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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/420,070	02/06/2015	Aleksandar Sekularac	DKT12109A (559)	1198
71274	7590	01/07/2020	EXAMINER	
BORGWARNER INC. C/O PATENT CENTRAL LLC 1401 HOLLYWOOD BOULEVARD HOLLYWOOD, FL 33020-5237			VENKATESAN, UMASHANKAR	
			ART UNIT	PAPER NUMBER
			3753	
			MAIL DATE	DELIVERY MODE
			01/07/2020	PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ALEKSANDAR SEKULARAC

Appeal 2019-004210¹
Application 14/420,070²
Technology Center 3700

Before PHILLIP J. KAUFFMAN, TARA L. HUTCHINGS, and
ALYSSA A. FINAMORE, *Administrative Patent Judges*.

HUTCHINGS, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1–3, 5, and 6. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ Our Decision references Appellant's Specification ("Spec.," filed Feb. 6, 2015), Appeal Brief ("Appeal Br.," filed Dec. 17, 2018) and Reply Brief ("Reply Br.," filed May 3, 2019), and the Examiner's Answer ("Ans.," mailed Mar. 8, 2019) and Final Office Action ("Final Act.," mailed Apr. 17, 2018).

² We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies BorgWarner Inc., as the real party in interest. Appeal Br. 3.

CLAIMED INVENTION

Appellant's claimed invention is directed to a two-stage supercharger device (two turbochargers connected in series). Spec. 1:8–9, 34–35.

Claim 1 is the sole independent claim on appeal. It is representative of the claimed subject matter:

1. A two-stage supercharging device comprising a high pressure exhaust gas turbocharger and a low pressure exhaust gas turbocharger connected in series, each turbocharger comprising a compressor (6A, 7A), each compressor (6A, 7A) comprising a compressor wheel (1), at least one of said compressor wheels (1), having:
 - a hub (2); and
 - a multiplicity of non-recessed blades (3) which are arranged on the hub (2) and which have in each case a blade leading edge (3A) and a blade trailing edge (3B), wherein the blade leading edges (3A) define an inlet area (A_1) which is the area swept by the blade leading edges (3A) as the compressor wheel (1) rotates, the blade trailing edges (3B) define an outlet area (A_2) which is the area swept by the blade trailing edges (3B) as the compressor wheel (1) rotates, and the ratio A_2/A_1 is $> 60\%$.

REJECTIONS

Claims 1–3 and 5 are rejected under 35 U.S.C. § 103(a) as unpatentable over Ising (US 2011/0020152 A1, pub. Jan. 27, 2011) and Benetschik (DE102009024568 A1, pub. Dec. 9, 2010) (as translated).³

Claim 6 is rejected under 35 U.S.C. § 103 as unpatentable over Ising, Benetschik, and Guo (US 2009/0266060 A1, pub. Oct. 29, 2009).

³ The Examiner has provided an English-language translation of Benetschik in an Appendix to the Answer, and all citations to Benetschik refer to the translation.

ANALYSIS

We are persuaded by Appellant’s argument that the Examiner erred in rejecting claim 1 under 35 U.S.C. § 103(a), because Benetschik does not teach or suggest that the blade leading edges “define an inlet area (A_1) which is the area swept by the blade leading edges (3A) as the compressor wheel (1) rotates[;]” that “the blade trailing edges (3B) define an outlet area (A_2) which is the area swept by the blade trailing edges (3B) as the compressor wheel (1) rotates[;]” and that “the ratio A_2/A_1 is $> 60\%$,” as recited in claim 1. *See* Appeal Br. 10–16; *see also* Reply Br. 2–3. The Examiner finds that Ising discloses blade leading edges that define an inlet area, which is the area swept by the blade leading edges, and blade trailing edges that define an outlet area, which is the area swept by the blade trailing edges as the compressor wheel rotates. Final Act. 3 (citing Ising, Fig. 3). The Examiner acknowledges that Ising does not disclose that the ratio of the outlet area to the inlet area is more than 60%, and relies on Benetschik to cure the deficiency. *Id.* at 4 (citing Benetschik ¶ 74).

Benetschik relates generally to an exhaust turbocharger. Benetschik ¶ 1. The exhaust turbocharger includes single-stage radial compressor 1 having compressor impeller 20. *Id.* ¶¶ 57, 59. Compressor impeller 20 includes impeller hub 21, impeller blades 22, and additional blades 24. *Id.* ¶¶ 64, 68, Fig. 3. Impeller passage 23 extends between each pair of impeller blades 22, and has a single fluid inlet end 23a and two fluid outlets. *Id.* ¶¶ 65, 68–69. Specifically, each additional blade 24 divides the outlet end of each impeller passage 23 into two partial passages 23c, 23d, and each partial passage defines a fluid outlet. *Id.* ¶ 69.

Fluid inlet end 23a of impeller passage 23 has an inlet cross-sectional surface AE (i.e., a cross sectional area defined perpendicularly between impeller blades 22 at the inlet end). *See id.* ¶ 70, Fig. 3 (depicting inlet cross sectional surface AE). Partial passages 23c, 23d of impeller passage 23 have outlet cross-sectional surfaces AA₁, AA₂, and their sum reflects an overall outlet cross-sectional surface AA of impeller passage 23 (i.e., AA = AA₁ + AA₂). *Id.* ¶ 71. Benetschik teaches that size ratio GV of the inlet cross-sectional surface to the overall outlet cross-sectional surface (i.e., GV = AA/AE) is preferably less than 0.7. *Id.* ¶ 72. In particular, a size ratio GV less than 0.65 helps “realize boost pressures on the internal combustion engine of up to 6 bar without losses with respect to the efficiency in the operating point.” *Id.* ¶ 75. The Examiner finds that Benetschik’s disclosure of a size ratio of less than 0.65 teaches the claimed ratio in which A₂/A₁ > 60%. *See* Final Act. 4.

The difficulty with the Examiner’s finding is that Benetschik’s inlet cross-sectional surface AE is not “an area swept by the blade leading edges (3A) as the compressor wheel (1) rotates,” as recited in claim 1. Likewise, Benetschik’s overall outlet cross-sectional surface AA is not the claimed “area swept by the blade trailing edges (3B) as the compressor wheel (1) rotates.” For example, as shown in Figure 3 of Benetschik, Benetschik’s inlet cross-sectional surface AE does not lie in the planar surface of rotation swept by the leading edges of impeller blades 22.

Accordingly, we do not sustain the Examiner’s rejection of independent claim 1 and dependent claims 2, 3, and 5 under 35 U.S.C. § 103(a) as unpatentable over Ising and Benetschik. The Examiner’s rejection of dependent claim 6 as unpatentable under 35 U.S.C. § 103(a) as

unpatentable over Ising, Benetschik, and Guo does not cure the deficiencies in the Examiner's rejection of claims 1-3 and 5. Therefore, we also do not sustain the Examiner's rejection of claim 6.

DECISION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1-3, 5,	103(a)	Ising, Benetschik		1-3, 5
6	103(a)	Ising, Benetschik, Guo		6
Overall Outcome				1-3, 5, 6

REVERSED