Paper No. ___
Filed: April 11, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

CALIFORNIA INSTITUTE OF TECHNOLOGY,
Patent Owner.

Case IPR2017-00728
Patent No. 7,421,032

PATENT OWNER'S SURREPLY

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I. INTRODUCTION

In view of new argument and evidence submitted in Petitioner's Reply briefing, the Board (Paper 43) authorized a short sur-reply but prohibited submission of rebuttal evidence. As illustrated in further detail below, the Reply materials are replete with untimely and improper new argument and evidence—including submission of newly generated experimental data, attorney-generated Tanner graphs and block diagrams, and a declaration from a new witness. The Reply provides no justification for replacing Dr. Davis with a new witness, as Dr. Davis testified he remains available for deposition in the U.S. EX1273, ¶3. Accordingly, the Reply materials should be disregarded and given no weight.

II. ARGUMENT

A. Petitioner's new argument that MacKay discloses nonuniform column weights for information bits should be rejected

As the POR explained, the petition failed to provide any evidence that MacKay discloses non-uniform column weights for information bits. POR 17-21. Realizing the flaws in its petition, Petitioner now relies on MacKay's Figures 5 and 6 to pivot to a new theory that MacKay discloses information bits appearing in a variable number of subsets. Reply 2-4. This is improper and should be rejected, not least because Caltech will not have an opportunity to rebut the argument with expert evidence. *Dell Inc. v. Acceleron, LLC*, 818 F.3d 1293, 1301 (Fed. Cir. 2016). Even then, Petitioner's new argument does not explain why Figures 5 and 6 would motivate a POSA to modify Ping's $\mathbf{H}^{\mathbf{d}}$ submatrix (they would not). MacKay presents Figures 5 and 6 as a way to achieve "fast encoding" by applying a "lower triangular structure" already found in Ping. EX1202 1453; EX1203 38.

B. No motivation to combine Ping and MacKay

There is no motivation to modify Ping at least because its parity-check matrix is already irregular and MacKay does not teach selective application of uneven column weights to a submatrix. POR 28-32. The Reply's (6) response is that this argument should be rejected "for at least the reasons in the Petition and DI." But while the petition does not addres the fact that Ping's parity-check matrix is already irregular (*see* POR 29-31), the Reply (7) ***admits*** that Ping's parity-check matrix already has nonuniform column weights of, *e.g.*, 4, 2, and 1.

The Reply does not dispute that setting Ping's "t" value to 9 shows a parity-check matrix that is more irregular than MacKay's. Rather, the Reply (6) asserts that this example is "contrived," but Caltech's example of $\mathbf{H}^{\mathbf{d}}$ having column weights 9 was based on ***Petitioner's proposal*** to use column weights of 3 and 9 for Ping's $\mathbf{H}^{\mathbf{d}}$. Pet. 44; *see also* EX2033 229:4-9. PO's example simply adopts one of the weights proposed by Petitioner while maintaining $\mathbf{H}^{\mathbf{d}}$'s uniform column weight.

The Reply (7-8) absurdly asserts that it is improper to compare Ping's **H** matrix with MacKay's parity-check matrices. As Ping's **H** matrix is its parity-check matrix, it is the *only* thing properly compared with MacKay's parity-check matrices. $\mathbf{H^d}$ and $\mathbf{H^p}$ are indisputably *not* parity-check matrices. EX2033, 218:3-5.

The Reply (8) incorrectly asserts that the only way to obtain MacKay's benefits gained from nonuniform column weights is to modify $\mathbf{H^d}$. The easiest way to obtain MacKay's nonuniform column weights is to *do nothing to Ping*, because Ping's parity-check matrix already has nonuniform column weights.

The Reply (8) argues its combination has met claim 18, which requires encoding a data stream "in accordance with the following Tanner graph," because "parity check matrices and Tanner graphs are interchangeable." But that is not an argument made in the petition, nor does the petition make any attempt to compare a modified version of Ping with Claim 18's Tanner graph. The Reply (9) attempts to cure this defect by presenting for the first time purported Tanner graphs of Ping and MacKay (EX1248, 1249), but again fails to explain how its proposed modifications encode a data stream in accordance with Claim 18's Tanner graph.

These purported Tanner graph depictions of Ping and MacKay should also be rejected as untimely, discussed below in Section II.H. In addition, Petitioner's description of the exhibits is misleading. The Reply (9) claims the "open circles on the left" are "message nodes," and incorrectly claims that "Ping's message nodes all have degree four." But EX1248's *right* nodes are message nodes (because they correspond to parity bits in the codeword), and have degrees less than four.

Moreover, both graphs depict a misleadingly identical "Random

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