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Paper 7
Entered: October 16, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

SAINT LAWRENCE COMMUNICATIONS LLC,
Patent Owner.

Case IPR2017-01077
Patent 7,260,521 B1

Before ROBERT J. WEINSCHENK, SCOTT C. MOORE, and MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
35 U.S.C. § 314(a) and 37 C.F.R. § 42.108

I. INTRODUCTION

Apple, Inc. ("Petitioner") filed a Petition (Paper 2; "Pet.") to institute an *inter partes* review of claims 1, 2, 5–8, 10, 11, 14, 15, 17, 28, 29, 32, 33, 35, 37, 38, 41, 42, 44, 55, 56, 59, 60, and 62 of U.S. Patent No. 7,260,521 B1 (Ex. 1001; "the '521 Patent"). Saint Lawrence Communications LLC ("Patent Owner") filed a Preliminary Response (Paper 6; "Prelim. Resp."). We have statutory authority over this dispute pursuant to 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted "unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition."

Upon consideration of the Petition, the Preliminary Response, and the evidence cited by the parties, we determine that Petitioner has established a reasonable likelihood that it will prevail with respect to all challenged claims. Accordingly, we institute an *inter partes* review. We have not made a final determination under 35 U.S.C. § 318(a) as to the patentability of any claim.

II. BACKGROUND

A. Related Proceedings

Petitioner indicates that the '521 Patent is the subject of multiple lawsuits in the U.S. District Court for the Eastern District of Texas. Pet. 2. The '521 Patent also was the subject of IPR2015-01875, which was terminated prior to issuance of a decision on institution, and IPR2016-00705, in which institution was denied. *Id.* at 2–3. Petitioner was not a party to either of these prior *inter partes* review proceedings. *Id.*

B. The '521 Patent

The '521 Patent relates to digital encoding of a wideband signal, such as a speech signal. Ex. 1001, Abstract. An object of the invention is to efficiently encode a wideband signal using a Code Excited Linear Prediction ("CELP") technique. *Id*. at 1:44–46, 2:48–52.

CELP is a prior art technique in which a speech signal, for example, is sampled, and the samples are grouped into blocks called frames. Ex. 1001, 1:44–49. A linear prediction ("LP") filter is computed and transmitted for every frame. *Id.* at 1:50–51. The frames are then divided into smaller subframes, and an excitation signal is determined for each subframe. *Id.* at 1:51–54. The excitation signal typically consists of two components: one component from the past excitation (also called the pitch or adaptive codebook), and a second component from an innovation codebook (also called the fixed codebook). *Id.* at 1:54–59. The excitation signal is transmitted to a decoder and used as the input of a LP synthesis filter in order to obtain synthesized speech. *Id.* at 1:59–61.

The '521 Patent discloses a method for selecting optimal pitch codebook parameters during the encoding process. Ex. 1001, 2:56–60. In the disclosed method, the pitch prediction error for a pitch codevector[1] is calculated in each of at least two different signal paths, each of which is associated with a set of pitch codebook parameters. *See id.* at 2:56–62. At least one of the signal paths is filtered before the pitch prediction error is

[1] The '521 Patent and the cited prior art references use the terms "codevector" and "code vector" interchangeably. For purposes of consistency, this Decision uses the term "codevector" except when quoting from a document that uses the term "code vector."

calculated. *Id.* at 2: 62–65. The signal path having the lowest calculated pitch prediction error is chosen, and the pitch codebook parameters associated with this signal path are then selected for use. *Id.* at 2:65–3:2.

Figure 3 of the ’521 Patent is reproduced below.

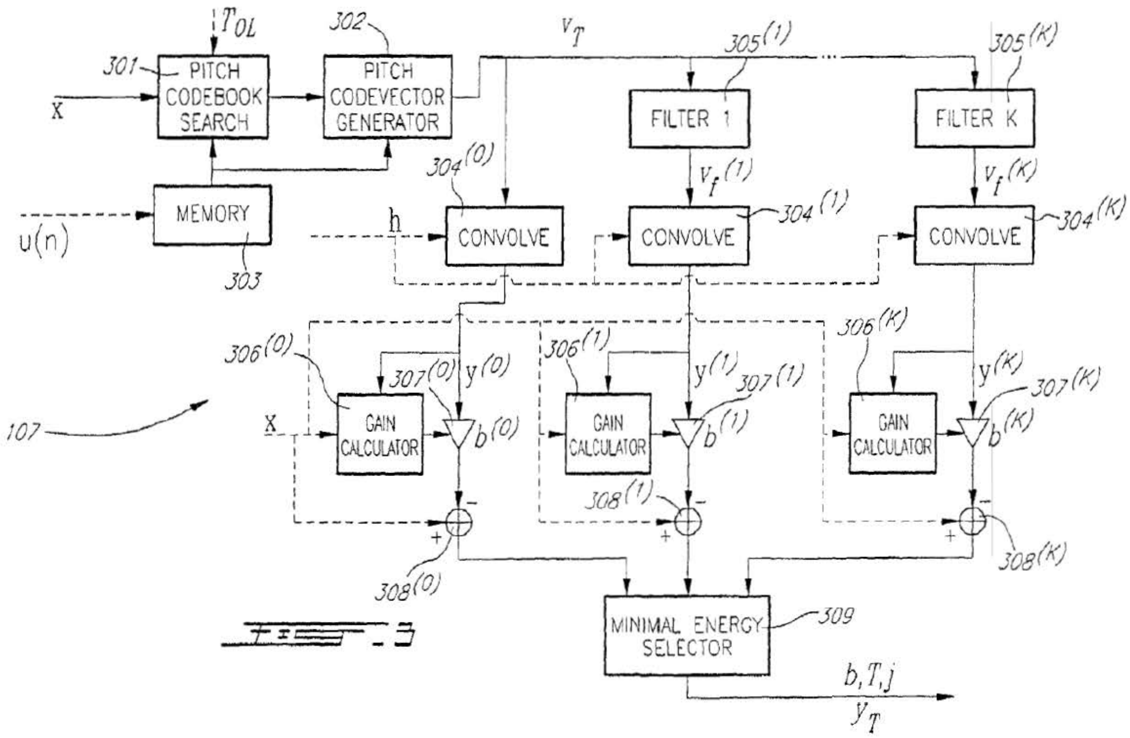

Figure 3, shown above, is a block diagram of a preferred embodiment of the disclosed invention. Ex. 1001, 11:66–67. In this embodiment, memory module 303 stores the past excitation component of the excitation signal that was determined for a particular subframe. *See id.* at 12:1–2. Pitch codebook search module 301 and pitch codevector generator module 302 generate an optimum pitch codebook vector (i.e., a pitch codevector) V_T for the subframe. *Id.* at 12:2–9. Codevector V_T is passed through filters $305^{(1)}$ through $305^{(K)}$ to generate K filtered codevectors $V_f^{(1)}$ through $Vf^{(K)}$. *Id.* at 12:20–23. The filtered versions of V_T ($V_f^{(1)}$ through $Vf^{(K)}$) and an unfiltered version of V_T ($V_f^{(0)}$) are then convolved with an impulse response signal h at modules $304^{(0)}$ through $304^{(K)}$ to obtain codevectors $y^{(0)}$ through $y^{(K)}$. *Id.* at 12:22–26; Fig. 3. Next, gain calculators 306, amplifiers 307, and subtractors 308 calculate the mean squared pitch prediction error for each of codevectors $y^{(0)}$ through $y^{(K)}$. *Id.* at 12:26–44. Finally, selector 309 selects the pitch codebook parameters that correspond to the one of codevectors $y^{(0)}$ through $y^{(K)}$ that has the minimum mean squared pitch prediction error. *Id.* at 12:45–47.

C. Illustrative Claims

Challenged claims 1 and 55 are independent. Claim 1, which is illustrative of the claimed subject matter, is reproduced below.

> 1. A pitch analysis device for producing a set of pitch codebook parameters, comprising:
>
> a pitch codebook search device configured to generate a pitch code vector based on a digitized input audio data, wherein said digitized input audio data represents an input audio signal that has been sampled and digitized;
>
> a) at least two signal paths associated to respective sets of pitch codebook parameters representative of said digitized input audio data, wherein:
>
> i) each signal path comprises a pitch prediction error calculating device for calculating a pitch prediction error of said pitch codevector from said pitch codebook search device; and
>
> ii) at least one of said at least two signal paths comprises a filter for filtering the pitch codevector before supplying said pitch codevector to the pitch prediction error calculating device of said at least one signal path; and

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