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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/576,498	10/22/2012	Silvio Giors	20103662-06	1080
22878	7590	08/19/2020	EXAMINER	
Agilent Technologies, Inc. Global IP Operations 5301 Stevens Creek Blvd Santa Clara, CA 95051			SEHN, MICHAEL L	
			ART UNIT	PAPER NUMBER
			3745	
			NOTIFICATION DATE	DELIVERY MODE
			08/19/2020	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SILVIO GIORS, GIANLUCA BUCCHERI, and
MAURO NEBIOLO

Appeal 2020-001273
Application 13/576,498
Technology Center 3700

Before CYNTHIAL. MURPHY, KENNETH G. SCHOPFER, and
ROBERT J. SILVERMAN, *Administrative Patent Judges*.

SCHOPFER, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1–5, 7–16, 18, and 19. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM IN PART.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Agilent Technologies, Inc. Appeal Br. 3.

BACKGROUND

The Specification discloses that “[t]he present teachings relate to a vacuum pump, and more particularly, a high-vacuum pump comprising one or more elements made of plastic material, and intended to obtain high vacuum degrees.” Spec. ¶ 020.

CLAIMS

Claims 1 and 16 are the independent claims on appeal. Claim 1 is illustrative of the appealed claims and recites:

1. A vacuum pump, comprising:
a vacuum-tight casing;
a suction port;
a discharge port; and

a pumping stage configured for pumping a gas from the suction port to the discharge port, and comprising a plurality of pumping elements that cooperate with each other for pumping the gas through the pumping stage, the pumping elements comprising:

a stator element, stationary and fastened to the casing; and
a rotor element mounted integral with a rotating shaft, and the rotating shaft configured to rotate about an axis thereof,

wherein

the pumping stage is selected from the group consisting of a turbomolecular pumping stage and a molecular drag pumping stage,

the rotor element is made of an injection moulded plastic material charged with reinforcing short fibres, and

the reinforcing short fibres are dispersed in a chaotic and random manner inside the plastic material.

Appeal Br. 27.

REJECTIONS

1. The Examiner rejects claims 16, 18, and 19 under 35 U.S.C. § 112, second paragraph, as indefinite.
2. The Examiner rejects claim 7² under 35 U.S.C. § 112, fourth paragraph, for failing to further limit the subject matter of the claim upon which it depends.
3. The Examiner rejects claims 1, 2, 4, 5, 7, 9, 11, and 14 under 35 U.S.C. § 103(a) as unpatentable over Stones³ in view of Niwa⁴ and Okamoto.^{5,6}
4. The Examiner rejects claim 3 under 35 U.S.C. § 103(a) as unpatentable over Stones in view of Niwa, Okamoto, and Moriwaki.⁷
5. The Examiner rejects claim 8 under 35 U.S.C. § 103(a) as unpatentable over Stones in view of Niwa, Okamoto, and Haylock.⁸
6. The Examiner rejects claim 10 under 35 U.S.C. § 103(a) as unpatentable over Stones in view of Niwa, Okamoto, and Favre-Felix.⁹

² The Examiner has withdrawn the rejection of claims 9–15 under this heading. Ans. 3.

³ Stones, US 2009/0035123 A1, pub. Feb. 5, 2009.

⁴ Niwa et al., US 5,525,558, iss. June 11, 1996.

⁵ Okamoto et al., US 5,202,293, iss. Apr. 13, 1993.

⁶ Although the Examiner does not list Okamoto in the heading for any of the art rejections, the rejections of the independent claims each relies on Okamoto to provide motivation for the modifications proposed. Thus, we find that the Examiner's use of Okamoto is critical to the rejections, and thus, the rejections are more properly viewed as a combination of teachings including those from Okamoto.

⁷ Moriwaki et al., US 6,399,695 B1, iss. June 4, 2002.

⁸ Haylock et al., GB 2420379A, pub. May 24, 2006.

⁹ Favre-Felix, et al., US 2004/0076510 A1, pub. Apr. 22, 2004.

7. The Examiner rejects claims 12 and 13 under 35 U.S.C. § 103(a) as unpatentable over Stones in view of Niwa, Okamoto, and Helmer.¹⁰
8. The Examiner rejects claim 15 under 35 U.S.C. § 103(a) as unpatentable over Stones in view of Niwa, Okamoto, and Englander.¹¹
9. The Examiner rejects claims 16, 18, and 19 under 35 U.S.C. § 103(a) as unpatentable over Stones in view of Otto,¹² Niwa, and Okamoto.

DISCUSSION

35 U.S.C. § 112, Fourth Paragraph

The Examiner finds that claim 7 is an improper dependent claim because it fails to further limit the claim from which it depends, independent claim 1. Final Act. 3. Appellant does not address the merits of this rejection and states that the rejection should be reversed or an Examiner's amendment should be entered. Appeal Br. 25. Because Appellant has provided no argument regarding the merits of the rejection, we summarily sustain it.

35 U.S.C. § 112, Second Paragraph

The Examiner finds that claim 16 is indefinite because the recitation of "the at least one pumping stage" lacks sufficient antecedent basis because the claim recites "a pump stage" and not "at least one pumping stage." Final Act. 3. Appellant argues that the phrase "the at least one pumping stage" would be understood to refer back to "the pumping stage" previously recited in the claim. Appeal Br. 24–25. Appellant asserts that the claim phrase at issue provides "a reasonable degree of clarity and particularity" in the context of claim 16. *Id.* at 25. However, Appellant also notes that this issue

¹⁰ Helmer et al., US 2010/0158667 A1, pub. June 24, 2010.

¹¹ Englander et al., WO 2005/052375 A1, pub. June 9, 2005.

¹² Otto, US 6,648,619 B2, iss. Nov. 18, 2003.

could be solved by an Examiner's amendment removing the "at least one" language from the claim. *Id.*

We agree with the Examiner that the repeated recitation of "a pumping stage" and "the pumping stage" set forth previously in the claim creates some confusion as to whether "the at least one pumping stage" refers to the same thing. Further, we note that

the patent drafter is in the best position to resolve the ambiguity in the patent claims, and it is highly desirable that patent examiners demand that applicants do so in appropriate circumstances so that the patent can be amended during prosecution rather than attempting to resolve the ambiguity in litigation.

Halliburton Energy Servs., Inc. v. M-ILLC, 514 F.3d 1244, 1255 (Fed. Cir. 2008). Thus, we sustain the rejection of independent claim 16 as indefinite. For the same reasons, we sustain the rejection of claims 18 and 19, which depend from claim 16.

35 U.S.C § 103(a)

Claim 1

We are persuaded by Appellant's argument that the Examiner has not established that the art of record teaches or otherwise renders obvious a vacuum pump possessing every limitation of claim 1.

With respect to claim 1, the Examiner finds that Stones discloses a vacuum pump as claimed except that Stones "fails to disclose the rotor element being made of an injection molded plastic material charged with reinforcing short fibers, the reinforcing short fibers being dispersed in a chaotic and random manner inside the plastic material." Final Act. 4. However, the Examiner finds that "Niwa teaches a plastic material charged with reinforcing short fibers, the reinforcing short fibers being dispersed in a

chaotic and random manner inside the material (Column 4, Lines 42-45; Column 5, Lines 44-49).” *Id.* at 5. The Examiner determines that it would have been obvious to modify Stones to use reinforcing fibers as set forth in Niwa “for the purpose of making the material easily mixed and preventing the fibers from becoming entangled, which would deteriorate the dispersibility of the fibers,” as taught by Okamoto. *Id.* (citing Okamoto, col. 2, ll. 52–58). Finally, the Examiner finds that the requirement in the claim that the rotor element is “injection molded” is a product-by-process limitation. *Id.* Thus, the Examiner finds that the claim only requires a structure that is made of plastic and does not require the specific method of manufacture recited. *Id.*

Generally, the patentability of a product does not depend on its mode of manufacture. Thus, where a claim includes such a product-by-process limitation regarding how a structural element is made, the Examiner need only show that the resulting structure is obvious to support a rejection under 35 U.S.C. § 103(a). *See* MPEP § 2113. However, an obviousness determination may be overcome where the Appellant can show some non-obvious difference between the claimed product and the prior art relied upon. *Id.* As discussed below, we agree with the Appellant that “the term ‘injection molded’ in claim 1 informs the structure of the end product, including the configuration of fibers within the plastic material, and particularly when compared to the disclosure of Niwa.” Reply Br. 4.

The Specification discloses an embodiment including a rotor element “manufactured as a single, monolithic piece, for instance by injection molding.” Spec. ¶ 810. The Specification further discloses that making a rotor of long fibers cannot be manufactured as an injection molding

monolith because “the long [fibers] have to be arranged all along a preferential direction.” *Id.* ¶ 820. However, the Specification discloses that the rotor element can be formed of a monolithic piece by injection molding if short fibers are used and “arranged in a chaotic and substantially random way,” which allows for manufacture “in a very inexpensive process.” *Id.* ¶ 830. Thus, the Specification indicates that the combination of injection molding and short fibers allows for the fibers to be arranged in a chaotic and random way, in contrast with methods that result in fibers arranged in the same direction. This supports Appellant’s contention that the method of manufacture imparts a specific structure to the rotor that allows the short fibers to be arranged in a chaotic and random way in all dimensions of the rotor, and not just in a single plane. This is also consistent with Appellant’s proposed definition of chaotic as “in a state of complete confusion or disorder,” implying there is no discernible pattern in the arrangement of the fibers in three dimensions. Reply Br. 4.

Under this understanding of the claim, we agree with Appellant that the Examiner has not identified any teaching in the art of record with respect to this rejection that provides a rotor with short fibers that are “dispersed in a . . . random manner inside [an injection molded] plastic material.” As noted, the mode of manufacturing, i.e. injecting molding, provides a specific structure in which the short fibers may be chaotically and randomly dispersed in three-dimensions. In contrast, the Examiner has only identified a rotor including short fibers that are arranged in a single plane. *See* Final Act. 5; *see also* Niwa col. 4, ll. 42–45; col. 5, ll. 44–49 (disclosing that the fibers in Niwa’s material are only randomly arranged in two dimensions).

Accordingly, we do not sustain the Examiner’s rejection of claim 1.

Claim 16

With respect to claim 16, the Examiner relies on Stones and Niwa in substantially the same manner as provided in the rejection of claim 1. Final Act. 9–10. However, claim 16 is a method claim that specifically requires that a pumping stage element is manufactured using an injection molding process. Appeal Br. 30. Regarding this requirement, the Examiner relies on Otto. Final Act. 10.

As discussed above, Niwa discloses only that short fibers are arranged randomly in a single plane. However, similar to claim 1, one of ordinary skill in the art would interpret claim 16 to require that the fibers arranged in “a chaotic and random manner” are so arranged in three dimensions. The Examiner findings and conclusion of obviousness fail to establish that the combination of art would have resulted fibers that are so arranged. Accordingly, we also do sustain the rejection of claim 16.

Claims 2–5, 7–15, 18, and 19

The remaining claims on appeal each depend from the independent claims. The Examiner does not provide any additional findings or reasoning with respect to the art of record that cure the deficiency in the rejections of the independent claims. Thus, we also do not sustain the rejections of claims 2–5, 7–15, 18, and 19

CONCLUSION

We AFFIRM the rejection of claims 16, 18, and 19 under 35 U.S.C. § 112, second paragraph. We AFFIRM the rejection of claims 7 under 35 U.S.C. § 112, fourth paragraph. We REVERSE the rejections of claims 1–5, 7–16, 18, and 19 under 35 U.S.C. § 103(a).

In summary:

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
16, 18, 19	112, second paragraph	Indefiniteness	16, 18, 19	
7	112, fourth paragraph	Improper Dependency	7	
1, 2, 4, 5, 7, 9, 11, 14	103(a)	Stones, Niwa, Okamoto		1, 2, 4, 5, 7, 9, 11, 14
3	103(a)	Stones, Niwa, Okamoto, Moriwaki		3
8	103(a)	Stones, Niwa, Okamoto, Haylock		8
10	103(a)	Stones, Niwa, Okamoto, Favre-Felix		10
12, 13	103(a)	Stones, Niwa, Okamoto, Helmer		12, 13
15	103(a)	Stones, Niwa, Okamoto, Englander		15
16, 18, 19	103(a)	Stones, Otto, Niwa, Okamoto		16, 18, 19
Overall Outcome			7, 16, 18, 19	1-5, 8-15

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 IN PART