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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HAIMIN TAO

Appeal 2019-005976
Application 15/324,367
Technology Center 2800

Before JOHN A. EVANS, JOHN P. PINKERTON, and
MICHAEL M. BARRY, *Administrative Patent Judges*.

EVANS, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject Claims 1–14, which are all of the claims pending in this application. Appeal Br. 3, *see also* Claims App. 14–18. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.²

¹ We use the word “Appellant” to refer to “Applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Philips Lighting Holding B.V. Appeal Br. 3.

² Rather than reiterate the arguments of Appellant and the Examiner, we refer to the Appeal Brief (“Appeal Br.”) and Claims Appendix (Claims App.), filed November 26, 2018, the Examiner’s Answer (“Ans.”), mailed April 2, 2019, the Final Office Action (“Final”), mailed June 29, 2018, and the Specification (“Spec.”), filed January 6, 2017, for their respective details.

STATEMENT OF THE CASE

Claimed Subject Matter

The claims relate to a tube LED (“TLED”) for retrofit replacement of a dimmable fluorescent tube lamp. Spec. 3:14–16. In one embodiment, the TLED includes a safety switch arranged between a driver circuit arrangement and an LED arrangement within the tube for disconnecting the connectors of the TLED and electrically connecting them only when it is safe to do so. *Id.* at 3:27–30, 4:4–6. Use of the safety switch prevents any significant leakage current from passing between a connected end of the lamp to an exposed end. *Id.* at 4:6–8.

Claims

Claims 1 and 13 are independent. An understanding of the invention can be derived from a reading of illustrative Claim 1, which is reproduced below with some formatting added:

1. A tube LED lamp realised to replace a fluorescent tube lamp, which tube LED lamp comprises a tube containing an LED arrangement with a number of LEDs;

a connector arrangement with connectors realized for insertion into sockets of a socket arrangement of a tube lamp housing incorporating a dimming ballast;

a driver circuit arrangement for driving the LED arrangement, which driver circuit arrangement is realized to output an LED current on the basis of an input current provided by the dimming ballast;

a safety switch arranged within the tube to electrically isolate connectors of the connector arrangement, wherein the safety switch is arranged between the driver circuit arrangement and the LED arrangement; and

a switch control circuit configured to control the safety switch, wherein the switch control circuit receives a high-frequency signal from the dimming ballast.

Appeal Br. 14 (Claims App.).

References

The prior art relied upon by the Examiner is:

Name	Reference	Date
Hartikka et al. (Hartikka)	US 2011/0260614 A1	Oct. 27, 2011
Hausman, JR. (Hausman)	US 2012/0286681 A1	Nov. 15, 2012
Sumitani et al. (Sumitani)	US 2012/0326616 A1	Dec. 27, 2012
Sadwick et al. (Sadwick)	US 2014/0265900 A1	Sept. 18, 2014
Boora et al. (Boora)	US 2015/0137783 A1	May 21, 2015

Rejections on Appeal

Claims 1–7, 9, and 12–14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hartikka and Sadwick. Final 3–6.

Claim 8 stands rejected under 35 U.S.C. § 103 as being unpatentable over Hartikka, Sadwick, and Boora. *Id.* at 6.

Claim 10 stands rejected under 35 U.S.C. § 103 as being unpatentable over Hartikka, Sadwick, and Hausman. *Id.* at 6–7.

Claim 11 stands rejected under 35 U.S.C. § 103 as being unpatentable over Hartikka, Sadwick, and Sumitani. *Id.* at 7.

ANALYSIS

We have reviewed the rejections of Claims 1–14 in light of Appellant’s arguments that the Examiner erred. We have considered in this

decision only those arguments Appellant actually raised in the Briefs. Any other arguments which Appellant could have made but chose not to make in the Briefs are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(iv). We adopt as our own the findings and reasons set forth in the Examiner’s Answer and in the rejection on Appeal for these claims, to the extent consistent with our analysis below. We provide the following explanation to highlight and address specific arguments and findings primarily for emphasis. We consider Appellant’s arguments *seriatim*, as they are presented in the Appeal Brief, pages 7–13.

CLAIMS 1–14:

OBVIOUSNESS BASED ON AT LEAST HARTIKKA AND SADWICK

Appellant presents arguments for the § 103(a) rejection of Claim 1 and relies on those same arguments as a basis for disputing the § 103 rejections of Claims 2–14. Appeal Br. 7–13. Therefore, we analyze these claims on the basis of representative Claim 1, and refer to the rejected claims collectively herein as “the claims.” *See* 37 C.F.R. § 41.37(c)(1)(iv); *In re Marco Guldenaar Holding B.V.*, 911 F.3d 1157, 1162 (Fed. Cir. 2018).

Input Current

Claim 1 recites, among other limitations, “a driver circuit arrangement . . . realized to output an LED current on the basis of an input current provided by the dimming ballast.” The Examiner finds the combination of Hartikka and Sadwick teaches this limitation. Final 3–4 (citing Hartikka ¶ 51; Sadwick ¶ 122). The Examiner explains that “Hartikka disclose[s] the input current is provided to a ballast but does not disclose a dimming ballast,” while “Sadwick discloses wherein the ballast is a dimming ballast.” Ans. 4 (citing Sadwick ¶ 122). The Examiner reasons that “it would have

been obvious to one of ordinary skill in the art to modify the lighting system of Hartikka include a dimming ballast as disclosed in Sadwick to allow retrofitting with different systems and better light control.” *Id.*, see also Final 4.

Appellant argues that “[a]lthough Hartikka discloses a driver circuit, its driver circuit is configured to convert mains voltage not ‘an input current provided by the dimming ballast.’” Appeal Br. 9. This argument is not persuasive because it attacks Hartikka individually, whereas the Examiner relies on the combined teachings of Hartikka and Sadwick for teaching or suggesting the disputed limitation. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

As the Examiner finds, Hartikka’s current supply components within an LED tube teach or at least suggest “a driver circuit arrangement . . . realized to output an LED current . . . on the basis of an input current provided by the . . . ballast.” See Final 3–4 (citing Hartikka ¶ 51); Ans. 3–4. The current supply components “convert the alternating voltage (e.g. 230 VAC) of the mains to direct voltage (dc) and to regulate the dc current.” Hartikka ¶ 51, see also *id.*, Figs. 3A–3C (item 33), Fig. 3D (item 33’). Hartikka also teaches an electronic ballast connected between the mains and an LED tube that provides a continuous electric current to the tube. See, e.g., Hartikka ¶¶ 4, 54, 56, Figs. 1C, 5A (item 12). Hartikka therefore teaches or at least suggests an input current provided by an electronic ballast because power has been received by the current supply components within the tube from the mains through an electronic ballast. Even though “Hartikka does not explicitly state the ballast is a dimming ballast,” the

Examiner finds (Final 4), and we agree, that Sadwick teaches this claim element with the following disclosure:

the LED Fluorescent Lamp Replacement also work with dimming fluorescent lamps ballasts including, but not limited, to DMX, DALI, RS 232, RS422, RS485, universal serial bus (USB), 0 to 10 V (or any other range of voltages including but not limited to 0 to 1 V, 0 to 3 V, 0 to 5 V, 1 to 6 V, 1 to 8 V, etc.), Triac and other phase angle/phase cut dimmers (including both forward and reverse phase cut dimmers), PLC and/or any other type of analog and or digital wired, wireless and/or PLC dimmable fluorescent lamp ballast or related (i.e., HID) ballast.

Sadwick ¶ 122. We also find reasonable the Examiner's rationale to combine the cited teachings of Hartikka and Sadwick—"it would have been obvious to one of ordinary skill in the art to modify the lighting system of Hartikka include a dimming ballast as disclosed in Sadwick to allow retrofitting with different systems and better light control." Ans. 4.

Appellant argues further that "by responding only the mains input, Hartikka's LEDs would not be dimmable even if a dimmable ballast was swapped in to replace Hartikka's ballast." Appeal Br. 9. First, this argument mischaracterizes the cited teachings of Hartikka, which, as discussed above, show that Hartikka's LEDs respond not only to the mains input, but also to an electronic ballast that provides a continuous electric current from the mains input to the LED tube. Second, to the extent Appellant is arguing that the dimming ballast of Sadwick must be bodily incorporated or physically integrated into Hartikka's LED tube and lamp arrangement, "the criterion [is] not whether the references could be physically combined but whether the claimed inventions are rendered obvious by the teachings of the prior art as a whole." *In re Etter*, 756 F.2d

852, 859 (Fed. Cir. 1985). Moreover, Appellant’s argument does not include any persuasive evidence to suggest that integrating Sadwick’s dimming ballast into Hartikka’s lamp arrangement would have been “uniquely challenging or difficult” to a person of ordinary skill, who is “a person of ordinary creativity, not an automaton.” *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007); *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

Safety Switch Arrangement

Claim 1 also recites a “safety switch . . . arranged between the driver circuit arrangement and the LED arrangement.” The Examiner finds Hartikka discloses a safety switch arranged within the tube along the LED circuitry to electrically isolate connectors of the connector arrangement. Final 4 (citing Hartikka ¶¶ 57–60). But, according to the Examiner, “Hartikka’s embodiments . . . do not show wherein the safety switch is arranged between the driver arrangement and the LED arrangement.” *Id.* (citing Hartikka Figs. 2, 3A–3C, 4A–B, 5B–C). The Examiner explains, however, that in Hartikka, ““circuit-breaking switches S1 and S2 may alternatively reside at any point of the LED circuitry as long as they break the current path.”” *Id.* (quoting Hartikka ¶ 68). The Examiner therefore reasons that

the teaching of Hartikka along with the knowledge of that of ordinary skill in the art at the time of filing would make it obvious to one of ordinary skill in the art to change the location of the safety switch as suggested by Hartikka since Hartikka states that the modification would work since protection of the circuit would be achieved no matter where along the [LED] tube the switch was located.”

Id. at 2, *see also id.* at 4.

Appellant argues that even though Hartikka’s circuit-breaking switches could reside at any point along the LED circuitry, “this would not lead a person of ordinary skill in the art to modify Hartikka” to arrange one of its switches between the current supply components and the LED components. Appeal Br. 10. According to Appellant, such a modification would impermissibly “ignore [Hartikka’s] teachings of a preferred location” away from the LEDs and close to the ends of the tube. *Id.* at 9–10.

This argument is not persuasive. In view of Hartikka’s disclosure that “the circuit-breaking switches . . . may . . . reside at any point of the LED circuitry as long as they break the current path,” arranging the switch between the current supply components and the LED components would have been obvious to try for a person of ordinary skill in the art. “When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability.” *KSR*, 550 U.S. at 417. Also,

[w]hen 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 421.³

³ See also *Perfect Web Tech., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009); *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1238 (Fed. Cir. 2010).

Here, there are only a finite number of places to position the switch within the LED tube, such as towards the ends of the tube (e.g., outside the current supply and LED components) or toward the middle of the tube (e.g., between the current supply and LED components). Given Hartikka’s disclosure that the circuit-breaking switches may reside at any point of the LED circuitry, a person of ordinary skill in the art would have had good reason to pursue other arrangements, which would be within their technical grasp. In other words, arranging the safety switch between the driver circuit arrangement and the LED arrangement is no more than a predictable variation or arrangement that would have been obvious.

The fact that Hartikka states, “it is more advantageous to have the circuit-breaking switches . . . as close as possible to the ends of the LED tube lighting fixture,” does not change our position. *See* Hartikka ¶ 68. “A reference does not teach away . . . if it merely expresses a general preference for an alternative invention but does not ‘criticize, discredit, or otherwise discourage’ investigation into the invention claimed.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (citing *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004)). Appellant does not identify any passage in Hartikka that discredits or discourages arranging a circuit-breaking switch between the current supply components and the LED components, and the cited statement does no more than articulate a preference for switches towards the end of the tube. That stated preference is insufficient to teach away from the claimed invention. *See id.*

Appellant argues as well that “[t]he cited art fails to appreciate the advantage” of “the claimed arrangement of the safety switch,” which “simplifies lamp construction and design, since it is only necessary to block

a DC current when the switch is open.” Appeal Br. 10. According to Appellant, “[t]his further confirms non-obviousness because the claims are directed to an arrangement that was not only discouraged by the prior art but which has benefits not appreciated by the prior art.” *Id.*

This argument too is not persuasive. “As long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor.” *In re Beattie*, 974 F.2d 1309, 1312 (Fed. Cir. 1992). Accordingly, “[i]n determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls.” *KSR*, 550 U.S. at 419. Rather, “any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *Id.* at 420. The Examiner’s articulated rationale for combining the teachings of Hartikka and Sadwick is adequate, as it is drawn directly from the Hartikka reference and the knowledge of one of ordinary skill in the art. And, as discussed above, the claimed arrangement of the safety switch, even if not the most advantageous, was not discouraged by Hartikka.

We also note for emphasis that the purported advantage of Appellant’s invention is not commensurate with the scope of claim 1. It appears that Appellant is assuming that its LED circuit includes an element for converting alternating current (AC) from the mains input to direct current (DC), to be used by the LED lamp. According to Appellant’s Specification, prior art switches arranged between the lamp terminals and the LED driver “must be able to conduct an AC current when on, and to block an AC

current when off, and their implementation is relatively complex and expensive.” Spec. 3:11–12. But claim 1 is not so limiting—it does not specify the use of AC, nor does it preclude the exclusive use of DC or specify a difference between the input current and the LED current. Accordingly, given its broadest reasonable interpretation, claim 1 could be performed using only DC, which would negate Appellant’s purported advantage, as only a DC current would need to be blocked regardless of the safety’s switch’s position within the circuit. And, in fact, this is consistent with Appellant’s admitted prior art, which suggests that DC may be used exclusively in the lighting fixture instead of AC. See Spec. 3:9–11 (citing WIPO International Publication No. WO 2013/150417 A1 (published Oct. 10, 2013, “Tao”)); Tao at 12:32–34 (“Furthermore, although the lamp devices 1 includes rectifiers 9, 10 they may be omitted in case the lamp device 1 is used in a lighting fixture providing a DC voltage.”).

High Frequency Signal

Claim 1 further recites “wherein the switch control circuit receives a high-frequency signal from the dimming ballast.” The Examiner finds “[t]he combination of Hartikka and Sadwick disclose[s] . . . [this] limitation[] since Hartikka discloses the switching control circuit receiving high frequency signals from a ballast and Sadwick discloses dimming ballasts.” Final 3 (Response to Arguments). In particular, the Examiner submits that Hartikka discloses “the detection circuits 42 and 43 receive an input current/ voltage from the ballast” and “high-frequency ballasts,” and that Sadwick discloses “a switch control circuit configured to control the safety switch, wherein the switch control circuit receives a signal from the dimming ballast.” Final 4 (citing Hartikka ¶¶ 4, 9, 24, 54), *id.* at 2 (citing Sadwick ¶ 19). The

Examiner also submits that “[t]he signal disclosed by the ballast of Sadwick would be high frequency since the ballast has ‘a high frequency diode bridge.’” Ans. 7 (citing Sadwick ¶ 19).

Appellant argues that “Hartikka does not teach, show, or suggest, a switch control that receives this high frequency signal,” but instead its switch control detects only a heating voltage, which is a low voltage. Appeal Br. 11. Appellant argues further that “Sadwick’s ‘high frequency diode bridge’ does not provide a signal that is received by the switch control circuit.” *Id.* at 12.

As an initial matter, Appellant’s arguments are not persuasive because they attack Hartikka and Sadwick individually, whereas the Examiner relies on the combined teachings of Hartikka and Sadwick for teaching or suggesting the disputed limitation. *Keller*, 642 F.2d at 425. Moreover, for the following reasons, we are not convinced the Examiner erred in finding the combined teachings of Hartikka and Sadwick at least suggest a switch control circuit that receives a high frequency signal from a dimming ballast.

First, consistent with the Examiner’s findings, Hartikka discloses voltage detectors, each of which is connected to contact pins at one of the ends of the LED tube and detects or measures a heating voltage, mains voltage, or some other supply voltage between the pins. *See, e.g.*, Hartikka ¶¶ 57, 61. Hartikka further discloses that the electronic ballast may supply a high frequency voltage to the pins of the LED tube. *See, e.g., id.* ¶¶ 4, 9, 54, 61, Claim 15. These disclosures at least suggest a switch control circuit that receives a high-frequency signal from an electronic ballast. That Hartikka’s voltage detectors may receive a low voltage signal is of no moment because a low voltage signal does not necessarily correspond to and, thus, is not

persuasive evidence of a non-high frequency. Second, the Examiner’s findings also show that Sadwick teaches an LED fluorescent lamp replacement device that works with a dimmer ballast such as DMX, DALI, RS232, RS422, and RS485, and with a high frequency ballast connected to a high frequency diode bridge. *See, e.g.*, Sadwick ¶¶ 19, 101, 109–10, 112, 122. Third, we find the Examiner’s rationale to combine the cited teachings of Hartikka and Sadwick—to “allow retrofitting with different systems and better light control”—to be reasonable. *See* Final 4. And fourth, Appellant does not present any persuasive evidence that combining the above teachings of Hartikka and Sadwick would not have suggested the disputed limitation, or that the combination would require more than a routine exercise of combining familiar elements according to known methods or applying known techniques to achieve predictable results. *See KSR*, 550 U.S. at 416–17 (explaining as examples of combinations likely to be obvious “[t]he combination of familiar elements according to known methods . . . when it does no more than yield predictable results” and “the mere application of a known technique to a piece of prior art ready for the improvement”).

We therefore sustain the Examiner’s § 103 rejection of Claims 1–14.

CONCLUSION

We affirm the Examiner’s rejection of Claims 1–14 under 35 U.S.C. § 103.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv). *See* 37 C.F.R. § 41.50(f).

In summary:

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1-7, 9, 12-14	103	Hartikka, Sadwick	1-7, 9, 12-14	
8	103	Hartikka, Sadwick, Boora	8	
10	103	Hartikka, Sadwick, Hausman	10	
11	103	Hartikka, Sadwick, Sumitani	11	
Overall Outcome			1-14	

AFFIRMED