NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

MANUFACTURING RESOURCES INTERNATIONAL, INC.,
Appellant

v.

JOHN A. SQUIRES, UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE,
Intervenor

2024-2228, 2024-2229

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2023-00199, IPR2023-00220.

Decided: March 31, 2026

JOHN C. ALEMANNI, Kilpatrick Townsend & Stockton LLP, Raleigh, NC, argued for appellant. Also represented by CARL SANDERS; MATTHEW MEYER, Menlo Park, CA; MICHAEL T. MORLOCK, DAVID A. REED, Atlanta, GA.

FAHD H. PATEL, Office of the Solicitor, United States Patent and Trademark Office, Alexandria, VA, argued for

intervenor. Also represented by PETER J. AYERS, NICHOLAS THEODORE MATICH, IV, ROBERT J. MCMANUS, MICHAEL TYLER.

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

TARANTO, *Circuit Judge*.

Manufacturing Resources International, Inc., (MRI) owns U.S. Patent Nos. 8,854,595 and 9,173,322, which describe and claim cooling systems for electronic displays. The patented cooling systems use a "constricted convection plate" to keep cool air flowing across the back of a hot display surface. Samsung Electronics Co. successfully petitioned the Patent and Trademark Office (PTO) to institute inter partes reviews (IPRs) of claims 1, 4, 7, and 8 of the '595 patent and claims 1–5, 7–13, and 16 of the '322 patent on obviousness grounds. The PTO's Patent Trial and Appeal Board (Board) found, as relevant here, that the prior art discloses a constricted convection plate and that MRI's objective-indicia evidence was entitled to little weight, and, as a result, the Board held all challenged claims unpatentable. *Samsung Electronics Co. v. Manufacturing Resources International, Inc.*, No. IPR2023-00199 (P.T.A.B. June 18, 2024); *Samsung Electronics Co. v. Manufacturing Resources International, Inc.*, No. IPR2023-00220 (P.T.A.B. June 18, 2024). MRI appeals. We affirm.

I

The '322 patent issued from a continuation application of the application that issued as the '595 patent, so the two patents share a specification. '322 patent, col. 1, lines 7–9. The patents, both titled "Constricted Convection Cooling System for an Electronic Display," describe a problem of removing heat from displays, especially large displays exposed to sunlight, and a prior-art solution of "cool[ing the] entire interior of the display" by using fans to move air "through as many sidewalls of the display as possible." '595

patent, col. 1, line 52, through col. 2, line 29. The patents assert that better cooling is achievable by instead inducing "constricted convection" immediately behind the display surface. *Id.*, col. 2, lines 30–59.

Constricted convection, as the name implies, results from reducing the space available for airflow and moving air through the resulting narrow space, which the patents term a "constricted convection channel." *Id.*, col. 4, line 66, through col. 5, line 21. The constricted convection channel is defined on one side by the hot "posterior display surface" and on an opposite side by a "constricted convection plate" that restricts the depth of the space for airflow to a few inches or less. *Id.* The constricted convection plate may have "access apertures," *i.e.*, holes, which may "allow access to hardware found on the display posterior" and which "may be plugged before operation [of the cooling system] to maintain directed contact between" the cool air moving through the channel and the posterior display surface. *Id.*, col. 5, lines 6–12.

Claim 1 of the '595 patent is illustrative for purposes of the main issue presented to us regarding both patents:

> 1. A system for cooling an electronic display having a posterior display surface and contained within a housing, the system comprising:
>
> **a constricted convection plate** placed posterior to the posterior display surface;
>
> two side panels placed adjacent to the constricted convection plate and the posterior display surface, defining a constricted convection channel having an entrance and an exit; and
>
> a fan placed to draw air from outside of the housing through the constricted convection channel.

Id., col. 9, line 63, through col. 10, line 6 (emphasis added). Each independent claim—claims 1, 4, and 9 of both

patents—has a relevantly similar "constricted convection plate" limitation. The '595 patent's claim 8, which depends on claim 4, presents an additional issue based on its limitation concerning access apertures:

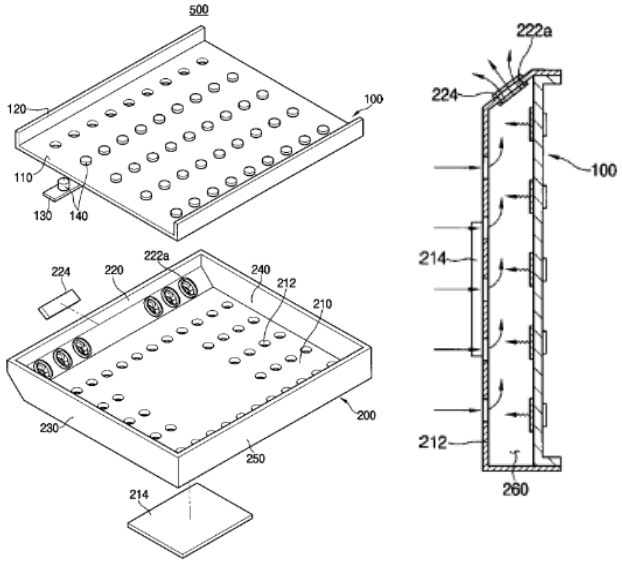
> 8. The [liquid crystal display] from claim 4 further comprising:
>
> a plurality of access apertures through the constricted convection plate.

Id., col. 10, lines 38–40.

In late 2022, Samsung petitioned the PTO to institute two IPRs, one for each patent, seeking cancellation on obviousness grounds of '595 claims 1, 4, 7, and 8 and '322 claims 1–5, 7–13, and 16. J.A. 1, 79; *see* J.A. 194, 198. As relevant here, Samsung argued that each of two prior-art references—Kim, which is U.S. Patent No. 7,800,706, and Na, which is unexamined Korean Patent Application Publication No. 10-2006-0016469—discloses the claimed "constricted convection plate." *See* J.A. 34–40, 93–98, 114–17. The Board, on behalf of the PTO's Director, instituted both IPRs in June 2023. J.A. 194, 198.

The first of the references, Kim, describes a display with a backlight and, behind the backlight, a "cooling fan unit that is combined to [a] shield cover." J.A. 1692, Abstract. The shield cover has "a plurality of air slits through which air generated by the cooling fan unit comes in and out." J.A. 1699, col. 2, lines 12–15. Samsung argued to the Board that the shield cover constitutes a constricted convection plate (as claimed by MRI) because Kim says that the shield cover "may be formed in diverse shapes such that the flowing air . . . can be efficiently guided." *See* J.A. 116–17 (quoting J.A. 1700, col. 4, lines 61–63).

The second reference, Na, describes a backlight for a liquid crystal display. J.A. 1721. The backlight has a collection of light-emitting diodes, which generate heat. J.A. 1725. To dissipate the heat, Na teaches using fans to move air through an "inner space" behind the backlight, defined by a "bottom plate" and "sidewalls"; "air is introduced into the inner space [ ] through [ ] through-holes," as shown in Na's Figures 1 (below, left) and 3 (below, right). J.A. 1725, 1733–34.



Samsung argued to the Board that the bottom plate (element 210) constitutes a constricted convection plate as claimed by MRI, J.A. 590–97, 1086–87, and that the through-holes (elements 212) constitute the MRI-claimed access apertures, J.A. 617–18. Although Na's figures depict through-holes in the bottom plate, the written description says that "through-holes may be further formed in the first to fourth sidewalls, *or may be formed only in the first to fourth sidewalls*." J.A. 1725, 1726 (emphasis added); J.A. 1727 (similar). Based on that disclosure, Samsung argued that a relevant artisan would have understood Na to disclose an embodiment where the bottom plate has no

holes, which also teaches the claimed constricted convection plate. J.A. 592–93, 1317.

MRI, in response, argued that Na's through-holes and Kim's air slits would prevent constricted convection. J.A. 752–56, 1249, 1257. Further, MRI contended that even an embodiment of Na without through-holes in the bottom plate would not create constricted convection and, regardless, that a relevant artisan would not understand Na to teach such an embodiment. J.A. 755–56, 862–63, 1369–70.

MRI also attempted to show the nonobviousness of the challenged claims with objective indicia. It alleged that, before the creation of MRI's patented cooling system, there had been a long-felt need for large displays capable of effectively dissipating heat when used outdoors, and that Samsung had tried to develop displays to meet that need, but its efforts were both technically flawed and commercially unsuccessful. *See* J.A. 764–67, 1277–1280. MRI added that, after the invention of the patented cooling systems, a Samsung employee praised MRI's accomplishments as "impressive and unique," and others in the industry licensed the patents. J.A. 773–74, 1289–90. MRI also asserted that Samsung, rather than take a license, acquired patent-practicing displays, tore them down to learn how they worked, copied the cooling system, and deployed infringing products that enjoyed immediate commercial success. J.A. 767–73, 1280–89.

The Board issued two final written decisions in June 2024, each holding all challenged claims unpatentable. J.A. 1, 78. The Board found that both Na and Kim disclose the claimed constricted convection plate, crediting Samsung's expert's testimony. J.A. 30–40, 93–98, 114–17. The Board also found that Na discloses the constricted convection plate with access apertures required by claim 8 of the '595 patent. J.A. 72–73. As to objective indicia, the Board assigned MRI's evidence "little or no weight." J.A. 58; *see* J.A. 135–50. It found that Samsung did not copy the

invention because Samsung had completely designed the allegedly infringing products' cooling system before the asserted tearing down of a patent-practicing display. J.A. 48–50, 141–43. For the rest of MRI's objective-indicia evidence, the Board determined that MRI had not established a nexus to the claims. *See* J.A. 42–57, 135–49.

MRI timely appealed from both final written decisions. We consolidated the appeals, and Samsung thereafter notified us of its nonparticipation in the case. The Director timely intervened as of right to defend the Board's decisions. *See* 35 U.S.C. § 143. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A) and 35 U.S.C. §§ 141(c), 319.

II

We review the Board's legal determinations without deference and its factual findings for substantial-evidence support. *Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1001 (Fed. Cir. 2023). Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion," *Consolidated Edison Co. v. National Labor Relations Board*, 305 U.S. 197, 229 (1938), which may be present even if an opposite resolution of the issue might also be supportable, *Consolo v. Federal Maritime Commission*, 383 U.S. 607, 619–20 (1966).

Claim construction based only on intrinsic evidence is a question of law. *Teva Pharmaceuticals USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 330–31 (2015). Obviousness is an issue of law whose resolution depends on underlying findings of fact. *Quanergy Systems, Inc. v. Velodyne Lidar USA, Inc.*, 24 F.4th 1406, 1414 (Fed. Cir. 2022). "These facts include the scope and content of the prior art and any objective indicia of nonobviousness." *Id.* at 1414.

The issues presented by MRI's appeal fall into two categories. First, MRI makes several arguments about the claimed constricted convection plate. Second, MRI asserts

error in the Board's giving little weight to objective indicia. We reject MRI's challenges.

A

With respect to the constricted convection plate required by all claims at issue, MRI challenges the Board's findings that each of Na and Kim discloses that element. MRI Opening Br. at 29–36, 62–65. With respect to claim 8 of the '595 patent, which requires a constricted convection plate with access apertures, MRI argues that the Board's finding that the limitation is taught by Na rests on an erroneous claim construction and is inconsistent with the Board's other reasoning. *Id.* at 58–61. We disagree with MRI in both respects.

1

The Board properly found that each of Na and Kim discloses a constricted convection plate. Regarding Na, the Board found that Na teaches an embodiment of its bottom plate that "does not include through-holes[ ]" and that the no-through-holes embodiment "teaches the recited 'constricted convection plate,'" a finding sufficient to support its determination regarding Na's disclosure of the constricted-convection-plate claim limitation without having to consider alternative embodiments. J.A. 37; *see* J.A. 95 (similar). Substantial evidence supports that finding.

MRI argues that Na does not disclose a bottom plate without through-holes because Na's "objective . . . is to exchange as much air as possible" and Na's disclosure must be understood in light of that aim. MRI Opening Br. at 35. But the Board was reasonable in finding otherwise based on Na's express teaching that "through-holes 'may be formed *only* in the first to fourth sidewalls,'" *i.e.*, not in the bottom plate. J.A. 38 (quoting J.A. 1725) (emphasis added by the Board); *see* J.A. 95. That reading is further supported by Samsung's expert evidence, credited by the Board, that Na discloses "using a bottom plate [ ] that does

not have through-holes." J.A. 38 (quoting J.A. 1642–44 ¶ 210); *see* J.A. 95–96. MRI identifies no evidence that compels its different interpretation. Nowhere, for example, does Na specify a minimum acceptable amount of airflow or say that through-holes in the bottom plate are necessary, and its express disclosures on the point clearly state that one option is to place through-holes "only" in the sidewalls. J.A. 1725, 1727.

Similarly, substantial evidence supports the Board's finding that Kim's shield cover discloses a constricted convection plate. The Board relied on Kim's disclosure that the shield cover "may be formed in diverse shapes such that the flowing air produced by the cooling fan [ ] can be efficiently guided." J.A. 116 (quoting J.A. 1700, col. 4, lines 61–63). The Board also credited the testimony of Samsung's expert that Kim's disclosure of "efficiently guided" air teaches that "Kim's shield cover [ ] guides and constricts airflow." J.A. 116–117 (citing J.A. 6775–77 ¶ 131).

MRI contends that the Board erred because "[g]uiding air and constricting it are two different concepts." MRI Opening Br. at 64. But the Board reasonably viewed them as related. And MRI cites no evidence to rebut the idea that the narrow space enclosed by Kim's shield cover is constricted or to contradict the Board's determination that Kim's disclosure about guiding also teaches constricting. A reasonable factfinder could therefore find, on the record before the Board, that Kim teaches a constricted convection plate.

2

MRI contends that the Board erred in holding '595 claim 8 unpatentable because it misconstrued the term "access apertures" and because its obviousness analysis for claim 8 was inconsistent with that for claim 4, on which claim 8 depends. We disagree.

First, we see no error in the Board understanding of "access apertures." *See* J.A. 20–21. Claim 8 incorporates claim 4's "constricted convection plate" requirement and adds a requirement of "a plurality of access apertures through the constricted convection plate." '595 patent, col. 10, lines 38–40. MRI urges that the access apertures, in light of the specification, must be so sized as to provide access to the hardware inside and "must be structured (or plugged) so that the air flow is maintained" when the cooling system is in operation. MRI Opening Br. at 59–60 (relying on '595 patent, col. 5, lines 6–12 and col. 6, lines 25–29). The Board properly rejected the suggested narrowing. The specification, while reciting hardware access as an example, "does not state that 'access' through the apertures must relate to hardware access or any other particular type of access." J.A. 21. And the specification indicates that plugging the access apertures is optional. '595 patent, col. 5, lines 10–12 ("The access apertures [ ] *may be* plugged before operation to maintain directed contact between the refrigerated air and the posterior display surface[.]" (emphasis added)). We do not see a sufficient basis for reading MRI's proposed limitation into the claims.

Second, MRI's argument that the Board's decision in the '595 patent IPR was internally inconsistent is incorrect (and it may well have been forfeited, which we need not decide). According to MRI, the Board's determination that claim 4 would have been obvious "rests squarely" on the "embodiment of Na in which the bottom plate does not contain any through[-]holes." MRI Opening Br. at 61; *see id.* at 12–14. Yet, for dependent claim 8, MRI notes, the Board was "persuaded that Na's through-holes [ ] teach the recited 'access apertures through the constricted convection plate[.]'" *Id.* at 61 (quoting J.A. 72). MRI asserts that the Board's reliance on two different Na embodiments creates an inconsistency because, MRI says, the Board, when discussing claim 4, found that *only* Na's bottom plate without holes teaches the constricted convection plate. *Id.* at 60–

61. But the crucial premise of MRI's argument is wrong: The Board did not find that *only* Na's bottom plate without holes teaches the claimed constricted convection plate, so the complained-of inconsistency is illusory.

Before the Board, Samsung argued that both Na's bottom plate with holes and Na's bottom plate without holes taught that claim limitation. J.A. 590–97, 611, 806–807, 940.[1] MRI contested Samsung's theory involving Na's bottom plate with holes on two bases: first, that a plate with holes could not define a constricted convection channel with a single entrance, and second, that such a plate would not constrict airflow. J.A. 752–58; 862–63.

The Board expressly rejected both of those arguments by MRI. The Board dealt with the former by declining to construe the claimed constricted convection channel as requiring only a single entrance. J.A. 15–18. As to the latter, in a portion of its analysis discussing the constricted convection channel, the Board wrote,

> [W]e are persuaded . . . that an ordinarily skilled artisan would have understood that the bottom plate [ ] constricts airflow in order to achieve the desired convective cooling effect. This is particularly true given [Samsung's] proposed modification to not include through-holes [ ] in [the] bottom plate [ ] based on Na's teachings.

J.A. 39 (quoting J.A. 592 ('595 IPR petition, advancing obviousness theory based on Na's bottom plate with holes)) (internal quotation marks and citation omitted).[2] The

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[1] The parties and the Board dealt with the constricted convection plate as part of the claim 1 analysis, incorporated by reference for claim 4. *See* J.A. 66.

[2] We understand the Board reference to "proposed modification" to refer merely to the modification of the with-holes-in-bottom version *depicted* in Na's Figures 2

Board's reasoning there applies to both the with-holes-in-bottom and the without-holes-in-bottom embodiments in Na—"particularly" to the latter but not exclusively so. Indeed, it is primarily a rejection of the MRI argument that was directed to Na's embodiment *with* holes as not disclosing the claim-required constricted convection plate. And the Board went on to find that Na also discloses "side panels," an "entrance," and an "exit" required by the claims, and in doing so referred to the bottom plate, without limitation, as the claimed constricted convection plate. J.A. 39 ("[The side panels] are adjacent to [the] bottom plate [ ] (the recited 'constricted convection plate)[.]'").

For those reasons, we reject MRI's crucial premise that the Board, in discussing claim 4, found that *only* Na's bottom plate without holes discloses the constricted convection plate. With that premise rejected, we reject MRI's argument of internal inconsistency in the Board's decision when it relied on the with-holes embodiment of Na in finding claim 8 unpatentable.

B

MRI challenges the Board's assignment of little weight to the objective indicia on which MRI relied. It argues that the Board erred in finding that MRI did not establish a nexus between its evidence and the challenged claims. MRI Opening Br. at 36–53, 65. MRI further contends that the Board's analysis was insufficiently developed to enable our review. *Id.* at 53–56, 65. These arguments lack merit.

In order for evidence of objective indicia to be accorded substantial weight, the proponent must show a nexus between the evidence and the claimed invention in one of two

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and 3, *see* J.A. 31, 1734, to reflect the no-holes-in-bottom embodiment taught in the description in Na at J.A. 1725, as discussed above. The word "modification" here does not refer to modifying what Na as a whole teaches.

ways. *See Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019). A nexus exists for an objective indicium if it is the "direct result of the unique characteristics of the claimed invention." *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996). When objective indicia relate to a product that "is the invention" because it "is coextensive with the claims," there is a rebuttable presumption of nexus. *Fox Factory*, 944 F.3d at 1373 (citations omitted). Where a product embodying the invention has unclaimed features, it is not coextensive with the invention unless the unclaimed features are relevantly "insignificant." *See id.* at 1374.

Here, the Board properly found that MRI was not entitled to a presumption of nexus for its evidence of the commercial success of the invention. In both IPRs, MRI argued that certain commercially successful Samsung displays infringed specific claims and asserted, without additional analysis, that the displays were "coextensive with those claims, and there is a nexus[.]" J.A. 1285; *see* J.A. 770 (similar); *see also* J.A. 771, 1287 (referring merely to "Samsung . . . products which infringe" and "Samsung's infringing [ ] products"). But even if they infringe, the Samsung products have features other than the claimed system for cooling an electronic display—saliently, they have electronic displays. MRI made no showing that the qualities of the electronic displays themselves were insignificant to the commercial success of Samsung's products. J.A. 53–54, 145–47; *see* J.A. 991–96, 1017–18. Such a showing was a prerequisite to a presumption of nexus, so the Board did not err in finding MRI's evidence insufficient to establish the presumption.

The Board also did not err in finding that MRI failed to prove a nexus by showing that the objective indicia were the direct result of the unique characteristics of MRI's invention. In particular, MRI has relied heavily for its nexus contention (relating, *e.g.*, to Samsung's commercial success) on Samsung's tear-down of a competing patent-

practicing product to discover the now-claimed elements. *See* Oral Arg. at 10:10–12:40, https://www.cafc.uscourts.gov/oral-arguments/24-2228_062026.mp3. The Board, however, found that Samsung's allegedly infringing displays were completely designed before the teardown. J.A. 48–50; 141–43. And, contrary to MRI's incorrect statement that only "bare assertions" support that finding, MRI Opening Br. at 51, the Board cited substantial evidence in the form of credible deposition testimony by a witness with relevant personal knowledge to find that no copying took place, *see* J.A. 49, 142–43. In light of that well-supported finding, the Board reasonably found no sufficient connection between MRI's evidence of objective indicia of nonobviousness and the teardown. Similarly, MRI has not shown error in the Board's finding of insufficient nexus between a Samsung employee's vague praise for MRI and the features claimed in the patents at issue here. Thus, the Board did not err in determining that MRI failed to establish a nexus.

Finally, we do not find that the Board inadequately explained how it weighed the objective indicia. The Board's decisions "enable meaningful judicial review." *Rovalma, S.A. v. Bohler-Edelstahl GmbH*, 856 F.3d 1019, 1024 (Fed. Cir. 2017). In each of its decisions, the Board correctly stated the principle that objective-indicia evidence, in the absence of a nexus to the claimed invention, is not to be accorded substantial weight. J.A. 44; *see* J.A. 136. It then carefully canvassed MRI's evidence and arguments, explained why it did not find a nexus, and said that it was not giving objective indicia substantial weight. J.A. 42–57, 135–49. As the foregoing discussion demonstrates, that analysis is amenable to our review. We therefore affirm the Board's determination to give little weight to objective indicia.

III

We have considered MRI's remaining arguments and find them unpersuasive. For the foregoing reasons, we affirm the decisions of the Board.

AFFIRMED