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ALFRED J MANGELS
4729 CORNELL ROAD
CINCINNATI, OH 452412433

| EXAMINER | |
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| SETLIFF, MATTHIEU F | |

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* FLORIAN VOGEL

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Appeal 2017-010961
Application 13/845,012
Technology Center 3600

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Before HUBERT C. LORIN, AMEE A. SHAH, and ROBERT J. SILVERMAN, *Administrative Patent Judges*.

SHAH, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

The Appellant[2] appeals under 35 U.S.C. § 134(a) from the Examiner's final decision rejecting claims 1–10. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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[1] Throughout this Decision, we refer to the Appellant's Appeal Brief ("Appeal Br.," filed Apr. 28, 2017), Reply Brief ("Reply Br.," filed Aug. 22, 2017), and Specification ("Spec.," filed Mar. 17, 2013, as amended July 2, 2015), and to the Examiner's Answer ("Ans.," mailed June 22, 2017) and Final Office Action ("Final Act.," mailed Sept. 29, 2016).

[2] According to the Appellant, the real parties in interest are the inventor (Florian Vogel), LuK GmbH & Co. KG, and Schaeffler Technologies AG & Co. KG. Appeal Br. 3.

STATEMENT OF THE CASE

The Appellant's invention "relates to a clamping device for a shaft-hub connection in a torque-transferring device in a drivetrain of a vehicle." Spec. 1, ll. 14–15.

Claims 1 and 4 are the independent claims on appeal. Claim 1 (Appeal Br. A-1–A-2) is illustrative of the subject matter on appeal and is reproduced below (with added bracketing for reference):

> 1. A clamping device for an axially engageable shaft-hub connection in a torque-transferring device in a drive train of a vehicle, said clamping device comprising:
>
> [(a)] an axial spline connection between an externally toothed shaft and an internally toothed hub for an axial plug connection of the externally toothed shaft and the internally toothed hub;
>
> [(b)] a toothed ring for circumferentially clamping the externally toothed shaft and the internally toothed hub when they form the axial spline connection,
>
> [(c)] wherein the toothed ring includes an annular body having teeth with intervening recesses formed on one of a radially inner circumferential edge and a radially outer circumferential edge, and includes a plurality of fastening tongues carried by the annular body and extending circumferentially relative to the annular body from one of the radially inner circumferential edge and the radially outer circumferential edge of the annular body,
>
> [(d)] wherein the fastening tongues have a curvature in the axial direction of the toothed ring and have a second end connected to the annular body of the toothed ring and a first end spaced circumferentially from the second end and spaced axially from the annular body, the first end adapted to be connected to one of the toothed components that form the axial spline connection,
>
> [(e)] wherein the fastening tongues have elasticity and have a curvature relative to an axial direction of the annular

body of the toothed ring, so that when the first ends of the fastening tongues are attached to one of the toothed components that form the axial spline connection, the one toothed component to which the fastening tongue first ends are attached and the annular body of the toothed ring lie in different axial planes,

[(f)] wherein the fastening tongues have both circumferential and axial elasticity relative to the annular body of the toothed ring to allow both axial and circumferential relative movement between the hub and the shaft of the axial spline connection;

[(g)] wherein the teeth of the toothed ring mesh with one of teeth of the internally toothed hub and teeth of the externally toothed shaft; and

[(h)] wherein by rotating the toothed ring against a circumferential force exerted by the fastening tongues a circumferential clamping force is produced on the shaft-hub connection when the axial spline connection is in a connected state, which circumferential clamping force is introduced into the shaft-hub axial spline connection through connection of the teeth of the toothed ring with one of the externally toothed shaft and the internally toothed hub and connection of the fastening tongues with the other of the externally toothed shaft and the internally toothed hub to eliminate tooth contact noises that develop as a result of play in the shaft-hub connection of the axial spline connection.

## THE REJECTION[3]

Claims 1–7 stand rejected under pre-AIA 35 U.S.C. § 103(a) as being obvious over Caray et al. (US 4,588,062, iss. May 13, 1986) ("Caray") in view of Nakane et al. (US 5,797,474, iss. Aug. 25, 1998) ("Nakane").

[3] The Examiner has withdrawn the rejection of claim 1–7 under 35 U.S.C. § 102(b) as anticipated by Caray. Ans. 7.

## ANALYSIS

We agree with the Appellant's contention that the Examiner's rejection under 35 U.S.C. § 103 of the independent claims is in error because the Examiner has not adequately shown how Caray and Nakane are combined to teach "a first end spaced circumferentially from the second end and spaced axially from the annular body, the first end adapted to be connected to one of the toothed components that form the axial spline connection," as recited in limitation (d) of claim 1 and similarly incorporated in claim 4. *See* Appeal Br. 22–23; Reply Br. 9–10.

The Examiner finds, in relevant part, that Caray teaches a fastening tongue (deformable arm 32) having a first end (end near radially inwardly enlarged portion 47). *See* Final Act. 4; *see also* Caray Fig. 7. The Examiner acknowledges that "[w]hile not expressly, positively, and clearly set forth in the instant claim, Caray does not expressly (although possibly implicit as noted above) disclose the first end of the fastening tongue being spaced in the axial direction from the annular body." *Id.* at 6. Thus, the Examiner relies on Nakane for teaching "a ring that includes an annular body (e.g. central most annular portion including openings 254-257) and fastening tongues (e.g. 233) having a first end (e.g. end near 232) spaced both circumferentially and axially from the annular body." *Id.* The Examiner determines one of ordinary skill would have such spacing "in order to prevent interference of the annular body with the fastening tongues during the application of circumferential twists (Col. 6, L 1-3)," and to "compensate for axial misalignment and/or assembly tolerances." *Id.* at 6–7.

Caray discloses a torsion damping assembly comprising, in relevant part, a resiliently deformable arm with a support member. *See* Caray

Abstract. Resiliently deformable arm 32 is attached to second coaxial part B by pin 45 and is adapted to rotate around pin 45. *Id.* at col. 5, ll. 45–50. Arm 32 includes radially inwardly enlarged portion 47 at its free end having aperture 46 in which pin 45 is received. *Id.* at col. 5, ll. 50–53. Nakane discloses a clutch disc with damper plates (Nakane Abstract) having, in relevant part, a plurality of arc-like cut line or slits formed to cause adjacent structures centrifugally spirally to be "dislocated from each other in the axial direction of the clutch axis" (*id.* at col. 5, ll. 56–66). The dislocation is "between an inner plate **231** positioned at the inner peripheral side of the damper plate **23** and an outer plate **232** positioned at the peripheral side thereof" (*id.* at col. 14, ll. 16–19) and "causes a plate **233** positioned intermediate between the inner plate **231** and the outer plate **232** to be inclined by a slight angle a and vertically spiral along the clutch axis (C)" (*id.* at col. 14, ll. 22–25). Due to dislocation between upper surface and lower surface of the damper plate, there is a little gap in the slit and cut line in the axial direction of the clutch disc. *Id.* at col. 14, ll. 26–37, Figs. 5(a), 5(b). "[W]hen the adjacent structures are dislocated radially from each other as a result of circumferential twists applied thereto, the arc-like cut lines or the arc-like slits do not interfere with each other." *Id.* at col. 5, l. 67–6, l. 3.

The Examiner combines Nakane's end near plate 232 with Caray's end near portion 47. *See* Final Act. 6–7. Even were we to agree that Nakane teaches plate 232 spaced circumferentially and axially from the annular body, as the Appellant states, "in the Caray et al. reference each of the individual outer ends (element 47 in Fig. 5) are free, whereas in the Nakane et al. structure the ends of spiral plates 233 are interconnected with one of inner plate 231 and outer plate 232." The Examiner has not adequately explained how the "end" of Nakane's interconnected plate 232 is combined with Caray's free end of portion 47 such that Caray's portion 47 is spaced axially from the annular body. We do not see, and the Examiner does not adequately explain how Nakane's plate end, spaced such so that "the arc-like cut lines or the arc-like slits do not interfere with each other" (Nakane, col. 6, l. 3), would be combined with Caray's end with aperture 46 through which pin 45 is received, attaching the arm to another part, "in order to prevent interference of the annular body with the fastening tongues during the application of circumferential twists" or to "compensate for axial misalignment and/or assembly tolerances" (Final Act. 7).

Accordingly, based on the record before us, we do not sustain the rejection of independent claims 1 and 4, and of dependent claims 2, 3, and 5–10, under 35 U.S.C. § 103(a).

## DECISION

The Examiner's rejection of claims 1–10 under 35 U.S.C. § 103 is REVERSED.

## REVERSED