

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HUTCHINSON TECHNOLOGY INC.,
HUTCHINSON TECHNOLOGY OPERATIONS (Thailand) CO., LTD.,
Petitioner,

v.

NITTO DENKO CORPORATION,
Patent Owner.

Case IPR2017-01421
Patent 8,895,870 B2

Before MELISSA A. HAAPALA, *Acting Vice Chief Administrative Patent Judge*, and THOMAS L. GIANNETTI and CHRISTA P. ZADO, *Administrative Patent Judges*.

GIANNETTI, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Hutchinson Technology Incorporated and Hutchinson Technology Operations (Thailand) Co., Ltd. (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1, 2, and 4 of U.S. Patent No. 8,895,870 B2 (Ex. 1001, “the ’870 patent”). Paper 2 (“Pet.”). Nitto Denko Corporation (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we granted Petitioner’s request and instituted an *inter partes* review on all challenged claims. Paper 8 (“Institution Dec.”). Following the Supreme Court’s decision in *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348 (2018), we modified our Institution Decision to institute trial on all of the grounds presented in the Petition, specifically adding two additional grounds for claim 2. Paper 25.

Following institution, Patent Owner filed a Response to the Petition (Paper 15, “PO Resp.”) and Petitioner filed a Revised Reply (Paper 35, “Pet. Reply”). In addition, Patent Owner filed a Motion to Amend (Paper 16, “Mot. To Amend”). Petitioner filed a Revised Opposition to the Motion (Paper 36, “Mot. Amend Opp.”) and Patent Owner filed a Reply (Paper 40, “Mot. Amend Reply”).

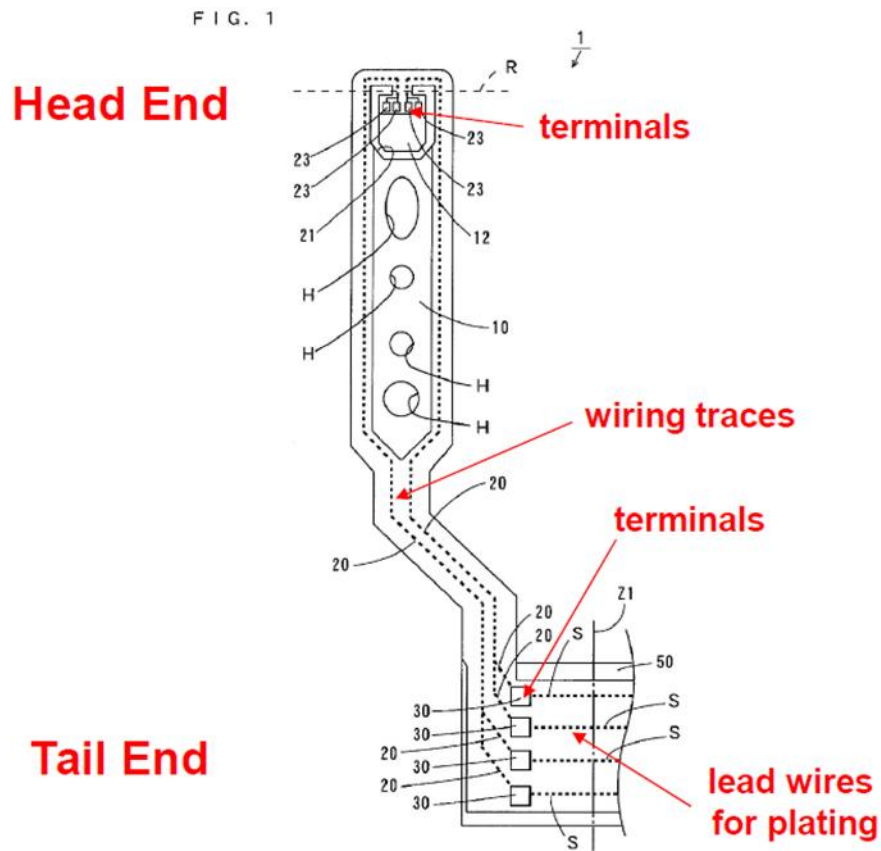
An Oral Hearing was held on July 17, 2018. The Hearing Transcript (“Tr.”) is included in the record as Paper 50. Having considered the evidence of record, and for the reasons set forth below, we determine that Petitioner has failed to demonstrate by a preponderance of the evidence that claims 1 and 4 of the ’870 patent are unpatentable. In addition, for the

reasons that follow, we grant the Motion to Amend. Finally, we order cancellation of claim 2 and replacement by new claim 5.

II. BACKGROUND

A. The '870 Patent

The '870 patent is titled “Printed Circuit Board and Method of Manufacturing the Same.” The patent discloses a printed circuit board that reduces the effect “a lead wire for plating” has on the waveform of an electrical signal passing through the wiring traces present on the board. Ex. 1001, 1:60–63. The board includes various “conductor traces” (or “wiring traces”), typically made from copper, for transmitting electrical signals. *Id.* at 1:17–19. Figure 1 (as annotated by Patent Owner) is illustrative:



Ex. 1001, '870 Patent
at Fig. 1 (annotated)

Figure 1 shows a circuit board with terminal pads 23 and 30 located at the opposite ends of wiring traces 20. *Id.* at 6:20–27. The particular type of circuit board shown in this figure and described in the patent is a “suspension board.” *Id.* at 6:20. This board is used in hard disk drives, to connect the magnetic head to other electrical hardware. *Id.* at 6:28–37.

The '870 patent further describes that a circuit board's connection terminals can be formed via electrolytic plating. *Id.* at 1:19–20. In this process, the circuit board is immersed in a solution that contains metal cations, such as nickel or gold, and power is applied to the conductor traces. This results in the deposition of a thin layer of nickel, gold, or other metal on the exposed trace surface and the formation of the desired terminal pad. *Id.*

at 8:12–15; *see also* Fig. 4(e)). To provide the electrical power needed for plating, during formation of the conductor traces, lead wires for plating are formed. Those leads extend from the portions at which the connection terminals are to be formed to one end of the substrate. *Id.* at 1:22–26. Power is fed to the conductor traces through the lead wires for plating. *Id.* at 1:26–27.

The '870 patent explains that once plating is complete, the plating leads are “unnecessary,” yet “remain on the printed circuit board.” *Id.* at 1:41–43. However, electrical signals reflected by the plating leads can interfere with the signals traveling through the functional wiring traces on the circuit board. *Id.* at 1:43–51. When an electrical signal is transmitted through the conductor traces while another electronic circuit is connected to the connection terminals of the printed circuit board, the lead wires for plating become stubs branched from transmission lines. *Id.* at 1:43–47. Resonance occurs at a particular frequency in such stubs. This causes a particular frequency component of the electrical signal to be attenuated. *Id.* at 1:47–50. This may result in disadvantages such as a blunt waveform of the electrical signal. *Id.* at 1:50–51,

The '870 patent explains that one solution is to “[r]emov[e] the lead wires for plating after the electrolytic plating.” *Id.* at 1:52–54. However, the patent says a process of removing the lead wires for plating is additionally required, thus leading to an increase in manufacturing cost. *Id.* at 1:54–56.

According to the '870 patent, rather than removing the leads, the leads are formed in a manner such that the effect of the resonance in the lead wire for plating to be exerted on the waveform of the electrical signal is reduced. *Id.* at 5:45–49. This will be discussed in more detail *infra*.

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