UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHN C. HARDWICK

Appeal 2009-002399
Application 10/046,666[1]
Technology Center 2600

Decided:[2] June 22, 2009

Before JOSEPH F. RUGGIERO, ROBERT E. NAPPI, and MARC S. HOFF, *Administrative Patent Judges*.

HOFF, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Appellant appeals under 35 U.S.C. § 134 from a Final Rejection of claims 1-77. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] The real party in interest is Digital Voice Systems, Inc.

[2] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

Appellant's invention relates to synthesis of digital speech samples corresponding to a selected voicing state. First and second digital filter coefficients are computed using respective first and second frames of speech model parameters. First and second signal samples are produced using pulse locations and first and second digital filters respectively. The sets of first and second signal samples are combined to produce a set of digital speech samples corresponding to the selected voicing state (Spec. 8).

Claim 1 is exemplary:

1. A method of synthesizing a set of digital speech samples corresponding to a selected voicing state from speech model parameters, the method comprising the steps of:

dividing the speech model parameters into frames, wherein a frame of speech model parameters includes pitch information, voicing information determining the voicing state in one or more frequency regions, and spectral information;

computing a first digital filter using a first frame of speech model parameters, wherein the frequency response of the first digital filter corresponds to the spectral information in frequency regions where the voicing state equals the selected voicing state;

computing a second digital filter using a second frame of speech model parameters, wherein the frequency response of the second digital filter corresponds to the spectral information in frequency regions where the voicing state equals the selected voicing state;

determining a set of pulse locations;

producing a set of first signal samples from the first digital filter and the pulse locations;

producing a set of second signal samples from the second digital filter and the pulse locations;

combining the first signal samples with the second signal samples to produce a set of digital speech samples corresponding to the selected voicing state.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Griffin	US 5,701,390	Dec. 23, 1997

Thomas P. Barnwell, III et al. (Barnwell), "Speech Coding: A computer laboratory textbook," John Wiley & Sons, Inc. (1966).

Claims 1-77 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

Claims 1-6, 16, 27, 28, 37-41, 43, 44, 59, 60, 62, and 63 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Griffin in view of Barnwell.

Claims 7, 42, 45, 46, 49, 61, 64, 65, and 68 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Griffin in view of Barnwell and well known prior art.

Throughout this decision, we make reference to the Appeal Brief ("App. Br.," filed November 27, 2007), the Reply Brief ("Reply Br.," filed May 5, 2008) and the Examiner's Answer ("Ans.," mailed March 4, 2008) for their respective details.

ISSUES

With regard to the § 101 rejection, Appellant argues that that the claims do not recite a mere abstract idea, and produce a useful, concrete, and tangible result (App. Br. 3-4).

With regard to the pending § 103 rejections, Appellant argues that Barnwell fails to remedy the deficiencies of Griffin conceded by the Examiner, and does not produce sets of first and second digital samples using pulse locations and respective digital filters (App. Br. 8).

The respective contentions of Appellant and the Examiner thus present us with the following issues:

1. Has Appellant shown that the Examiner erred in concluding that the claimed method of synthesizing a set of digital speech samples constitutes non-statutory subject matter under § 101?

2. Has Appellant shown that the Examiner erred in finding that Griffin in combination with Barnwell teaches determining a set of pulse locations, producing a set of first signal samples from the first digital filter and the pulse locations, and producing a set of second signal samples from the second digital filter and the pulse locations, as recited in claim 1?[3]

FINDINGS OF FACT

The following Findings of Fact (FF) are shown by a preponderance of the evidence.

The Invention

1. According to Appellant, the invention concerns synthesis of digital speech samples corresponding to a selected voicing state. First and second digital filter coefficients are computed using respective first and second frames of speech model parameters. First and second signal samples are produced using pulse locations and first and second digital filters respectively. The sets of first and second signal samples are combined to produce a set of digital speech samples corresponding to the selected voicing state (Spec. 8).

Griffin

2. Griffin teaches regenerating the voiced component phase in speech synthesis, where the phase is estimated from the spectral envelope of the voiced component (col. 4, ll. 40-43).

[3] Independent claim 38 recites similar (though not identical) limitations.

Barnwell

3. Barnwell teaches linear predictive coding in the context of pitch-excited vocoders (p. 85).

PRINCIPLES OF LAW

> The Supreme Court . . . has enunciated a definitive test to determine whether a process claim is tailored narrowly enough to encompass only a particular application of a fundamental principle rather than to pre-empt the principle itself. A claimed process is surely patent-eligible under § 101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing. *See Gottschalk v. Benson*, 409 U.S. 63, 70 , 93 S.Ct. 253, 34 L.Ed. 2d 273 (1972) ("Transformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that does not include particular machines."); *Diehr*, 450 U.S. 175, 192, 101 S.Ct. 1048, 67 L.Ed.2d 155 (1981) (holding that use of mathematical formula in process "transforming or reducing an article to a different state or thing" constitutes patent-eligible subject matter); *see also Parker v. Flook*, 437 U.S. 584, 589 n.9, 98 S.Ct. 2522, 57 L.Ed.2d 451 (1978) ("An argument can be made [that the Supreme] Court has only recognized a process as within the statutory definition when it either was tied to a particular apparatus or operated to change materials to a 'different state or thing'"); *Cochrane v. Deener*, 94 U.S. 780, 788 (1876) ("A process is . . . an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing.").

In re Bilski, 545 F.3d 943, 954 (Fed. Cir. 2008) (footnote omitted).

> The machine-or-transformation test is a two-branched inquiry; an applicant may show that a process claim satisfies § 101 either by showing that his claim is tied to a particular machine, or by showing that his claim transforms an article. *See Benson*, 409 U.S. at 70, 93 S.Ct. 253. Certain considerations are applicable to analysis under either branch. First, as illustrated by *Benson* and discussed below, the use of a specific machine or transformation of an article must impose meaningful limits

> on the claim's scope to impart patent-eligibility. *See Benson*, 409 U.S. at 71-72, 93 S.Ct. 253. Second, the involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity. *See Flook*, 437 U.S. at 590.

Id., 545 F.3d at 961-62.

On the issue of obviousness, the Supreme Court has stated that "the obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 419 (2007). Further, the Court stated "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 416. "One of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims." *Id.* at 419-420.

ANALYSIS

§ 101 REJECTION

We select claim 1 as representative of this group, pursuant to our authority under 37 C.F.R. § 41.37(c)(1)(vii).

Appellant argues that the claimed invention defines patent-eligible subject matter because the claims are directed to the practical application of the processing of digital speech, rather than a mere abstract idea, and because the claimed result (a set of digital speech samples) is useful, concrete, and tangible (App. Br. 3-4).

As an initial matter, the Federal Circuit recently held that inquiry into whether a process produces a useful, concrete and tangible result is

insufficient to determine whether a claim is patent-eligible under § 101, and reaffirms the Supreme Court's machine-or-transformation test. *Bilski*, 545 F.3d at 561-62. Appellant's contention that the claimed invention produces a useful, concrete, and tangible result is thus rendered moot.

As articulated by the *Bilski* court, the test for subject-matter eligibility of a process is a two-branched inquiry. An applicant may show that a process claim satisfies § 101 either by showing that his claim is tied to a particular machine, or by showing that his claim transforms an article. *Bilski*, 545 F.3d at 961-62. With regard to the claims at issue in this appeal, it is clear that the invention contemplated by claim 1 is not tied to a particular machine. Claim 1 contains no limitations directed to any particular machine.[4] Claim 1 does recite "computing a first [and second] digital filter." Appellant's clear intent, however, is the computation of *coefficients* of a digital filter to be implemented as a software process. Further, claim 1 does not call for the transformation of a physical article: the claim contains no limitations directed to any operation on any physical article. Appellant argues that the invention is limited to the processing of digital speech. Claim 1, however, requires only "synthesizing a set of digital speech *samples*" (emphasis added) (i.e., *data* representing speech parameters), and the several steps of the claim are directed to various ways in which those data are

[4] Appellant argues on page 4 of the Brief, that the claimed method is tangible, and reasons that the speech samples may be used on a phone but limiting the method to such a device would be absurd as it would preclude patent protection if the method were performed on a device such as a server. This argument in effect is an admission by Appellant that the claims are not directed to the method being performed on any particular machine.

manipulated in order to come up with further data ("a set of digital speech samples corresponding to the selected voicing state").

This determination does not end the inquiry, however. The *Bilski* court allowed for the possibility that the manipulation of electronic signals or data could be considered "transformation of an article." With reference to the claimed invention at issue in *In re Abele*, the Bilski court indicated that a broad independent claim reciting a process of graphically displaying variances of data from average values was held unpatentable because the claim did not specify any particular type or nature of data, nor did it specify how or from where the data was obtained or what the data represented. *See Bilski*, 545 F.3d at 962. In contrast, a dependent claim specifying that the data to be displayed "is X-ray attenuation data produced in a two dimensional field by a computed tomography scanner"[5] was held to be drawn to patent-eligible subject matter because the data clearly represented physical and tangible objects; the transformation of that raw data into a particular visual depiction of a physical object on a display was sufficient to render that more narrowly-claimed process patent-eligible. *Bilski*, 545 F.3d at 962-63. *Bilski* held that there is no danger of pre-emption of fundamental principles "[s]o long as the claimed process is limited to a practical application of a fundamental principle to transform specific data, and the claim is limited to a visual depiction that represents physical objects or substances." Bilski, 545 F.3d at 963.

Applying this "exception" to the rule requiring transformation of an article to Appellant's claim 1, we find that claim 1 does specify synthesizing digital speech samples from speech model parameters. Claim 1 does not,

[5] Abele, 684 F.2d 902, 908-09.

however, specify how those parameters were obtained, nor recite transformation of raw data into a visual depiction, or any other analogous depiction (e.g., audio output) that would be cognizable by a human operator. Therefore, the weight of the evidence indicates that Appellant's claim 1 is substantially more similar to the nonstatutory independent claim in *Abele* than to the statutory dependent claim.

We therefore conclude that the invention of claim 1 is not tied to a particular machine, nor does it transform an article. As a result, we conclude that claim 1 is directed to nonstatutory subject matter.

Because Appellant has not shown error in the Examiner's rejection of representative claim 1, we will sustain the rejection of claims 1-77 under 35 U.S.C. § 101.

CLAIMS 1-6, 16, 27, 28, 37-41, 43, 44, 59, 60, 62, AND 63

Claims 1 and 38 constitute all of the independent claims pending in this application. Claim 1 recites determining a set of pulse locations, producing a set of first signal samples from the first digital filter and the pulse locations, producing a set of second signal samples from the second digital filter and the pulse locations, and combining the first signal samples with the second signal samples to produce a set of digital speech samples corresponding to the selected voicing state. Claim 38 recites computing a set of pulse locations, producing a set of first signal samples from the first impulse response and the pulse locations, producing a set of second signal samples from the second impulse response and the pulse locations, and combining the first signal samples with the second signal samples to produce the digital speech samples for the subframe corresponding to the selected

voicing state. The Examiner concedes that Griffin does not teach these limitations, but finds that Barnwell teaches speech coding where a filter is programmed with coefficients and excited with pulses, where the pulses will necessarily have a separation (pitch period – location) and sequential sets of samples (from frames or subframes) will produce a signal (Ans. 6).

We are not persuaded by the Examiner's position. We have reviewed Barnwell and do not find the teaching of computing or determining a set of pulse locations generally alluded to by the Examiner (Ans. 6, citing Barnwell pp. 85-89). We agree with Appellant that Barnwell does not illustrate the connection between the fundamental frequency and pulse locations as claimed when used to excite a filter (programmed with spectral information) (App. Br. 7). We further agree with Appellant that even if the Examiner is correct that Barnwell describes the input of pitch information to a pulse generator which excites a filter (linear predictor) which is configured with spectral information (LPC coefficients), that description fails to teach the use of first and second digital filters, along with pulse locations, to produce sets of first and second digital samples that are combined to produce a set of digital speech samples, as recited in claim 1 (App. Br. 5), nor the analogous recitations of claim 38. Finally, we agree with Appellant that the Examiner failed to explain why one of ordinary skill in the art would have found it obvious to modify Griffin's multi-band excitation (MBE) decoder to include elements from Barnwell's linear predictive coding (LPC) decoder (App. Br. 9), given the substantial differences between the two coding approaches.

We therefore find that the Examiner erred in finding that the combination of Griffin and Barnwell would have rendered the claimed

invention obvious. Accordingly, we will not sustain the rejection of claims 1-6, 16, 27, 28, 37-41, 43, 44, 59, 60, 62, and 63 under 35 U.S.C. § 103.

CLAIMS 7, 42, 45, 46, 49, 61, 64, 65, AND 68

As noted *supra*, we reverse the § 103 rejection of independent claims 1 and 38, from which these claims depend. The Examiner's taking of Official Notice that reinitialization after a period of non-pulsed operation is well known in the art does not remedy the deficiencies of Griffin in view of Barnwell which we have noted. As a result, we will not sustain the rejection of claims 7, 42, 45, 46, 49, 61, 64, 65, and 68 under 35 U.S.C. § 103 as being unpatentable over Griffin in view of Barnwell and well known prior art.

CONCLUSIONS OF LAW

1. Appellant has not shown that the Examiner erred in concluding that the claimed method of synthesizing a set of digital speech samples constitutes non-statutory subject matter under § 101.

2. Appellant has shown that the Examiner erred in finding that Griffin in combination with Barnwell teaches determining a set of pulse locations, producing a set of first signal samples from the first digital filter and the pulse locations, and producing a set of second signal samples from the second digital filter and the pulse locations, as recited in claim 1.

ORDER

The Examiner's rejection of claims 1-77 under 35 U.S.C. § 101 is affirmed. The Examiner's rejection of claims 1-7, 16, 27, 28, 37-46, 49, 59, 60-65, and 68 under 35 U.S.C. § 103(a) is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

ELD

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