

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

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**TECHNICAL CONSUMER PRODUCTS, INC.,  
NICOR, INC., AMAX LIGHTING,**  
*Appellants*

v.

**LIGHTING SCIENCE GROUP CORPORATION,**  
*Appellee*

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2019-1361

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Appeal from the United States Patent and Trademark  
Office, Patent Trial and Appeal Board in Nos. IPR2017-  
01287, IPR2018-00263, IPR2018-00269.

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Decided: April 8, 2020

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Chicago, IL, argued for appellants. Also represented by  
JOHN LLOYD ABRAMIC, KATHERINE H. JOHNSON.

KAYVAN B. NOROOZI, Noroozi PC, Los Angeles, CA, ar-  
gued for appellee.

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Before DYK, CHEN, and STOLL, *Circuit Judges*.  
STOLL, *Circuit Judge*.

Technical Consumer Products, Inc., Nicor, Inc., and Amax Lighting (collectively, “TCP”) petitioned for inter partes review of several claims of U.S. Patent No. 8,201,968. The Patent Trial and Appeal Board determined that TCP did not demonstrate by a preponderance of the evidence that claims 1–4, 6, 14, and 15 of the ’968 patent were anticipated by U.S. Patent No. 7,670,021 (“Chou”) or that claims 3, 4, 7, 8, 11, 12, 16, 17, and 19–23 would have been obvious over Chou alone or in view of other prior art references. The Board based its determinations exclusively on its finding that Chou does not disclose a single limitation (hereinafter, the “H/D limitation”) in claims 1 and 20 of the ’968 patent, the only independent claims at issue.

The Board’s conclusions regarding the H/D limitation resulted from an erroneous interpretation of the claim language and a misunderstanding of our case law. The Board did not address any of the parties’ other arguments regarding the other limitations of claim 1 or of the rest of the challenged claims. Because claims 1, 11, 14, 15, 17, and 19–23 of the ’968 patent were found to be unpatentable on other grounds not at issue on appeal, we vacate the Board’s decision of no anticipation or obviousness solely as to claims 2–4, 6–8, 12, and 16 and remand for consideration of the parties’ remaining arguments pertaining to those claims.

## BACKGROUND

### I

The ’968 patent is directed to replacement light emitting diode (LED) light fixtures. The specification explains that the advent of LED lighting, and the advantages it offered over conventional lighting, created a demand for replacement LED light fixtures that could be used to replace existing light installations. Because different types of light installations used different kinds of housing, manufacturers of prior art replacement LED light fixtures would create unique designs for each type of installation to

accommodate the dimensional requirements of the light fixtures being replaced. The '968 patent seeks to minimize the need for such customization by creating "low profile downlighting for retrofit applications" that accommodates a variety of housing shapes and sizes. '968 patent col. 1 ll. 13–14.

Claim 1 of the '968 patent illustrates the various features of the claimed light fixture design:

1. A luminaire, comprising:

a heat spreader and a heat sink thermally coupled to the heat spreader, the heat sink being substantially ring-shaped and being disposed around and coupled to an outer periphery of the heat spreader;

an outer optic securely retained relative to at least one of the heat spreader and the heat sink; and

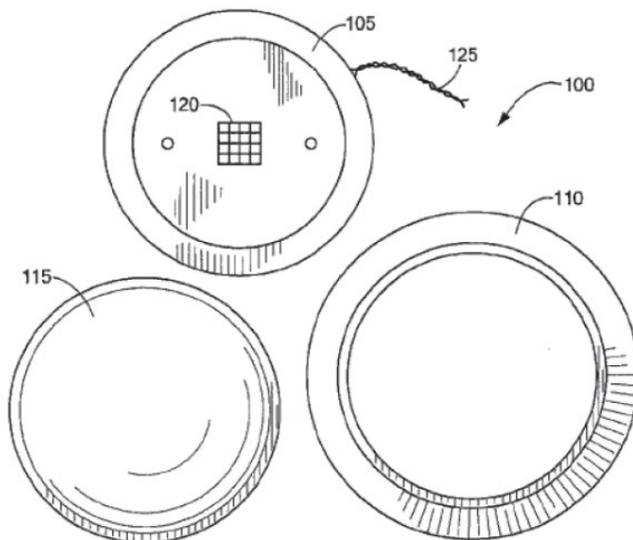
a light source disposed in thermal communication with the heat spreader, the light source comprising a plurality of light emitting diodes (LEDs) that are disposed on the heat spreader such that the heat spreader dissipates heat from the LEDs;

*wherein the heat spreader, the heat sink and the outer optic, in combination, have an overall height  $H$  and an overall outside dimension  $D$  such that the ratio of  $H/D$  is equal to or less than 0.25;*

wherein the combination defined by the heat spreader, the heat sink and the outer optic, is so dimensioned as to: cover an opening defined by a nominally sized four-inch can light fixture; and, cover an opening defined by a nominally sized four-inch electrical junction box.

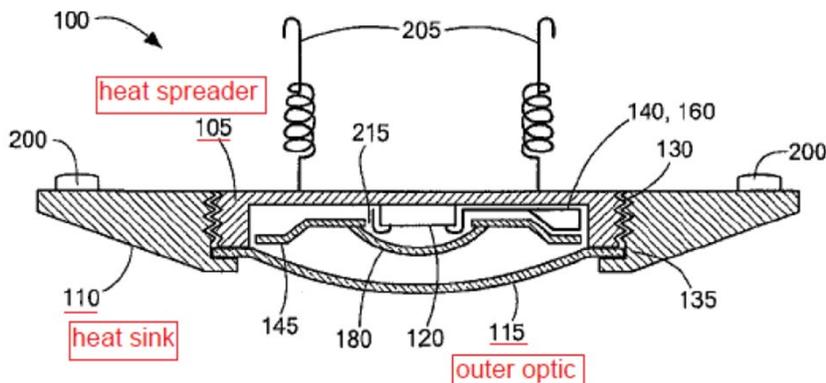
*Id.* at col. 10 ll. 20–40 (emphasis added to the disputed H/D limitation).

Figures 5 and 12 of the '968 patent show a top view and cross-sectional view, respectively, of an embodiment of the claimed luminaire 100, including LED 120, heat spreader 105, heat sink 110, and outer optic 115:



**FIG. 5**

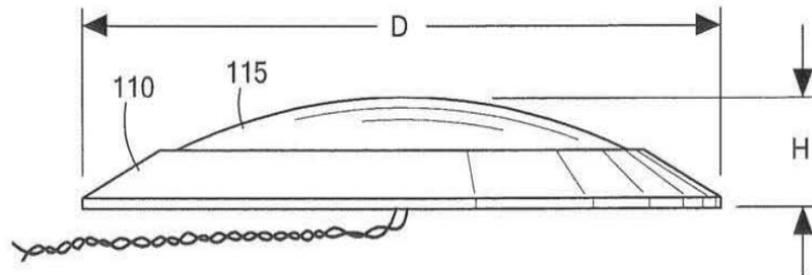
*Id.* Fig 5; see also *id.* at col. 2 ll. 50–52.



**FIG. 12**

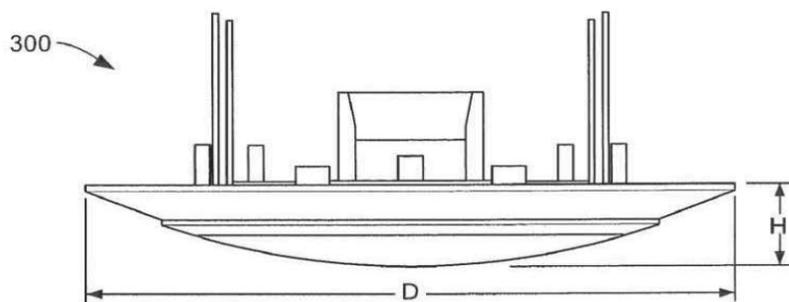
*Id.* Fig. 12 (annotated by the Board); see also *id.* at col. 3 ll. 1–2; J.A. 6.

In this embodiment, the heat sink 110 is annularly coupled to the heat spreader 105, which is covered by the outer optic 115. *See id.* at col. 3 l. 61–col. 4 l. 5. The specification describes that in the preferred embodiments, “the combination of the heat spreader 105, heat sink 110 and outer optic 115, have an overall height H and an overall outside dimension D such that the ratio of H/D is equal to or less than 0.25” in order to “provide for a low profile luminaire 100.” *Id.* at col. 4 ll. 1–5. Figures 4 and 28 depict the H and D dimensions, which in these embodiments constitute the height from the base of the heat sink/spreader to the top of the outer optic (H) and the diameter of the circular base (D):



**FIG. 4**

*Id.* Fig. 4.



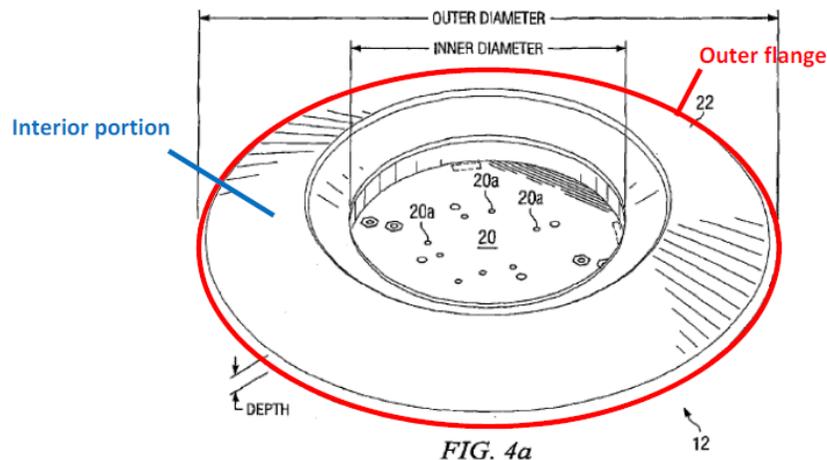
**FIG. 28**

*Id.* Fig. 28; *see also id.* at col. 7 ll. 47–51.

## II

Like the '968 patent, Chou describes the advantages of the “[s]uccessful retrofit of an LED lamp to . . . existing and new recessed can housings.” Chou col. 2 ll. 9–13. Chou’s specification explains that prior art LED devices had problems with heat dissipation when installed into recessed can housings. *Id.* at col. 1 ll. 37–52. Chou purportedly solves this problem by creating “a recessed light fixture having a thermally effective trim” that aids in the dissipation of heat from the light source. *Id.* at col. 1 ll. 17–18.

The trim of Chou’s light fixture “has thermally conductive properties and includes a flange around a perimeter of the trim.” *Id.* at col. 2 ll. 54–55. The light fixture also includes “a heatsink mounted to a back surface of the trim,” *id.* at col. 2 ll. 57–58, that is inserted “into the recessed can housing,” *id.* at col. 2 l. 31. The trim 12, flange 22, and heat sink 14 are depicted in Figures 4a and 2a:



*Id.* Fig. 4a (annotated by TCP); see also *id.* at col. 7 l. 48–col. 8 l. 3; Appellant’s Br. 18.

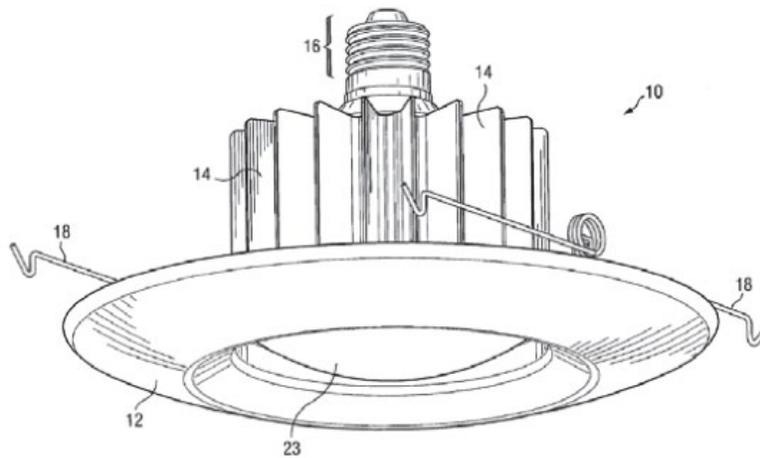


FIG. 2a

*Id.* Fig. 2a; *see also id.* at col. 3 l. 42–col. 4 l. 39.

In the embodiment depicted in Figures 2a and 4a, “heat is transferred directly into trim 12 from the light source.” *Id.* at col. 5 ll. 2–3. “As the temperature of trim 12 increases, heat is vented from the flange portion of trim 12 that resides outside the recessed can housing.” *Id.* at col. 5 ll. 3–5. While “a portion of the heat residing in trim 12 is transmitted into heatsink 14” and “vented into the recessed housing,” the “majority of heat is dissipated from trim 12 outside the housing.” *Id.* at col. 5 ll. 6–10. Indeed, Chou discloses that approximately 65% of the heat generated by the LED light source is dissipated through the trim and flange, *id.* at col. 7 ll. 1–3, while 35% of the heat is dissipated by heat sink 14, *id.* at col. 7 ll. 11–13.

### III

During prosecution, the examiner initially rejected claim 1 of the '968 patent as anticipated by Chou. J.A. 669. The examiner identified Chou's “heat sink 14” as disclosing the claimed heat sink, and “trim 12” as disclosing the claimed heat spreader. *Id.* In response, the applicant amended the claim to clarify that the heat sink must be “substantially ring-shaped” and “disposed around and coupled to an outer periphery of the heat spreader.” J.A. 673.

The applicant argued that Chou's heat sink 14 was neither ring-shaped nor coupled to the outer periphery of the heat spreader, and therefore did not anticipate claim 1. J.A. 679. The applicant also argued that the combination of these elements did not disclose the H/D limitation; that is, that the "ratio of the combined height of [Chou's] heat sink 14 and the trim 12[,] and of the overall outside dimension of the assembly 10," was not less than 0.25. *Id.* The examiner allowed the amended claim without addressing whether Chou's outer flange 22 satisfied the claimed heat sink limitations.

#### IV

In its petition for IPR, TCP argued that Chou in fact anticipates the allowed claim 1 of the '968 patent. In particular, TCP argued that Chou's outer flange 22, rather than heat sink 14, disclosed the claimed heat sink. TCP explained that Chou's outer flange 22 was configured in a ring shape around trim 12. Regarding the H/D limitation, TCP asserted that the height-to-diameter ratio of the combination of trim 12, flange 22, and outer optic 23 was less than 0.25. TCP did not rely on heat sink 14 for the disclosure of any of the limitations of claim 1.

Responding to TCP, patent owner Lighting Science Group Corp. ("LSG") argued that both heat sink 14 and trim 12 must be included in the H/D calculation, and that when heat sink 14 is included, the height-to-diameter ratio is not less than 0.25. According to LSG, Chou's "heat sink" necessarily includes "heat sink 14" in addition to its other heat sinking elements. To support its argument, LSG presented expert evidence that Chou would not dissipate heat sufficiently enough to function were heat sink 14 removed.

The Board agreed with LSG, finding that "the arrangement of heat sinking elements disclosed in Chou includes both trim 12 and heatsink 14." *Tech. Consumer Prods., Inc. v. Lighting Sci. Grp. Corp.*, No. IPR2017-01287, 2018 WL 5733733, at \*6 (P.T.A.B. Oct. 31, 2018) (*Decision*).

Citing *In re Chudik*, 851 F.3d 1365 (Fed. Cir. 2017), the Board found that the only way to meet the claim requirements was to remove an essential element of Chou—heat sink 14—and thus Chou could not anticipate the claim. *Id.* at \*7. The Board also found that the prosecution history supported its determination, as the claim was allowed over Chou after amendment of the heat sink limitation. *Id.* Because Chou does not disclose the H/D limitation if heat sink 14 is included in the calculation of the height-to-diameter ratio, the Board found that Chou does not anticipate claim 1. *Id.*

The Board did not address any of the parties' other arguments, determining that this finding alone was sufficient to resolve all of TCP's anticipation and obviousness grounds based on Chou as a primary reference.<sup>1</sup> TCP appeals. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

#### DISCUSSION

Whether a prior art reference discloses a particular claim limitation presents a question of fact that we review for substantial evidence. *See Wasica Fin. GmbH v. Continental Auto. Sys., Inc.*, 853 F.3d 1272, 1278 (Fed. Cir. 2017); *Mettler-Toledo, Inc. v. B-Tek Scales, LLC*, 671 F.3d 1291, 1297 (Fed. Cir. 2012); *Golden Bridge Tech., Inc. v. Nokia, Inc.*, 527 F.3d 1318, 1323 (Fed. Cir. 2008). We review claim construction incident to the issues of anticipation and obviousness and relying on intrinsic evidence de novo. *Wasica*, 853 F.3d at 1278.

The sole question presented on appeal is whether the Board erred in determining that Chou's heat sink 14 must be included in the calculation of the height-to-diameter

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<sup>1</sup> The Board held that claims 1, 11, 14, 15, 17, and 19–23 were unpatentable on other grounds. LSG did not appeal the unpatentability of these claims.

ratio recited in claim 1 of the '968 patent. Because the Board's findings of fact are divorced from the plain language of the claim, and are further premised on an incorrect interpretation of our case law, we hold that they are not supported by substantial evidence.

The H/D limitation requires that “the heat spreader, the heat sink and the outer optic, in combination, have an overall height H and an overall outside dimension D such that the ratio of H/D is equal to or less than 0.25.” '968 patent col. 10 ll. 32–35. The antecedent basis for “the heat sink” in the H/D limitation is found earlier in the claims and requires “a heat sink thermally coupled to the heat spreader, the heat sink being substantially ring-shaped and being disposed around and coupled to an outer periphery of the heat spreader.” *Id.* at col. 10 ll. 21–24. No other heat sink is specified in the claim. Consequently, “the heat sink” that is used in the calculation of the height-to-diameter ratio is the same heat sink that is annularly coupled to the heat spreader.

TCP argued to the Board that Chou's outer flange 22 corresponds to the “heat sink” described in the '968 patent claims. In response, LSG did not dispute that outer flange 22 is a “heat sink,” or that it is configured in a ring-shape around the heat spreader trim 12. Rather, LSG argued that *both* of Chou's heat sinks, i.e., outer flange 22 and heat sink 14, must be included in the calculation of the H/D limitation's height-to-diameter ratio. The Board agreed.

This argument, however, contradicts the plain language of claim 1. The claim only requires that a specific heat sink—the one annularly coupled to the heat spreader—be included in the H/D ratio calculation. The claim does not suggest that *all* heat sinks in the luminaire must be included in this calculation, nor does it suggest that there must be only one heat sink. Indeed, the “comprising” language in the preamble suggests that there may

be additional, unclaimed elements in the device, including additional heat sinks. *See Crystal Semiconductor Corp. v. TriTech Microelecs. Int'l, Inc.*, 246 F.3d 1336, 1348 (Fed. Cir. 2001) (explaining that the word “comprising” in a claim “creates a presumption that the recited elements are only a part of the device, that the claim does not exclude additional, unrecited elements” (citing *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1356 (Fed. Cir. 2000))). And the figures and specification make clear that outer flange 22 and heat sink 14 are separate components of the light fixture that dissipate heat in different directions. *See* Chou col. 5 ll. 3–10 (describing how the majority of heat is vented through the flange outside the can housing, while a portion of the heat is dissipated via heat sink 14 into the can housing).

Reading the H/D limitation to include heat sink 14 is also inconsistent with the '968 patent specification. The specification describes the H/D limitation as “provid[ing] for a low profile [of the] luminaire.” '968 patent col. 4 ll. 1–5. The embodiments disclosed in the '968 patent only include in the H/D calculation all of the elements of the luminaire that are external to the can housing, and exclude any element that is affixed inside the can housing, such as the wire connections or power conditioner 165. *See id.* Figs. 4, 28, 30; *see also id.* at col. 5 ll. 9–15. Neither the claims nor the specification of the '968 patent describe any particular dimensional requirements for components that are to be fixed within the housing. This makes intuitive sense, as it is unclear how the sizing of those elements would contribute to, or detract from, the “low profile” of the luminaire. That Chou's heat sink 14 is inserted “into the recessed can housing” to install the fixture, Chou col. 2 l. 31, and Chou's outer flange 22 is external to the can housing, suggests that Chou's outer flange 22 is the “heat sink” that claim 1 contemplates having low profile dimensions.

Contrary to the Board's decision, the prosecution history does not support a determination that heat sink 14

must be included in the calculation of the H/D limitation. In fact, the prosecution history makes it clear that heat sink 14 is *not* the heat sink recited by claim 1, as it is not configured in a ring shape around and coupled to trim 12. *See* J.A. 679. Importantly, the examiner never addressed whether the outer flange 22 could itself be the anticipatory “heat sink.”

LSG argues that the Board specifically found that “heatsink 14 and trim 12 (including outer flange 22) are part of a singular heat sink in Chou, which cannot be separated without rendering Chou inoperable.” Appellee’s Br. 15. According to LSG, this finding is supported by substantial evidence, including Chou’s disclosure that heat sink 14 and outer flange 22 work together to dissipate heat from trim 12, as well as expert evidence that Chou could not function using only trim 12 and outer flange 22. Citing *In re Morsa*, 713 F.3d 104, 110 (Fed. Cir. 2013), LSG argues that “Chou would not be enabled based on the heat dissipation capabilities of outer flange 22 alone” because it would not function without the additional heat dissipation provided by heat sink 14. Appellee’s Br. 20.

It is well established in our case law that a prior art reference must be enabling in order to anticipate a claim. *See, e.g., Impax Labs., Inc. v. Aventis Pharms. Inc.*, 468 F.3d 1366, 1381 (Fed. Cir. 2006) (“[A] prior art reference must be enabling so that the claimed subject matter may be made or used by one skilled in the art.” (citations omitted)); *Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc.*, 246 F.3d 1368, 1374 (Fed. Cir. 2001) (“To anticipate, the reference must also enable one of skill in the art to make and use the claimed invention.” (citing *In re Donohue*, 766 F.2d 531, 533 (Fed. Cir. 1985))). In *Morsa*, we made clear that “an examiner must determine if prior art is enabling by asking whether a person of ordinary skill in the art could make or use the claimed invention without undue experimentation based on the disclosure of *that particular document*.” 713 F.3d at 110 (emphasis in original).

In so stating, we rejected the idea that an examiner can assess enablement by comparing the disclosures of a prior art reference to the disclosures of the patent application it purportedly anticipates. *Id.* In other words, what matters for enablement is that the allegedly anticipatory invention disclosed by a prior art reference is enabled by that prior art reference. Whether that invention is in fact anticipatory is a separate question.

Here, the invention disclosed in and enabled by Chou clearly includes heat sink 14. TCP does not argue otherwise. Instead, TCP argues that the relevant heat sink for anticipation and obviousness is outer flange 22. TCP's invalidity theory does not require that heat sink 14 be removed from Chou's light fixture. It simply requires considering only the specific heat sink required by claim 1—the one annularly coupled to the heat spreader—when assessing whether the H/D limitation is satisfied. Even accepting all of LSG's evidence regarding the operation of Chou as true, this does not change the fact that claim 1 incorporates only one particular heat sink in its calculation of the claimed height-to-dimension ratio. This is a matter of claim construction, not enablement.

LSG vociferously argues that the Board found that there is only one heat sink in Chou, of which both outer flange 22 and heat sink 14 are a part. The Board's decision is not so clear on this point, however. The Board described that the "arrangement of heat sinking elements disclosed in Chou includes both trim 12 and heatsink 14," *Decision*, 2018 WL 5733733, at \*6, and determined based on this finding that Chou cannot anticipate the H/D limitation without "tearing the invention apart," *id.* at \*7 (quoting *Chudik*, 851 F.3d at 1374). The Board relied primarily on *Chudik* in reaching this conclusion. Like *Morsa*, however, *Chudik* does not support the Board's conclusion.

In *Chudik*, the patent claim at issue related to a medical device used in shoulder replacement surgery. *Id.*

at 1367. The claim required that a “protruding surface” of the device be “arranged to engage the surface” of a particular cavity. *Id.* at 1368. The “protruding surface” in the purportedly anticipatory prior art reference was incapable of engaging the surface of the cavity because an anchoring element of the device was in the way. *Id.* at 1373–74. We held that the prior art reference did not anticipate the claim because it could only meet the claim language if the anchoring element was physically removed, thus distorting the original design. *Id.*

As described above, under a proper reading of claim 1, heat sink 14 need not be physically removed from Chou for Chou to anticipate the claim. Rather, heat sink 14 is irrelevant to the calculation of the height-to-dimension ratio, or any of the other claim limitations, because it is not the “heat sink” contemplated by claim 1 and claim 1 does not require a single heat sinking element.

It is worth noting that the Board reached nearly the opposite result in assessing Chou’s disclosure of a nearly identical claim limitation in a related patent. *See Tech. Consumer Prods. Inc. v. Lighting Sci. Grp. Corp.*, No. IPR2017-01280, 2018 WL 5733727 (P.T.A.B. Oct. 31, 2018) (*TCP II*). When considering whether Chou disclosed a heat spreader, heat sink, and outer optic that “have an overall height H such that the ratio of H/D is equal to or less than 0.25,” the Board in *TCP II* found that Chou’s flange portion 22 and trim 12 mapped to the heat sink and heat spreader elements of the claim. *Id.* at \*10. In doing so, the Board rejected LSG’s identical argument regarding heat sink 14, finding that “Chou’s flange 22 of trim 12 teaches a discrete ‘heat sink’ commensurate with claim 1” and that heat sink 14 was merely an additional, unrecited element. *Id.* It is difficult to reconcile these seemingly inconsistent findings, and we agree with the Board’s analysis in *TCP II*.

CONCLUSION

The Board's determination that Chou does not disclose the H/D limitation in claim 1 of the '968 patent is not supported by substantial evidence. For the reasons described above, we vacate the Board's decision of no anticipation or obviousness of claims 2-4, 6-8, 12, and 16 of the '968 patent and remand for consideration of the parties' remaining arguments.

**VACATED AND REMANDED**

COSTS

Costs to Appellants.