION

We have considered Lytone’s remaining arguments and do not find them persuasive. For the foregoing reasons, we *affirm* the Board’s determination in IPR2021-00451 that claims 3 and 11 of the ’185 patent are unpatentable.

AFFIRMED