UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte LARS C. ALMSTRAND and COURTNEY KONOPKA

Appeal 2008-6283
Application 10/457,153
Technology Center 2600

Decided: December 4, 2008

Before MAHSHID D. SAADAT, ROBERT E. NAPPI, and JOHN A. JEFFERY, *Administrative Patent Judges*.

JEFFERY, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's rejection of claims 1-12 and 14-26. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

Appellants invented a microphone array system used in speech recognition. The array includes microphones and a processor to receive acoustic signals. Using models, such as time-versus-frequency or -energy profiles, the processor selects an output signal that represents an acoustic source. The output is sent to a speech recognition device or other components.[1] Independent claim 1 is reproduced below:

> 1. A microphone array system, comprising:
>
> plural microphones; and
>
> at least one array processor receiving signals from the microphones, the array processor executing logic including:
>
> receiving at least one model time-frequency acoustic hypothesis; and
>
> based at least in part on the model time-frequency acoustic hypothesis, selectively outputting signals representing at least one acoustic source to at least one client component.

The Examiner relies upon the following as evidence in support of the rejection:

Valve	US 6,449,593 B1	Sep. 10, 2002 (filed Jan. 13, 2000)
Arrowood	US 7,092,882 B2	Aug. 15, 2006 (filed Dec. 6, 2000)

[1] *See generally* 2:14-19, 4:19-5:8, 6:1-7:11, and 9:9-10:4.

(1) The Examiner rejected claims 1, 2, 4-12, 14-16, 18-23, 25, and 26 under 35 U.S.C. § 102(e) as being anticipated by Arrowood (Ans. 4-11).[2]

(2) The Examiner rejected claims 3, 17, and 24 under 35 U.S.C. § 103(a) as being unpatentable over Arrowood and Valve (Ans. 12).

Rather than repeat the arguments of Appellants or the Examiner, we refer to the Briefs and the Answer[3] for their respective details. In this decision, we have considered only those arguments actually made by Appellants. Arguments, which Appellants could have made but did not make in the Briefs, have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

ANTICIPATION REJECTION

The Examiner first rejected claims 1, 2, 4-12, 14-16, 18-23, 25, and 26 under 35 U.S.C. § 102(e) as being anticipated by Arrowood. Claims 1, 2, 4, 6-12, 14, 16, 18, 19, 21-23, 25, and 26 are separately argued from claims 5, 15, and 20 (App. Br. 4-5). Each grouping will be independently addressed.

Claims 1, 2, 4, 6-12, 14, 16, 18, 19, 21-23, 25, and 26

The Examiner finds that Arrowood discloses all the limitations in representative independent claim 1,[4] including a processor executing logic

---

[2] Although the Examiner included claim 13 in this rejection, this claim has been cancelled (App. Br. 2). Nevertheless, this error is deemed harmless.

[3] Throughout this opinion, we refer to (1) the Appeal Brief filed March 14, 2007, (2) the Examiner's Answer mailed June 18, 2007, and (3) the Reply Brief filed June 21, 2007.

[4] Appellants do not separately argue independent claims 1, 12, and 19 (App. Br. 4-5). Additionally, Appellants do not particularly argue claims 2, 4, 6-

that receives a model time-frequency acoustic hypothesis (Ans. 4). Appellants argue that Arrowood only discloses a processor that receives an amplitude-frequency hypothesis. According to Appellants, the Fourier transform of Arrowood remains in the amplitude-frequency domain and does not form a time-frequency hypothesis (App. Br. 4-5; Reply Br. 1).

ISSUE

Have Appellants shown the Examiner erred in finding Arrowood discloses a processor executing logic that receives a model time-frequency acoustic hypothesis in rejecting claim 1 under § 102?

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

1. The Specification provides non-limiting model hypotheses, including a time-versus-frequency Cartesian profile where time is on the x-axis and frequency is on the y-axis (Spec. 4:19-5:2).
2. Arrowood discloses a microphone array system having microphones (i.e., M1-M4) and a "processor" comprising beam steering apparatus 200, speech detection apparatus 205, and noise detection apparatus 210 that receive signals from the microphone (Arrowood, col. 3, ll. 30-31 and 49-55; Fig. 7).

11, 14, 16, 18, 21-23, 25, and 26 (*Id.*) Accordingly, we select independent claim 1 as representative. 37 C.F.R. § 41.37(c)(1)(vii).

3. Arrowood discusses a technique to identify a pulsating noise signal, such as an idling engine. Arrowood characterizes this continuous and constantly changing noise with a periodically changing Fourier spectrum (Arrowood, col. 5, ll. 14-22).
4. Apparatuses 200, 205, and 210 in Arrowood use the noise characterization to identify and process lobes carrying the strongest noise signals (Arrowood, col. 3, ll. 49-51 and col. 4, ll. 39-44; Fig. 8).
5. Arrowood teaches the lobe or lobes having the highest signal-to-noise ratio are outputted to the speech recognition device 215 (Arrowood, col. 5, ll. 23-27).

PRINCIPLES OF LAW

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of Calif.*, 814 F.2d 628, 631 (Fed. Cir. 1987).

During examination of a patent application, a claim is given its broadest reasonable construction "in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Am. Acad. Of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004).

ANALYSIS

The crux of this appeal focuses on whether Arrowood discloses a "model time-frequency acoustic hypothesis" as recited in claim 1. As such, we start by examining the above-quoted phrase and its broadest reasonable construction in light of the Specification. *Am.*

Acad. Of Sci. Tech., 367 F.3d at 1364. While the Specification describes a model hypothesis example or a time-frequency Cartesian profile (FF 1), we do not find this example to be a special definition of the recited "model time-frequency acoustic hypothesis" in claim 1. Additionally, the claim does not include a limitation to a Cartesian profile as described in the Specification (*Id.*). Appellants have also not provided any evidence that ordinarily skilled artisans would limit the interpretation of this term to a time-versus-frequency Cartesian profile. The Specification further indicates this Cartesian example is non-limiting (*Id.*). We, therefore, construe the phrase, "a model time-frequency acoustic hypothesis," to mean an acoustic hypothesis that includes components of time and frequency.

Appellants acknowledge that Arrowood discloses differentiating continuous sounds from pulsating sounds using a Fourier transform (App. Br. 4). Appellants take the position that these Fourier transforms describe or model amplitude and frequency components of sounds and not time and frequency as claim 1 requires (App. Br. 4-5; Reply Br. 1). We do not disagree with Appellants that a Fourier spectrum describes a signal in terms of amplitude and frequency. However, Arrowood identifies or models a continuous and constantly changing noise with a *periodically changing* Fourier spectrum (FF 3). That is, a constantly changing noise would therefore have both a Fourier spectrum *and* a temporal component. Arrowood's acoustic model or hypothesis for this changing noise is thus more than a Fourier transform: it accounts for both frequency and time. Additionally, this noise model is received by Arrowood's processor

and outputs a signal based, at least in part, on the hypothesis (FF 4-5). We, therefore, find that Arrowood discloses "the array processor executing logic including: receiving at least one model time-frequency acoustic hypothesis" as recited in claim 1.

Since Appellants have not persuaded us the Examiner erred in rejecting claims 1, 2, 4, 6-12, 14, 16, 18, 19, 21-23, 25, and 26, we sustain the rejection of these claims.

Claims 5, 15, and 20

Regarding representative claim 5,[5] the Examiner finds that Arrowood discloses the processor includes selectively outputting a signal to a speech recognition engine based in part on region R or a spatial location of an acoustic source (Ans. 5 and 14). Appellants contend that Arrowood does not discriminate between acoustic sources in the beams or lobes covering an expected area and acoustic sources outside these areas based on a spatial location (App. Br. 5; Reply Br. 1).

ISSUE

Have Appellants shown the Examiner erred in finding a disclosed region R in Arrowood is a spatial location of an acoustic source on which the processor bases, at least in part, the selectively outputted signal in rejecting claim 5 under § 102?

[5] Appellants group claims 5, 15, and 20 together (App. Br. 5). Accordingly, we select claim 5 as representative. 37 C.F.R. § 41.37(c)(1)(vii).

FINDINGS OF FACT

The record supports the following additional findings of fact (FF) by a preponderance of the evidence.

6. Arrowood discloses that a driver at a drive-up window of a fast-food restaurant will communicate through an open window W (Arrowood, col. 6, ll. 15-19 and 29-31).
7. Arrowood explains the region in space R is expected to contain the open window of the driver W (Arrowood, col. 6, ll. 37-38; Fig. 10).
8. Arrowood discloses region R is empirically defined by sampling automobiles and their open window coordinates (Arrowood, col. 6, ll. 39-43).
9. Arrowood discloses identifying the lobes with the strongest speech signal and using these lobes to output selectively signals to the speech recognition device (Arrowood, col. 4, ll. 40-43 and col. 5, ll. 23-26).
10. The Specification describes a window 26 as a source of sound or an acoustic source (Spec. 5:9-15).

ANALYSIS

Appellants' argument focuses on Arrowood's inability to detect sounds outside of the areas defined by the lobes (App. Br. 5; Reply Br. 1). Claim 5 requires the logic on the processor to selectively output signals to a client component based at least partly on one spatial location of one acoustic source. The spatial location in the claim has not been defined nor has the claim recited that all acoustic sources or sounds must be detectable. Thus, giving claim 5 its broadest reasonable interpretation in light of the

Specification, the claim only requires selectively outputting signals based on *one* signal location of *one* acoustic source.

Arrowood discloses the expected spatial location or region R where the open window of a driver located at the drive-up window of a fast-food restaurant will communicate (FF 6-8). This region R represents the spatial location or region where the driver will speak or an acoustic source. This spatial information is used, at least in part, to detect and select the lobes having the highest speech signals, and the sounds from this source will be processed to output signals to a speech recognition device (FF 9). The Specification similarly describes a window can be an acoustic source (FF 10). We, therefore, find Arrowood discloses the processor includes selectively outputting signals to the client component "based at least in part on one spatial location of at least one acoustic source" as recited in claim 5.

For the above reasons, we will sustain the rejection of claims 5, 15, and 20 as being anticipated by Arrowood.

OBVIOUSNESS REJECTION OVER ARROWOOD AND VALVE

Apart from stating claims 3, 17, and 24 "inherit the patentability of their independent claims" (App. Br. 5), Appellants do not specifically address the Examiner's position articulated in the Answer (Ans. 12) – a position that we find reasonable. Moreover, Appellants have not persuasively rebutted this position nor explained why it is deficient. We are, therefore, not convinced by Appellants' arguments for the reasons previously discussed in connection with independent claims 1, 12, and 19.

Accordingly, we sustain the Examiner's rejection of claims 3, 17, and 24.

CONCLUSIONS OF LAW

(1) Appellants have not shown the Examiner erred in finding Arrowood discloses a processor executing logic that receives a model time-frequency acoustic hypothesis in rejecting claim 1 under § 102.

(2) Appellants have not shown the Examiner erred in finding a disclosed region R in Arrowood is a spatial location of an acoustic source on which the processor bases, at least in part, the selectively outputted signal in rejecting claim 5 under § 102.

(3) Appellants have not rebutted the Examiner's finding that the combination of Arrowood and Valve teaches the limitations of claims 3, 17, and 24 under § 103.

ORDER

We affirm the Examiner's rejection of all claims on appeal.

No 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

ROGITZ & ASSOCIATES
750 B STREET
SUITE 3120
SAN DIEGO, CA 92101