



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/346,704	03/21/2014	Takehiro Kanayama	DK-US145059	8106
22919	7590	11/15/2018	EXAMINER	
GLOBAL IP COUNSELORS, LLP David Tarnoff 1233 20TH STREET, NW Suite 600 WASHINGTON, DC 20036-2680			HANSEN, KENNETH J	
			ART UNIT	PAPER NUMBER
			3746	
			NOTIFICATION DATE	DELIVERY MODE
			11/15/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailpto@giplaw.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TAKEHIRO KANAYAMA, NAOTO TOMIOKA,
and YUUICHIROU WATANABE

Appeal 2018-001237¹
Application 14/346,704²
Technology Center 3700

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 1–16. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ Our decision references Appellants’ Appeal Brief (“App. Br.,” filed May 16, 2017) and Reply Brief (“Reply Br.,” filed November 16, 2017), and the Examiner’s Answer (“Ans.,” mailed September 20, 2017), and Final Office Action (“Final Act.,” mailed November 17, 2016).

² Appellants identify Daikin Industries, Ltd. as the real party in interest. App. Br. 4.

CLAIMED INVENTION

Appellants' claimed "invention relates to a compressor to be used in, for example, air conditioners, refrigerators[,] and the like." (Spec. ¶ 1).

Claims 1 and 7 are the independent claims on appeal. Claim 1 is illustrative of the claimed subject matter:

1. A compressor comprising:
 - a closed container;
 - a compression element disposed in the closed container;and
 - a motor disposed in the closed container, the motor being configured and arranged to drive the compression element via a shaft,
 - the compression element including
 - a first bearing configured and arranged to support a first shaft portion of the shaft,
 - a second bearing configured and arranged to support a second shaft portion of the shaft, and
 - at least one cylinder disposed between the first bearing and second bearing, the at least one cylinder having at least one cylinder chamber
 - the first bearing being disposed closer to the motor than the second bearing,
 - the first bearing having a first annular groove opened to the at least one cylinder chamber and a first annular shaped elastic portion positioned radially inside of the first annular groove provided in a first opposing surface thereof that is opposed to the at least one cylinder,
 - the second bearing having a disc-shaped end plate portion, a boss portion provided in a center of the end plate portion, and a second annular groove opened to the at least one cylinder chamber and a second annular shaped elastic portion positioned radially inside of the second annular groove provided in a second opposing surface thereof that is opposed to the at least one cylinder, with a depth of the second annular groove being smaller than a thickness of the disc-shaped [end] plate portion,

a diameter of the second shaft portion being smaller than a diameter of the first shaft portion, and
a rigidity of the second elastic portion being smaller than a rigidity of the first elastic portion.

REJECTION

Claims 1–16 are rejected under 35 U.S.C. § 103(a) as unpatentable over Miura et al. (US 2011/0067434 A1, pub. Mar. 24, 2011) (hereinafter “Miura”).

ANALYSIS

Independent Claim 1 and Dependent Claims 2–6, 8–12, 15, and 16

In rejecting independent claim 1 under § 103(a), the Examiner cites Miura as disclosing a compressor comprising a “first bearing having a first annular groove” and a “second bearing having a disc-shaped end plate portion . . . and a second annular groove” (Final Act. 3–4 (citing Miura Fig. 2)). In particular, the Examiner equates Miura’s main bearing 21 to the claimed “first bearing” and Miura’s sub-bearing 22 to the claimed “second bearing” (*id.* at 3).

The Examiner acknowledges that Miura does not disclose, in its Figure 2 embodiment, that “the depth of the second annular groove [in the second bearing, i.e., sub-bearing 22, is] smaller than a thickness of the disc-shaped [end] portion,” as called for in claim 1 (*id.* at 5). However, the Examiner notes that, in the Figure 3 embodiment, Miura shows an annular groove Ka, provided in a bearing end-plate portion 21a of bearing 21 (i.e., the claimed “first bearing”) having a groove depth smaller than the thickness of the plate portion (*id.*) (citing Miura ¶¶ 92 and 101). And the Examiner proposes to modify Miura such that groove Kd in sub-bearing 22 (i.e., the

claimed “second bearing”), as shown in Figure 3, has a smaller groove depth than the thickness of flange 22a of sub-bearing 22.

According to the Examiner, Miura “establishes that groove depth is a result effective variable that affects hydrodynamic oil film thickness and the rigidity of the shaft bearing system” (*id.*) (citing Miura ¶¶ 64 and 65). 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 form the second annular groove smaller than a thickness of the disc-shaped portion since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges involves only routine skill in the art” (*id.* at 6) (citing *In re Aller*, 220 F.2d 454, 456 (CCPA 1955)).

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 Miura, as the Examiner proposes (App. Br. 11; *see also* Reply Br. 3–4). Responding to Appellants’ argument, the Examiner asserts in the Answer that “varying groove depth and location with respect to the bearing elements is known to be result effective to optimize the strength and rigidity of the bearing contacting surface while also affecting oil film thickness of this hydrodynamic bearing system” (Ans. 14) (citing Miura Figs. 6 and 7). However, Figures 6 and 7 of Miura do not disclose optimizing groove depth relative to flange thickness. Figure 6 is a characteristic diagram that depicts oil film thickness and contact force as a function of “Groove depth (shaft diameter ratio),” and Figure 7 is a characteristic diagram that depicts contact force as a function of “Groove minimum wall thickness (shaft diameter

ratio).” Miura also consistently teaches that the depth L of groove K is set as a percentage of the shaft diameter D (*see, e.g.*, Miura ¶ 68 (“The depth L of the circular groove K is formed equal to or more than 40% of the diameter D of the bearing hole N.”); ¶¶ 70, 72, 73). In other words, Miura discloses that groove depth *as a percentage of the shaft diameter D* is a result-effective variable. However, we find no disclosure or suggestion in Miura that the relationship between groove depth L and wall thickness H is recognized as a result-effective variable. *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 further asserts in the Answer “that the recited configuration is essentially analogous to flipping the Miura FIG. 3 first bearing arrangement upside down” and that “[t]his would change the elastic properties of the bearing shaft system but not in a manner that provides a new or unexpected result that weighs in favor of patentability” (Ans. 14). According to the Examiner, “the skilled artisan would be able to recognize this arrangement is opposite to that being claimed” and “it would not take a leap of imagination to contemplate doing so when faced with the problems of tuning shaft bearing system performance for example” (*id.* at 15).

The Examiner concludes, “[t]herefore, flipping the Miura FIG. 3 arrangement upside down would have been obvious to teach the arrangement being recited in the instant claims” (*id.*). But, as Appellants observe, the Examiner provides “no reason for flipping the main bearing structure 21 of [Miura] to be that of the sub bearing 22” (Reply Br. 4).

Instead, the Examiner offers a conclusory assertion that a person of ordinary skill would have made the proposed modification “when faced with the problems of tuning shaft bearing system performance” (Ans. 15). We find nothing in the cited portions of Miura, including Figure 3, on which the Examiner relies, that discloses or suggests flipping the arrangement shown in Figure 3 of Miura upside down. *Cf. In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) (Although a prior art device could have been turned upside down, that did not make the modification obvious unless the prior art fairly suggested the desirability of turning the device upside down.).

As a further basis for the proposed modification, the Examiner takes the position that “forming the groove depth shallower on the bottom side may also be considered to be an obvious matter of engineering design choice and routine experimentation since groove depth would also be known to affect the strength of the bearing disc portion for example” and “maintaining the strength of the bearing disc would be an important design consideration in any bearing system subject to dynamic load forces” (Ans. 15–16). However, contrary to the Examiner’s position, Miura suggests that making the groove K *deeper* improves the strength of the main bearing. *See* Miura ¶ 65 (“[T]he depth of the groove K and the wall thickness between the groove K and the bearing hole N are increase[d] to enhance the strength.”).

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 Miura, 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).

Therefore, 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 2–6, 8–12, 15, and 16. *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 7 and Dependent Claims 13 and 14

Independent claim 7 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. 7). Therefore, we do not sustain the Examiner's rejection under 35 U.S.C. § 103(a) of independent claim 7 and claims 13 and 14, which depend therefrom, for the same reasons set forth above with respect to claim 1.

DECISION

The Examiner's rejection of claims 1–16 under 35 U.S.C. § 103(a) is reversed.

REVERSED