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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MASARU TAKADA, SHIGEKI ONISHI, and HIDEMOTO ARAI

Appeal 2014-009226
Application 12/936,806
Technology Center 3700

Before LINDA E. HORNER, JEFFREY A. STEPHENS, and ERIC C. JESCHKE, *Administrative Patent Judges*.

HORNER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Masaru Takada et al. (Appellants)[1] seek our review under 35 U.S.C. § 134 of the Examiner's decision rejecting claims 1–3 under 35 U.S.C. § 103(a) as unpatentable over Liu (US 2006/0130508 A1, published June 22, 2006, hereinafter "Liu"). We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] Appellants identify the real party in interest as Mitsubishi Electric Corporation. Appeal Br. 2.

CLAIMED SUBJECT MATTER

Appellants' claimed subject matter relates to a "heat exchange ventilator." Spec. para. 1.[2] Claims 1, 2, and 3 are independent. Claim 1 is illustrative of the subject matter on appeal and is reproduced below.

> 1. A heat exchange ventilator comprising:
>
> a supply air duct that takes in outdoor air and blows it out indoors;
>
> an exhaust air duct that takes in indoor air and blows it out outdoors; and
>
> a plurality of heat exchangers that exchange heat between outdoor air flowing down through the supply air duct and indoor air flowing down through the exhaust air duct, the heat exchangers being arranged in series from an outdoor side to an indoor side,
>
> wherein a sensible heat exchange efficiency of a heat exchanger arranged on a most outdoor side is higher than a sensible heat exchange efficiency of a heat exchanger arranged on an indoor side adjacent to the heat exchanger arranged on the most outdoor side,
>
> wherein the heat exchanger arranged on the most outdoor side takes in the outdoor air from an inlet of the supply air duct and a heat exchanger arranged on a most indoor side takes in the indoor air from an inlet of the exhaust air duct, and the outdoor air flows through the heat exchangers in order from the outdoor side to the indoor side while the indoor air flows through the heat exchangers in order from the indoor side to the outdoor side.

Independent claims 2 and 3 also each recite a heat exchange ventilator, wherein the heat exchanger arranged on the most outdoor side

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[2] Citations to "Spec." refer to the Substitute Specification, as filed on October 7, 2010.

takes in the outdoor air from an inlet of the supply air duct and a heat exchanger arranged on a most indoor side takes in the indoor air from an inlet of the exhaust air duct, and the outdoor air flows through the heat exchangers in order from the outdoor side to the indoor side while the indoor air flows through the heat exchangers in order from the indoor side to the outdoor side. Claim 3, similar to claim 1, likewise recites that a sensible heat exchange efficiency of the outdoor side heat exchanger is higher than a sensible heat exchange efficiency of the indoor side heat exchanger. Claim 2 does not contain this sensible heat exchange efficiency limitation. Rather, claim 2, and also claim 3, recites that a latent heat exchange efficiency of the outdoor side heat exchanger is lower than a latent heat exchange efficiency of the indoor side heat exchanger.

ANALYSIS

The Examiner found that Liu discloses a heat exchange ventilator having a first heat exchanger 70 and a second heat exchanger 41 that are arranged serially and exchange heat between indoor air and outdoor air. Final Act. 2 (citing Liu, Fig. 4, para. 19). The Examiner found that Liu suggests that V-shaped heat-pipe heat exchanger 70 could be placed on sides AD of total heat exchanger 41, and that in such a configuration the first heat exchanger 70 would be arranged on a most outdoor side and the second heat exchanger 41 would be arranged on a most indoor side of the heat exchange ventilator. *Id.* at 3 (citing Liu, para. 24). The Examiner further found that first heat exchanger 70 only exchanges sensible heat and comprises copper and second heat exchanger 41 exchanges both latent and sensible heat. *Id.* at

2 (citing Liu, paras. 20, 22); *see also* Ans. 8 (Examiner finding that "Liu recognizes that total heat exchangers are primarily geared toward latent heat exchange as opposed to sensible heat exchange") (citing Liu, para. 5). Based on these findings, and the Examiner's understanding of the purpose of Liu, the Examiner found that Liu's first heat exchanger 70 has a higher sensible heat exchange efficiency than the second heat exchanger 41, explaining:

> Although Liu does not appear to explicitly disclose relative latent and sensible heat exchange efficiencies of the first and second heat exchangers, the reference recognizes that "total heat exchangers (moisture heat exchangers)" (e.g. the second heat exchanger) have limited sensible heat exchange potential as they are primarily geared toward moisture exchange (Paragraph 5). Liu compensates for this deficiency by incorporating a dedicated sensible heat exchanger (e.g. the first heat exchanger) formed from relatively high thermal conductivity materials. As a result, it is understood from Liu that the first heat exchanger has high sensible heat exchange efficiency and low latent heat exchange efficiency, relative to the second heat exchanger.

Id. at 2–3 (citing Liu, para. 5).

Appellants argue that the Examiner erred in rejecting claims 1 and 3 because Liu does not disclose that a sensible heat exchange efficiency of an outdoor side heat exchanger is higher than a sensible heat exchange efficiency of an indoor side heat exchanger. Appeal Br. 7. In particular, Appellants contend that "[i]t is not necessary, nor does Liu disclose, that the relative sensible heat exchange efficiency of the first heat exchanger 70 be greater than that of the second heat exchanger 41" in order to achieve Liu's goal "merely to increase the sensible heat exchange." *Id.* at 8.

Liu discloses that "the exchange of heat and moisture between different air flows [in a stationary-type total heat exchanger] is conducted only in its total heat exchange member by resorting to the heat-conductivity and moisture-permeability capabilities of the partition plates 2, which results in a limited sensible heat exchange rate as the partition plates 2 typically have its focus placed on the capability of moisture-permeability rather than heat-conductivity." Liu, para. 5. Liu describes that "[t]ypically, partition plates 2 are specially treated papers with the capability of heat conductivity and moisture permeability, and may be made from a carbon-fiber based material such as ceramic fibers, asbestos, [or] fiber glass impregnated with a hydrophilic material." *Id.*, para. 4 (describing prior art total heat exchanger of Fig. 7). Liu identified "there is a need for a total heat exchanger which can improve the sensible heat exchange effect between different air flows conducting heat exchange in the total heat exchanger." *Id.*, para. 6. Liu's total heat exchanger 10*a* includes a V-shaped heat-pipe heat exchanger 70 that covers two adjacent surfaces of total heat exchange member 41. *Id.*, para. 22. In this embodiment, heat exchanger 70 allows for a sensible heat exchange between the supplied air and the exhausted air, while total heat exchange member 41 allows for a total heat exchange of heat and moisture therebetween. *Id.* Liu discloses that the total heat exchange member may be constructed according to the prior art, as shown in Figure 7, and that the heat pipes and cooling fins of the heat-pipe heat exchanger are made from high thermally conductive materials such as copper or aluminum. *Id.*, paras. 18, 20. Thus, Liu's total heat exchanger 10*a* increases the sensible heat

exchange efficiency between the supplied air and the exhausted air as compared to a prior art total heat exchanger that lacks the heat-pipe heat exchanger. *Id.*, para. 22.

The express and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. §§ 102 or 103. *In re Napier*, 55 F.3d 610, 613 (Fed. Cir. 1995) ("The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness."). "[W]hen the PTO shows sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990); *see also In re Best*, 562 F.2d 1252, 1255 (CCPA 1977) ("Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product."); *In re King*, 801 F.2d 1324, 1327 (Fed. Cir. 1986) (finding it insufficient for an appellant to merely assert that the prior art does not inherently possess the characteristic relied on and challenge the PTO to prove the contrary by experiment or otherwise, noting that"[t]he PTO is not equipped to perform such tasks"). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999).

For the reasons that follow, we find that the Examiner had a sound basis for finding that the heat-pipe heat exchanger 70 of Liu has a higher sensible heat exchange efficiency than the total heat exchanger 41. We further find that Appellants have not met their burden to show that the heat-pipe heat exchanger 70 of Liu fails to necessarily or inherently possess the higher sensible heat exchange efficiency characteristics as claimed.

In particular, as noted by the Examiner, Liu's heat-pipe heat exchanger includes heat pipes and fins made of materials such as copper having high thermal conductivity. Final Act. 2–3; Ans. 8. As discussed *supra*, the partition plates of Liu's total heat exchanger 41 are made of a carbon-fiber-based material capable of heat conductivity and moisture permeability. Further, Liu acknowledges that the total heat exchanger 41 has a limited sensible heat exchange rate because the partition plates are focused on the moisture permeability characteristic of the material at the expense of the heat conductivity. Liu, para. 5. Based on these disclosures in Liu, we find that the Examiner had a sound basis for finding that Liu's heat-pipe heat exchanger 70, which exchanges only sensible heat, has a higher sensible heat exchange efficiency and lower latent heat exchange efficiency than Liu's total heat exchanger 41. Ans. 9. Appellants' argument (Appeal Br. 8–9) that it is not necessary to achieve the goals of Liu to provide an additional heat exchanger having a higher sensible heat exchange efficiency than Liu's total heat exchanger is unavailing. Appellants' arguments fail to address the specific materials disclosed in Liu for the heat-pipe heat exchanger 70 and the total heat exchanger 41, and the relative sensible heat

exchange properties of these materials. Thus, Appellants have failed to demonstrate error in the Examiner's determination that, based on the specific construction of the heat-pipe heat exchanger 70 disclosed in Liu, the first heat exchanger (heat-pipe heat exchanger 70) would have a higher sensible heat exchange efficiency than the second heat exchanger (total heat exchanger 41).

Appellants further argue that the Examiner erred in rejecting claims 1, 2, and 3, because in the embodiment depicted in Figure 4 of Liu, "the outdoor air and the indoor air flow through the plurality of heat exchangers in the same order" and that "according to claim 1, the outdoor air and the indoor air flow through the plurality of heat exchangers in opposing directions." Appeal Br. 10; *see also* Reply Br. 6. This argument, however, does not address the Examiner's rejection, which is based on a modification to the embodiment of Figure 4 to place the heat-pipe heat exchanger 70 on sides AD of total heat exchanger 41, as explicitly taught as an alternate embodiment in Liu. Final Act. 3 (citing Liu, para. 24).

Appellants further argue that "[e]ven if the heat exchangers were rearranged as suggested by paragraph [0024], this would merely place the heat exchanger 41 before the heat exchanger 70." Appeal Br. 11–12. Appellants also contend that in this modified embodiment of Liu, the heat exchanger 70 "is now arranged on an indoor side and not on an outdoor side." Reply Br. 8. We disagree with these assertions. As explained by the Examiner, in this modified embodiment of Figure 4, heat-pipe heat exchanger 70 would be arranged on the most outdoor side and take in the

outdoor air from an inlet (outdoor air opening 65a) of the supply air duct and total heat exchanger 41 would be arranged on the most indoor side and take in the indoor air from an inlet (indoor air opening 66a) of the exhaust air duct, as called for in each of the claims. *See* Final Act. 4 (annotated Figure 4 of Liu showing outdoor and indoor air flows). Further, Liu describes that total heat exchanger 41 defines a first air passage extending through surfaces A and C and a second air passage extending through surfaces B and D. Liu, para. 18. Thus, in this modified embodiment of Figure 4 of Liu, the outdoor air flows through a first heat-pipe heat exchanger 70 (via side A) and would exchange heat with the indoor air flow (via the portion of heat exchanger 70 on side D). This heat exchange occurs after the indoor air flow already has exchanged heat with the outdoor air flow in total heat exchanger 41, similar to the flow depicted in Appellants' Figure 2. The outdoor air then flows through total heat exchanger 41 and is output to the indoor side (via outlet 68). Conversely, the indoor air flows first through total heat exchanger 41 and then through heat-pipe heat exchanger 70 before being exhausted to the outdoor side (via outlet 69). Thus, in Liu's modified Figure 4 embodiment, the outdoor air flows through heat exchanger 70 and then heat exchanger 41 in order from the outdoor side to the indoor side, and the indoor air flow through heat exchanger 41 and then heat exchanger 70 in order form the indoor side to the outdoor side, as called for in each of the claims.

For these reasons, Appellants have not demonstrated error in the Examiner's rejection of claims 1–3 under 35 U.S.C. § 103(a) as unpatentable over Liu.

DECISION

The decision of the Examiner to reject claims 1–3 is AFFIRMED.

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

AFFIRMED