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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YURI ANATOLY KARPENKO, CHARLES K. EVANS,
J. CHRIS OAKWOOD, and PETER KOWALOW

Appeal 2018-002535¹
Application 14/843,008²
Technology Center 3600

Before HUBERT C. LORIN, NINA L. MEDLOCK, and
BRADLEY B. BAYAT, *Administrative Patent Judges*.

MEDLOCK, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner’s final rejection of claims 1–20. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ Our decision references Appellants’ Appeal Brief (“App. Br.,” filed May 30, 2017) and Reply Brief (“Reply Br.,” filed November 21, 2017), and the Examiner’s Answer (“Ans.,” mailed September 21, 2017), Advisory Action (“Adv. Act.,” mailed March 23, 2017), and Final Office Action (“Final Act.,” mailed December 29, 2016).

² Appellants identify Ford Global Technologies, LLC as the real party in interest. App. Br. 2.

CLAIMED INVENTION

Appellants' claimed invention "relates to brake pads that reduce brake squeal noise caused by brake rotor tangential modes" (Spec. ¶ 1).

Claims 1, 9, and 16 are the independent claims on appeal. Claims 1 and 16, reproduced below, are illustrative of the claimed subject matter:

1. A brake pad comprising:
a body having upper and lower edges, a friction surface extending between the upper and lower edges for engaging a rotor, and a notch located along a section of the upper edge,
wherein the notch has an arc length of about 1/4 to about 1/2 of an arc length of the brake pad and a depth of about 1/8 to about 1/6 of a height of the brake pad, and
wherein, during engagement with the rotor, the notch is configured to reduce squeal noise caused by tangential modes of the rotor. (App. Br., Claims Appendix, 36.)

16. A method of reducing brake squeal noise from rotor tangential modes, comprising:
removing a portion of a brake pad along a section of an upper edge of the pad, the portion being positioned and sized to prevent contact between a friction surface of the pad and a rotor, during engagement of the friction surface with the rotor, at an area of the rotor having a potential for high modal displacement in a tangential direction. (App. Br., Claims Appendix, 39.)

REJECTIONS

Claim 9 is rejected under 35 U.S.C. § 112(b) as indefinite for failing to particularly point out and distinctly claim the subject matter that Appellants regard as the invention.

Claims 1–20 are rejected under 35 U.S.C. § 103(a) as unpatentable over Liu et al. (US 8,151,433 B2, iss. Apr. 10, 2012) ("Liu").

ANALYSIS

Indefiniteness

The Examiner rejected claim 9 under 35 U.S.C. § 112(b) as indefinite on the ground that “[c]laim 9 recites the limitation ‘the brake pad’ in line 6” and “[t]here is insufficient antecedent basis for this limitation in the claim.” Final Act. 2.

Appellants filed an Amendment After Final on February 28, 2017 in which claim 9 was amended to obviate the indefiniteness rejection. The Examiner entered the amendment in a communication mailed December 26, 2017 (after an administrative remand to the Examiner). The rejection, as set forth in the Final Office Action, does not address the claim language before us on appeal. Accordingly, the rejection is not sustained.

Obviousness

Independent Claim 1 and Dependent Claims 2–8

In rejecting independent claim 1 under § 103(a), the Examiner cites Liu as disclosing substantially all of the limitations of claim 1, including “a notch located along a section of the upper edge,” i.e., Liu’s relieved portion 38 (Final Act. 3). The Examiner acknowledges that Liu does not disclose that “the notch has an arc length of about 1/4 to about 1/2 of an arc length of the brake pad and a depth of about 1/8 to about 1/6 of a height of the brake pad,” as called for in claim 1 (*id.* at 4). The Examiner, however, notes that Liu discloses “dynamometer tests (SAE J2521) used as test procedure” (*id.*) (citing Liu col. 11, ll. 14–47, Examples 1–3, and Table 1), and that Appellants’ Specification also discloses use of the SAE J2521 test procedure (*id.*). The Examiner, thus, concludes that it would have been

obvious to a person of ordinary skill in the art at the time of Appellants' invention,

to merely provide friction material of Liu et al. with the notch having an arc length of about 1/4 to about 1/2 of an arc length of the brake pad and a depth of about 1/8 to about 1/6 of a height of the brake pad which are relatively broad, in order to yield predictable results of reducing squeal noise and vibration modes of the rotor via design, experiment, and test depending upon the type of material used, size and shape of the brake pad.

Id.

Appellants argue, and we agree, that the rejection cannot be sustained at least because the Examiner has not established that a person of ordinary skill in the art would have had an apparent reason to modify Liu, as the Examiner proposes (App. Br. 19–21; *see also* Reply Br. 5–11).

Responding to Appellants' argument, the Examiner asserts in the Answer that the claimed dimensions for the notch would have been the obvious result of "routine experimentation" and testing (Ans. 4) (citing Manual of Patent Examining Procedure ("MPEP") § 2144.04(II)(A)).³ As best understood, the Examiner's position is that the proposed modification would have been an obvious result of optimizing the arc length and depth of Liu's relieved portion 38. The cited portions of Liu, however, do not disclose optimizing the arc length and depth of relieved portion 38.

³ We treat the Examiner's reference to MPEP § 2144.04(II)(A) ("Omission of an Element and Its Function Is Obvious if the Function of the Element Is Not Desired") as a typographical error. As best understood, the Examiner relies on MPEP § 2144.05(II)(A) ("Optimization Within Prior Art Conditions or Through Routine Experimentation").

Example 1 of Liu discloses a modified inner pad that “includes a diamond chamfer 66, center slot 31, and top center V-chamfer 37” (Liu col. 12, ll. 51–53). Example 2 of Liu discloses a “modified pad shape which includes a parallel chamfer 62, center slot 31, and V-chamfers 37” (*id.* col. 12, l. 67 – col. 13, l. 2). Example 3 of Liu discloses “alternative pad shapes” that “include parallel chamfer 62, radial chamfer 64, diamond chamfer 66, as well as combinations of regular chamfer 60, slot 31 and top/bottom V-chamfer” (*Id.* col. 13, ll. 59–62). Table 1 of Liu is entitled “Summary of noise performances of 15 brake applications” and lists results from “dynamometer tests (SAEJ2521)” (*id.* col. 13, ll. 63–64). As shown in Table 1 of Liu, the 15 new pad shapes in the right-hand column include various combinations of slots, notches, and chamfers. But, there is no disclosure there, or in the other cited portions of Liu, of optimizing an arc length and depth of a notch or relieved portion. As such, we find no disclosure or suggestion in Liu that the claimed notch arc length and depth are recognized as result-effective variables. *Cf. In re Antonie*, 559 F.2d 618, 620 (CCPA 1977) (One exception to “the rule that the discovery of an optimum value of a variable in a known process is normally obvious” applies where “the parameter optimized was not recognized to be a result-effective variable.”).

The Examiner has not established, on this record, that a person of ordinary skill in the art would have had an apparent reason to modify Liu, as the Examiner suggests, to arrive at the claimed invention, as recited in claim 1. As such, the Examiner has failed to establish a prima facie case of obviousness. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (holding that a prima facie case of obviousness requires showing that one of

ordinary skill in the art would have had both an apparent reason to modify the prior art and predictability or a reasonable expectation of success in doing so).

We do not sustain the Examiner's rejection of claim 1 under 35 U.S.C. § 103(a). For the same reasons, we also do not sustain the rejection of dependent claims 2–8. *Cf. In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) (“dependent claims are nonobvious if the independent claims from which they depend are nonobvious”).

Independent Claim 9 and Dependent Claims 10–15

Independent claim 9 includes language substantially similar to the language of claim 1, and stands rejected based on the same rationale applied with respect to claim 1 (Final Act. 5–7). Therefore, we do not sustain the Examiner's rejection under 35 U.S.C. § 103(a) of independent claim 9 and claims 10–15, which depend therefrom, for the same reasons set forth above with respect to claim 1.

Independent Claim 16 and Dependent Claims 17–20

In rejecting independent claim 16 under § 103(a), the Examiner takes the position that Liu discloses a method of reducing brake squeal noise from rotor tangential modes, as recited in claim 16. (Final Act. 7). According to the Examiner, the “[i]nventors' claim and Liu's disclosure both show [removing a portion of a brake pad at] the same location,” i.e., along a section of an upper edge of the pad, and “[t]he effect of removing a portion of a brake pad along a section of an upper edge of the pad will result in reducing brake squeal noise from rotor **tangential and/or normal modes**” (Adv. Act. 3) (citing Liu col. 11, ll. 51–52). Appellants argue, and we agree,

that the Examiner's position is based on a conclusory assertion of inherency (App. Br. 23–25).

Responding to Appellants' argument, the Examiner asserts in the Answer that "the end result of reducing squeal noise caused by rotor tangential modes will follow the same as the structure of removing a portion (notch) on the upper edge of the brake pad that appears for both Appellants' and Liu's brake pad" (Ans. 5). According to the Examiner, "having the same pad structure of having a notch on upper edge section thus will perform the same function of reducing squeal noise caused by rotor tangential modes" (*id.*) (citing Liu col. 8, l. 62 – col. 9, l. 12).

There is no dispute that Liu discloses forming a notch or relieved portion 38 along an upper edge of a brake pad. Yet, we find nothing in the cited portions of Liu to indicate that relieved portion 38 is formed "at an area of the rotor having a potential for high modal displacement in a tangential direction" as called for in claim 16. For example, Liu discloses, at column 11, lines 52–53, that "[d]uring a brake squeal event, the friction forces, both normal and tangential, arise from the contact of rotor and pads." But the mere recognition in Liu of the *existence* of noise caused by tangential forces does not support the Examiner's position that the relieved portion 38 of Liu's brake pad corresponds to "an area of the rotor having a potential for high modal displacement in a tangential direction." As Appellants point out (App. Br. 17), Liu explicitly discloses that "[i]n-plane modes [i.e., rotor tangential modes] . . . are . . . not considered as no clear

indication of pad shape design can be derived” (Liu col. 12, ll. 17–20).⁴ *See In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (An inherency-based rejection requires objective evidence or technical reasoning that makes clear that the allegedly inherent feature necessarily flows from the teaching of the cited prior art, and that it would be so recognized by persons of ordinary skill in the art).

In view of the foregoing, we do not sustain the Examiner’s rejection under 35 U.S.C. § 103(a) of independent claim 16 and claims 17–20, which depend therefrom.

DECISION

The Examiner’s rejection of claim 9 under 35 U.S.C. § 112(b) is reversed.

The Examiner’s rejection of claims 1–20 under 35 U.S.C. § 103(a) is reversed.

REVERSED

⁴ As disclosed in the Specification, in-plane modes are equivalent to tangential modes. *See* Spec. ¶ 27 (“rotor tangential modes (otherwise referred to as in-plane or circumferential modes).”).