

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

CALIFORNIA INSTITUTE OF TECHNOLOGY,
Patent Owner.

Case IPR2017-00297¹
Patent No. 7,916,781

**PATENT OWNER'S RESPONSE
PURSUANT TO 37 C.F.R. § 42.120**

¹ Case IPR2017-00423 has been consolidated with this proceeding.

TABLE OF CONTENTS

I. STATEMENT OF PRECISE RELIEF REQUESTED 1

II. INTRODUCTION AND OVERVIEW OF ARGUMENT 1

III. OVERVIEW OF THE ART AND CITED REFERENCES 5

 A. MacKay (EX1002)..... 7

 B. Ping (EX1003)..... 8

IV. WEIGHT TO BE GIVEN RESPECTIVE EXPERT TESTIMONY 10

 A. Dr. Davis’s testimony includes basic errors demonstrating a lack of credibility 10

 B. Dr. Davis’s testimony is not independent..... 13

 C. Dr. Davis’s evasiveness during his deposition undermines his credibility..... 14

V. GROUND 1: PING IN VIEW OF MACKAY DOES NOT RENDER CLAIMS 13-15, 18 AND 22 OBVIOUS 15

 A. Legal Principles 16

 B. The Petition fails to establish that either Ping or MacKay discloses information bits in a variable number of subsets 18

 C. A POSA would not be motivated to modify Ping in view of MacKay 23

 1. Ping is already irregular as defined by MacKay..... 23

 2. The proposed modification would eliminate Ping’s stated improvement 30

 3. Petitioner’s additional arguments regarding motivation to combine fail 33

 4. Dr. Davis’s claim that MacKay’s irregularity is ill-defined indicates a lack of motivation to combine 37

 D. The petition inadequately defines its proposed modification 39

 E. Modifying Ping in view of MacKay would not be expected to succeed. 44

VI. GROUND 2: THE COMBINATION OF PING, MACKAY AND COOMBES DOES NOT RENDER CLAIM 16 OBVIOUS 49

VII. GROUND 3: PING DOES NOT ANTICIPATE CLAIMS 19-21 49

VIII. OBJECTIVE INDICIA OF NON-OBVIOUSNESS.....51

- A. Nexus between the Objective Evidence and the Claims52
- B. Long-felt need and failure of others54
- C. Industry Praise57
- D. Unexpected Results.....59
- E. Commercial Success60

IX. CONCLUSION62

X. APPENDIX64

I. STATEMENT OF PRECISE RELIEF REQUESTED

In IPR2017-00297, Apple, Inc. (“Petitioner”) filed a petition for review of claims 1-12 and 19-21 of the U.S. Patent No. 7,916,781 (the “’781 patent”, EX1101). The Board issued its decision instituting trial (“297 Decision,” Paper 16) on Ground 2 with respect to claims 19-21. In IPR2017-00423, Petitioner filed a petition for *inter partes* review of claims 13-22 of under two grounds.² The Board issued its decision instituting trial (“423 Decision,” Paper 16) on both grounds with respect to claims 13-16, 18, and 22 and consolidated that proceeding with IPR2017-00297. The patent owner (“PO” or “Caltech”) hereby requests that the Board now issue a final written decision rejecting all grounds of challenge still remaining, and confirming that claims 13-16 and 19-22 are not unpatentable.

For purposes of the response, Caltech will refer to the instituted grounds of the IPR2017-00423 petition as Grounds 1 and 2, and the instituted ground of the IPR2017-00297 petition as Ground 3.

II. INTRODUCTION AND OVERVIEW OF ARGUMENT

The ’781 patent is one of four Caltech patents that resulted from research performed by the inventors, Drs. Jin, Khandekar, and McEliece, in 1999-2000. The patents claim inventions directed to a revolutionary class of error-correction

² Caltech herein refers to the -00423 Petition as “Pet.” and the -00297 Petition as “297 Pet.”

codes, dubbed “irregular repeat and accumulate codes,” or “IRA codes,” which rivaled and surpassed the performance of the best known codes at that time. One of the features that made IRA codes unique and superior to other known codes, however, was their capability of being encoded *and* decoded with linear complexity, a critical requirement for most practical applications. No other code known at the time could boast linear encoding, linear decoding, and performance near the theoretical Shannon limit.

The IRA encoders and decoders described in the '781 patent were the culmination of more than a year of research and analysis by the inventors into different code structures. As even Petitioner's expert acknowledges, the field of error correction coding is a complex and highly unpredictable one. Design of new error correction codes typically requires extensive experimentation by experts in the field in order to identify a viable code structure, create useable encoders and decoders, and demonstrate the capabilities of the code's performance. Even simple code structures require rigorous simulation and analysis to determine whether they can be practically and reliably encoded and decoded, and features that may improve performance in one code may have detrimental effects in others.

In arguing that the instituted claims are unpatentable, Petitioner relies chiefly on two prior art references: the MacKay reference, which discloses randomly generated parity check matrices (which are “irregular” in the sense that 11 of 12

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