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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/532,919	01/16/2006	Albert Kooiman	DE 020239	4947

91337 7590 01/29/2013

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EXAMINER	
SHAH, PARAS D	

ART UNIT	PAPER NUMBER
2659	

NOTIFICATION DATE	DELIVERY MODE
01/29/2013	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ALBERT KOOIMAN

Appeal 2010-008374
Application 10/532,919
Technology Center 2600

Before KALYAN K. DESHPANDE, LARRY J. HUME, and JOHN G. NEW, *Administrative Patent Judges*.

NEW, *Administrative Patent Judge*.

DECISION ON APPEAL

SUMMARY

Appellant files this appeal under 35 U.S.C. § 134(a) from the Examiner's Final Rejection of claims 1-13. Specifically, the Examiner rejected claims 1, 2, 4, and 10 as unpatentable under 35 U.S.C. § 102(b) as being anticipated by Polikaitis et al. (US 6,366,091 B1, January 1, 2002) ("Polikaitis").

The Examiner rejected claim 3 as unpatentable under 35 U.S.C. § 103(a) as being obvious over the combination of Polikaitis and Nguyen (US 5,765,130, June 9, 1998) ("Nguyen") and Crane et al. (US 7,069,221 B2, June 27, 2006) ("Crane").

The Examiner rejected claim 5 as unpatentable under 35 U.S.C. § 103(a) as being obvious over the combination of Polikaitis and Van Gerven and Xie (Stefaan Van Gerven and Fei Xie, *A Comparative Study of Speech Detection Methods*, PROC. 5TH EUR. CONF. SPEECH COMMUNICATIONS TECHNOLOGY EUROSPEECH, '97, Rhodes, Greece (1997)) ("Van Gerven").

The Examiner rejected claim 6 as unpatentable under 35 U.S.C. § 103(a) as being obvious over the combination of Polikaitis and Marx et al. (US 6,173,266 B1, January 9, 2001) ("Marx").

The Examiner rejected claim 7 as unpatentable under 35 U.S.C. § 103(a) as being obvious over the combination of Polikaitis, Marx, and Vanbuskirk et al. (US 6,505,155 B1, January 7, 2003) ("Vanbuskirk").

The Examiner rejected claim 8 as unpatentable under 35 U.S.C. § 103(a) as being obvious over the combination of Polikaitis, Vanbuskirk and Steinbrenner et al. (US 6,754,310 B1, June 22, 2004).

The Examiner rejected claim 9 and 11-13 as unpatentable under 35 U.S.C. § 103(a) as being obvious over the combination of Polikaitis, Marx, and Bridges (US 5,978,763, November 2, 1999) ("Bridges").

We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

STATEMENT OF THE CASE

Appellant's invention is directed to a method for operating a speech recognition system in which a speech signal of a user is detected and analyzed so as to recognize speech information contained in the speech signal. Abstract.

GROUPING OF CLAIMS

Because Appellant argues that the Examiner erred for substantially the same reasons with respect to claims 1, 4, and 10, we select claim 1 as representative of this group. App. Br. 14, 19. Claim 1 recites:

> 1. A method for operating a speech recognition system (l), the method comprising:
>
> detecting a speech signal (SI) of a user;
>
> analyzing the speech signal to recognize speech information contained in the speech signal (ST);
>
> determining a reception quality value (SQ) or a noise value which represents a current reception quality; and
>
> switching the speech recognition system over to a mode of operation, which is less sensitive to noise when the noise value exceeds a noise threshold, or outputting an alert signal

(SW) to the user when the reception quality value (SQ) drops below a given reception quality threshold, or both.

App. Br. 31.

Appellant argues that the Examiner erred for substantially the same reasons with respect to claims 6 and 7. We therefore select claim 6 as representative. App. Br. 21. Claim 6 recites:

6. A method as claimed in claim 4, wherein the voice activity detector applies the reception quality value (SQ) or the noise value or, when the reception quality value drops below the reception quality threshold or when the noise value exceeds the noise threshold, a reception corruption indication signal (SEB) to a dialog control device.

App. Br. 32.

Appellant argues that the Examiner erred for substantially the same reasons with respect to claims 9 and 11-13 and we therefore select claim 9 as representative of this group. Claim 9 recites:

9. A speech recognition system, comprising:

means for detecting a speech signal (SI) of a user;

a speech recognition device adapted to analyze the detected speech signal (SI) to recognize speech information contained in the speech signal;

a quality control device adapted to determine a reception quality value (SQ) or a noise value, representing a current reception quality;

a comparator adapted to compare the reception quality value (SQ) with a predetermined reception quality threshold or for comparing the noise value with a given noise threshold,

> and control means adapted to switch the speech recognition system over to a mode of operation which is less sensitive to noise, or an alert signal (SW) is output to the user when the reception quality value drops below the reception quality threshold or when the noise value exceeds the noise threshold, or both.

App. Br. 33-34.

ISSUES AND ANALYSES

A. Rejection of claims under 35 U.S.C. § 102(b)

Claim 1

Issue

Appellant argues that the Examiner erred in rejecting claim 1 as unpatentable under 35 U.S.C. § 102(b) as being anticipated by Polikaitis. App. Br. 10. We therefore address the issue of whether the Examiner erred in finding that Polikaitis discloses each and every limitation recited in claim 1.

Analysis

Appellant argues that although Polikaitis discloses the use of sound energy thresholds, none of the thresholds so disclosed are reception quality thresholds or a noise threshold as recited in claim 1. App. Br. 16. Rather, Appellant argues, Polikaitis discloses start energy thresholds and end energy thresholds, which relate to energy in frames. *Id.* Furthermore, Appellant asserts that the decisions or determinations made by the method taught by Polikaitis all relate to user errors and do not relate to determining a value

which represents a current reception quality in the sense of strength of the cell phone or other incoming signal, noisy environment of the user, or other factors other than user error.[1] App. Br. 17.

Appellant also contends that Polikaitis does not disclose the limitation of claim 1 reciting switching the speech recognition system over to a mode of operation which is less sensitive to noise when the noise value exceeds a noise threshold. App. Br. 18. According to Appellant, when Polikaitis determines that one of Errors 1-4 has occurred, Polikaitis merely prompts the user and/or adjusts the window size or the level of amplification. Appellant asserts that Polikaitis does not switch over to a mode of operation which is less sensitive to noise. *Id.*

The Examiner responds that Polikaitis teaches the use of thresholds which utilize energy values, noise energy, and other parameters to indicate the quality of the input signal received from the user from a communication device. Ans. 19-20 (citing Fig. 3). The Examiner finds that Appellant's Specification has not provided any special definition for the "reception quality threshold" as recited in the limitation. Ans. 20. The Examiner finds that the thresholds disclosed by Polikaitis are therefore reception quality thresholds insofar as they are used to evaluate the received signal quality at the microphone from a user for use in speech recognition. Ans. 20 (citing Polikaitis, col. 2, ll. 15-27).

With respect to Appellant's argument that Polikaitis fails to disclose the limitation of claim 1 reciting switching the speech recognition system

[1] Appellant defines "user error," as disclosed by Polikaitis, as speaking over the beginning or the end of the recording frame, or speaking too loudly or softly.

over to a mode of operation which is less sensitive to noise, the Examiner finds that the relevant limitation of claim 1 recites "or" terminology. Ans. 21. The Examiner therefore finds that the claims are satisfied if the prior art teaches or suggests either (1) "switched over to a mode of operation which is less sensitive to noise" or (2) "outputting an alert signal to the user …." *Id.* The Examiner finds that the teachings of Polikaitis anticipate option (2). *Id.* (citing Polikaitis, Figs. 2, 3; col. 6, ll. 49-52; col. 7, ll. 36-39; col. 8, ll. 16-19, 59-61).

We are persuaded by the Examiner's reasoning and adopt it as our own. Specifically, we find that Polikaitis teaches that when "the ratio of SpeechEnergy to NoiseEnergy is less than a sixth threshold value, Thresh**6**, then the speech signal is obscured by noise. This condition shows the user spoke too softly." Ans. 19-20*; see also* Polikaitis, Fig. 3, col. 8, ll. 49-53. We agree with the Examiner that this discloses the limitations of claim 1 reciting "determining a reception quality value (SQ) or a noise value which represents a current reception quality." Since Appellant does not provide, in the claims or Specification, a precise definition of a "reception quality value" or a "noise value," the Examiner gives the claim its "broadest reasonable interpretation consistent with the specification." *See In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004) (citation omitted). With respect to this limitation, we find that Polikaitis' disclosure of "the ratio of SpeechEnergy to NoiseEnergy" anticipates the recited "reception quality value (SQ) or a noise value which represents a current reception quality" as it teaches a ratio of signal to noise energy.

Furthermore, we find that the Examiner correctly finds that the use of the disjunctive "or" in the limitation of claim 1 reciting "switching the

speech recognition system over to a mode of operation, which is less sensitive to noise when the noise value exceeds a noise threshold, or outputting an alert signal (SW) to the user when the reception quality value (SQ) drops below a given reception quality threshold" requires only that (1) the speech recognition system be switched over to a mode of operation which is less sensitive to noise; or (2) outputting an alert signal to the user, but does not require both. Consequently, the limitation is anticipated if one of the requirements is disclosed by Polikaitis. *See, e.g., Ex Parte Eric Thelen, Andreas Kellner, Jan Kneissler and Holger R. Scholl*, Appeal No. 2009-015263, 2012 WL 2522441, at *2 (Bd. Pat. App. & Interf., June 28, 2012). Appellant does not dispute that alternate requirement (2) is disclosed by Polikaitis, and we therefore conclude that the Examiner did not err in finding that the disputed limitation is disclosed by Polikaitis.

Claim 2

Issue

Claim 2 depends from claim 1 and recites:

> 2 A method as claimed in claim 1, further comprising: automatically resetting the speech recognition system to a previous mode of operation when the reception quality value (SQ) exceeds the reception quality threshold or when the noise value drops below the noise threshold.

App. Br. 31.

Appellant argues that the Examiner erred in finding that Polikaitis anticipates claim 2. Specifically, Appellant argues that the Examiner erred

in finding that Polikaitis anticipates the limitation of claim 2 reciting "automatically resetting the speech recognition system to a previous mode of operation when the reception quality value (SQ) exceeds the reception quality threshold or when the noise value drops below the noise threshold." App. Br. 19. We therefore address the issue of whether the Examiner so erred.

Analysis

Appellant argues that the Examiner erred because although Polikaitis extends the speech acquisition window in response to user error, Polikaitis does not describe changing the length of the user window in response to a reception quality value exceeding a quality threshold. App. Br. 19. According to Appellant, Polikaitis does not set forth criteria to returning the window length or amplification to their original length or amplitude. Returning to the original settings, as taught by Polikaitis, is not a change of mode, argues Appellant, and is not responsive to a threshold level being crossed. App. Br. 20.

The Examiner finds, however, that in the example provided in the Specification, it is stated that the user is a key factor in allowing the reception quality to become better. Ans. 23. The Examiner finds that this is similar to Polikaitis' usage of thresholds which, if not met, result in the re-prompting for user input to enhance reception quality of the input signal for speech recognition and to therefore satisfy the thresholds. *Id.* Such "re-prompting," finds the Examiner, goes to a previous mode of operation, which is the capture of user input via a microphone. *Id.* (citing Polikaitis, Fig. 3, col. 6, ll. 62-65).

The Examiner further finds that Polikaitis discloses the return to the operation of requesting speech input from the user when the threshold values steps 230 or 240. *Id.* The Examiner finds that Polikaitis thus discloses that the system is reset to a previous mode, specifically re-entry of speech from user. *Id.*

We are not persuaded by the Examiner's reasoning. The additional requirement of the limitation reciting "automatically resetting the speech recognition system to a previous mode of operation when the reception quality value (SQ) exceeds the reception quality threshold or when the noise value drops below the noise threshold" requires that the system automatically reset to a previous "mode of operation" when the reception quality value exceeds the reception quality threshold or when the noise value drops below the noise threshold. Claims are viewed in light of the specification. *See, e.g., SanDisk Corp. v. Kingston Technology Co., Inc.*, 695 F.3d 1348, 1353 (Fed. Cir. ,2012) ("Claim terms generally are construed in accordance with the ordinary and customary meaning they would have to one of ordinary skill in the art in light of the specification and the prosecution history" (citation omitted)). Appellant's Specification states, in relevant part:

> In a particularly advantageous embodiment the speech recognition system is automatically reset to the previous mode of operation when the reception quality value exceeds the reception quality threshold again. This means that the speech recognition system, for example, automatically becomes more sensitive again so that it responds more comfortably for the user as soon as the user has successfully created a better reception quality in response to the alert signal, or when the reception quality becomes better again for other reasons.

Specification, p. 4, ll. 7-12. The Specification thus states that when the signal-to-noise ratio increases (e.g., the noise value drops *below* the noise threshold), the system automatically resets to a more sensitive setting. Therefore "mode of operation," as used throughout the Specification, refers to a greater or lesser sensitivity of the sensitivity depending upon the relative ratio of voice (signal) to noise. We find that Polikaitis does not teach different sensitivity settings dependent upon background noise but rather, as explained for claim 1 *supra*, discloses alerting the caller with a signal that the signal-to-noise value is too low. We consequently find that the Examiner erred in finding that Polikaitis anticipates the limitation of claim 2 reciting "automatically resetting the speech recognition system to a previous mode of operation when the reception quality value (SQ) exceeds the reception quality threshold or when the noise value drops below the noise threshold."

B. Rejection of claims under 35 U.S.C. § 103(a)

Claim 3

Issue

Appellant argues that the Examiner erred in finding dependent claim 3 obvious over the combination of Polikaitis and Nguyen. App. Br. 20. Claim 3 depends from claim 1 and recites:

> 3. A method as claimed in claim 1, further comprising deactivating a barge-in mode of operation of the speech recognition system when the reception quality value drops below the reception quality threshold or the noise value exceeds the noise threshold.

App. Br. 32. Appellant argues that the Examiner erred in finding that Nguyen teaches deactivating a barge-in mode. App. Br. 20. We therefore address the issue of whether the Examiner so erred.

Analysis

Appellant argues that Polikaitis is silent with respect to a barge-in mode. App. Br. 20. Furthermore, Appellant contends, Nguyen does not teach or suggest deactivating a barge-in mode. *Id.* Appellant argues rather that the Nguyen system teaches that the user is barging-in, i.e., Nguyen is always in a barge-in mode. App. Br. 21 (citing Nguyen, col. 5, ll. 27-34). Therefore, Appellant contends, neither Polikaitis, which has no barge-in system, nor Nguyen, which is always in a barge-in mode, teaches or suggests switching into or out of a barge-in mode, nor do they teach or suggest deactivating a barge-in system, much less what criteria should be used for such a deactivation. App. Br. 21.

The Examiner finds that Nguyen does teach a barge-in detection that is based on a reception quality threshold. Ans. 25 (citing Nguyen col. 4, ll. 46-67; col.5, lines 9-21). The Examiner finds that speech is detected from the signal to determine if barge-in has occurred; this is done by evaluating with respect to a reception quality threshold of the input signal. Ans. 25. The Examiner finds that Nguyen inspires Polikaitis' teachings as it provides detection of barge-in and barge-in echo that may result in an interactive session (i.e., speech recognition). *Id.* The Examiner finds that the system of Polikaitis would therefore benefit from such teachings since it would enable the capture of speech information during the playing of prompt 270 to prevent the speech input being spoken over the start of the speech

acquisition window and to allow for correct input into the speech recognizer upon subsequent input from the user. *Id.*

The Examiner also finds that Crane teaches or suggests deactivation of barge-in. Ans. 26. The Examiner finds that Crane teaches or suggests determining whether a target source has been detected. *Id.* (citing Crane, Figure 3, step 70). The Examiner finds that Crane teaches or suggests that if the detected source is a true barge-in, the system is activated (*see* step 72) and speech recognition takes place; if not, then barge-in is not activated. Ans. 26. The Examiner finds that this is explicitly described in step 74, where the speech prompts continues or is re-played. *Id.* The Examiner finds that in neither in claim 3, nor in paragraph [0034] of the Appellant's published Specification, does the term "deactivation" have a special meaning. *Id.* Rather, the Examiner finds that the deactivation of the barge-in enables the prompt not to be interrupted. *Id.* Similarly, finds the Examiner, Crane teaches or discloses that when a target signal is not identified, the prompt continues to be played and is not interrupted by a non-target signal. *Id.* The Examiner therefore finds that the language of claim 3 can be reasonably interpreted as described above. *Id.*

We agree with the Examiner. As explained with respect to claim 1 *supra*, Polikaitis teaches a method for detecting when a signal has dropped below a threshold value of the ratio of SpeechEnergy to NoiseEnergy and for altering the system accordingly. Ans. 19-20. Further, both Nguyen and Crane teach or suggest barge-in systems for dealing with unanticipated noises during prompts; consequently such systems are well-known in the art. Ans. 25-26. We conclude that it would have been obvious for an artisan of ordinary skill in the contemporaneous art to have combined the teachings of

low signal-to-noise detection and system switching of Polikaitis, with the use of barge-in systems taught or suggested by Nguyen and Crane, to arrive at the limitations recited in claim 3.

Claim 5

Issue

Appellant argues that the Examiner erred in finding dependent claim 5 obvious over the combination of Polikaitis and Van Gerven. App. Br. 20. Claim 5 depends from claim 1 and recites:

> 5. A method as claimed in one of the claims 1, wherein the reception quality value (SQ) or the noise value is determined on the basis of a background signal which is received prior to a beginning of an utterance, or in a speech pause of the user, or both.

App. Br. 32. Specifically, Appellant argues that neither Polikaitis nor Van Gerven teaches or suggests determining the reception quality value or the noise on the basis of a background signal which is received prior to a beginning of an utterance or in a speech pause of the user, or both. App. Br. 21. We therefore address the question of whether the Examiner so erred.

Analysis

Appellant argues that Van Gerven teaches or suggests the determination of when speech is present and when only background noise is present. App. Br. 21-22 (citing Van Gerven, p. 1, ¶ 2). Appellant contends that, although Van Gerven addresses in detail how to tell when speech is present or absent, nowhere does Van Gerven teach or suggest analyzing the

signal when no speech is present to determine either a reception quality value or a noise value for switching modes of operation. Ans. 22.

The Examiner responds that Van Gerven analyzes a signal and recalculates parameters during non-speech periods (i.e., when no speech is present). Ans. 28 (citing Van Gerven, p. 3, § 2.3, ¶ 2). The Examiner also finds that Polikaitis teaches or suggests a speech/noise classifier for determining periods of speech and noise. Ans. 28 (citing Polikaitis, col. 4, ll. 32-41). The Examiner further finds that Polikaitis uses the classification result to determine the speech energy and noise energy when a user speaks too softly where the ratio is a reception quality value used to determine if a user spoke softly. Ans. 28 (citing Polikaitis, col. 5, ll. 6-23; col. 8, ll. 46-51). The Examiner finds that Van Gerven teaches methods to detect speech when noise is present, which would aide in the classification process taught or suggested by Polikaitis. Ans. 28 (citing Van Gerven, p. 1, § 1, ¶ 1). Hence, concludes the Examiner an artisan of ordinary skill would be motivated to alter the Polikaitis system a specific speech detection algorithm as Polikaitis already analyses a signal for noise (background signal) and speech. Ans. 28.

We agree with the Examiner's reasoning and adopt it as our own. We have described with respect to claim 1, *supra,* our findings concerning how Polikaitis teaches detection of the ratio between SpeechEnergy and NoiseEnergy. Ans. 19-20. We agree with Examiner's finding that Polikaitis teaches or suggests a speech/noise classifier and that an artisan of ordinary skill would be motivated to combine the teachings of Polikaitis with the teaching of Van Gerven on the detection of speech when noise is present. Ans. 28. We therefore conclude that the Examiner did not err in finding that

the limitations of claim 5 are taught or suggested by the teachings of Polikaitis and Van Gerven.

Claim 6

Issue

Appellant next argues that the Examiner erred in finding that claim 6 was obvious over the combination of Polikaitis and Marx. App. Br. 22. Specifically, Appellant argues that claim 6 calls for a reception corruption indication signal and that Marx does not cure this shortcoming of Polikaitis. *Id.* We therefore address the issue of whether the Examiner so erred.

Analysis

Appellant argues that Marx teaches or suggests, in Steps 260 and 270, the determination of a confidence level and, if the confidence is low, a step 15, which prompts the user with a prompt such as "I'm sorry, I didn't hear your response. Please repeat your answer now." App. Br. 22-23 (citing Marx col. 2, ll. 5-9, 26-39). According to Appellant, Marx teaches that a lack of confidence is determined from such factors such as speaking too loud or too soft, accents, word choice, and the like. App. Br. 23. Therefore, Appellant argues, rather than a reception corruption indication signal, Marx merely determines a confidence level with which the response was interpreted. *Id.*

The Examiner agrees with Appellant that Marx uses confidence metrics to determine the user's quality of speech input. Ans. 29. The Examiner finds that Marx teaches or suggests that a determined lack of confidence results in a prompt to the user to repeat input. *Id.* The Examiner

also finds that Marx teaches that a determined confidence parameter generates a reception indication signal as to the quality of speech input. *Id.* (citing Marx, Fig. 2, steps 280, 290 (take appropriate action), step 215 (re-prompt)). The Examiner finds that Appellant's Specification is consistent with this interpretation; e.g., Specification, p. 5, ll. 13-16 describes the outputting of an indication signal to the dialog control device or other components when reception quality drops. Ans. 29. The Examiner finds that there is no description in the Specification as to what this indication signal represents and it can therefore be interpreted as a signal determined as a result from confidence scoring for outputting a prompt or and action as taught by Marx. Ans. 29-30.

Appellant replies that Marx determines a confidence parameter indicative of how confident it is that the speech was interpreted properly. Reply Br. 5. According to Appellant, the confidence value cannot be determined at a voice activity detector; rather, the confidence level can only be determined after the speech is analyzed. Reply Br. 6. Appellant contends that, because Marx cannot determine the confidence level until the speech is analyzed, Marx not only does not teach, but cannot determine the confidence level with a voice activity detector. *Id.*

We are not persuaded by Appellant's argument. We have explained with respect to claim 1, *supra,* how Polikaitis teaches detection of the ratio between SpeechEnergy and NoiseEnergy and thus determines a sound quality metric. Ans. 19-20. We agree with the Examiner's finding that Marx teaches a metric for determining a confidence level to determine the user's quality of speech input. Ans. 29. We find that the combination of Marx and Polikaitis teaches or suggests the limitations of claim 6 and

conclude that the Examiner did not err in rejecting claim 6 as being obvious over the combination of Polikaitis and Marx.

Claim 8

Issue

Appellant argues that the Examiner erred in rejecting claim 8 over the combination of Polikaitis, Vanbuskirk, and Steinbrenner. App. Br. 23. Claim 8 recites:

> 8. A method as claimed in one of the claims 1, further comprising:
>
> analyzing an incoming signal for a type of disturbance causing the reception quality value (SQ) to be below the reception quality threshold or the noise value to be above the noise threshold, and outputting a prompt (SW) to the user.

App. Br. 33. Specifically, Appellant argues that the Examiner erred in finding that the combination of Polikaitis, Steinbrenner, and Vanbuskirk teaches analyzing an incoming signal for a type of disturbance causing the reception quality value to be below the reception quality threshold or the noise value to be above the noise threshold. App. Br. 23. We therefore address the issue of whether the Examiner so erred.

Analysis

Appellant argues that Steinbrenner is directed to a telephony interface device for providing status and diagnostic information for a telephone operatively coupled to a telephone interface device. App. Br. 23. (citing Steinbrenner, col.1, ll. 7-11). According to Appellant, Steinbrenner teaches or suggests telephone system diagnostic information, particularly when a

telephone is off the hook, which provides problems to the network switching system. *Id.* Appellant contends that adding the Steinbrenner system to Polikaitis would merely tell Polikaitis when a phone is off the hook. *Id.* However, argues Appellant, if a telephone is off the hook, the user will not be calling in to the Polikaitis system so Polikaitis has no need for or use for the information that a telephone somewhere in the network is off the hook or otherwise experiencing network problems. App. Br. 23-24.

The Examiner responds that Steinbrenner teaches or suggests that the off-hook feature relates to the user picking up a phone (e.g., off hook), which is connected to a telephony interface. Ans. 30 (citing Steinbrenner, col. 8, ll. 17-24). Therefore, finds the Examiner, the phone in Steinbrenner is in use and would enable calling within the Polikaitis system and would enable the conveying of actual information with respect to error (low quality) input from the user in order to prevent future occurrences. Ans. 30-31 (citing Steinbrenner, col. 3, ll. 35-42). The Examiner finds that such teachings would benefit the system of Polikaitis, because Polikaitis teaches the use of telephony devices as a communication device through which the user inputs speech and also teaches the playback of prompts. Ans. 31 (citing Polikaitis, col. 3, ll. 6-8). The Examiner therefore finds that incorporation of utilizing diagnostic information into the system of Polikaitis enables voiced prompts to the user to be conveyed about possible problems in the initial received speech. Ans. 31.

Appellant replies that Steinbrenner is concerned with system malfunctions, whereas Polikaitis is concerned with user errors. Reply Br. 6. Appellant argues that there would therefore be no motivation to combine the two references. *Id.*

We agree with the Examiner. Polikaitis teaches the detection of sound quality based on the ratio of signal to noise energies. *See supra* with respect claim 1; Ans. 19-20. Steinbrenner teaches providing a telephony interface device for providing diagnostic information to at least one telephone operatively coupled to the telephony interface device. Steinbrenner, col. 4, ll. 16-19. We therefore find that the Examiner did not err in finding that the combination of Steinbrenner and Polikaitis teaches or suggests the limitations of claim 8.

Claim 9

Issue 1

Appellant argues that the Examiner erred in rejecting claim 9 over the combination of Polikaitis, Marx, and Bridges. App. Br 25. Specifically, Appellant argues that the Examiner erred in finding that the references teach or suggest a quality control device adapted to determine a reception quality value or a noise value representing a current reception quality as recited in claim 9. App Br. 26. We therefore address whether the Examiner so erred.

Analysis

Appellant argues that the Examiner erred in finding that the disputed limitation is met by steps or decision boxes 230, 240, 250, 260 of Polikaitis. App. Br. 26. Appellant contends that the steps merely detect user error and that these boxes make no determination of a reception quality value, a noise value, or any other value that represents a current reception quality. *Id.*

The Examiner responds that issue of determining reception quality in claim 9 is the same as that discussed for claim 1, *supra*, and repeats his

findings. Ans. 31. As explained with respect to claim 1, *supra*, we agree with the Examiner's findings in this respect and conclude that the Examiner did not err in finding that the references teach or suggest the limitation of claim 9 reciting "a quality control device adapted to determine a reception quality value (SQ) or a noise value, representing a current reception quality."

Issue 2

Appellant next argues that the Examiner erred in finding that the combination of Polikaitis, Marx, and Bridges teaches or suggests outputting an alert signal either that the reception quality has dropped below a threshold or that a noise value exceeds a threshold. App Br. 26. We therefore address whether the Examiner so erred.

Analysis

Appellant argues that, contrary to the Examiner's finding, elements 260, 270, 280, and 215 of Marx do not disclose or suggest outputting an alert signal either that the reception quality has dropped below a threshold or that a noise value exceeds a threshold, but rather relate to whether an answer was understood. App. Br. 26. Therefore, contends Appellant, like Polikaitis, Marx does not teach or suggest making a determination whether reception quality is below a threshold or whether noise exceeds a threshold nor outputs an alert signal indicative of low reception quality or high noise. *Id.*

The Examiner responds that Polikaitis teaches or suggests the outputting of the alert signal when the reception quality dropped below a

threshold. Ans. 32. The Examiner finds that Marx teaches or suggests such a feature where the dialog modules interface with the various speech output components and subsequently interface with the telephony interface. *Id.* The Examiner finds that Marx teaches or suggests that voice prompts are output when low confidence with respect to the received speech is obtained. *Id.* (citing Marx, Fig. 2, at 215). The Examiner finds that the usage of the control means of Marx enables the alerts of Polikaitis to be sent to the user indicating reception quality issues with coordination of the prompts as well as the speech recognition system. *Id.*

We are persuaded by the Examiner's reasoning and adopt it as our own. As explained with respect to claim 1 *supra* we agree with the Examiner that Polikaitis teaches or suggests outputting of the alert signal when the reception quality dropped below a threshold. Ans. 19-20, 32. Moreover, we agree with the Examiner that Marx teaches or suggests that voice prompts are output when low confidence with respect to the received speech is obtained. Ans. 32. We therefore conclude that the Examiner did not err in concluding that the limitation of claim 9 reciting "an alert signal (SW) is output to the user when the reception quality value drops below the reception quality threshold or when the noise value exceeds the noise threshold."

Issue 3

Appellant argues that the Examiner erred in finding that the combination of Polikaitis, Bridges and Marx teaches or suggests the limitation of claim 9 reciting "a comparator adapted to compare the reception quality value (SQ) with a predetermined reception quality

threshold or for comparing the noise value with a given noise threshold." App. Br. 27. We therefore address the issue of whether the Examiner so erred.

Analysis

Appellant admits that Bridges teaches or suggests the use of a comparator. App. Br. 27. However, argues Appellant, the comparator 268 of Bridges is for a different purpose and produces a different result. *Id.* Appellant argues that the comparator 268 of Bridges determines whether or not an incoming signal is direct speech to deactivate the speech generator and activate the speech recognizer. *Id.* (citing Bridges, col. 6, ll. 5-13). Appellant submits that if one were to add the comparator 268 of Bridges to Polikaitis, that Bridge's comparator would be used in a part of the system which would arbitrate between whether the interface is in a mode for the user to provide a speech input 215 or whether the interface is a mode in which the user is prompted 270 or informed 275. App. Br. 27-28. Appellant argues that Bridges' comparator would neither replace steps 230, 240, 250, or 260 of Polikaitis, nor would replacing these steps with a comparator cure the shortcomings of Polikaitis noted above. App. Br. 28.

The Examiner responds that Bridges teaches or suggests a comparator that uses a threshold. Ans. 34 (citing Bridges, Fig. 2, 268; col. 6, ll. 5-13). The Examiner finds that Polikaitis teaches or suggests the use of reception quality thresholds in terms of speech input from a user. Ans. 34. The Examiner finds that the component lacking in Polikaitis is a comparator component for performing the threshold operations. *Id.* The Examiner finds that incorporating Bridges' comparator into the processing component for

performing the determinations of thresholds allows a specific component within the processing system to be realized to be realized (i.e., change or addition of software code for determining the thresholds (i.e., function call for performing the comparison). *Id.* The Examiner finds further that, contrary to Appellant's assertion, the functionality of bridge's comparator is not being directly incorporated into the system of Polikaitis but rather teaching or suggestion of Bridges, of the use of a comparator with its threshold capabilities, such that one skilled in the art would have sufficient knowledge to modify software to include the threshold operations of Polikaitis in a comparator (i.e., function call). *Id.*

We are persuaded by the Examiner's reasoning and adopt it as our own. Bridges teaches or suggests a voice activity detection method that uses a comparator to compare a received signal against an adaptive threshold in a voice activity detector. Ans. 17 (citing Bridges, Fig 2, 268; ¶ [0018]). We agree with the Examiner's conclusion that it would have been obvious to one of ordinary skill in the contemporaneous art to implement the teachings of Bridges into the teachings of Polikaitis, since Polikaitis teaches or suggests a speech recognition system that tests received signal for quality measures against a threshold and Bridges teaches or suggests that the use of a "threshold comparator" improves the performance of the voice activity detection in the case where echo return loss interferes with voice prompt system performance. *Id.* We therefore conclude that the Examiner did not err in finding that the combination of Marx, Bridges, and Polikaitis teaches or suggests the limitation of claim 9 reciting "a comparator adapted to compare the reception quality value (SQ) with a predetermined reception

quality threshold or for comparing the noise value with a given noise threshold."

Claim 12

Issue

Appellant argues that the Examiner erred in concluding that claim 12 was obvious over the combination of claim 12 over Polikaitis, Marx, and Bridges. App. Br. 28. Claim 12 recites:

> 12. A speech recognition system as claimed in claim 9, wherein the control means further comprises a barge-in switching unit.

App. Br. 34. Specifically, Appellant argues that recitation the barge-in switching unit now requires claim 12 to be interpreted in accordance with the Examiner's option (1) set forth in paragraph 17b of the Final Rejection.[2] Further, Appellant argues that Marx does not teach or suggest a barge-in switching unit for switching modes. App. Br. 28-29. We therefore address the issue of whether the Examiner so erred.

Analysis

Appellant argue that the Examiner has effectively conceded that Polikaitis does not disclose or teach switching modes. App. Br. 28. Further, Appellant argues that, although Marx teaches or suggests software for

[2] Paragraph 17b of the Final Rejection recites: "In the context of this claim, the "or" being satisfied if the speech recognition system (1) "switches over to a mode of operation which is less sensitive to noise" or (2) "outputs an alert signal to the user." Polikaitis, et al., teaches the invention of claim 1 consistent with option (2). Final Rejection 16.

detecting a barge-in, Marx does not suggest a barge-in switching unit for switching modes. *Id.* Appellant argues that, to the contrary, Marx merely discloses that, when barge-in protection is provided, a prompt going out to the user should be stopped in response to sensing a barge-in. App. Br. 28-29.

The Examiner responds that the language of claim 12 recites "further comprises…." Ans. 35. Moreover, finds the Examiner, there is no limitation in claim 12, which requires that option 1 be incorporated into the claim, as there is no terminology that so refers back to claim 9 as asserted by the Appellant. *Id.* Hence, interpreting the barge-in switching unit independently as another component in the system is a reasonable interpretation. *Id.*

The Examiner also finds that the language of claim 12 does not recite a barge-in switching unit for switching modes but, rather, only a barge-in switching unit is recited. *Id.* The Examiner finds that claim 12 does not provide any limitations to further define the functionality of the barge-in switching unit. Ans. 36. The Examiner finds that Marx's barge-in software, which is switching based on user speaking during a prompt, teaches claim 12. *Id.* The Examiner finds further that the Specification provides a description of the barge-in switching unit as being a software switch. *Id.* (*see* Specification, p. 9, ll. 27-30).

We agree with the Examiner's reasoning and adopt it as our own. We find nothing in the language of claim 12 that demands that option 1 of paragraph 17b of the Final Rejection be read into the language of claim 12. The relevant language of claim 9 recites (1) "switches over to a mode of operation which is less sensitive to noise" *or* (2) "outputs an alert signal to

the user." Final Rejection 16. The disjunctive "or" requires that one or the other (or both, as later recited in the claim) of the limitations be performed. Claim 12 recites "control means further comprises a barge-in switching unit" and we agree with the Examiner's finding that the "further comprises a barge-in switching unit" language in the claim does not set forth a requirement that limitation (1) be met as a condition precedent to addition of the limitation of a "barge-in switching unit" as recited in claim 12.

Furthermore, we agree with the Examiner's finding that the language of claim 12 recites a "barge-in switching unit" and not "a barge-in switching unit for switching modes," as Appellant suggests. Ans. 35. We find that the barge-in switching software of Marx teaches or suggests the limitation of claim 12, and we consequently conclude that the Examiner did not err in finding that claim 12 is taught or suggested by the combination of Polikaitis, Marx, and Bridges.

DECISION

The Examiner's rejection of claims 1, 4, and 10 as anticipated under 35 U.S.C. § 102(b) is affirmed.

The Examiner's rejection of claim 2 as anticipated under 35 U.S.C. § 102(b) is reversed.

The Examiner's rejection of claims 3, 5-9 and 11-13 as unpatentable under 35 U.S.C. § 103(a) is affirmed.

AFFIRMED-IN-PART

msc