UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TECHNOFIRST S.A.,
Appellant and Patent Owner

Appeal 2009-010931
Reexamination Control 90/007,841
Patent 4,833,719
Technology Center 3900

Decided: March 5, 2010

Before SCOTT R. BOALICK, JOHN A. JEFFERY, and KEVIN F. TURNER, *Administrative Patent Judges*.

TURNER, *Administrative Patent Judge*

DECISION ON APPEAL

TECHNOFIRST S.A.[1] appeals under 35 U.S.C. §§ 134(b) and 306 from a final rejection of claims 1-19. We have jurisdiction under 35 U.S.C. §§ 134(b) and 306.

We heard oral arguments on September 2, 2009, a written transcript of which is included in the record.

We REVERSE.

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[1] TechnoFirst S.A. is the real party in interest and the current owner of the patent under reexamination.

STATEMENT OF THE CASE

This proceeding arose from a request for *ex parte* reexamination filed by Robert C. Perez on December 12, 2005 of United States Patent 4,833,719 (the '719 Patent), now expired, issued to Christian E. Carme and Alain R. Roure on May 23, 1989 based on United States Application 07/110,699 filed September 23, 1987. None of the claims in this reexamination have been amended.

Patentee's invention relates to apparatuses and methods for attenuating external origin noise reaching the eardrum, and for improving the intelligibility of electro-acoustic communications (Spec. Col. 1, ll. 8-11). The apparatus includes a headset (1) which forms a cavity adjacent to the ear canal (3), with a microphone (8) and loudspeaker (6) near that cavity, and having a feedback circuit working with the microphone and loudspeaker to attenuate outside noise (*id*. at col. 5, ll. 40-57; Fig. 2).

Claim 1, which we deem to be representative, reads as follows:

> 1. Apparatus for attenuating externally originating noise reaching the eardrum, the apparatus being of the type including passive soundproofing means which together with each ear delimits a respective cavity, and also including an electro-acoustic transducer and a microphone disposed inside each said cavity and interconnected via a feedback loop including a constant gain amplifier and a filter with which they constitute an active sound attenuator, the apparatus being

> characterized in that the transfer function C(w) of said filter is a complex polynomial function and in that the product of the constant gain K of said amplifier multiplied by the modulus |C(w)| of the transfer function of said filter and by the modulus |H(w)| of the open loop transfer function as measured at the input to said transducer and at the output from said microphone is considerably greater than unity throughout the range of low audio frequencies which are to be attenuated and satisfies the stability criterion for all audible frequencies.

The prior art references relied upon by the Examiner in rejecting the claims are:

Bose U.S. 4,494,074 Jan. 15, 1985

Adel. S. Sedra & Kenneth C. Smith, Microelectronic Circuits, 563-566 (CBS College Publishing 1982) (hereinafter "Sedra").

The Examiner also relied upon the Patent Owner's Admitted Prior Art (APA), specifically portions of the Specification of the '719 Patent: Cols. 1-2, col. 4, ll. 6-7, and col. 9, ll. 42-45.

The Examiner rejected claims 1-19 under 35 U.S.C. § 103(a) as unpatentable over Bose and Sedra (Ans. 4-21).

Appellant relied upon the following in rebuttal to the Examiner's rejection:

Declaration under 37 C.F.R. § 1.132 of Dr. Christian E. Carme dated December 17, 2007 (Evidence Appendix, hereinafter "Carme-1").

Declaration under 37 C.F.R. § 1.132 of Dr. Christian E. Carme dated June 30, 2008 (Evidence Appendix, hereinafter "Carme-2").

Colin H. Hansen & Scott D. Snyder, Active Control of Noise and Vibration, 642-658 (E & FN Spon 1997) (hereinafter "Hansen").

Handbook of Acoustics, 855-856 (Malcolm J. Crocker ed., Wiley-IEEE 1998) (hereinafter "Crocker").

ISSUES

Appellant contends that the Examiner's rejection is in error because Bose discloses only first order filters, where the independent claims require that the transfer function is a complex polynomial function (App. Br. 22-23). While Appellant acknowledges the teachings of Sedra (App. Br. 23), Appellant argues that at the time of the invention of the '719 Patent, those teachings, taken with the teachings of Bose, would not render obvious the claimed transfer function (App. Br. 23-24). Appellant also argues that the teachings of Declarations submitted (Carme-1; Carme-2) have not been rebutted by the Examiner, where the Examiner was alleged to have found them to be unpersuasive (App. Br. 25-26). Based on those Declarations, Appellant argues that the combination of Bose and Sedra would render the invention of Bose inoperable and that the combination results in an unstable system, that the claimed headsets have achieved international commercial success, and that the instant invention has been copied and licensed by others (App. Br. 28-29).

The Examiner finds that the claims do not recite that the open loop gain should meet the Nyquist stability criteria, that Bose does not necessarily provide that all filters in Bose are first order, and it would have been obvious

to have implemented the transfer function of the filter as a complex polynomial function because such techniques were well known to the person skilled in the art.

Appellant argues that the use of "complex polynomial function" in the claims applies standard industry terminology to describe a filter of an order higher than first order (App. Br. 27).

We also note that Appellant indicated that the Examiner's finding that a "complex polynomial function" could be interpreted as a "polynomial function with complex coefficients" (Ans. 25), represented a new issue (Reply Br. 4) and that complex numbers are not involved in the art of noise reduction (Reply Br. 8). However, at the Oral Hearing, Appellant clarified that complex numbers are involved, but still agued that the Examiner's alternate interpretation is unsupported by the Specification of the '719 Patent or by evidence submitted by Appellant or the Examiner (Oral Hearing Transcript pp. 9-10; Reply Br. 9).

Only those arguments actually made by Appellant have been considered in this decision. Arguments which Appellant could have made but chose not to make in the Brief have not been considered and are deemed to be waived. *See 37* C.F.R. § 41.37(c)(1)(vii).

Thus, the issues arising from the respective positions of Appellant and the Examiner are:

What is the proper interpretation of the claim terms "complex polynomial function" and "complex polynomial transfer function" in the

context of the instant claims and the disclosure of the Specification of the '719 Patent?

Has the Examiner erred in determining that the Bose and Sedra render the subject matter of the independent claims obvious under 35 U.S.C. § 103(a)?

FINDINGS OF FACT

1. The Specification details apparatuses and methods for attenuating external origin noise reaching the eardrum, and for improving the intelligibility of electro-acoustic communications, where the apparatus includes a headset (1) which forms a cavity adjacent to the ear canal (3), with a microphone (8) and loudspeaker (6) near that cavity, and having a feedback circuit working with the microphone and loudspeaker to attenuate outside noise (Spec. col. 1, ll. 8-11; col. 5, ll. 40-57; Fig. 2).
2. The Specification also details that an open-loop transfer function (H(w)) is determined by injecting white noise into the speaker and receiving that noise through the microphone (Spec. col. 3, ll. 6-14). The transfer function of the filter (C(w)) is a complex polynomial function and the coefficients of that function are calculated so that the product of the gain and the moduli of the open-loop and filter transfer functions is much greater than unity for the range of low audio frequencies (Spec. col. 3, ll. 24-38).

3. The Specification also provides that "[i]n practice, the filter 12 used is preferably an active analog filter comprising, for example, one or more integrated circuit filters each having a polynomial transfer function of the form:
$C(w)=(a1(w)^2 +a2(w)+a3)/(b1(w)^2 +b2(w)+b3)$"
(Spec. col. 9, ll. 30-35).

4. The Examiner takes as Admitted Prior Art that the Specification discloses that "the design of analog polynomial filters is a technique that is well known to the person skilled in the art" (Spec., col. 4, 6-7), and that "[t]he calculations necessary for constructing polynomial filters and forms of the transfer functions of such filters are well known to persons skilled in the electrical art" (Spec., col. 9. ll. 42-45) (Ans. 5-6).

5. Bose discloses an apparatus for attenuating outside noise through headphones which reproduce a music or speech signal (Bose, col. 1, ll. 4-14). The headphones have a cushion (15) placed against the ear and a microphone (11) to detect transmitted sound and a driver (17) for producing the music or speech signal (Bose, col. 2, l. 60 – col. 3, l. 11; Fig. 1).

6. Bose describes that the microphone and driver are interconnected via feedback loop with a constant gain amplifier and filter, with the filter having a transfer function (Bose, col. 3, l. 41 – col. 4, l. 28). The product of the gain with the moduli of the filter transfer

function and the open loop transfer function is greater than unity over a range of audible frequencies, including meeting the Nyquist stability criteria for those frequencies (*id.*).

7. Sedra discloses that a low pass filter may be expressed as a complex function, such as provided the equations (11.1) - (11.5) (Sedra, pp. 465-466).

8. Hansen notes that the "[r]esults obtained by Carme using the optimized filter are much better than those shown in the previous figure, extending the range of significant noise reduction over almost two decades in frequency" (Hansen, p. 648).

9. Crocker notes the "results of the system derived by Carme,[] who used a second-order compensation filter G(jw) with considerable success" (Crocker, p. 855, col. 2).

PRINCIPLES OF LAW

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007).

KSR disapproved a rigid approach to obviousness (*i.e.*, an analysis *limited to* lack of teaching, suggestion, or motivation). *KSR*, 550 U.S. 398 at

419 ("The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents.").

> While objective factual evidence going towards a § 103 determination is preferable to statements of opinion on the issue, the nature of the matter sought to be established, as well as the strength of the opposing evidence, must be taken into consideration in assessing the probative value of expert opinion. Opinion testimony rendered by experts must be given consideration, and while not controlling, generally is entitled to some weight. Lack of factual support for expert opinion going to factual determinations, however, may render the testimony of little probative value in a validity determination. While the opinion testimony of a party having a direct interest in the pending litigation is less persuasive than opinion testimony by a disinterested party, it cannot be disregarded for that reason alone and may be relied upon when sufficiently convincing.

Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 294 (Fed. Cir. 1985) (citations omitted).

ANALYSIS

Appellant contends that the Examiner's rejection is in error because Bose discloses only first order filters, where the independent claims require that the transfer function is a complex polynomial function (App. Br. 22-23). Appellant argues that the use of "complex polynomial function" in the claims applies standard industry terminology to describe a filter of an order higher than first order (App. Br. 27).

The Examiner finds that Appellant never defines the term "complex" to means greater than first order in the Specification (Ans. 24), and that a "complex polynomial function" could be interpreted as a "polynomial function with complex coefficients" or as a function which is "fundamentally hard enough to analyze or solve" (Ans. 24-25). Appellant argues that the Examiner's alternate interpretation is not supported by the Specification of the '719 Patent nor by evidence submitted by Appellant or the Examiner (Reply Br. 9). We generally agree with Appellant.

While Appellant points to examples of complex polynomial functions in the Specification (Reply Br. 9-11), the Examiner is correct that Appellant has not specifically defined that term therein (Ans. 24). However, while giving claim terms their broadest reasonable interpretation is correct and proper, such interpretations need to be made in view of the specification. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005). With such a standard, we do not find the Examiner's alternate interpretations to be consistent with the instant Specification.

While "complex" can imply the use of complex numbers (i.e., square root of -1) as coefficients and complex numbers are used in noise reduction (FF 6, 7), specifically to analyze and perform such functions, we do not find such an interpretation to be consistent with the Specification (FF 2). While the frequency applied in the transfer function can be expressed by use of imaginary numbers, the use of "complex polynomial function" in the Specification does not connote their use (FF 3; Oral Hearing Transcript p.

7). We can find no support in the Specification for such an interpretation of "complex polynomial function." We find no discussion or example in the Specification that a transfer function of a filter is a polynomial function with complex coefficients.

In addition, Appellant has proffered declaration evidence that one of ordinary skill in the art, at the time that the application was filed, would have understood "complex polynomial function" to require a filter of order higher than first (Carme-2, ¶6). While Dr. Carme's opinion cannot be said to come from a disinterested party, we find that the Examiner has provided nothing to counter his opinion other than a finding of the plain meaning of the term. While "complex" can certainly connote complex numbers, we find no support for such a contention in the Specification. As such, we do not agree with the Examiner that the claim term "complex polynomial function" should be interpreted as a "polynomial function with complex coefficients."

Similarly, we do not find the Examiner's alternate interpretation of complex, i.e. to mean hard to analyze or solve, (Ans. 25), to be compelling or supported by the underlying facts and the Specification. While finding that a "complex polynomial function" is a polynomial function having a complex or difficult nature has the benefit of simplicity from a linguistic standpoint, we likewise fail to find support in the Specification for such a determination. As such, we do not agree with the Examiner that the claim term "complex polynomial function" should be interpreted as a polynomial function which is hard to analyze or solve.

As such, we find, consistent with the Specification, that the claimed "complex polynomial function" implies a polynomial function of order greater than first. Even with this interpretation, the Examiner still finds that the claims are obvious over Bose and Sedra (Ans. 25-26).

Appellant argues that at the time of the invention of the '719 Patent, the teachings of Sedra, taken with the teachings of Bose, would not render obvious the claimed transfer function (App. Br. 23-24). Appellant also argues that the teachings of Declarations submitted (Carme-1; Carme-2) have not been rebutted by the Examiner, where the Examiner was alleged to have found them to be unpersuasive (App. Br. 25-26). Based on those Declarations, Appellant argues that the combination of Bose and Sedra would render the invention of Bose inoperable and that the combination results in an unstable system, that the claimed headsets have achieved international commercial success, and that the instant invention has been copied and licensed by others (App. Br. 28-29).

The Examiner finds that the claims do not recite that the open loop gain should meet the Nyquist stability criteria, that Bose does not necessarily provide that all filters in Bose are first order, and that it would have been obvious to have implemented the transfer function of the filter as a complex polynomial function because such techniques were well known to the person skilled in the art (Ans. 26-28).

First, we do not find that Bose teaches filters that are greater than first order. While the Examiner is correct that there is nothing in Bose that would

confine the filtering functions to that reference to first order, we find nothing that suggests it is not linear either (FF 5, 6). Considering that the Examiner has acknowledged that "Bose does not expressly teach said transfer function C(ω) of said filter is a complex polynomial function," (Ans. 5), we need not consider Bose's specific disclosure and can instead focus on what the combination of Bose and Sedra renders obvious.

Additionally, while the Examiner is correct that the claims do not recite that the gain should meet the Nyquist stability criteria, the independent claims do require that the system satisfies the stability criterion for all audible frequencies. As such, inquiring whether a system resulting from the proposed combination of Bose and Sedra would satisfy the stability criterion of the claim is not outside the scope of the claims and should be considered.

Appellant has submitted evidence that one of ordinary skill in the art, at the time of the invention of the '719 Patent, would have known how to implement a transfer function of the filter as a complex polynomial function (Carme-2, ¶¶7, 8), but that they would not have implemented one, because they believed it would be unstable (*id*.). We generally agree.

We find that the evidence presented in the Declarations indicates that there would have been no motivation for those skilled in the art to combine the linear order filter of Bose with a feedback control (App. Br. 28). We find no dispute that one of ordinary skill in the art at the time of invention would have understood that the combination of a complex polynomial filter with a feedback control loop would lead to instability in the form of delay

(Carme-2, ¶8). We find that this goes directly to the motivation to combine Bose and Sedra.

While the Examiner finds that the combination of Bose and Sedra is similar to the invention of the '719 Patent (Ans. 57-58), that does not refute the view of one of ordinary skill at the time of the invention. Appellant's evidence suggests that the ordinary skilled artisan would not have been motivated to combine Bose and Sedra because of the believed stability problems. The Examiner also alleges that the scopes of the claims do not limit "the strength level of the stability of the feedback control," such that it is not possible to determine whether the feedback system is stable or unstable in accordance with the subject matter of those claims (Ans. 58). We do not agree. We find that while the claims may not specifically recite the stability criterion, that has no bearing on whether an ordinary skilled artisan would have been motivated to combine Bose and Sedra because of the believed stability problems. Overall, we find Appellant's arguments and evidence, especially the testimony of the Declarations, to be compelling and suggest that the combination of Bose and Sedra would not have been motivated as alleged in the rejection of the claims.

Appellant also argues that the combination of Bose and Sedra would render the invention of Bose inoperable (App. Br. 28), but we do not agree. While we have accepted that the combination may not have been motivated for one of ordinary skill in the art, we find no evidence that implementing a transfer function of the filter as a complex polynomial function would render

Bose inoperable. Such a combination, if successfully made, would be equivalent to Appellant's system, which we do not find to be inoperable. We also fail to find any support for this contention in the submitted Declarations. As such, we do not find that the combination of Bose and Sedra would render the invention of Bose inoperable.

With respect to the international commercial success alleged by Appellant (Carme-1, ¶4; Carme-2, ¶4), while we do not doubt the success achieved, the assertions made are with respect to the overall success of Technofirst and have not been shown to necessarily be related to subject matter specifically recited in the claims. As such, we find no nexus between the financial success of Appellant's company and the patent claims, and thus do not find compelling this evidence of secondary considerations of non-obviousness.

With respect to the copying of the instant invention and its licensure by others (Carme-1, ¶¶5, 6; Carme-2, ¶4), we find this evidence presented by Appellant to be compelling. The evidence presented suggests that copying occurred prior to licensing (Oral Hearing Transcript pp. 13-14), and we find this to be a secondary consideration of nonobviousness. The fact that the patent has been litigated, not found to be invalid or unenforceable, and had parties take licenses thereto is indicative that Appellant's invention is not obvious. As such, we find this evidence to be compelling with respect to obviousness of the independent claims.

Additionally, while not specifically argued by Appellant, the citations and characterizations by Hansen and Crocker also demonstrate praise of the invention by others, another secondary consideration of nonobviousness (FF 8, 9). We also take this into account in determining the propriety of the obviousness rejection.

In review of the totality of the evidence proffered by Appellant, we find that Appellant has demonstrated that it would not have been obvious to combine Bose and Sedra as asserted by the Examiner in the rejection of the independent claims. As such, we find that the Examiner erred in finding claims 1-19 as unpatentable over Bose and Sedra under 35 U.S.C. § 103(a).

CONCLUSIONS

We find that the proper interpretation of the claim terms "complex polynomial function" and "complex polynomial transfer function" in the context of the instant claims and the disclosure of the Specification of the '719 Patent is a filter of an order higher than first order, and we also find reversible error in the Examiner's determination that Bose and Sedra render the subject matter of the independent claims obvious under 35 U.S.C. § 103(a) in view of the evidence of secondary considerations proffered by Appellant.

DECISION

The decision of the Examiner to reject claims 1-19 is REVERSED.

Appeal 2009-010931
Reexamination Control 90/007,841
United States Patent 4,833,719

REVERSED

ack

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