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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ERIK NORVELL and VOLODYA GRANCHAROV

Appeal 2017-009299
Application 14/002,509
Technology Center 2600

Before LARRY J. HUME, JAMES W. DEJMEK, and
STEVEN M. AMUNDSON, *Administrative Patent Judges*.

AMUNDSON, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants¹ seek our review under 35 U.S.C. § 134(a) from a final rejection of claims 56–69, i.e., all pending claims. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

¹ Appellants identify the real party in interest as Telefonaktiebolaget LM Ericsson. App. Br. 2.

STATEMENT OF THE CASE

The Invention

According to the Specification, the invention “relates to gain correction in audio coding based on quantization schemes where the quantization is divided into a gain representation and a shape representation, so called gain-shape audio coding, and especially to post-quantization gain correction.” Spec. 1:5–8.²

Exemplary Claims

Independent claims 56 and 63 exemplify the claims at issue and read as follows (with formatting added for clarity):

56. A method of decoding an encoded audio signal comprising:

receiving an encoded audio signal comprising a set of gain values and a corresponding set of shape vectors, each gain value representing the energy of a frequency sub-band in a frequency transform of an input audio signal, and each corresponding shape vector representing a fine structure of the frequency transform in the frequency sub-band;

determining an accuracy measure for each shape vector as a function of a quantization resolution [of] the shape vector, the accuracy measure reflecting how accurately the shape vector represents the fine structure of the frequency transform in the frequency sub-band corresponding to the shape vector, and wherein higher quantization resolutions correspond to higher accuracy and lower quantization resolutions correspond to lower accuracy;

² This decision uses the following abbreviations: “Spec.” for the Specification, filed August 30, 2013; “Final Act.” for the Final Office Action, mailed July 29, 2016; “App. Br.” for the Appeal Brief, filed January 3, 2017; “Ans.” for the Examiner’s Answer, mailed April 20, 2017; and “Reply Br.” for the Reply Brief, filed June 19, 2017.

obtaining a set of corrected gain values by scaling each gain value as a function of the accuracy measure calculated for the corresponding shape vector;

synthesizing an audio signal from the set of corrected gain values and the corresponding set of shape vectors; and

outputting the synthesized audio signal.

63. An apparatus configured to decode encoded audio signals and comprising:

input circuitry configured to

receive an encoded audio signal comprising a set of gain values and a corresponding set of shape vectors, each gain value representing the energy of a frequency sub-band in a frequency transform of an input audio signal, and each corresponding shape vector representing a fine structure of the frequency transform in the frequency sub-band; and

gain correction circuitry configured to:

determine an accuracy measure for each shape vector as a function of a quantization resolution [of] the shape vector, the accuracy measure reflecting how accurately the shape vector represents the fine structure of the frequency transform in the frequency sub-band corresponding to the shape vector, and wherein higher quantization resolutions correspond to higher accuracy and lower quantization resolutions correspond to lower accuracy; and

obtain a set of corrected gain values by scaling each gain value as a function of the accuracy measure calculated for the corresponding shape vector; and

output circuitry configured to:

synthesizing [sic] an audio signal from the set of corrected gain values and the corresponding set of shape vectors; and

output the synthesized audio signal.

App. Br. 18, 20–21 (Claims App’x).

The Prior Art Supporting the Rejections on Appeal

As evidence of unpatentability under 35 U.S.C. § 103(a), the Examiner relies on the following prior art:

Koishida et al. (“Koishida”)	US 2003/0004711 A1	Jan. 2, 2003
Maulik et al. (“Maulik”)	US 2009/0042526 A1	Feb. 12, 2009
Schmidt et al. (“Schmidt”)	US 2009/0225980 A1	Sept. 10, 2009
Oshikiri et al. (“Oshikiri”)	US 2010/0049512 A1	Feb. 25, 2010

The Rejections on Appeal

Claims 56–69 stand rejected under 35 U.S.C. § 101 as directed to patent-ineligible subject matter. Final Act. 3–5.

Claims 56–58, 61, 63–65, and 68 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Oshikiri and Schmidt. Final Act. 5–12.

Claims 59, 60, 66, and 67 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Oshikiri, Schmidt, and Maulik. Final Act. 12–15.

Claims 62 and 69 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Oshikiri, Schmidt, and Koishida. Final Act. 15–17.

ANALYSIS

We have reviewed the rejections in light of Appellants’ arguments that the Examiner erred. Based on the record before us and for the reasons explained below, we concur with Appellants’ contentions the Examiner

erred in determining that the claims fail to satisfy § 101 and that under § 103 the references teach or suggest the claimed subject matter.

The § 101 Rejection of Claims 56–69

INTRODUCTION

The Patent Act defines patent-eligible subject matter broadly: “Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.” 35 U.S.C. § 101. In *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66, 70 (2012), and *Alice Corp. v. CLS Bank International*, 134 S. Ct. 2347, 2354 (2014), the Supreme Court explained that § 101 “contains an important implicit exception” for laws of nature, natural phenomena, and abstract ideas. *See Diamond v. Diehr*, 450 U.S. 175, 185 (1981). In *Mayo* and *Alice*, the Court set forth a two-step analytical framework for evaluating patent-eligible subject matter: First, “determine whether the claims at issue are directed to” a patent-ineligible concept, such as an abstract idea. *Alice*, 134 S. Ct. at 2355. If so, “consider the elements of each claim both individually and ‘as an ordered combination’ to determine whether the additional elements” add enough to transform the “nature of the claim” into “significantly more” than a patent-ineligible concept. *Id.* at 2355, 2357 (quoting *Mayo*, 566 U.S. at 79); *see Affinity Labs of Tex., LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1257 (Fed. Cir. 2016).

Step one in the *Mayo/Alice* framework involves looking at the “focus” of the claims at issue and their “character as a whole.” *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016); *Enfish, LLC v.*

Microsoft Corp., 822 F.3d 1327, 1335 (Fed. Cir. 2016). Step two involves the search for an “inventive concept.” *Alice*, 134 S. Ct. at 2355; *Elec. Power Grp.*, 830 F.3d at 1353. An “inventive concept” requires more than “well-understood, routine, conventional activity already engaged in” by the relevant community. *Rapid Litig. Mgmt. Ltd. v. CellzDirect, Inc.*, 827 F.3d 1042, 1047 (Fed. Cir. 2016) (quoting *Mayo*, 566 U.S. at 79–80). But “an inventive concept can be found in the non-conventional and non-generic arrangement of known, conventional pieces.” *BASCOM Global Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1350 (Fed. Cir. 2016).

MAYO/ALICE STEP ONE

Appellants argue the Examiner erred in rejecting claims 56 and 63 because “[t]he relevant courts have not identified audio signal decoding as being an abstract idea, and audio signal decoding does not analogize to the processes that have been identified by the courts as being abstract.” App. Br. 7. Appellants contend that “the claims set forth a concrete application that yields a technical effect—obtaining a synthesized audio signal according to a particularized decoding process.” *Id.* at 8. Moreover, based on *Enfish v. Microsoft*, Appellants assert that “the claims are directed to a method and apparatus representing an improvement in computer-related technology.” *Id.* at 7–8.

Appellants’ arguments do not persuade us of Examiner error under *Mayo/Alice* step one. The Examiner determines that the claims “are directed to speech/audio encoding/decoding” constituting “a series of mathematical calculations.” Final Act. 3–4; Ans. 17. The Examiner also determines that the claims do not concern an improvement to computer functionality, e.g., an advance in hardware or software that causes a computer to operate faster

or more efficiently. *See* Ans. 17. In contrast to the claims here, the claims in *Enfish* were directed to a “specific improvement to the way computers operate,” i.e., an improved database configuration that permitted faster searching for data. *Enfish*, 822 F.3d at 1330–33, 1336. Further, a claim for a beneficial abstract idea is still an abstract idea. *See Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379–80 (Fed. Cir. 2015).

MAYO/ALICE STEP TWO

Appellants argue that claims 56 and 63 satisfy *Mayo/Alice* step two because they “include explicitly detailed steps by which a received encoded audio signal is processed, including various details regarding the correction of gain values included in the encoded audio signal, and a synthesized audio signal is correspondingly obtained and output,” and “[t]hese details are sufficient to transform the claims into patent-eligible applications of any ‘abstract’ idea alleged to be present in them.” App. Br. 8–9. In addition, Appellants contend that the claims “capture a decoding improvement, whereby the audio signal synthesized (recreated) from the encoded gain values and shape vectors relies on ‘compensated’ gain values” obtained by “calculating accuracy measures for the shape vectors of the encoded audio signal and scaling the corresponding gain values of the encoded audio signal as a function of the accuracy measures.” Reply Br. 2.

The Examiner considers each claim limitation individually, explains why it does not suffice to confer patent eligibility under step two, and then determines that the limitations collectively do not suffice to confer patent eligibility under step two. Final Act. 3–4; Ans. 18. In discounting the significance of the limitations, however, the Examiner relies on part of the Specification that describes the prior art, not the claimed invention. Final

Act. 4 (citing Spec. 7:18–29); Ans. 18 (citing Spec. 7:18–29); *see* Spec. 7:18–29, Fig. 2. Thus, the Examiner did not consider the contribution of all limitations towards an “inventive concept.” And that error distorted the Examiner’s analysis of the limitations as an ordered combination. *See* Final Act. 3–4; Ans. 18.

Accordingly, based on the record before us, we agree with Appellants that claims 56 and 63 recite a particular arrangement of elements that, when considered as an ordered combination, include enough to satisfy *Mayo/Alice* step two. Here, the specificity of the technical solution and the particular arrangement of elements required by the claims more closely resemble claims considered patent eligible by the Federal Circuit compared to the patent-ineligible claims in the decisions the Examiner cites. *See Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288, 1299–1306 (Fed. Cir. 2016); *BASCOM*, 827 F.3d at 1349–51; *Trading Techs. Int’l, Inc. v. CQG, Inc.*, 675 F. App’x 1001, 1002–05 (Fed. Cir. 2017); *see also Realtime Data, LLC v. Carbonite, Inc.*, No. 6:17-CV-00121, 2017 WL 4693969, at *5–6 (E.D. Tex. Sept. 20, 2017) (distinguishing patent-ineligible claims reflecting “mere encoding and decoding”).

For instance, in *Trading Technologies International, Inc. v. CQG, Inc.*, the patents in suit “describe[d] and claim[ed] a method and system for the electronic trading of stocks, bonds, futures, options and similar products” where a graphical user interface displayed the “market depth of a commodity traded in a market,” including a dynamic display of bids and asks for the commodity and a static display of prices. *Trading Techs.*, 675 F. App’x at 1002–03. The claimed method and system “reduc[ed] the time . . . for a trader to place a trade when electronically

trading on an exchange, [and] thus increas[ed] the likelihood that the trader will have orders filled at desirable prices and quantities.” *Id.* at 1003.

Similarly, claims 56 and 63 advantageously improve the output audio signal’s perceived quality while employing “low computational complexity” and requiring few, if any, additional bits. *See* Spec. 4:19–21. Moreover, the claims recite a technical solution at least as specific as the technical solution recited in the claims at issue in *Trading Technologies*. *See* 675 F. App’x at 1003; *see also Trading Techs. Int’l, Inc. v. CQG, Inc.*, No. 05-CV-4811, 2015 WL 774655, at *1–2 (N.D. Ill. Feb. 24, 2015).

The Supreme Court has “explained that claims are patent eligible under § 101 ‘when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect.’” *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1347–48 & n.2 (Fed. Cir. 2017) (quoting *Diamond v. Diehr*, 450 U.S. 175, 192 (1981)). When considered as a whole, claims 56 and 63 perform such a function.

For the reasons discussed above, Appellants’ arguments have persuaded us the Examiner erred in rejecting claims 56 and 63 under § 101. Hence, we do not sustain the § 101 rejection of these independent claims.

Claims 57–62 depend directly or indirectly from claim 56, whereas claims 64–69 depend directly or indirectly from claim 63. For the reasons discussed regarding the independent claims, we do not sustain the § 101 rejection of these dependent claims.

The § 103(a) Rejection of Claims 56–58, 61, 63–65, and 68

Appellants argue the Examiner erred in rejecting claims 56 and 63 because Schmidt does not teach or suggest the following limitation in claim 56 and a limitation with similar scope in claim 63: “obtaining a set of corrected gain values by scaling each gain value as a function of the accuracy measure calculated for the corresponding shape vector.” *See* App. Br. 10–12; Reply Br. 4–6. In particular, Appellants contend Schmidt discloses: (1) “a hands-free communication system that receives a speech signal $x(n)$ ” transmitted from a remote device; and (2) “a ‘gain and shape’ (GAS) control unit 402 [that] enhances the quality of the received signal *by applying gain and shape processing to the received signal*” to obtain an enhanced speech signal. App. Br. 10; *see* Reply Br. 4–5. Further, Appellants assert the cited portions of Schmidt “do not involve correcting gain values in a received encoded audio signal based on accuracy measures determined for the corresponding shape vectors in that received encoded audio signal.” App. Br. 11. Appellants also assert Schmidt “explicitly describes controlling the gain and shape of” received signal $x(n)$ “based on detecting [an] echo” and “not based on calculating accuracy measures for shape representations included in” received signal $x(n)$. Reply Br. 4–5.

The Examiner finds Schmidt teaches “the gain is controlled based on the shape control output.” Final Act. 6. The Examiner explains that, even if Schmidt’s GAS control unit 402 “is being used for a different purpose in the invention of Schmidt,” it “still performs a similar function, namely controlling the gain and shape signals,” and is applicable to “the invention of Oshikiri.” Ans. 19–20.

Based on the record before us, however, we agree with Appellants that the Examiner has not adequately explained how the cited portions of Schmidt teach or suggest “obtaining a set of corrected gain values by scaling each gain value as a function of the accuracy measure calculated for the corresponding shape vector,” as recited in claim 56 and similarly recited in claim 63. The cited portions of Schmidt do not discuss scaling gain values based on shape-vector accuracy measures. *See* Schmidt ¶¶ 44–45, Fig. 5. In GAS control unit 402, shape control unit 504 sends to gain control unit 502 signal G_{Des} representing a desired gain, e.g., for establishing a constant echo-to-noise level. *See id.* ¶¶ 45–49, Figs. 5–7. The cited portions of Schmidt do not indicate that signal G_{Des} operates on a vector-by-vector basis. Hence, we do not sustain the § 103(a) rejection of claims 56 and 63.

Claims 57, 58, and 61 depend directly or indirectly from claim 56, whereas claims 64, 65, and 68 depend directly or indirectly from claim 63. For the reasons discussed regarding the independent claims, we do not sustain the § 103(a) rejection of these dependent claims.

The § 103(a) Rejections of Claims 59, 60, 62, 66, 67, and 69

Claims 59, 60, and 62 depend directly from claim 56, whereas claims 66, 67, and 69 depend directly from claim 63. On this record, the Examiner has not shown how the additionally cited secondary references—Maulik and Koishida—overcome the deficiency in Schmidt discussed above for claims 56 and 63. Hence, we do not sustain the § 103(a) rejections of these dependent claims.

Because these determinations resolve the appeal with respect to claims 56–69, we need not address Appellants’ other arguments regarding Examiner error.

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DECISION

We reverse the Examiner's decision to reject claims 56–69.

REVERSED