NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

LEVEL SLEEP LLC,
Plaintiff-Appellant

v.

SLEEP NUMBER CORPORATION, SELECT COMFORT RETAIL CORPORATION,
Defendants-Appellees

2020-1718

Appeal from the United States District Court for the Eastern District of Texas in No. 2:18-cv-00119-RWS, Judge Robert Schroeder, III.

Decided: July 13, 2021

JAMES L. DAY, JR., Farella Braun & Martel LLP, San Francisco, CA, argued for plaintiff-appellant. Also represented by LAURA PEDERSEN.

RUFFIN B. CORDELL, Fish & Richardson P.C., Washington, DC, argued for defendants-appellees. Also represented by ROBERT COURTNEY, CONRAD GOSEN, MATHIAS WETZSTEIN SAMUEL, Minneapolis, MN.

Before O'MALLEY, TARANTO, and STOLL, *Circuit Judges*.

STOLL, *Circuit Judge*.

Level Sleep LLC appeals the United States District Court for the Eastern District of Texas's grant of summary judgment of noninfringement of Level Sleep's U.S. Patent Nos. 6,807,698 and 7,036,172. Because we agree with the district court's construction of "low body pressure," and the parties agree that the accused products do not infringe under that construction, we affirm.

BACKGROUND

I

Level Sleep sued Sleep Number Corporation and Select Comfort Retail Corporation (collectively, "Sleep Number") for infringement of all claims of the '698 and '172 patents (collectively, the "asserted patents") in March 2018. The '172 patent is a continuation-in-part of the '698 patent.[1] The asserted patents relate to "improved mattresses for beds that enhance the quality of sleep." '172 patent col. 1 ll. 10–12. The specification explains that "[g]ood sleeping is normally associated with a low number of body shifts during the sleep period[,]" and "[b]ed-induced shifts due to discomfort caused by the bed are a significant cause of poor sleep quality." *Id.* at col. 1 ll. 37–40. There are two major causes of bed-induced shifting: (1) "buildup of pressures on parts of the body"; and (2) "poor body alignment." *Id.* at col. 1 ll. 49–52. Only the first cause relates to the claim construction issue in this case.

Addressing the buildup of pressures on parts of the body, the specification explains that "the pressure tends to be greatest on the body's protrusions (such as shoulders

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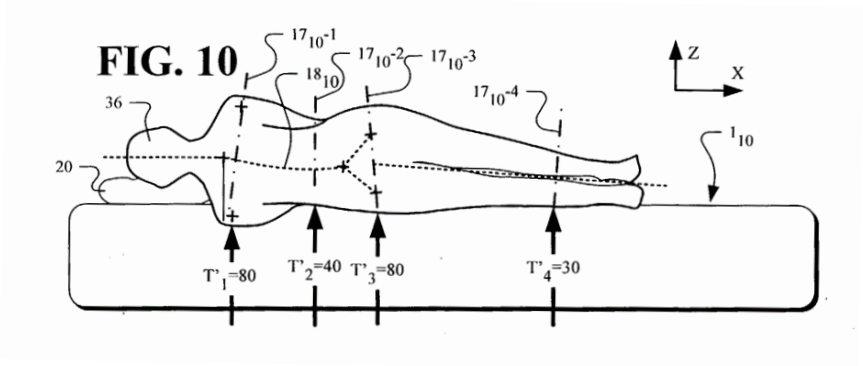
[1] Because the parties cite to the '172 patent when referencing the specification, we do the same.

and hips) where body tissues are put in high compression against the mattress." *Id.* at col. 1 ll. 54–58. The feeling of discomfort is in part a result of this high compression causing a discontinuance of capillary blood flow. The specification states that "[t]he amount of pressure [that] causes a discontinuance of capillary blood flow is called the ischemic pressure[,]" and the "ischemic pressure threshold is normally considered to be approximately thirty mmHg." *Id.* at col. 1 ll. 60–63. "When parts of the body (usually shoulders and hips in conventional mattresses) are subjected to pressures above the ischemic threshold, discomfort results" and the person generally shifts to relieve the pressure. *Id.* at col. 1 l. 66–col. 2 l. 3.

To reduce these high pressures, the asserted patents contemplate a mattress that "is capable of supporting a reclining body . . . where the reclining body is supported by low body pressure." *Id.* at col. 9 ll. 29–31. The specification states: "The terminology low body pressure means a pressure which is below a pressure threshold (typically the ischemic threshold) for comfortable sleep and of a level which materially reduces causes of bed-induced shifting." *Id.* at col. 9 ll. 32–35.

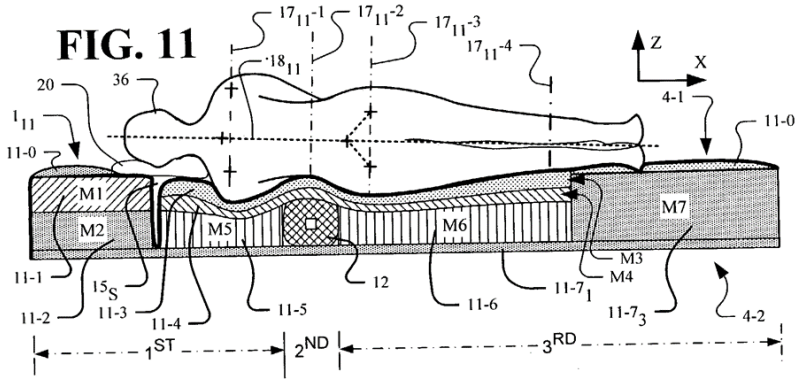
Figure 10 illustrates a side view of a conventional mattress with the resultant surface body pressures:



Id. Fig. 10. The specification explains that "the surface pressures T'_1, T'_2, T'_3 and T'_4 at the shoulder alignment line

17_{10}-1, the waist alignment line 17_{10}-2, the hip alignment line 17_{10}-3 and the leg alignment line 17_{10}-4 are typically 80, 40, 80 and 30 mmHg, respectively." *Id.* at col. 15 ll. 33–37. The asserted patents explain that the "80 and 40 values are above the ischemic pressure threshold and hence tend to cause bed-induced shifting in a conventional mattress." *Id.* at col. 15 ll. 37–39.

In comparison, Figure 11 illustrates a side view of an embodiment of the asserted patents:



Id. Fig. 11. The specification discloses that, in this embodiment, "[t]he surface pressures T_1, T_2, T_3 and T_4 at the shoulder alignment line 17_{11}-1, the waist alignment line 17_{11}-2, the hip alignment line 17_{11}-3 and the leg alignment line 17_{11}-4 are typically low and below a low pressure threshold." *Id.* at col. 16 ll. 19–23. In this preferred embodiment, "the low pressure threshold is below the ischemic pressure of about 30 mmHg." *Id.* at col. 16 ll. 24–25.

Independent claim 1 of the '172 patent is illustrative of the claims on appeal and recites:

> 1. A mattress, extending in a lateral direction from side to side and extending in a longitudinal direction from a mattress head to a mattress foot, for supporting a reclining body, said mattress including a head part, a shoulder part, a waist part, a hip

> part and a leg part, said reclining body having a displacement profile, said mattress comprising,
>
> a core extending in said longitudinal direction and in said lateral direction, said core for undergoing differing vertical displacements when supporting the reclining body,
>
> said core having displacement parameters varying to match the displacement profile of the reclining body *whereby the reclining body is supported by low body pressure*,
>
> said core having a plurality of regions where the vertical displacement in one or more of the regions varies to match the displacement profile of the reclining body to maintain the reclining body in alignment,
>
> said core including one or more foam members having structural modification where the one or more foam members at different longitudinal positions exhibit different displacement parameters including different ILDs *to support the reclining body with low body pressure* and exhibits different vertical displacements to maintain the reclining body in alignment.

Id. at col. 39 ll. 24–48 (emphases added to disputed limitations).

Because Level Sleep relies on dependent claims 11 and 12 of the '172 patent and the doctrine of claim differentiation to support its construction of "low body pressure," we introduce these claims as well. Dependent claims 11 and 12 of the '172 patent ultimately depend from claim 1 and further define the features of the claimed mattress:

> 11. The mattress as in claim 3 wherein said low body pressure is below a low pressure threshold.

> 12. The mattress as in claim 11 wherein said threshold is below an ischemic pressure threshold.

Id. at col. 40 ll. 44–47.

II

At the *Markman* hearing, the parties agreed that the term "low body pressure" as recited in the '172 patent and "low supporting surface pressure" as recited in the '698 patent (the "low pressure" limitations) should be construed consistently across both patents. Level Sleep asserted that the "low pressure" limitations should be construed to mean a "[l]ower surface pressure supporting the body as compared to conventional mattresses," while Sleep Number asserted that they should be construed to mean "pressure below about 30 mmHg." *Level Sleep LLC v. Sleep No. Corp.*, No. 2:18-cv-00119, 2019 WL 2221601, at *4 (E.D. Tex. May 22, 2019) (*Claim Construction Order).* The district court construed the "low pressure" limitations to mean "pressure of a level which materially reduces causes of bed-induced shifting." *Id.* at *7 (emphasis omitted).

Subsequently, in opposing Sleep Number's motion for summary judgment of noninfringement, Level Sleep submitted the expert report of Dr. Elizabeth Friis, who tested the accused mattresses and compared the claim limitations to the accused mattresses. As part of her testing, Dr. Friis compared (1) the average surface pressure, (2) the percent of pressure readings above 30 mmHg, and (3) the maximum measured surface pressure of each accused mattress to that of a conventional mattress. Dr. Friis determined that the accused products outperformed the conventional mattress in each of these measured categories, generally resulting in lower surface pressures as compared to the conventional mattress. As such, Dr. Friis concluded that each of the accused products met the "low pressure" limitations as construed by the district court to mean "pressure of a level which materially reduces causes of bed-induced shifting." J.A. 4664. Dr. Friis's testing also demonstrated,

however, that the maximum measured surface pressure of each of the accused products was above 40 mmHg. *See, e.g.*, J.A. 4777. In at least some of the testing, the accused products exhibited pressures below 80 mmHg at the shoulder and below 40 mmHg at the waist. *See, e.g.*, J.A. 4810.

In January 2020, the district court granted summary judgment of noninfringement of both patents. Order at 1, *Level Sleep LLC v. Sleep No. Corp.*, No. 2:18-cv-00119 (E.D. Tex. Jan. 14, 2020), ECF No. 178 (*Summary Judgment Order*). The district court explained that although it previously construed the "low pressure" limitations as "pressure of a level which materially reduces causes of bed-induced shifting," it had "instructed that any testimony relating to the Court's construction must be 'constrained by the Court's reasoning.'" *Id.* at 5 (quoting *Claim Construction Order*, 2019 WL 2221601, at *15). The district court explained that while it rejected Sleep Number's proposed upper limit of 30 mmHg, it recognized that the "low pressure" limitations must have some upper limit. *Summary Judgment Order* at 5–6. The district court reasoned that although the intrinsic evidence does not "establish a specific bright-line level," the specification criticizes prior-art mattresses with pressures of 40 mmHg and thus makes clear that pressures of 40 mmHg are too high to satisfy the "low pressure" limitations. *Id.* at 6 (internal quotation marks omitted). The district court subsequently rejected Level Sleep's alternative argument that, if there is an upper limit, it is 80 mmHg at the shoulder and hip and 40 mmHg at the waist. *Id.* Considering the evidence presented—namely, Dr. Friis's expert report—the district court concluded that there was no genuine dispute that the accused products had a maximum pressure above 40 mmHg and, accordingly, the accused products could not as a matter of law infringe the claims as properly construed. *Id.* at 8–9.

Level Sleep appeals. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

DISCUSSION

I

On appeal, Level Sleep challenges the district court's grant of summary judgment on several grounds. First, it asserts that it introduced substantial, admissible evidence showing that the accused mattresses meet the claim limitations as construed by the district court in the initial claim construction order. As part of this argument, it asserts that the district court erred by sua sponte changing its construction when granting summary judgment. Finally, Level Sleep challenges the district court's construction of the "low pressure" limitations as requiring pressure levels that are at least lower than 40 mmHg. We review a district court's claim construction de novo where, as here, it depends only on the intrinsic evidence. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331 (2015); *see also Trs. of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1362 (Fed. Cir. 2016) ("The construction of claim terms based on the claim language, the specification, and the prosecution history are legal determinations.").

A

We start by addressing Level Sleep's assertion that the district court erred by changing its claim construction sua sponte in the summary judgment order. This argument fails because "a district court may (and sometimes must) revisit, alter, or supplement its claim constructions . . . to the extent necessary to ensure that final constructions serve their purpose of genuinely clarifying the scope of claims for the finder of fact." *In re Papst Licensing Digit. Camera Pat. Litig.*, 778 F.3d 1255, 1261 (Fed. Cir. 2015) (first citing *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1359 (Fed. Cir. 2008); and then citing *Pfizer, Inc. v. Teva Pharm., USA, Inc.*, 429 F.3d 1364, 1377 (Fed. Cir. 2005)). Indeed, we have held that district courts "may engage in a rolling claim construction, in which the court revisits and alters its interpretation of the claim

terms as its understanding of the technology evolves." *Jack Guttman, Inc. v. Kopykake Enters., Inc.*, 302 F.3d 1352, 1361 (Fed. Cir. 2002). And we have explained that "a district court may engage in claim construction during various phases of litigation, not just in a *Markman* order." *Conoco, Inc. v. Energy & Envt'l Int'l, L.C.*, 460 F.3d 1349, 1359 (Fed. Cir. 2006). Under our precedent, the district court was well within its power to clarify, supplement, and even alter its construction of the "low pressure" limitations in its summary judgment order.[2]

B

We next turn to whether the district court's modified claim construction—requiring "low pressure" to be at least below 40 mmHg—is proper in light of the intrinsic evidence. We determine that it is.

Illustrative claim 1 of the '172 patent recites a mattress comprising a core having features "whereby the reclining body is supported by low body pressure." '172 patent col. 39 ll. 37–38. While the claim language itself is not particularly helpful in understanding the meaning of "low body pressure," the patent specification expressly defines the term. It states: "The terminology low body pressure means a pressure which is below a pressure threshold (typically the ischemic threshold) for comfortable sleep and of a level which materially reduces causes of bed-induced

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[2] While our decision does not rely on it, we further note that we do not necessarily agree with Level Sleep that the district court wholly changed its construction. As the district court itself explained, though it "declined to adopt Sleep Number's proposed upper limit of 30 mmHg" in its Markman order, it "agreed with and adopted [Sleep Number's] argument that the patents disclosed pressure levels (40 and 80 mmHg) that the patents 'considered too high.'" *Summary Judgment Order*, at 5–6.

shifting." *Id.* at col. 9 ll. 32–35. The specification further discloses that the surface pressures at the shoulder, waist, hip, and leg alignment lines "are typically low and below a low pressure threshold." *Id.* at col. 16 ll. 19–23. It adds that this "low pressure threshold is below the ischemic pressure of about 30 mmHg." *Id.* at col. 16 ll. 24–25. We have previously explained that where "a patent applicant has elected to be a lexicographer by providing an explicit definition in the specification for a claim term[,]" the "definition selected by the applicant controls." *Renishaw PLC v. Marposs Societa' Per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998).

In addition, the specification disavows a "low pressure" of 40 mmHg or above by characterizing pressure levels of 40 mmHg as not achieving the required reduction of bed-induced shifting. "Disavowal requires that the specification [] make[] clear that the invention does not include a particular feature, . . . or is clearly limited to a particular form of the invention[.]" *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1372 (Fed. Cir. 2014) (second alteration in original) (internal citations omitted). We have found disavowal or disclaimer when the patent repeatedly disparaged an embodiment as "antiquated" and then detailed the "deficiencies [that] make it difficult" to use. *Chicago Bd. Options Exch., Inc. v. Int'l Sec. Exch., LLC,* 677 F.3d 1361, 1372 (Fed. Cir. 2012) (alteration in original). Here, the specification repeatedly disparages "conventional mattresses" as causing shifting in bed due to discomfort. *See* '172 patent, col. 1 ll. 40–44 ("On conventional mattresses . . . most people experience about forty major postural body shifts [per night.]"); col. 1 l. 66–col. 2 l. 3 ("When parts of the body (usually shoulders and hips in conventional mattresses) are subjected to pressures above the ischemic threshold, discomfort results[.]"); col. 3 ll. 25–27 ("Conventional . . . mattresses . . . are generally unable to provide the qualities necessary for an ideal mattress."). The specification then explains that one of the

reasons discomfort results is that certain surface pressures of a conventional mattress—including 80 and 40 mmHg—are above the ischemic pressure threshold. Particularly, the specification explains that "the surface pressures T'_1, T'_2, T'_3 and T'_4 [of a conventional mattress] at the shoulder alignment line 17_{10}-1, the waist alignment line 17_{10}-2, the hip alignment line 17_{10}-3 and the leg alignment line 17_{10}-4 are typically 80, 40, 80 and 30 mmHg, respectively." *Id.* at col. 15 ll. 30–37. It continues by explaining that these "80 and 40 values are above the ischemic pressure threshold and hence tend to cause bed-induced shifting in a conventional mattress." *Id.* at col. 15 ll. 37–39.

In our view, the specification limits "low body pressure" beyond simply "a level which materially reduces causes of bed-induced shifting." *Id.* at col. 9 ll. 32–35. The express definition of "low body pressure" includes this phrase, but it also states that "low body pressure means a pressure which is below a pressure threshold (typically the ischemic threshold)[,]" *id.*, and the specification disparages surface pressures of 40 mmHg or above as being "above the ischemic pressure threshold and hence tend[ing] to cause bed-induced shifting in a conventional mattress[,]" *id.* at col. 15 ll. 37–39. Accordingly, we agree with the district court's construction that "low body pressure" is a pressure falling below a pressure threshold that materially reduces causes of bed-induced shifting and, whatever that specific threshold is, it is lower than 40 mmHg.

Level Sleep's reliance on claim differentiation based on dependent claims 11 and 12 is unavailing. Though these claims purport to narrow the independent claim by requiring a "low pressure threshold," and that the "threshold is below an ischemic pressure threshold," *id.* at col. 40 ll. 44–47, at most, they support Level Sleep's successful argument to the district court that the "low body pressure" limitation in claim 1 is not 30mmHg. Because the doctrine of claim differentiation "does not serve to broaden claims beyond their meaning in light of the specification," *Intell.*

Ventures I v. Motorola Mobility LLC, 870 F.3d 1320, 1326 (Fed. Cir. 2017) (quoting *Toro Co. v. White Consol. Indus., Inc.*, 199 F.3d 1295, 1302 (Fed. Cir. 1999)), the dependent claims cannot erase express definitions and disclaimers in the patent specification. Here, the specification is clear: "low body pressure means a pressure which is below a pressure threshold." '172 patent col. 9 ll. 32–33. Furthermore, pressures of 40 mmHg "tend to cause bed induced shifting in a conventional mattress." *Id.* at col. 15 ll. 37–39.

Level Sleep alternatively asserts that if a numeric standard is necessary to construe the "low pressure" limitations, then the correct standard would be 80 mmHg at the shoulder, 40 mmHg at the waist, and 80 mmHg at the hip. We disagree. Nothing in the patent specification suggests to a person of ordinary skill in the art to differentiate pressure thresholds between different parts of the body. To the contrary, in the background of the invention section, the specification explains that "[w]hen parts of the body (usually shoulders and hips in conventional mattresses) are subjected to pressures above *the ischemic threshold* [i.e., 30 mmHg], discomfort results" and the person generally shifts to relieve the pressure. *Id.* at col. 1 l. 66–col. 2 l. 3 (emphasis added). Similarly, in disclosing various surface pressures from a conventional mattress at the shoulder, waist, and hip alignment lines, the specification explains that the "80 and 40 values are above the ischemic pressure threshold and hence tend to cause bed-induced shifting in a conventional mattress." *Id.* at col. 15 ll. 37–39. In both of these examples, the specification expressly contemplates the surface pressure that would result in discomfort at various parts of the body, and in both cases the specification recognizes just a single pressure threshold for causing discomfort at those various parts.

This comports with the embodiments contemplated by the asserted patents. In Figure 11, the specification discloses surface pressures at each of the shoulder, waist, hip, and leg alignment lines. *Id.* at col. 16 ll. 19–23; Fig. 11.

There, it explains that the surface pressures at these alignment lines "are typically low and below a low pressure threshold," where that "low pressure threshold is below the ischemic pressure of about 30 mmHg." *Id.* at col. 16 ll. 19–25. Once again, the specification discloses only a single pressure threshold for each of the various parts of the body. Accordingly, we are not convinced that the specification supports Level Sleep's argument that the claim construction of "low body pressure" should vary based on different parts of the body. While we appreciate that the claims and the specification could have defined "low body pressure" to be different at the hips and shoulders compared to the waist, they did not do so. We thus conclude that the district court's construction is most consistent with the claim language and the specification and we adopt it as our own.

II

We review a grant of summary judgment according to the law of the regional circuit, which in this case is the Fifth Circuit. *Ineos USA LLC v. Berry Plastics Corp.*, 783 F.3d 865, 868 (Fed. Cir. 2015). The Fifth Circuit reviews a district court's grant of summary judgment de novo. *Triple Tee Golf, Inc. v. Nike, Inc.*, 485 F.3d 253, 261 (5th Cir. 2007). Summary judgment is improper where there is a genuine dispute of material fact and where "the evidence is such that a reasonable jury could return a verdict for the nonmoving party." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986). In the present case, Sleep Number asserts that it is undisputed that each of the accused products exhibits pressure exceeding 40 mmHg. Thus, if we agree with the district court's construction, no genuine issue of material fact exists. Level Sleep concedes this point. Oral Arg. at 17:53–18:33, http://oralarguments.cafc.uscourts.gov/default.aspx?fl=20-1718_01052021.mp3 ("I don't believe that the record evidence and the infringement contentions we made based on the original construction provide a basis to change the

[district court's summary judgment] decision if forty is an upper limit."). Because we determine that the correct claim construction recognizes pressures above 40 mmHg as too high to meet the "low pressure" limitations, there is no dispute of material fact in this case that would preclude summary judgment of noninfringement.

CONCLUSION

We have considered Level Sleep's remaining arguments and find them unpersuasive. For the foregoing reasons, we affirm the district court's grant of summary judgment of noninfringement.

AFFIRMED