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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/660,109	05/07/2007	Niels Krebs	695752001700	6027
25227	7590	01/22/2013	EXAMINER	
MORRISON & FOERSTER LLP 1650 TYSONS BOULEVARD SUITE 400 MCLEAN, VA 22102			FRITCHMAN, REBECCA M	
			ART UNIT	PAPER NUMBER
			1777	
			NOTIFICATION DATE	DELIVERY MODE
			01/22/2013	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte Force Technology
(Inventor: Neils Krebs)

Appeal 2011-011898
Application 11/660,109
Technology Center 1700

Before BRADLEY R. GARRIS, RICHARD E. SCHAFER, and
JAMES C. HOUSEL, *Administrative Patent Judges*.

SCHAFER, *Administrative Patent Judge*.

DECISION ON APPEAL

Force Technology (Applicant) appeals an Examiner's decision rejecting claims 1-7 and 16. 35 U.S.C. §§ 6(b) and 134(a). We have reviewed the rejections in light of Applicant's arguments. We disagree with the Applicant's arguments and conclusions. We therefore see no error in the Examiner's decision and affirm.

Claimed Subject Matter

Applicant claims a device for improving processes that involve the interaction of a solid and a gas. The device includes a sonic generator that sends sound or ultra sound waves of at least 140 dB through the gas to reduce or eliminate the laminar flow layer that occurs when a gas flows across the surface of a solid. The processes said to be improved include those involving heat transfer and catalytic reactions. The sound treatment is said to increase the rate of heat transfer and the rate of catalytic processes between the solid and gas.

Specification, 6:20-23, 7:15-18.

Claim 1 illustrates the invention:

1. A sonic device for enhancing a process involving a solid object (100) and a gas (500), where the gas (500) surrounds the object (100) or at least is in contact with a surface (204) of the object (100), the device comprising:

a sonic generator (301) adapted to apply a high intensity sound or ultrasound to at least the surface (204) of the object (100),

wherein the high intensity sound or ultrasound, during use of the sonic device, is applied directly in the gas (500) that is also the medium through which the high intensity sound or ultrasound propagates to the surface (204) of the object (100),

where the high intensity sound or ultrasound has an intensity level that is 140 dB or larger so a laminar sublayer (203) at the surface (204) of the object (100) is reduced and/or minimized.

Rejections

In the Answer, the Examiner maintained the rejection of Claims 1-7 and 16 relying on Bodai¹ and Meegan² to support a conclusion that the invention would have been obvious under 35 U.S.C. § 103(a).

ANALYSIS

In contesting the rejections, Applicant limits discussion to the subject matter of Claims 1, 4, 5, 7 and 16. Our opinion will also.

Claim 1

Applicant contends that the Examiner erred in rejecting Claim 1 because:

Bodai neither discloses a laminar flow sub-layer at the surface of the solid or the reduction or elimination of the sub-layer as the mechanism for enhancing processing.

Brief, 16. Applicant further argues that the references neither teach nor suggest the need to eliminate or minimize the laminar sub-layer. Brief, 17.

We disagree. The Examiner found that Bodai describes this concept. Answer, 4. Bodai teaches a sonic device --a frequency modulator--that generates “an acoustic field of constant ultrasonic frequency.” Bodai 6:16-18. The device can be used to improve the heat transfer between a gas and a solid by “disruption of the . . . gas layer adjacent to the heat transfer surface.” Bodai, 6:42-44. While Bodai does not describe the concept in the same words used in the claims, Applicant has not presented any evidence, or even any argument, establishing that one having ordinary skill in the art would not have considered Bodai’s teaching of the disruption of the gas layer at the solids surface as describing the reduction or elimination of the laminar sub-layer at the surface of the solid.

¹ Bodai, U.S. Patent 4,347,983.

² Meegan, U.S. Patent 7,150,779 B2.

Applicant contends that Bodai does not teach that the ultrasound has an intensity of at least 140 dB or larger. Brief, 16. The Examiner acknowledged that Bodai does not state the specific intensity of the ultrasound. Answer, 4. The Examiner, however, found that Bodai teaches that the intensity or amplitude of the ultrasound was a result effective variable. Answer, 4. Thus, in the Examiner's view the determination of the appropriate intensity was within the skill of the art.

Bodai teaches that "it is often times desirable to maximize the intensity of the resultant [ultrasonic] wave amplitude." Bodai, 9:47-50. The reference also teaches that

[t]he frequency modulator is capable of acting as a frequency multiplier for generating the necessary spectrum of ultrasonic frequencies and an amplitude amplifier for imparting sufficient vibrational energy to, for example, various aerosols and smoke to cause coagulation of particles.

Bodai, 11:25-30. The reference goes on to describe control of the amplitude of the ultrasound. Bodai, 9:47 - 10:48.

Thus, a preponderance of the evidence supports the Examiner's finding that the sound intensity is a result effective variable and the determination and selection of the appropriate sound intensity would have been within the level of ordinary skill in the art. We discern no error in the Examiner's determination that the recitation of 140 dB or larger does not recite an unobvious distinction over Bodai's teachings.

Applicant argues that the specific device described by Bodai is not capable of generating the required minimum sound amplitude of 140 dB. Brief, 16. According to Applicant, that device can only generate a maximum of 131 dB. *Id.* Applicant tells us that support for this argument was presented in a response to an Office action it filed on March 1, 2010. *Id.* That response refers to two

publications, neither of which has been made of record.³ Applicant's argument, therefore, is unsupported by evidence. Attorney argument cannot take the place of evidence not present in the record. *Estee Lauder, Inc. v. L'Oreal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997); *In re Langer*, 503 F.2d 1380, 1395 (CCPA 1974).

Additionally, Applicant has not shown that 140 dB is critical. Indeed, Applicant's specification teaches that for some embodiments the sound amplitude may be as low as 100 dB. Specification, 15:9-10.

The Examiner also relied upon the Meegan reference with respect to the use of ultrasound having an amplitude of at least 140 dB. Meegan teaches using ultrasound with an amplitude of 130 – 175 dB to enhance the agglomeration particles in a gas stream. Meegan, 2: 12-17 and 2:33-37. The Examiner concluded that it would have been obvious to use an acoustic amplitude in Meegan's range when agglomerating particles as taught by Bodai (6:33-38).

Applicant challenges the Examiner's reliance on Meegan, arguing the means for generating ultrasonic waves in Bodai and Meegan are different, that adding Meegan's device to Bodai's would prevent Bodai's ultrasound device from working as intended, and it would not be possible to modify Bodai's ultrasonic generators with Meegan's ultrasonic generators. Brief, 18-19.

Applicant's arguments misapprehend the Examiner's reliance on Meegan's teachings. Meegan was relied upon not for the structure of the sonic generators but for the teaching that it is known in the art that an amplitude of greater than 140 dB is useful in agglomerating particles. Answer, 4. Agglomeration of particles is one of the uses of Bodai's sonic device. Bodai, 6:31-38. We see no error in the

³ "Vonnegut, B. A vortex whistle. *J. Acoust. Soc. Am.* 26 (1954) 18-20 and Borisov, Yu. Ya. in I.P. Golyamina (ed.) 'Ultrasound. The small encyclopedia.' Moscow: Sovetskaya entsiklopedia (1979), 313 -315. Application 11/660,109, Paper filed March 1, 2010, p. 10.

Examiner's reliance on Meegan as an alternative basis supporting the conclusion that it would have been obvious to use an ultrasound amplitude of 140 dB or greater to agglomerate particles as taught by Bodai.

Claims 4 and 5

These claims specify that the process enhanced is a heat exchange process and the temperature of the solid is higher than the temperature of the gas (Claim 4) or the solid is at a lower temperature than the gas (Claim 5). Applicant argues that Bodai does not identify any specific temperature differences. Brief, 20.

We disagree. The temperature differences are implicit in Bodai's teaching that "[t]he present invention can also be used for heat transfer enhancement by disruption of the . . . gas layer adjacent to the heat transfer surface." Bodai, 6: 42-44.

On record before us, we do not see error in the Examiner's rejection of the subject matter of Claims 4 and 5.

Claim 7

Claim 7 depends from Claim 1 and adds that the surface is an inner surface and the process is a change in gas composition and a previous gas composition at the inner surface enhancing the interaction of the gases. The Examiner found that Bodai discloses a device having an inner surface (shown in Bodai's Figures 1-7) and teaches separating SO₂ from air (Bodai, 11: 23-35). Answer, 5. Applicant argues that the Examiner "has not identified where the reference teaches a structure comprising an inner surface of a volume having a laminar sub-layer which can be minimized so as to provide an increased gas exchange." Brief, 21.

We disagree. The Examiner specifically identified the portions of Bodai that were relied upon (Answer, 5). Applicant has not explained why the referenced portions do not describe the concepts embodied in Claim 7.

We do not see error in the Examiner rejection of the subject matter of Claim 7.

Claim 16

With respect to the subject matter of Claim 16, Applicant makes the same contention that it made with respect to Claim 1 – that Bodai’s ultrasonic generator is not capable of providing high intensity ultrasound. Brief, 21. As we noted above with respect to Claim 1, Applicant’s position lacks evidentiary support in the record.

We do not see error in the Examiner’s decision rejecting the subject matter of Claim 16 for the same reasons we stated above for Claim 1.

DECISION

The decisions of the Examiner rejecting Claims 1-7 and 16 are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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