UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.
Petitioner

v.

SCRAMOGE TECHNOLOGY LTD.
Patent Owner

U.S. Patent No. 10,491,043

**PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,491,043**

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# I. INTRODUCTION

Samsung Electronics Co., Ltd. ("Petitioner") requests *inter partes* review ("IPR") of claims 1-20 ("challenged claims") of U.S. Patent No. 10,491,043 ("the '043 Patent," Ex. 1001). According to PTO records, the '043 Patent is assigned to Scramoge Technology Ltd. ("PO"). For the reasons set forth below, the challenged claims should be found unpatentable and canceled.

# II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

## A. Real Party-in-Interest

Petitioner identifies the following as the real parties-in-interest: Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.

## B. Related Matters

The '043 Patent is at issue in the following district court proceeding:

- *Scramoge Technology Ltd. v. Samsung Electronics Co.*, Case No. 2:22-cv-00015-JRG-RSP (E.D. Tex.)

## C. Counsel and Service Information

Lead Counsel: Naveen Modi (Reg. No. 46,224). Backup Counsel: (1) Phillip Citroën (Reg. No. 66,541), (2) Paul M. Anderson (Reg. No. 39,896), and (3) Mark Consilvio (Reg. No. 72,065). Service Information: Paul Hastings LLP, 2050 M Street, N.W., Washington, DC 20036. Tel: (202) 551-1700. Fax: (202) 551-1705. E-mail: PH-Samsung-Scramoge-IPR@paulhastings.com. Petitioner consents to electronic service.

## III. PAYMENT OF FEES

The PTO is authorized to charge any fees due during this proceeding to Deposit Account No. 50-2613.

## IV. GROUNDS FOR STANDING

Petitioner certifies that the '043 Patent is available for IPR, and that Petitioner is not barred or estopped from requesting IPR on the grounds identified below.

## V. PRECISE RELIEF REQUESTED

Claims 1-20 of the '043 Patent should be cancelled as unpatentable based on the following grounds:

**Ground 1**: Claims 1-20 are anticipated by U.S. Patent No. 7,295,096 ("Tamata") (Ex. 1005);

**Ground 2**: Claims 1-20 are obvious based on Tamata in view of U.S. Patent Application Publication No. 2009/0096413 ("Partovi") (Ex. 1010);

**Ground 3**: Claims 1-5 and 11-15 are anticipated by U.S. Patent No. 7,403,090 ("Kita") (Ex. 1007); and

**Ground 4**: Claims 1-20 are obvious based on Kita in view of Partovi.

The '043 Patent issued from U.S. Patent Application No. 15/424,179 (Ex. 1004), filed on February 3, 2017, which is a continuation of, and claims priority to, U.S. Patent Application No. 14/124,997, filed on April 24, 2012.[1]

Tamata issued on November 13, 2007, Partovi was published on April 16, 2009, and Kita issued on July 22, 2008. Therefore, Tamata, Partovi, and Kita are prior art at least under pre-AIA 35 U.S.C. § 102(b). None of Tamata, Partovi, and Kita were considered during prosecution. (*See generally* Ex. 1004.)

## VI. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art as of the claimed priority date of the '043 patent ("POSITA") would have had a bachelor's degree in electrical engineering, computer engineering, applied physics, or a related field, and at least one year of experience in the research, design, development, and/or testing of wireless charging systems, or the equivalent. (Ex. 1002, ¶¶20-21.)[2] More education can supplement practical experience and vice versa. (*Id.*)

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[1] Petitioner does not concede that the '043 Patent is entitled to its claimed priority date.

[2] Petitioner submits the testimony of Dr. R. Jacob Baker (Ex. 1002, ¶¶1-147), an expert in the field of the '043 Patent. (*Id.*, ¶¶5-15; Ex. 1003.)

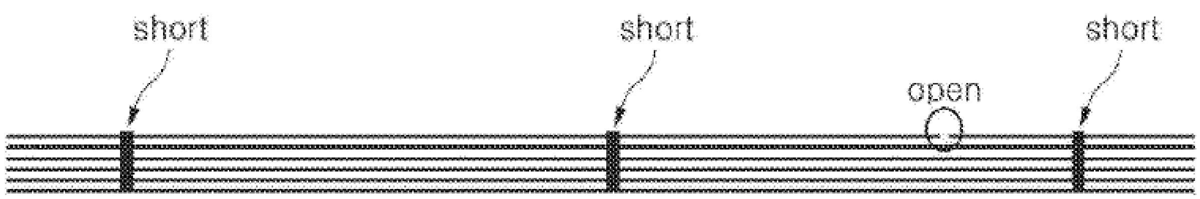
## VII. OVERVIEW OF THE ’043 PATENT AND PRIOR ART

### A. The ’043 Patent

The ’043 patent relates to “wireless power transmission,” in other words, “a technology for wireless transferring electric energy to desired devices.” (Ex. 1001, 1:19-30; Ex. 1002, ¶¶27-29.) The ’043 patent acknowledges that “the principle of electromagnetic induction has been extensively used” since the 1800’s. (Ex. 1001, 1:30-34.) Similarly, the ’043 patent recognizes that transmitting electric energy “by irradiating electromagnetic waves, such as radio waves” was also known and had been employed in wireless energy transfer along with magnetic induction and resonant coils. (*Id*., 1:33-45.)

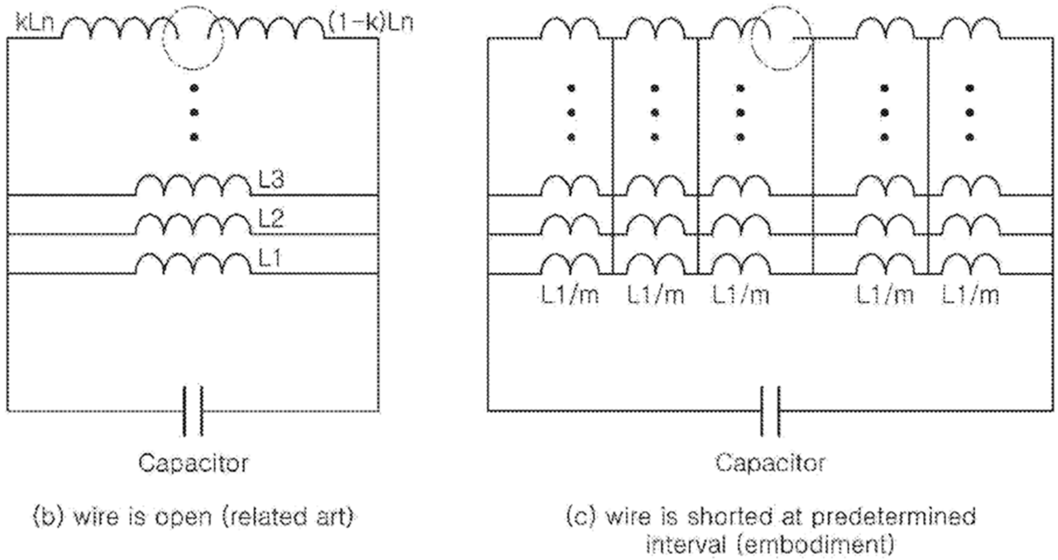
According to the ’043 patent, “litz coils are mainly used for the wireless power transmission.” (*Id*., 1:41-43.) Litz coils consist of a plurality of wires and a spark may occur due to potential difference between the wires if one of the wires is open. (*Id*., 1:43-45, 3:60-62, FIG. 5(b).) Therefore, the wires of a coil are shorted at predetermined intervals. (*Id*., 1:20-27, 1:49-52, 1:56-60, 4:17-22, 4:47-55, FIG. 6.)

**FIG. 6**




(*Id*., FIG. 6.)

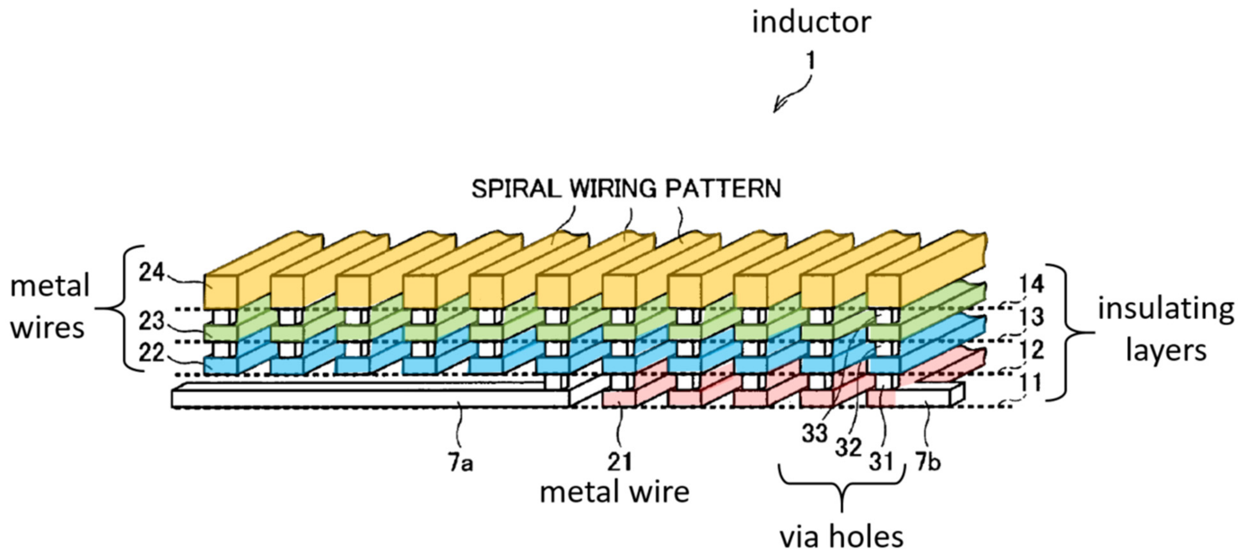
The claims, however, do not mention litz wires. For example, claim 1 recites a coil unit including "a first coil; a second coil comprising an open section; a first conductor connecting the first coil and the second coil; and a second conductor connecting the first coil and the second coil and positioned adjacent to the first conductor, wherein the open section is positioned between the first conductor and the second conductor." (*See*, *e.g.*, Ex. 1001, 5:1-12.) According to the '043 patent, the purported novel feature distinguishing the "related art" is the inclusion of "shorts" at "predetermined intervals." (*See id*., 4:43-55, FIGS. 7(b), 7(c).) Notably, such a feature is not recited in the independent clams. Moreover, as illustrated by the prior art presented here, providing conductors connecting coils at predetermined intervals was well known in the art. (*See infra* Sections IX.A.4, IX.C.4.)




(Ex. 1001, FIGS. 7(b), 7(c).)

### B. Tamata

Tamata is titled "Inductor, Resonant Circuit, Semiconductor Integrated Circuit, Oscillator, and Communication Apparatus." (Ex. 1005, Title.) Tamata discloses an inductor that includes a plurality of stacked insulating layers, where coil patterns on the insulating layers are interconnected to form the inductor. (*Id*., 2:25-31; *see also* Ex. 1015, 1:19-20; Ex. 1002, ¶¶31-33.) As shown in figure 1 of Tamata, four insulating layers 11-14 with corresponding metal wires 21-24 are interconnected using via holes 31-33. (Ex. 1005, 4:1-4.)




(*Id.*, FIG. 1 (annotated); Ex. 1002, ¶31.)

Figures 2(a) and 2(b) of Tamata show a top view of the spiral wiring patterns corresponding to each of the metal wires 21-24, where FIG. 2(a) illustrates a plan view of the metal wires for top three layers 22-24 and FIG. 2(b) illustrates a plan view of the metal wire 21 on the bottom layer. (Ex. 1005, 4:21-34.)

FIG. 2 (a)

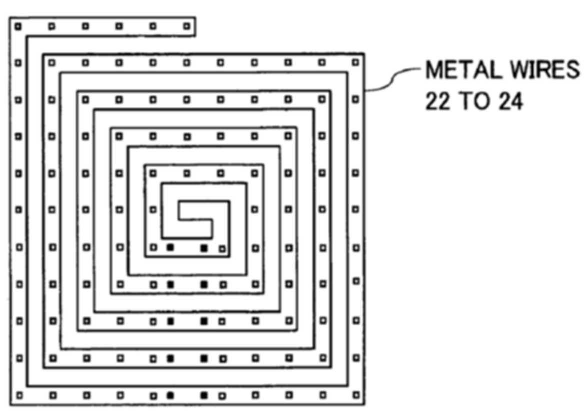
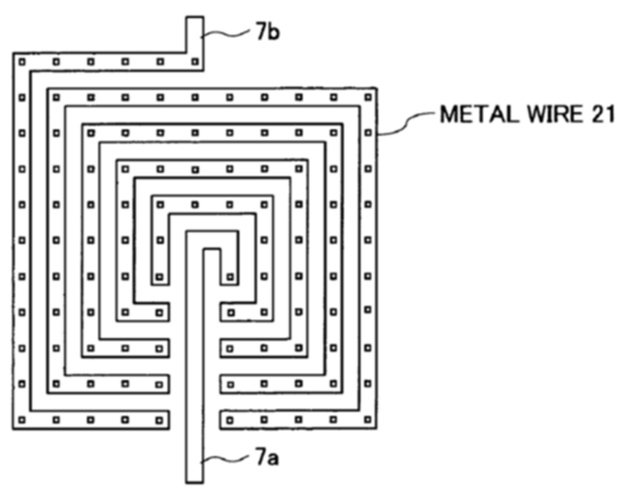



FIG. 2 (b)




(*Id.*, FIGS. 2(a), 2(b).)

Tamata further discloses that the coils are connected by via holes that include conductive material. (*Id*., 4:36-38 ("The metal wires 21 through 24 are connected to each other through the via holes 31 to 33, which are provided on the respective wires."), 4:14-16 ("Through the via holes 31, the first metal wire 21 and the second metal wire 22 are electrically connected."); *see also* Ex. 1016, ¶[0045].) As shown in figures 2(a) and 2(b) above, Tamata discloses that the via holes (represented by white squares) are provided at regular intervals in order to connect the coils in a parallel manner that reduces resistance of the coil. (Ex. 1005, 4:38-40; *see also id*., 2:34-38, 2:57-3:5, 5:1-5, 5:44-58, 5:59-61, FIGs. 3, 6, and 7.) Therefore, Tamata discloses the purported novel feature of providing conductors electrically connecting (shorting) wires at predetermined intervals.

**C. Kita**

Kita is titled "Characteristic Adjustment Method for Inductor and Variable Inductor." (Ex. 1007, Title.) Like Tamata, Kita discloses a multi-layer inductor that includes a plurality of coils stacked vertically and interconnected. (*Id*., 2:33-36 ("A first aspect of the present invention is applied to a characteristic adjustment method for an inductor formed by laminating a plurality of coils and electrically connecting these coils by a through hole."); Ex. 1002, ¶¶34-39.) Figure 1 of Kita shows a plan view of the Kita's inductor that includes a spiral coil 110. (Ex. 1007, 3:50-52, 3:64, FIG. 1.)

Fig. 1

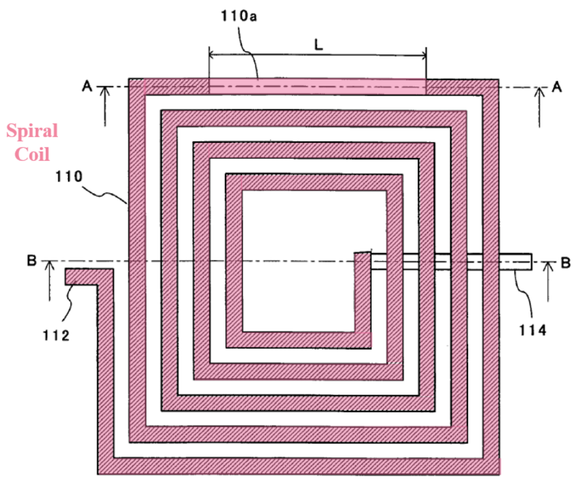
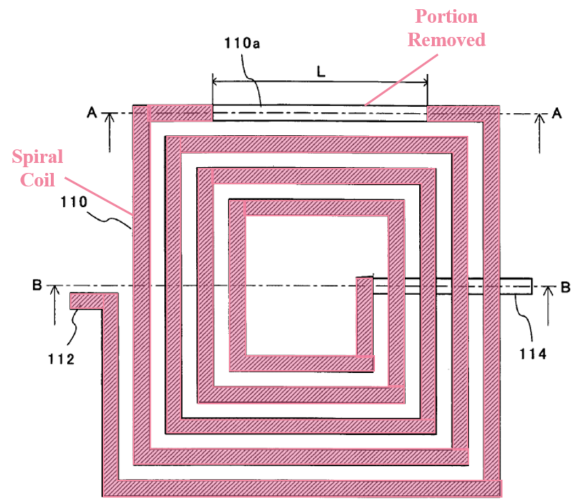



Fig. 1

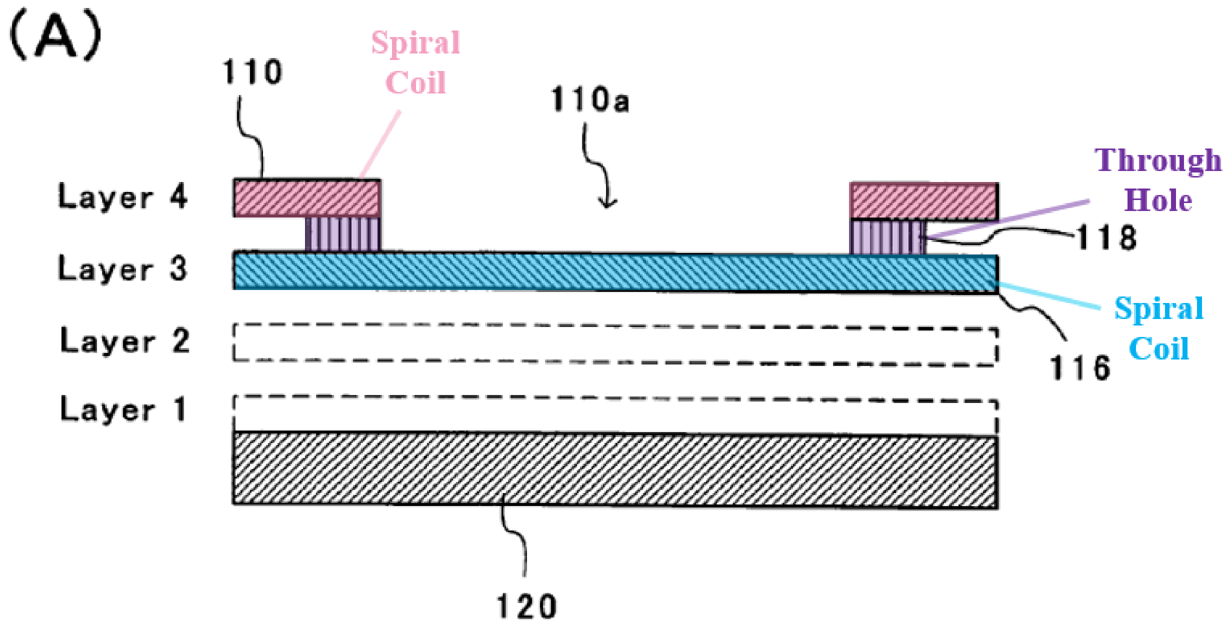



(*Id.*, FIG. 1 (annotated); Ex. 1002, ¶34.)

Kita further discloses that the inductance of the multi-layer inductor can be adjusted by providing an adjustment area in the uppermost spiral coil 110, where a portion of the coil is removed (as shown in figure 1 on the right above) in order to adjust the inductance. (*Id.*, 4:13-24, 4:39-40 ("the adjustment area 110a of the spiral coil 110 is removed (cut down)").)

Annotated figure 2(A) of Kita below shows a first cross-sectional view of the inductor having the multiple layers, where the cross-sectional view is taken along the A-A line in figure 1 above. (*Id.*, 3:23-24, FIG. 2(A).)

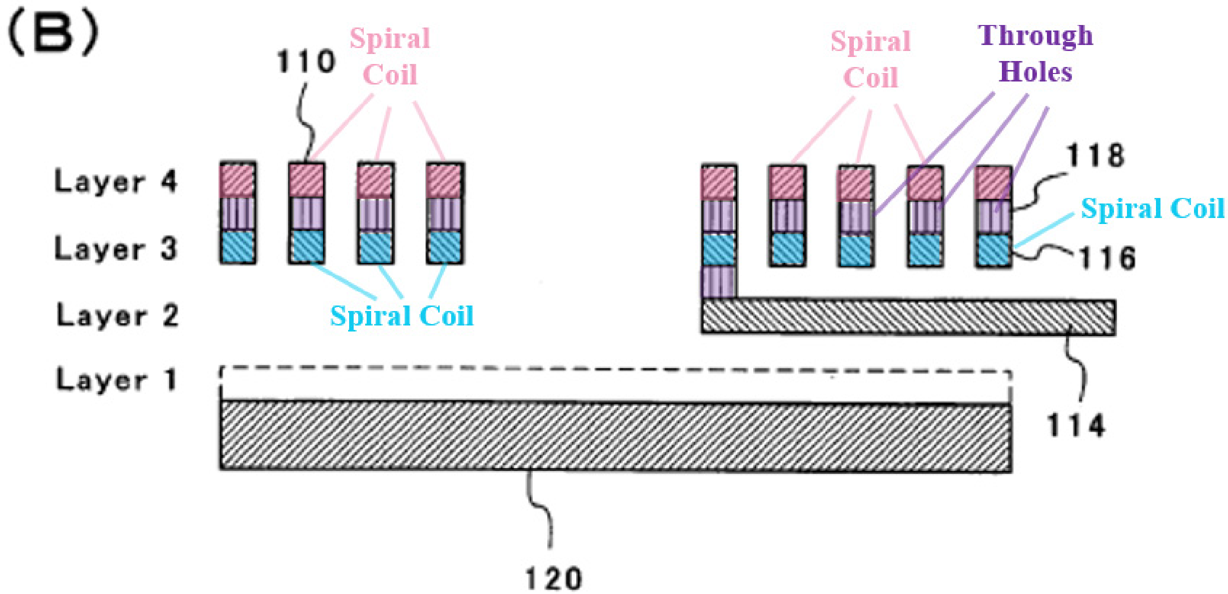
Fig. 2




(*Id*., FIG. 2(A) (annotated); Ex. 1002, ¶36.)

If the cross-section shown above, the top spiral coil 110 is shown to include a gap that corresponds to an adjustment area 110, where adjustment area 110 is an area in the inductor that is designed to allow a portion of the inductor to be removed in order to fine tune the inductance and other characteristics of the inductor. (Ex. 1007, 4:13-27.) For example, while Kita discloses that through holes that include conductive material are provided at predetermined intervals to connect the spiral coil patterns of the different layers in parallel (*id*., 4:6-12), there are no such through holes in the space corresponding to the adjustment area (*id*., 4:15-18).

Annotated figure 2(B) of Kita below provides another cross-sectional view of the inductor, where the figure 2(B) cross-sectional view is taken along the B-B line in figure 1 above. (*Id.*, 3:24-25, FIG. 2(B).)

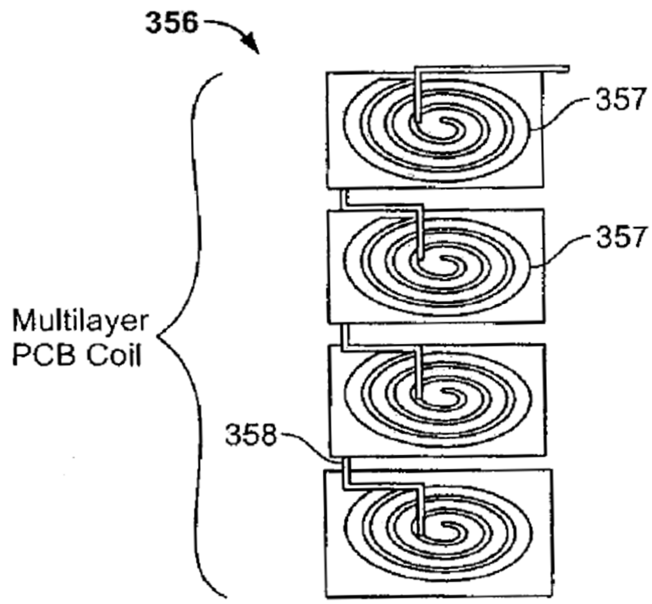



(*Id.*, FIG. 2(B) (annotated); Ex. 1002, ¶38.)

In the cross-section above, which cuts across the traces of the spiral coils in the middle of the inductor, the through holes formed in an insulating material that connect the coils are visible. (Ex. 1007, 4:6-8.) Kita discloses that through holes 118 are filled with conductive material and "formed over the entire coil at predetermined intervals." (*Id.*, 4:8-12.) Therefore, Kita also discloses the purported novel feature of providing conductors electrically connecting (shorting) wires at predetermined intervals.

### D. Partovi

Partovi is titled "System and Method for Inductive Charging of Portable Devices." (Ex. 1010, Title.) Like Tamata and Kita, Partovi discloses a multi-layer inductor that includes a plurality of coil patterns that are stacked to form the inductor. (*Id.*, ¶[0212] ("FIG. 18 shows an illustration of a means for stacking coils, in accordance with an embodiment."); Ex. 1002, ¶¶40-42.)




(Ex. 1010, FIG. 18.)

As shown in figure 18 above, "a multi-layer PCB coil 356 is created in separate PCB layers 357, which are then connected 358, and manufactured together via common techniques used in PCB fabrication, for example by use of a via or contacts." (*Id.*, ¶[0224].) Partovi discloses that using a multi-layer coil, like that shown in figure 18 above, in a wireless power transfer system can provide a number of advantages, including higher flux densities and greater coupling efficiency. (*Id.*,

¶[0212].) Partovi further discloses that such stacked coils can provide low resistance, which is desirable. (*Id.*, ¶[0224] ("The resulting overall stack is a thin multi-layer PCB that contains many turns of the coil. In this way, wide coils (low resistance) can be used, while the overall width of the coil is not increased.").)

Partovi discloses a number of different wireless power transfer systems, including the system 110 shown in annotated figure 2 below. Partovi discloses that the system 110 includes a charger 112 that provides power to a receiver 114. (*Id.*, ¶[0117]; *see also* Ex. 1012, ¶¶[0003], [0005], [0048]-[0049]; Ex. 1013, 1:44-53.) The charger 112 includes a power source 118 that is used to generate an AC voltage cross the coil 116, which results in an AC magnetic field. (Ex. 1010, ¶[0117].) The field generates a voltage in the coil 120 of the receiver 114 "that is rectified and then smoothed by a capacitor to provide power 122 to a load RI 124." (*Id.*)

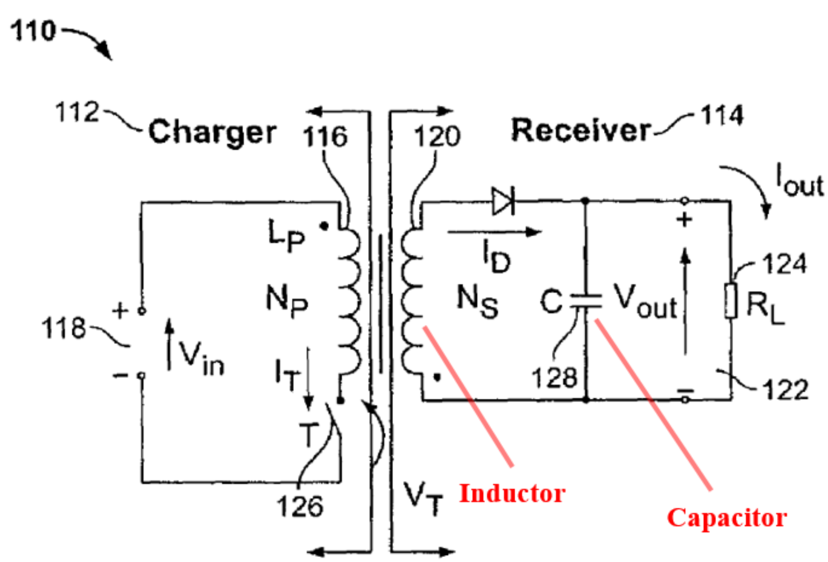



FIG. 2

(*Id*., FIG. 2 (annotated); Ex. 1002, ¶43.)

## VIII. CLAIM CONSTRUCTION

For IPR proceedings, the Board applies the claim construction standard according to *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 83 Fed. Reg. 51,340-59 (Oct. 11, 2018). Under *Phillips*, claim terms are typically given their ordinary and customary meanings, as would have been understood by a POSITA at the time of the invention. *Phillips*, 415 F.3d at 1313; *see also id.*, 1312-16. The Board, however, only construes the claims when necessary to resolve the underlying controversy. *Toyota Motor Corp. v. Cellport Systems, Inc.*, IPR2015-00633, Paper No. 11 at 16 (Aug. 14, 2015) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). Petitioner believes that no express constructions of the claims are necessary to assess whether the prior art reads on the challenged claims. (Ex. 1002, ¶30.)

# IX. DETAILED EXPLANATION OF UNPATENTABILITY

## A. Ground 1 – Tamata Anticipates Claims 1-20[3]

### 1. Claim 1

#### a) "A coil unit for wirelessly transmitting or receiving power, comprising:"

The preamble is not limiting. In general, there is a "presumption against reading a statement of purpose in the preamble as a claim limitation." *Marrin v. Griffin*, 599 F.3d 1290, 1294–95 (Fed. Cir. 2010); *Allen Eng'g Corp. v. Bartell Indus.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002) ("Generally, the preamble does not limit the claims."). Here, the preamble is not limiting because, for example, it (i) merely states a purpose or intended use of the invention; (ii) does not impose any structural requirements beyond those explicitly provided in the claim body; (iii) is not relied upon for antecedent basis in the claim body; and (iv) was not relied upon during prosecution to distinguish from the prior art. *Arctic Cat Inc. v. GEP Power Prods.*, 919 F.3d 1320, 1329-30 (Fed. Cir. 2019); *Shoes by Firebug LLC v. Stride Rite Children's Grp., LLC*, 962 F.3d 1362, 1367-68 (Fed. Cir. 2020).

[3] The mapping of the claim features to the disclosure of Tamata is consistent with Patent Owner's infringement allegations in the district court proceedings. (*See* Ex. 1011, generally.)

First, the preamble recites a "coil unit *for wirelessly transmitting or receiving power*," which merely states a purpose or intended use of the alleged invention. *Marrin*, 599 F.3d at 1294–95. Indeed, "[a]pparatus claims cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1468 (Fed. Cir. 1990). The inductance capability of a coil unit to wirelessly transmit or receive power by converting an oscillating electromagnetic field to electric current or vice versa is inherent to conductive coils and therefore does not limit the claimed structure. (Ex. 1002, ¶43.) *Kropa v. Robie*, 187 F.2d 150, 152 (C.C.P.A. 1951). Second, the preamble does not impose any structural requirements on the claim because the claim body provides a complete structure. (Ex. 1001, 5:2-12 (body of claim 1 reciting all elements of a coil unit).) *Arctic Cat Inc.*, 919 F.3d at 1329–30; *Shoes by Firebug LLC*, 962 F.3d at 1367–68. Nor does the preamble provide antecedent basis for terms in the claim body. (*Id.)* The preamble was also not relied upon during prosecution to distinguish over the prior art. (*See generally* Ex. 1004.) *Arctic Cat Inc.*, 919 F.3d at 1329.

Nevertheless, to the extent the preamble is limiting, Tamata discloses an inductor 1 ("coil unit") for wirelessly transmitting or receiving power. (Ex. 1002, ¶¶44-46; *see also infra* Sections IX.A.1(b)-(f) for the remaining claim elements.) Tamata's inductor is made up of a plurality of stacked insulating layers, where coil patterns on the insulating layers are interconnected to form the inductor. (Ex. 1005, 2:25-31; Ex. 1002, ¶44.) In the example embodiment disclosed in figure 1 of Tamata, four insulating layers 11-14 with corresponding metal wires 21-24 are interconnected using via holes 31-33. (Ex. 1005, 4:1-4.) As illustrated in figure 2 below, each of the metal wires 21-24 is formed as a spiral wiring pattern, where FIG. 2(a) illustrates a plan view of the metal wires for top three layers and FIG. 2(b) illustrates a plan view of the metal wire on the bottom layer. (Ex. 1005, 3:11-15, 4:21-34; Ex. 1002, ¶45.)

FIG. 2 (a)

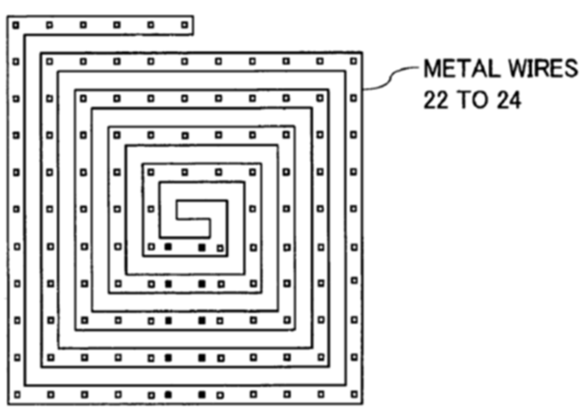
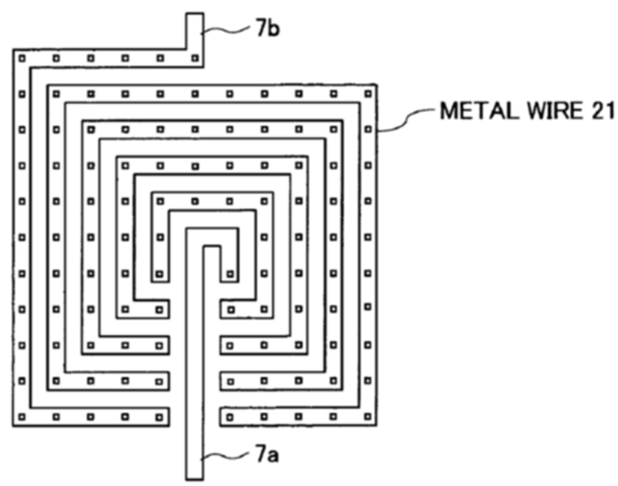
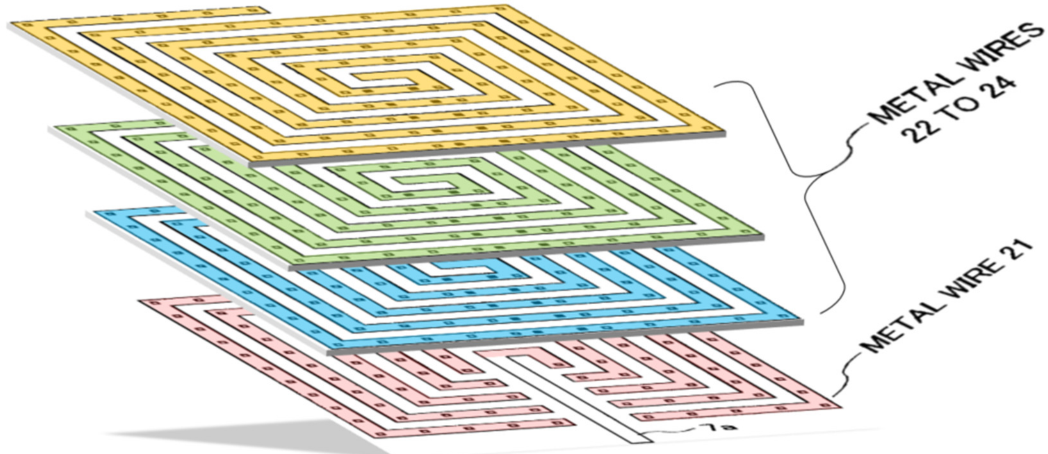


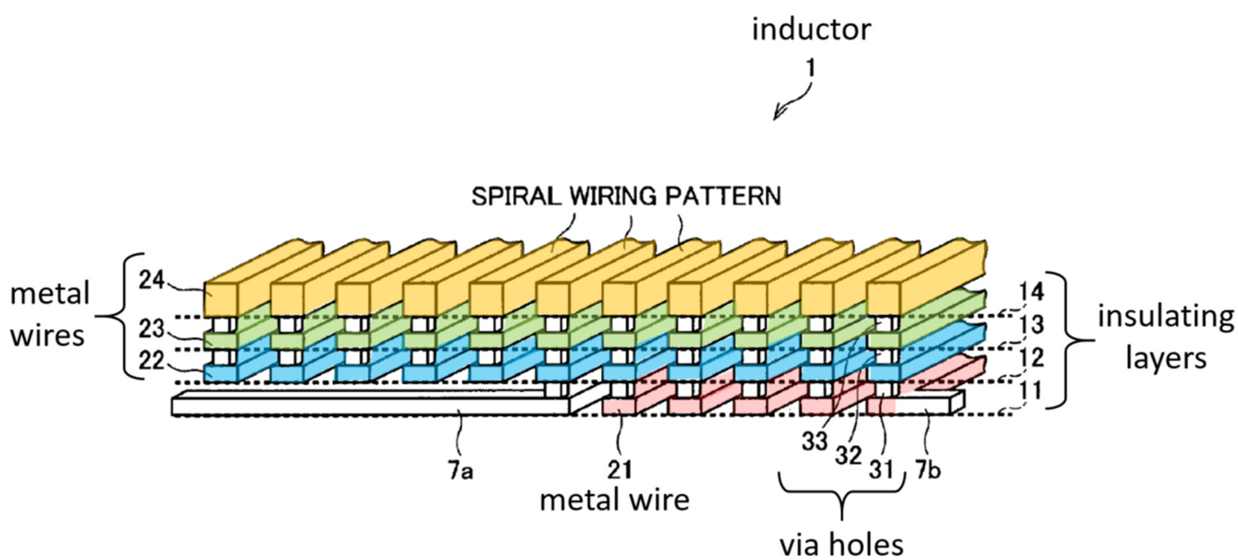

FIG. 2 (b)




(Ex. 1005, FIGS. 2(a), 2(b).) The non-limiting demonstrative below provides a perspective view of the stacked structure of Tamata's inductor.

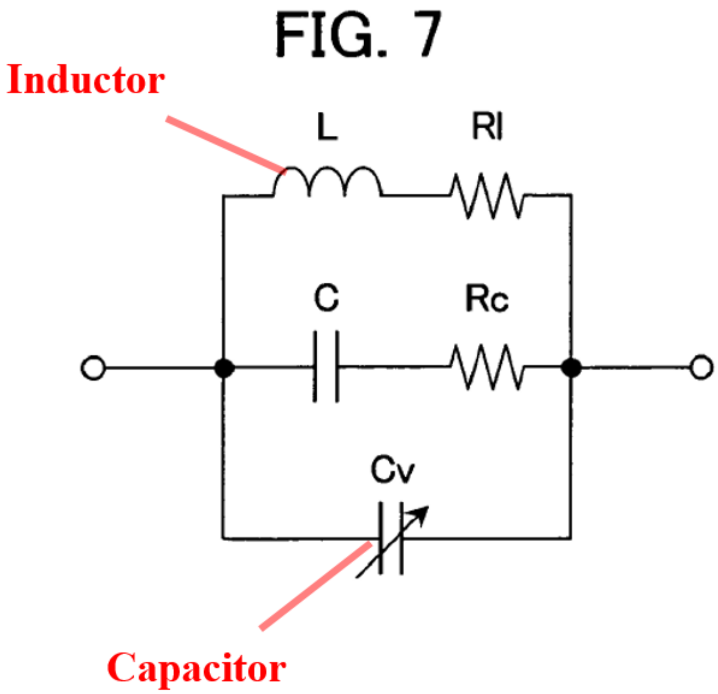



(Ex. 1002, ¶46.) Annotated figure 1 below is a cross-sectional view of Tamata's inductor 1 that includes insulating layers 11-14, metal wires 21-24, and via holes 31-33. (Ex. 1005, 3:9-10, 4:1-4.)




(Ex. 1005, FIG. 1 (annotated); Ex. 1002, ¶47.) As shown in annotated figure 1 above, each metal wire is provided on a respective insulating layer, and the wires are electrically connected by sets of via holes that connect neighboring metal wires. (Ex. 1005, 4:5-20; Ex. 1002, ¶48.)

Tamata discloses that the inductor ("coil unit") shown in figure 1 is used in an apparatus that performs wireless transmission and/or reception. (Ex. 1005 at 1:13-19; *see also id*., 11:42-46 (resonant circuit), 11:65-67 (voltage controlled oscillator); 12:1-10 (radio frequency transmitter-receiver, such as a tuner for satellite broadcasts, a wireless LAN apparatus, or mobile communication devices); Ex. 1002, ¶49.) Tamata discloses a wireless transmitting and receiving apparatus that includes a resonant circuit formed using the inductor structure that corresponds to the inductor 1 shown in figures 1 and 2. (Ex. 1005, 1:13-19, 3:9-25, 5:19-23 ("[T]he inductor 10 illustrated in FIG. 4 has the same structure as the inductor 1 illustrated in FIG. 1, with regard to the positions and connections of the insulating layers, the metal wires, and the via holes. The inductor 10 has advantages described below."), 5:24-58.) Tamata further discloses an example resonant circuit in figure 7. (*Id*., 5:59-61 ("FIG. 7 illustrates a structure in which the inductor illustrated in FIG. 6 is connected to a variable capacitance device Cv in parallel so that a resonant circuit is constructed.").)



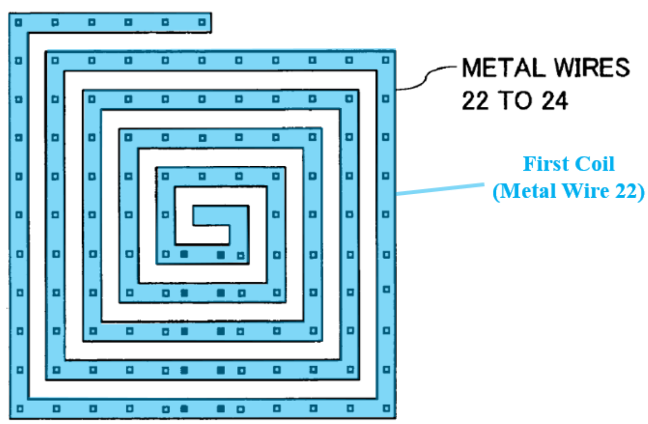

(*Id*., FIG. 7 (annotated); Ex. 1002, ¶49.)

The understanding that such resonant circuits are used for wireless power transfer is consistent with the disclosure of the ’043 patent. (Ex. 1001, 2:4-8, 3:18-22) and supported by numerous contemporaneous references. (*See*, *e.g*., Ex. 1008, 2:46-64, FIGs. 2A-2C; Ex. 1010, ¶¶[0013], [0017], [0115]-[0119], [0167]-[0174], [0212], [0249], FIGs. 2, 9, 18; Ex. 1009, ¶¶[0013], [0036], [0048]; Ex. 1002, ¶¶50-51.) Therefore a POSITA would have understood that Tamata’s inductor constitutes “a coil unit for wirelessly transmitting or receiving power,” as recited in claim 1. Such an understanding is confirmed by Tamata’s disclosure of all of the elements of claim 1, as demonstrated below. (Ex. 1002, ¶52; *Infra* Sections IX.A.1(a)-(f); *In re Earley*, 836 F. App'x 905, 915–16 (Fed. Cir. 2020).)

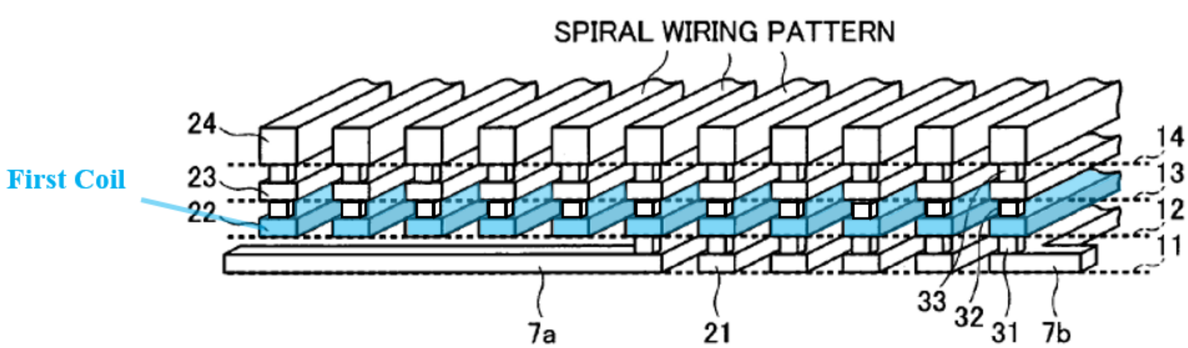
#### b) "a first coil;"

Tamata discloses this claim feature. (Ex. 1002, ¶53.) For example, as shown in annotated figures 1 and 2(a) below, the second metal wire 22 included in Tamata's inductor 1 discloses a "first coil." (Ex. 1005, 3:63-67, 4:57-61 ("metal wires 21 to 24 [are] disposed in a **spiral wiring pattern (coil patterns)**") (emphasis added), FIGs. 1, 2(a).)

FIG. 2 (a)




(Ex. 1005, FIG. 2(a) (annotated); Ex. 1002, ¶53.)

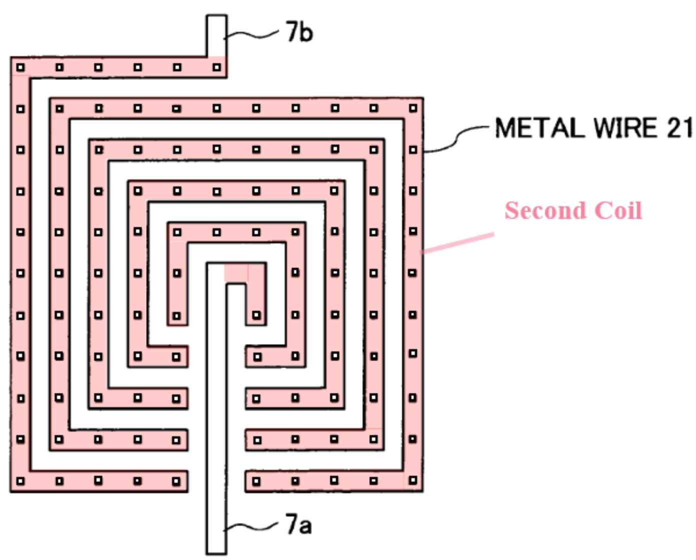



(Ex. 1005, FIG. 1 (annotated); Ex. 1002, ¶53.)

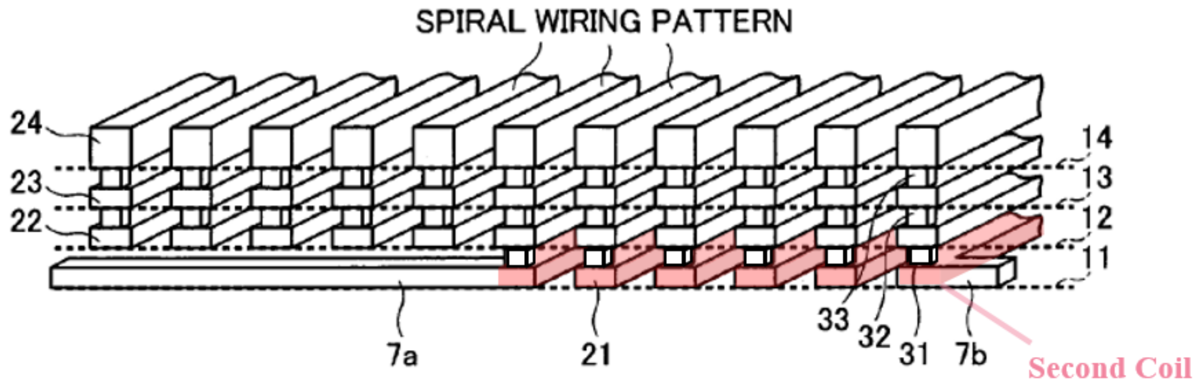
**c) "a second coil comprising an open section;"**

Tamata discloses this claim feature. (Ex. 1002, ¶¶54-55.) For example, as shown in annotated figures 1 and 2(b) below, the first metal wire 21 included in Tamata's inductor 1 discloses a "second coil." (Ex. 1005, 3:63-67, 4:57-61 ("metal wires 21 to 24 [are] disposed in a spiral wiring pattern (coil patterns)"), FIGs. 1, 2(b); Ex. 1002, ¶54.)

FIG. 2 (b)



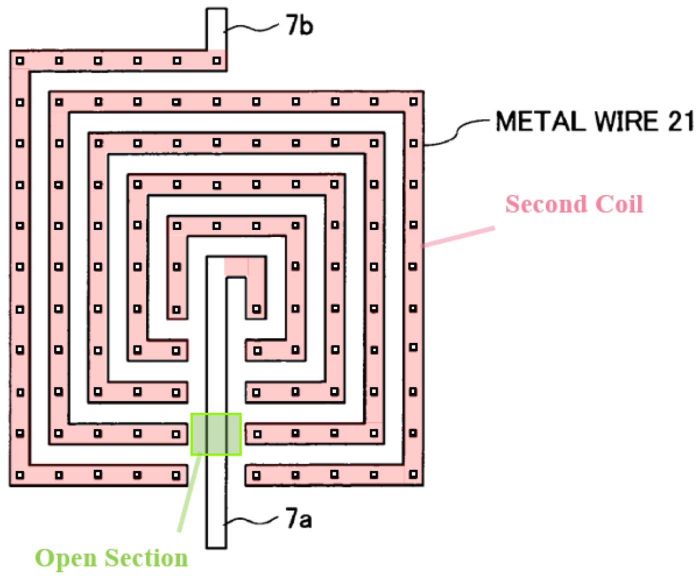

(Ex. 1005, FIG. 2(b) (annotated); Ex. 1002, ¶54.)




(Ex. 1005, FIG. 1 (annotated); Ex. 1002, ¶54.)

As shown in annotated figure 2(b) below, the second coil includes an "open section" corresponding to a separation in one of the windings of the second coil. (Ex. 1005, 4:27-30 ("[E]ach of the windings is separated at a part (portion where the lead 7a is supposed to cross the winding) so as not to contact the lead 7a."); Ex. 1002, ¶55.) This open section, as well as additional similar separations in the windings of the coil shown in figure 2(b), allows the lead 7a to provide a connection to the center of the inductor. (Ex. 1005, 4:23-30; Ex. 1002, ¶55.)

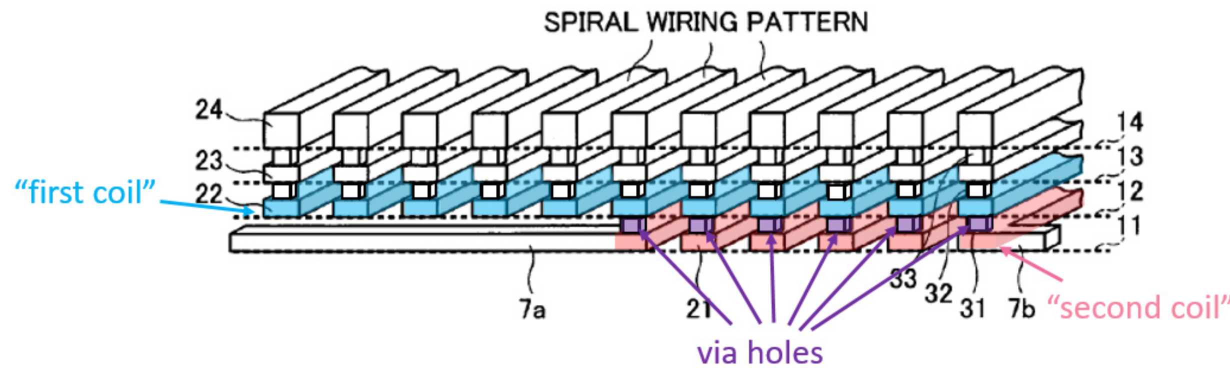
FIG. 2 (b)




(Ex. 1005, FIG. 2(b) (annotated); Ex. 1002, ¶55.)

**d) “a first conductor connecting the first coil and the second coil; and”**

Tamata discloses this feature. (Ex. 1002, ¶¶56-57.) For example, Tamata discloses via holes, which are holes that include conductive material (“conductors”) that electrically connect the coils. (Ex. 1005, 4:36-38 (“The metal wires 21 through 24 are connected to each other through the via holes 31 to 33, which are provided on the respective wires.”).) The via holes 31 that include the conductive material that electrically connect the first metal wire (“second coil”) and the second metal wire ("first coil") are highlighted in annotated figure 1 below.[4] (Ex. 1005, 4:14-16 ("Through the via holes 31, the first metal wire 21 and the second metal wire 22 are electrically connected.").)




(Ex. 1005, FIG. 1 (annotated); Ex. 1002, ¶56.)

As shown in annotated figure 2(b) below, the via holes, which are represented by white squares, "are formed at regular intervals on the first metal wire 21 (bottom layer) arranged in a spiral pattern." (Ex. 1005, 4:38-40, 4:53-54.) Therefore, each of the white squares in figure 2(b) includes conductive material that constitutes a "conductor connecting the first coil and the second coil." (Ex. 1002, ¶57.) The via hole that is positioned just to the left of the open section (circled in purple) includes conductive material that constitutes the "first conductor" recited in claim 1. (*Id.*)

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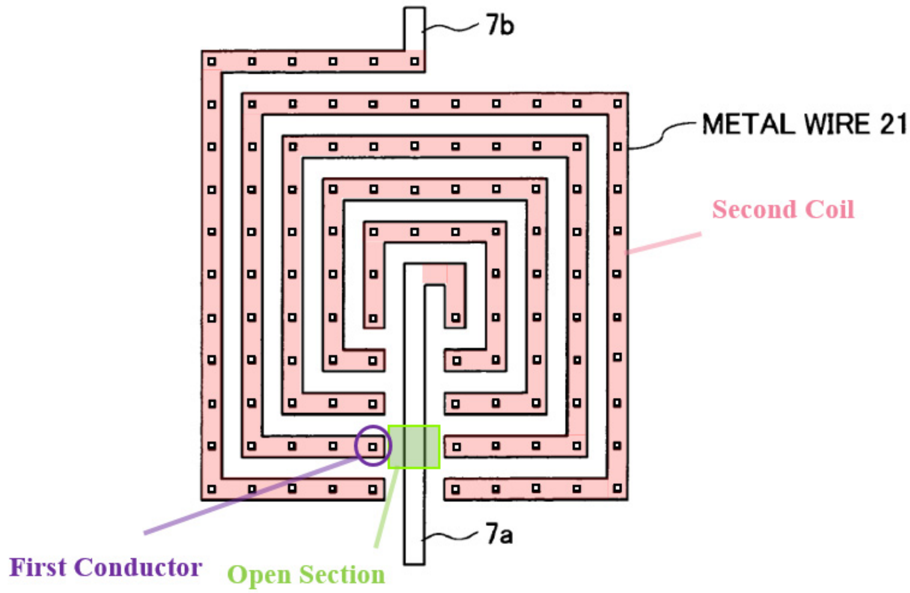
[4] A POSITA would have understood that only a small subset of the via holes are visible in the cross section shown in figure 1. (Ex. 1002, ¶56, n.2.)

FIG. 2 (b)

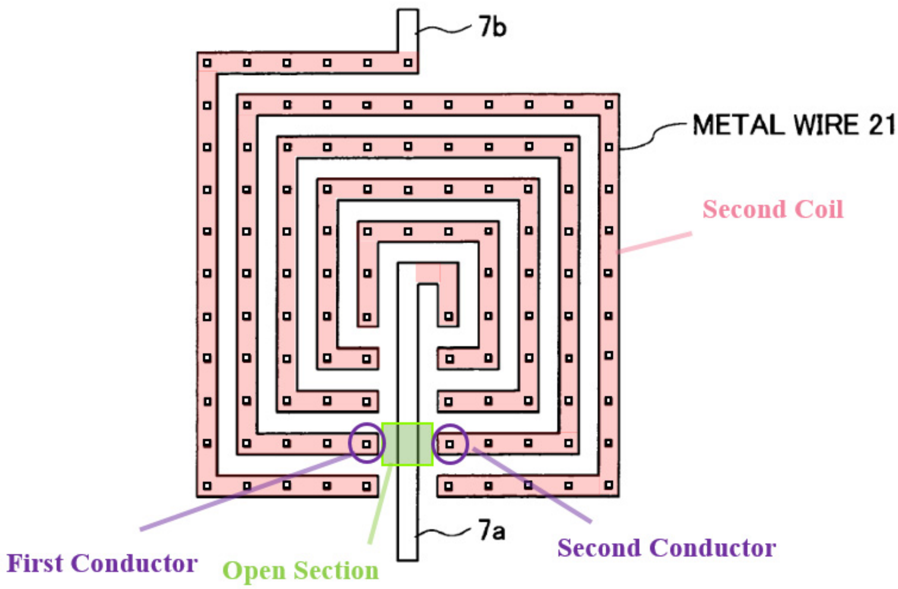



(Ex. 1005, FIG. 2(b) (annotated); Ex. 1002, ¶57.)

**e) "a second conductor connecting the first coil and the second coil and positioned adjacent to the first conductor,"**

Tamata discloses this feature. (Ex. 1002, ¶58.) For example, as shown in annotated 2(b) below, the conductive material in the via hole that is positioned just to the right of the open section connects the first coil and the second coil, where that conductive material constitutes the "second conductor" recited in claim 1. (Ex. 1005, 4:36-38; 4:14-16; Ex. 1002, ¶58.) As can be seen in the annotated figure, the second conductor is positioned "adjacent to" the first conductor discussed above in Section IX.A.1(d). (Ex. 1002, ¶58.)

FIG. 2 (b)

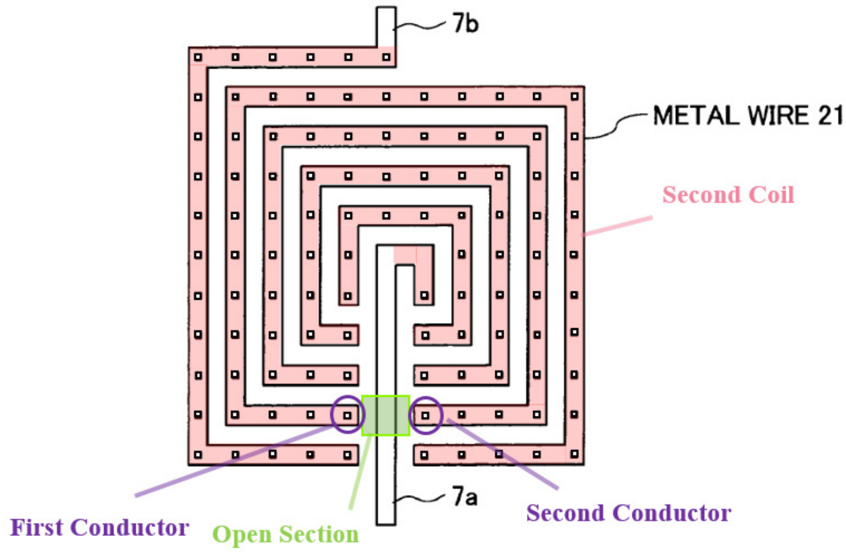



(Ex. 1005, FIG. 2(b); Ex. 1002, ¶58.)

**f) "wherein the open section is positioned between the first conductor and the second conductor"**

Tamata discloses this feature (Ex. 1002, ¶59.) As shown in annotated figure 2(b) below, the open section is positioned between the first conductor and the second conductor. (Ex. 1005, FIG. 2(b), 4:1-56; Ex. 1002, ¶59.)

FIG. 2 (b)



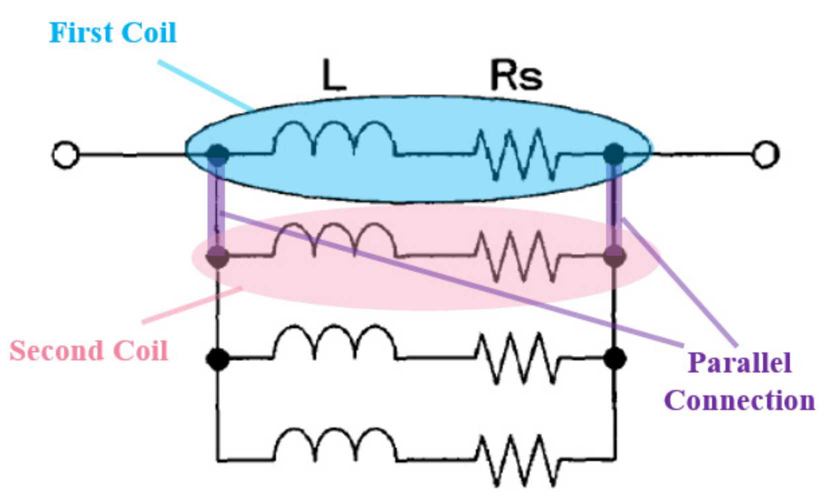

(Ex. 1005, FIG. 2(b) (annotated); Ex. 1002, ¶59.)

### 2. Claim 2

**"The coil unit of claim 1, wherein the first coil and the second coil are electrically connected in parallel with each other."**

Tamata discloses this feature. (Ex. 1002, ¶¶60-62.) For example, Tamata discloses that the metal wires 22 and 21 ("first coil" and "second coil," respectively) are connected in parallel by the regularly-spaced via holes that include conductive material. (Ex. 1005, 4:14-16 ("Through the via holes 31, the first metal wire 21 and the second metal wire 22 are electrically connected."), 4:38-40 ("For example, the via holes 31 are formed at regular intervals on the first metal wire 21 (bottom layer) arranged in a spiral pattern."); *see also id.*, 2:34-38, 2:57-3:5, 5:1-5, 5:44-58, 5:59-61, FIGS. 3, 6, and 7; Ex. 1002, ¶60.) As taught by Tamata, this arrangement of electrical connections to provide parallel connected coils reduces parasitic capacitance and increases quality factor (hence counteracting the skin effect). (Ex. 1002, ¶60; Ex. 1005, 2:21-3:5, 5:1-10.)

The parallel connection of the first and second coils is confirmed by Tamata in conduction with the description of figure 3. (Ex. 1005, 4:57-67; Ex. 1002, ¶61.) For example, the parallel connection between the first coil and the second coil is shown in annotated figure 3 below, where Tamata discloses that each coil is represented as an inductor L in series with a resistance Rs of the coil. (Ex. 1005, 4:65-67 ("Assuming the series connected coil and resistance as one set, four sets are **connected in parallel**." (emphasis added); *see also id.*, 5:24-26 ("L is a spiral-shaped metal wire, Rs is a resistance generated in the metal wire."); Ex. 1002, ¶62.)

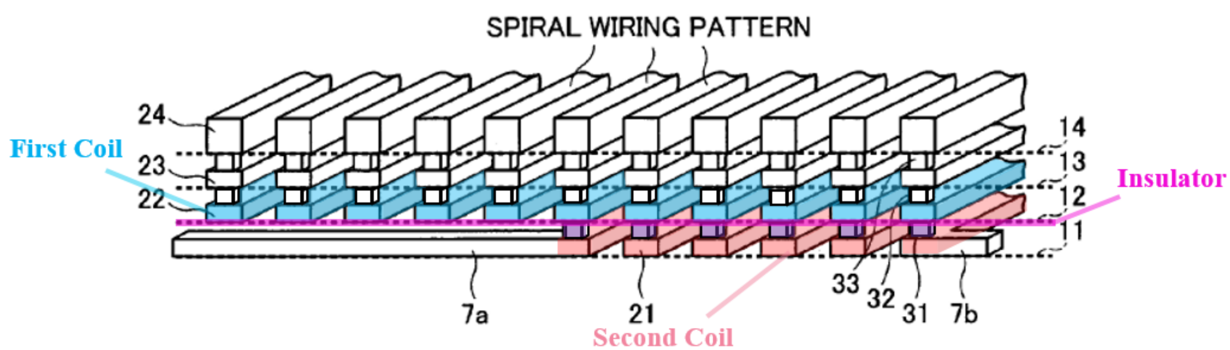



(Ex. 1005, FIG. 3 (annotated); Ex. 1002, ¶62.)

### 3. Claim 3

#### a) "The coil unit of claim 1, comprising an insulator between the first coil and the second coil,"

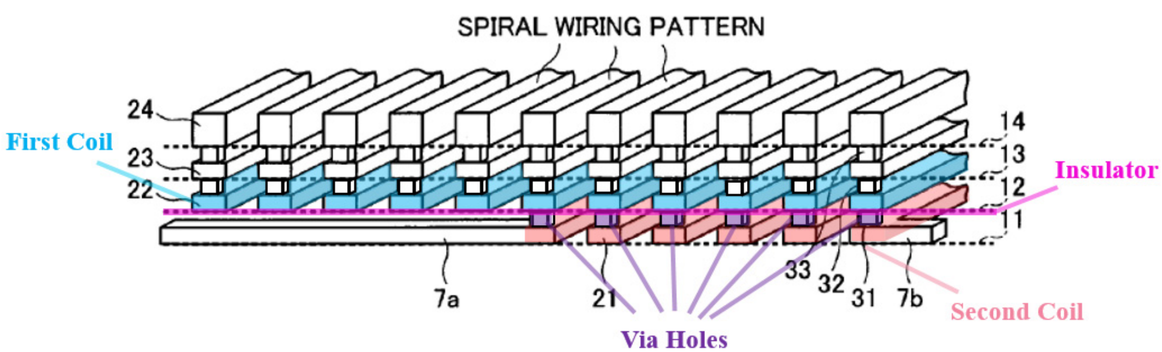
Tamata discloses this feature. (Ex. 1002, ¶63.) For example, as illustrated in annotated FIG. 1 below, Tamata discloses an insulating layer 12 ("insulator") between the metal wire 22 ("first coil") and the metal wire 21 ("second coil"). (Ex. 1005, 4:7-11 ("The first metal wire 21 is formed on an upper surface of the first insulating layer 11 … and the second metal wire 22 is formed on an upper surface of the second insulating layer 12."); Ex. 1002, ¶63.)




(Ex. 1005, FIG. 1 (annotated); Ex. 1002, ¶63.)

#### b) "wherein the first conductor and the second conductor pass through the insulator, and"

Tamata discloses this feature. (Ex. 1002, ¶64.) As shown in annotated figure 1 below, Tamata discloses that the second insulating layer 12 separates the metal wires 22 and 21 corresponding to the first and second coils. (Ex. 1005, 4:5-11 ("The first to fourth insulating layers 11 to 14 are stacked on a semiconductor substrate (not shown) in the order illustrated in FIG. 1. The first metal wire 21 is formed on an upper surface of the first insulating layer 11 (a surface on the opposite side of the semiconductor substrate), and the second metal wire 22 is formed on an upper surface of the second insulating layer 12.") A POSITA would have understood that the via holes 31 are holes in the insulating layer 12 that include conductive material in order to provide the electrical connections between those coils. (Ex. 1005, 4:14-16 ("Through the via holes 31, the first metal wire 21 and the second metal wire 22 are electrically connected."); Ex. 1002, ¶64.) Therefore, Tamata discloses that the conductive material in the via holes 31, including the "first conductor" and "second conductor" identified above in Sections IX.A.1(d), (e), passes through the insulating layer 12 ("insulator"). (Ex. 1002, ¶64.)




(Ex. 1005, FIG. 1 (annotated); Ex. 1002, ¶64.)

**c) "wherein the insulator comprises holes through which the first conductor and the second conductor pass."**

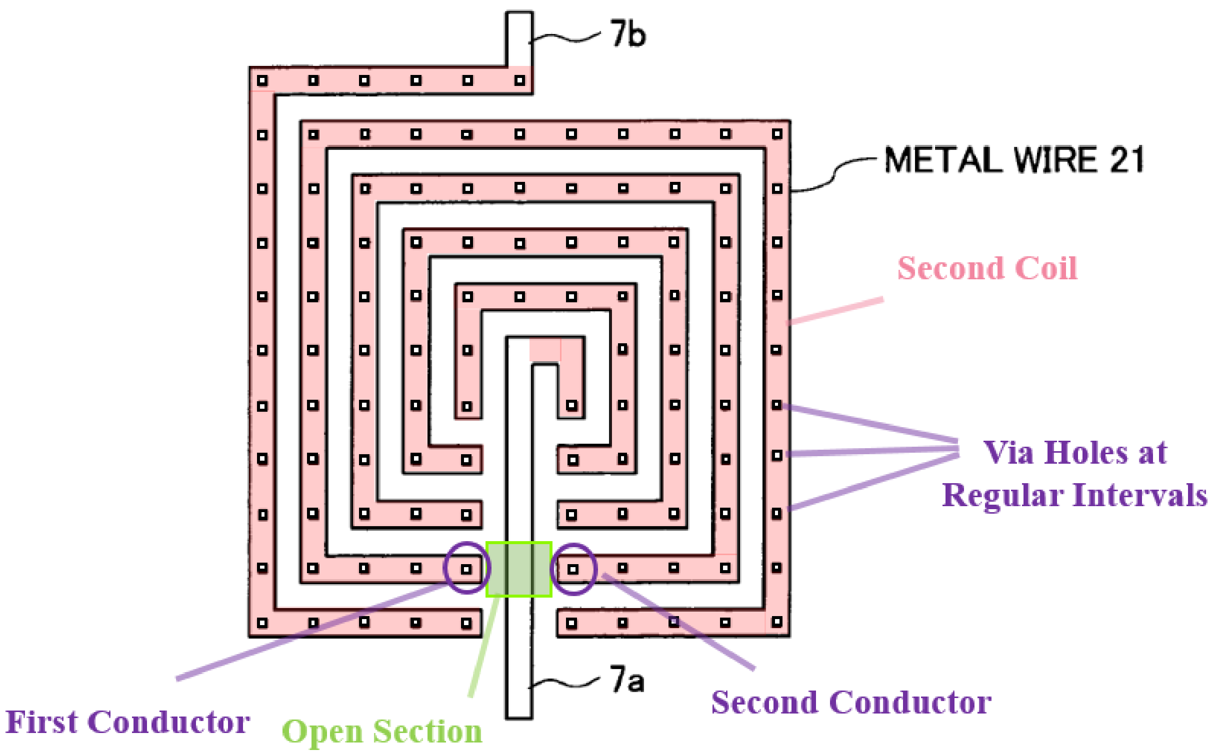
Tamata discloses this feature. (Ex. 1002, ¶65.) As discussed above with respect to claim elements 3[a] and 3[b], Tamata discloses the insulating layer 12 ("insulator") includes via holes ("holes") that include conductive material (including the "first conductor" and the "second conductor") that provides the connections between the first and second coils. (*Id*.; Ex. 1005, 4:35-40, FIGS. 1, 2(a), 2(b); *supra* Sections IX.A.3(a), (b).) The conductive material (including the "first conductor" and the "second conductor") is included in and passes through the via holes in order to provide the electrical connections between the coils. (Ex. 1002, ¶65.)

#### 4. Claim 4

**"The coil unit of claim 1, wherein the first conductor and the second conductor are positioned at a predetermined interval."**

Tamata discloses this feature. (Ex. 1002, ¶66.) For example, Tamata discloses "the via holes 31 are formed **at regular intervals** on the first metal wire 21 (bottom layer) arranged in a spiral pattern." (Ex. 1005, 4:39-41.) Tamata further discloses that "no via hole is formed on the leads 7a and 7b." (*Id*., 4:41-42.) The via holes that connect the first and second coils, including the via holes that include the conductive material corresponding to the first and second conductors, are shown in figure 2(b) below as positioned at a "predetermined interval." A POSITA would have understood Tamata's regular intervals to constitute "predetermined intervals." (Ex. 1002, ¶66.)

FIG. 2 (b)




(Ex. 1005, FIG. 2(b) (annotated); Ex. 1002, ¶66.)

#### 5. Claim 5

**"The coil unit of claim 1, wherein a plurality of the first conductors and a plurality of the second conductors are positioned throughout an entirety of the first coil and the second coil."**

Tamata discloses this feature to the extent it can be understood.[5] (Ex. 1002, ¶67.) As shown in FIGS. 2(a) and 2(b), Tamata discloses a plurality of the first

[5] Claim 1 requires the "second conductor" to be adjacent to the "first conductor" and further requires the open section to be between the first and second conductors.

conductors and a plurality of the second conductors (*e.g.*, conductors of via holes 31) are positioned throughout an entirety of the metal wire 22 ("first coil") and metal wire 21 ("second coil"). (Ex. 1005, 4:39-41 ("the via holes 31 are formed at regular intervals on the first metal wire 21 (bottom layer) arranged in a spiral pattern"); Ex. 1002, ¶67.)

FIG. 2 (a)

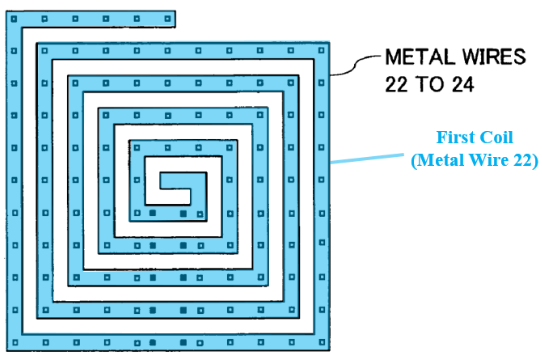
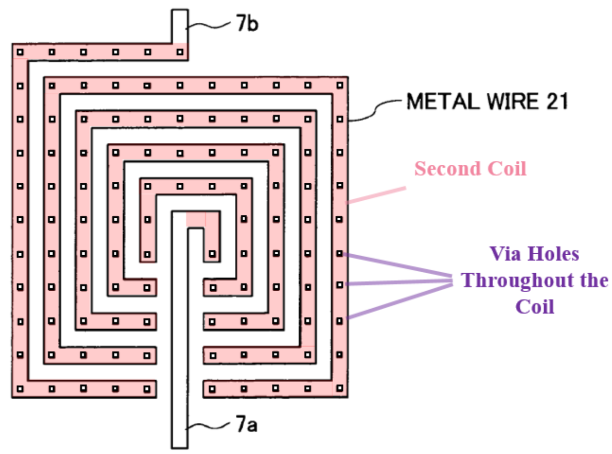



FIG. 2 (b)




(Ex. 1005, FIGS. 2(a), (b) (annotated); Ex. 1002, ¶67.)

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Petitioner does not concede that claim 5 satisfies 35 U.S.C § 112, but to the extent PO argues that the plurality of first and second conductors recited in claim 5 must be adjacent and have an open section in between, Tamata's conductors in each pair of adjacent via holes that flank lead 7a would disclose the limitations of claim 5. (Ex. 1002, ¶67.)

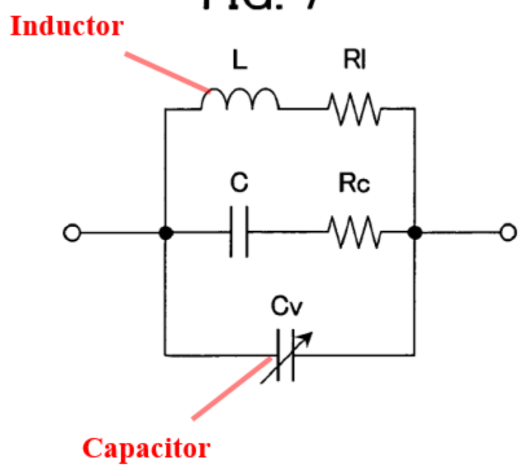
**6. Claim 6**

**a) "A wireless power apparatus for wirelessly transmitting or receiving power, comprising:"**

The preamble of claim 6 is not limiting. As discussed above for the preamble of claim 1, here, the preamble is not limiting, because, for example, the preamble (i) merely states a purpose or intended use of the invention, (ii) does not impose any structural requirements beyond those explicitly provided in the claim body, (iii) is not relied upon for antecedent basis in the claim body, and (iv) was not relied upon during prosecution to distinguish from the prior art. (*Supra* Section IX.A.1(a).)

To the extent the preamble is limiting, Tamata discloses "a wireless power apparatus for wirelessly transmitting or receiving power." (Ex. 1002, ¶¶68-70.) For example, Tamata discloses that the inductor shown in figure 1 is used in an apparatus that performs wireless transmission and/or reception. (Ex. 1005 at 1:13-19; *see also id.*, 11:42-46 (resonant circuit), 11:65-67 (voltage controlled oscillator); 12:1-10 (radio frequency transmitter-receiver, such as a tuner for satellite broadcasts, a wireless LAN apparatus, or mobile communication devices).) Tamata discloses a wireless transmitting and receiving apparatus that includes a resonant circuit formed using the inductor structure of Tamata discussed above for claim 1. (*Id.*, 1:13-19, 3:9-25, 5:19-23 ("[T]he inductor 10 illustrated in FIG. 4 has the same structure as the inductor 1 illustrated in FIG. 1, with regard to the positions and connections of the insulating layers, the metal wires, and the via holes. The inductor 10 has advantages described below."), 5:24-58; *supra* Section IX.A.1(a); Ex. 1002, ¶69.) Tamata further discloses an example resonant circuit in figure 7. (Ex. 1005, 5:59-61 ("FIG. 7 illustrates a structure in which the inductor illustrated in FIG. 6 is connected to a variable capacitance device Cv in parallel so that a resonant circuit is constructed.").)

FIG. 7




(Ex. 1005, FIG. 7 (annotated); Ex. 1002, ¶69.)

A POSITA would have understood that a wireless transmitting and receiving apparatus that includes the resonant circuit shown in figure 7, as disclosed by Tamata, constitutes "a wireless power apparatus for wirelessly transmitting or receiving power" as recited in claim 1. Such an understanding is confirmed by Tamata's disclosure of all of the elements of claim 6, as demonstrated below. (Ex. 1002, ¶70; *infra* Sections IX.A.6(b)-(g).)

**b) "a first coil;"**

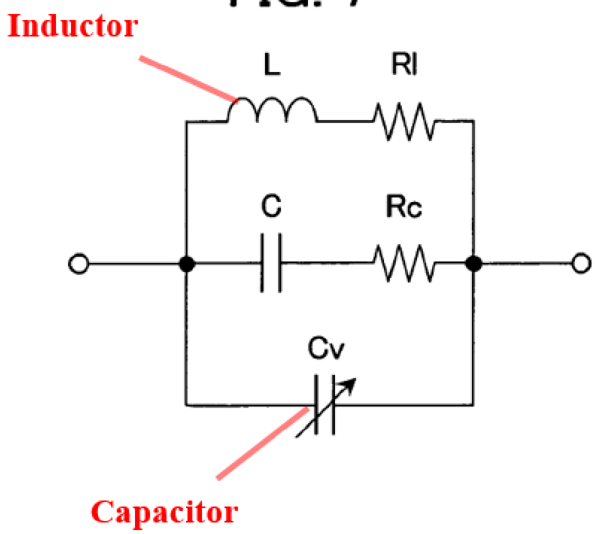
**c) "a second coil comprising an open section;"**

Tamata discloses these features. (Ex. 1002, ¶71.) As discussed above in Section IX.A.6(a), Tamata discloses a "wireless power apparatus" that includes the resonant circuit shown in figure 7. The inductor "L" shown in figure 7 corresponds to an inductor that has the same structure as that shown in figures 1 and 2 and discussed above for claim 1. (Ex. 1005, 5:19-22; Ex. 1002, ¶71.) Therefore, Tamata discloses these features for at least the same reasons as presented above for claim elements 1[b] and 1[c]. (*Supra* Sections IX.A.1(b), (c); Ex. 1002, ¶71.)

**d) "a capacitor connected to the first coil and the second coil;"**

Tamata discloses this feature. (Ex. 1002, ¶72.) For example, as shown in annotated figure 7 below, Tamata discloses a variable capacitor Cv connected to the inductor L, which, as discussed above for claim 2, includes the first coil and second coil connected in parallel. (Ex. 1005, 5:59-64 ("FIG. 7 illustrates a structure in which the inductor illustrated in FIG. 6 is connected to a variable capacitance device Cv in parallel so that a resonant circuit is constructed. That is, the series-connected coil L and resistor R1, the series-connected capacitor C and resistor Rc, and the variable capacitance device Cv are connected in parallel."); *supra* Section IX.A.2; Ex. 1002, ¶72.) Because the capacitor Cv is connected to the inductor L that includes the first and second coils connected in parallel, the capacitor is connected to both of the first and second coils. (Ex. 1002, ¶72.)

FIG. 7




(Ex. 1005, FIG. 7 (annotated); Ex. 1002, ¶72.)

**e) "a first conductor connecting the first coil and the second coil; and"**

**f) "a second conductor connecting the first coil and the second coil and positioned adjacent to the first conductor,"**

**g) "wherein the open section is positioned between the first conductor and the second conductor"**

Tamata discloses these features. (Ex. 1002, ¶73.) As discussed above in Sections IX.A.6(a) and IX.A.6(b), Tamata discloses a "wireless power apparatus" that includes an inductor that has the same structure as that shown in figures 1 and 2 and discussed above for claim 1. (Ex. 1005, 5:19-22; *supra* Sections IX.A.6(a), (b).)

Therefore, Tamata discloses these features for at least the same reasons as presented above for claim elements 1[d]-1[f]. (*Supra* Sections IX.A.1(d)-(f); Ex. 1002, ¶73.)

**7. Claim 7**

**"The wireless power apparatus of claim 6, wherein the first coil and the second coil are electrically connected in parallel with each other."**

**8. Claim 8**

**a) "The wireless power apparatus of claim 6, comprising an insulator between the first coil and the second coil,"**

**b) "wherein the first conductor and the second conductor pass through the insulator, and"**

**c) "wherein the insulator comprises holes through which the first conductor and the second conductor pass."**

**9. Claim 9**

**"The wireless power apparatus of claim 6, wherein the first conductor and the second conductor are positioned at a predetermined interval."**

**10. Claim 10**

**"The wireless power apparatus of claim 6, wherein a plurality of the first conductors and a plurality of the second conductors are positioned throughout an entirety of the first coil and the second coil."**

Tamata discloses these features. (Ex. 1002, ¶74.) As discussed above in Sections IX.A.6(a) and IX.A.6(b), Tamata discloses a "wireless power apparatus" that includes an inductor that has the same structure as that shown in figures 1 and 2 and discussed above for claim 1. (Ex. 1005, 5:19-22; *supra* Sections IX.A.6(a), (b).)

Therefore, Tamata discloses the features of claims 7-10 for at least the same reasons as presented above for claims 2-5, respectively. (*Supra* Sections IX.A.2-5; Ex. 1002, ¶74.)

**11. Claim 11**

**a) "A coil unit for wirelessly transmitting or receiving power, comprising:"**

The preamble of claim 11 is not limiting for the same reasons discussed above for the preamble of claim 1. (*Supra* Section IX.A.1(a).) Moreover, to the extent the preamble is limiting, Tamata discloses this feature for at least the same reasons as presented above for the preamble of claim 1. (*Id.*; Ex. 1002, ¶75; *see also infra* Sections IX.A.11(b)-(e) for the remaining elements of this claim.)

**b) "a first coil;"**

**c) "a second coil comprising an open section;"**

Tamata discloses these features for at least the same reasons as presented above for claim elements 1[b] and 1[c], respectively. (*Supra* Sections IX.A.1(b), (c); Ex. 1002, ¶76.)

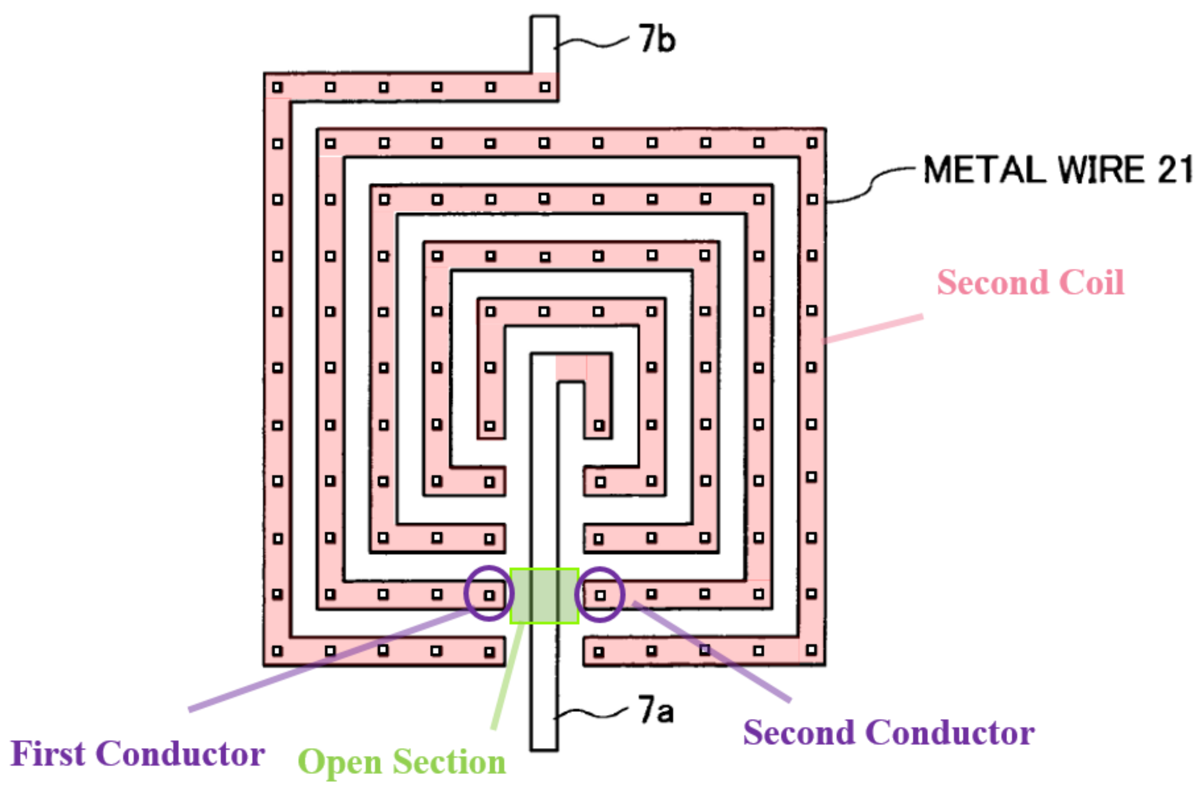
**d) "a plurality of conductors connecting the first coil and the second coil,"**

Tamata discloses this feature for at least the same reasons as presented above for claim elements 1[d] and 1[e], where the first and second conductors constitute a "plurality of conductors." (*Supra* Sections IX.A.1(d), (e); Ex. 1002, ¶77.)

**e) "wherein the plurality of conductors is absent in the open section."**

Tamata discloses this feature. (Ex. 1002, ¶78; *see also supra* Section IX.A.1(f).) For example, as shown in annotated figure 2(b) below, there are no via holes that include conductive material ("conductors") in the open section. (Ex. 1005, 4:45-46 ("It should be noted that, for the first metal wire 21, no via hole is formed on the leads 7a, 7b, and their surroundings.").)

FIG. 2 (b)




(Ex. 1005, FIG. 2(b) (annotated); Ex. 1002, ¶78.)

**12. Claim 12**

**"The coil unit of claim 11, wherein the first coil and the second coil are electrically connected in parallel with each other."**

**13. Claim 13**

**a) "The coil unit of claim 11, comprising an insulator between the first coil and the second coil,"**

**b) "wherein the plurality of conductors passes through the insulator, and"**

**c) "wherein the insulator comprises holes through which the plurality of conductors passes."**

**14. Claim 14**

**"The coil unit of claim 11, wherein the plurality of conductors is positioned at predetermined intervals."**

**15. Claim 15**

**"The coil unit of claim 11, wherein the plurality of conductors is positioned throughout an entirety of the first coil and the second coil."**

Tamata discloses the features of claims 12-15 for at least the same reasons as presented above for claims 2-5, respectively. (*Supra* Sections IX.A.2-5; Ex. 1002, ¶79.)

**16. Claim 16**

**a) "A wireless power apparatus for wirelessly transmitting or receiving power, comprising:"**

As discussed above for claim 6, this preamble is not limiting. (*Supra* Section IX.A.6(a).) Nevertheless, to the extent the preamble is limiting, Tamata discloses this feature for at least the same reasons as presented above for the preamble of claim 6. (*Supra* Section IX.A.6(a); Ex. 1002, ¶80; *see also infra* Sections IX.A.16(b)-(f) for the remaining elements of this claim.)

**b) "a first coil;"**

**c) "a second coil comprising an open section;"**

**d) "a capacitor connected to the first coil and the second coil;"**

Tamata discloses these features for at least the same reasons as presented above for claim elements 6[b]-6[d], respectively. (*Supra* Sections IX.A.6(b)-(d); Ex. 1002, ¶81.).

**e) "a plurality of conductors connecting the first coil and the second coil,"**

**f) "wherein the plurality of conductors is absent in the open section."**

Tamata discloses these features for at least the same reasons as presented above for claim elements 11[d] and 11[e], respectively. (*Supra* Sections IX.A.11(d), (e); Ex. 1002, ¶82.)

**17. Claim 17**

**"The wireless power apparatus of claim 16, wherein the first coil and the second coil are electrically connected in parallel with each other."**

**18. Claim 18**

**a) "The wireless power apparatus of claim 16, comprising an insulator between the first coil and the second coil,"**

**b) "wherein the plurality of conductors passes through the insulator, and"**

**c) "wherein the insulator comprises holes through which the plurality of conductors passes."**

**19. Claim 19**

**"The wireless power apparatus of claim 16, wherein the plurality of conductors is positioned at predetermined intervals."**

**20. Claim 20**

**"The wireless power apparatus of claim 16, wherein the plurality of conductors is positioned throughout an entirety of the first coil and the second coil."**

Tamata discloses the features of claims 17-20 for at least the same reasons as presented above for claims 2-5, respectively. (*Supra* Sections IX.A.2-5; Ex. 1002, ¶83.)

### B. Ground 2 – Tamata and Partovi Render Obvious Claims 1-20

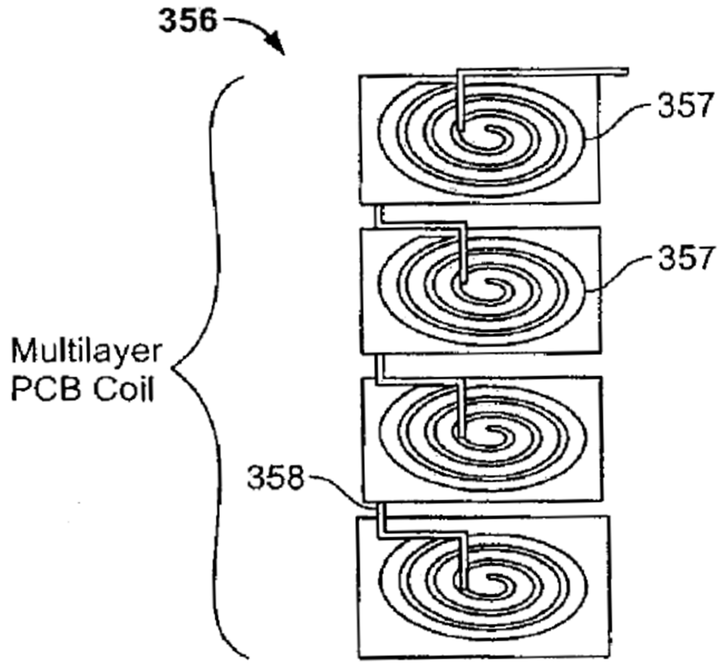
#### 1. Claims 1-5 and 11-15

As discussed above in Section IX.A, the preambles of independent claims 1 and 11 are not limiting. To the extent the preambles of claims 1 and 11 are limiting and Tamata does not disclose the features therein, Partovi discloses using an inductor like that disclosed by Tamata for wireless power transfer, and in view of Partovi, a POSITA would have found it obvious to include Tamata's inductor ("coil unit") in a system such that the inductor ("coil unit") is used "for wirelessly transmitting or receiving power." (Ex. 1002, ¶¶84-92.)

Partovi, like Tamata, discloses multi-layer inductors where a plurality of coil patterns are stacked to form the inductor:

> FIG. 18 shows an illustration of a means for stacking coils.... [T]o achieve higher flux densities, a coil is constructed with two or more layers, for example by using two or more layers of printed circuit board. Multiple layer boards can be used to allow compact fabrication of high flux density coils. By altering the dimensions of the coil in each layer (including the thickness, width, and number of turns) and by stacking multiple layers, the resistance inductance flux density, and coupling efficiency for the coils can be adjusted so as to be optimized for a particular application.

(Ex. 1010, ¶[0212]; Ex. 1002, ¶85.)




(Ex. 1010, FIG. 18.)

As shown in figure 18 above, "a multi-layer PCB coil 356 is created in separate PCB layers 357, which are then connected 358, and manufactured together via common techniques used in PCB fabrication, for example by use of a via or contacts." (Ex. 1010, ¶[0224].) This arrangement is structurally and functionally similar to Tamata's stacked metal wire coils connected with vias. (Ex. 1002, ¶86.) Hence, a POSITA would have had reason to consider the teachings of Partovi and Tamata together. (*Id.*)

Partovi is directed to "a system and method for inductive charging of portable devices" (Ex. 1010, ¶[0003]) where such portable devices include, for example, cellular telephones (*id.*, [0004].) To avoid the drawbacks of special connectors to charge the portable devices, Partovi discloses "[a] portable inductive power source, power device, or unit, for use in powering or charging electrical, electronic, battery-operated, mobile, and other devices or rechargeable batteries." (*Id.*, ¶[0013].) Partovi discloses a system that includes a "base unit that contains a primary, which creates an alternating magnetic field by means of applying an alternating current to a winding, coil, or any type of current carrying wire" and "a receiver that comprises a means for receiving the energy from the alternating magnetic field from the pad and transferring it to a mobile or other device or rechargeable battery" using "coils, windings, or any wire that can sense a changing magnetic field, and rectify it to produce a direct current (DC) voltage, which is then used to charge or power the device." (*Id.*) For example, Partovi states "[a] mobile device can be 'enabled' to receive power inductively by providing a receiver (such as a coil, etc.)." (*Id.*, ¶[0460]; Ex. 1002, ¶87.)

Partovi discloses that using a coil, like that depicted in figure 18 of Partovi, in such a wireless power transfer application provides for an efficient power transfer using a compact arrangement that achieves "higher flux densities." (Ex. 1010, ¶¶[0212], [0224], FIG. 18.) Partovi further discloses that such stacked coils can provide low resistance, which is desirable. (*Id.*, ¶[0224] ("The resulting overall stack is a thin multi-layer PCB that contains many turns of the coil. In this way, wide coils (low resistance) can be used, while the overall width of the coil is not increased."; *see also id.*, ¶¶[0167] ("[I]n order for the power efficiency to be maximized and to minimize losses in the coil, the coils should be manufactured to have as low a resistance as possible."), [0473], [0224]; Ex. 1002, ¶88.)

In view of Partovi, a POSITA would have found it obvious to use Tamata's inductor that includes stacked coils in wireless power transfer systems like those disclosed by Partovi. (Ex. 1002, ¶89.) A POSITA would have had good reason to combine the teachings of Tamata and Partovi, as described above, to implement a coil unit or wireless power apparatus that includes an inductor like that shown in figure 1 of Tamata and discussed above in Section IX.A. (*Id*.) Partovi discloses that inductors made of stacked coils, like that shown in figure 1 of Tamata, provide advantages such as high flux density and low resistance, which results in more efficient power transfer. (Ex. 1010, ¶¶[0212], [0224].) Indeed, Tamata recognizes that having the coil patterns stacked and connected together "allows resistances (wiring resistance) applied to series to the coil patterns to be applied in a parallel manner, enabling reduction in the total resistance of the inductor." (Ex. 1005, 2:34-38.) Therefore, a POSITA would have understood that an inductor like that of Tamata would have been appropriate for use in wireless power transfer systems like those disclosed by Partovi, because Tamata's inductor has the characteristics Partovi teaches are advantageous in such systems, such as lower resistance. (Ex.1002, ¶90.)

Including an inductor as disclosed by Tamata in a wireless power transfer system as disclosed by Partovi would have been straightforward for a POSITA to implement, because Partovi discloses how to implement such a wireless power transfer system that includes a multi-layer inductor as disclosed by both Tamata and Partovi. (Ex. 1002, ¶91.) Moreover, a POSITA would have understood how to select the appropriate dimensions, materials, and other inductor characteristics for the multi-layer inductor as described by Tamata for use in a particular application according the Tamata-Partovi combination. (*Id*.) The wireless power transfer apparatus/coil unit would have been a predictable combination of known components according to known methods (e.g., applying the teachings of Partovi regarding using multi-layer inductors in wireless power transfer systems to Tamata's multi-layer inductor), and would have been produced the predictable result of a wireless power transfer apparatus with numerous advantages as described by Partovi. (*Id*.) *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 ("*KSR*") ("The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.").

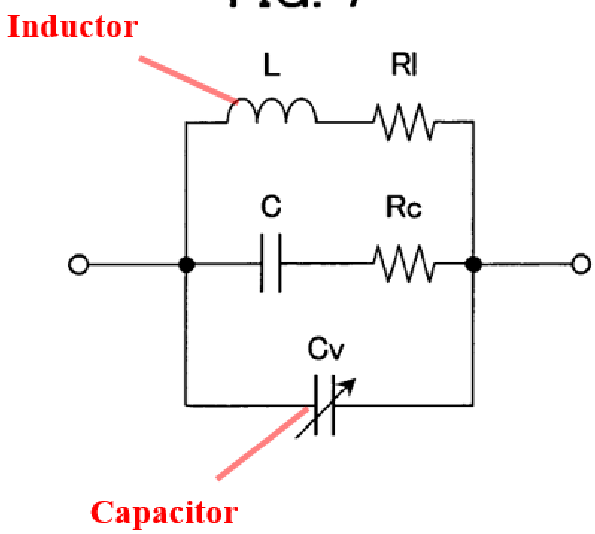
Therefore, the Tamata-Partovi combination discloses or suggests each of the preambles of claims 1 and 11, whereas the remaining features of claims 1-5, and 11-15 are disclosed by Tamata for the reasons presented above in Section IX.A. (Ex. 1002, ¶92.)

### 2. Claims 6-10 and 16-20

As discussed above in Section IX.A, the preambles of independent claims 6 and 16 are not limiting. To the extent the preambles of claims 6 and 16 are limiting and Tamata does not disclose the features therein, as discussed above in Section IX.B.1, Partovi discloses using an inductor like that disclosed by Tamata for wireless power transfer, and in view of Partovi, a POSITA would have found it obvious to include Tamata's inductor in a system such that the inductor is used a wireless power transfer system ("wireless power apparatus for wirelessly transmitting or receiving power.") (*Supra* Section IX.B.1; Ex. 1002, ¶¶93-96.)

As discussed above for claim 6, Tamata discloses using the multi-layer inductor in a resonant circuit like that shown in figure 7 of Tamata. (Ex. 1005, 5:59-64 ("FIG. 7 illustrates a structure in which the inductor illustrated in FIG. 6 is connected to a variable capacitance device Cv in parallel so that a resonant circuit is constructed."); Ex. 1002, ¶94.)

FIG. 7




(Ex. 1005, FIG. 7 (annotated); Ex. 1002, ¶94.)

As shown in annotated figure 2 below, Partovi discloses a wireless power transfer system 110, where, in the receiver 114, the inductor 120 is connected to a capacitor 128. (Ex. 1010, ¶[0117]; Ex. 1002, ¶95.)

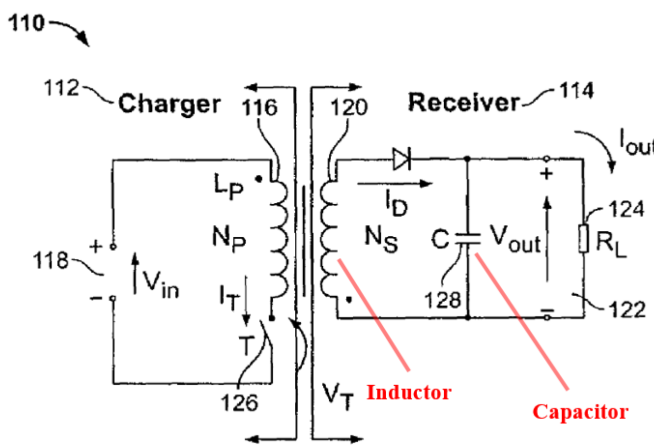



FIG. 2

(Ex. 1010, FIG. 2 (annotated); Ex. 1002, ¶95.)

As discussed above in Section IX.B.1, a POSITA would have found it obvious to use the inductor as disclosed by Tamata in wireless power transfer systems like those disclosed by Partovi, where such a combination results in a number of advantages. Therefore, a POSITA would have found it obvious to use a multi-layer inductor like that of Tamata in the wireless power transfer system like that disclosed in figure 2 of Partovi. (Ex. 1002, ¶96.) And, in addition to disclosing the preamble of claims 6 and 16, the Tamata-Partovi combination discloses "a capacitor connected to the first coil and the second coil," as recited in claim elements 6[d] and 16[d], because Tamata's multi-layer inductor, which included in the power transfer system like that in figure 2 of Partovi, includes the first and second coils connected in parallel. (*Id.*; *supra* Sections IX.A.6(d), IX.A.16(d).)

The Tamata-Partovi combination discloses or suggests the remaining features of claims 6-10 and 16-20 for the same reasons discussed above in Section IX.A.6-10 and IX.A.16-20. (Ex. 1002, ¶96.)

### C. Ground 3 – Kita Anticipates Claims 1-5 and 11-15[6]

#### 1. Claim 1

##### a) "A coil unit for wirelessly transmitting or receiving power, comprising:"

As discussed above in Section IX.A.1(a), the preamble of claim 1 is non-limiting. (*See* Section IX.A.1(a).) Nevertheless, to the extent the preamble is limiting, Kita discloses these features. (Ex. 1002, ¶¶97-99.) For example, Kita discloses a variable inductor ("coil unit") for use in various transfer circuits:

> The variable inductor according to the present invention can be applied to a transfer circuit in radio communication such as in a GPS, mobile phone, and wireless LAN, and used, for example, in an amplifier and an oscillator. The present invention is particularly preferably for a radio communication transfer circuit for a high frequency area. As the characteristic adjusted by the present invention, various characteristics such as the gain of the amplifier and the noise factor (NF) are included as well as the inductance and the Q value.

(Ex. 1007, 3:4-12; *see also* Ex. 1018, ¶¶9, 14, 16, 55, 70, 91; Ex. 1019, ¶¶[0005]-[0008]; Ex. 1020, 1:8-59, 2:5-10.)

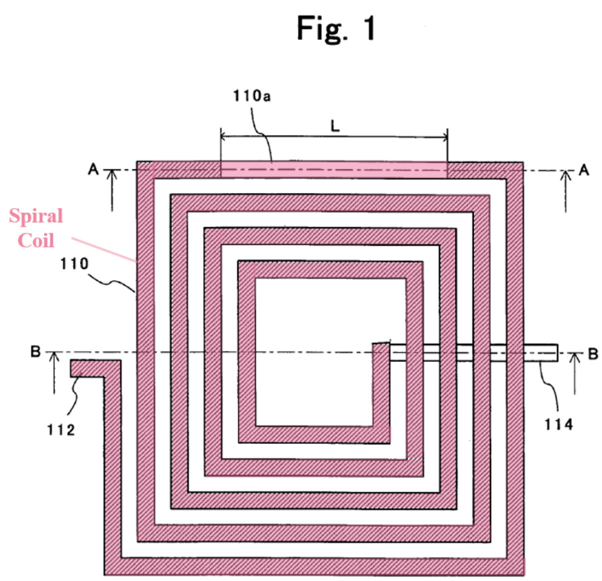
[6] The mapping of the claim features to the disclosure of Kita is consistent with PO's infringement allegations in the district court proceedings. (*See* Ex. 1011, generally.)

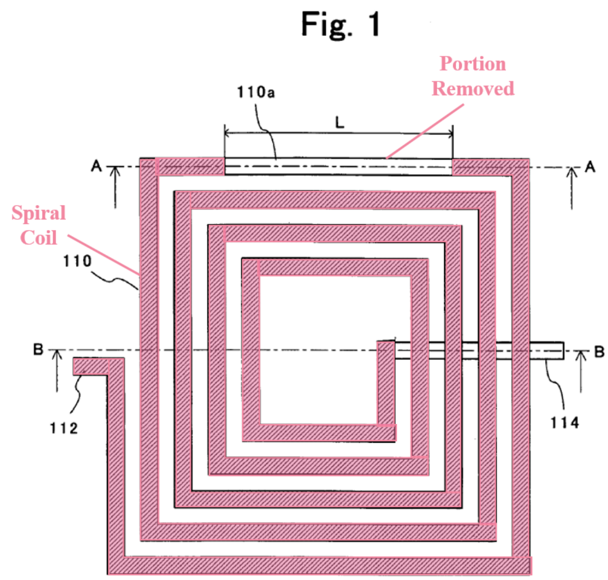
Further, Kita discloses, that, when used in a transfer circuit, a shift in the inductor's characteristics can cause "a decrease in receiver sensitivity." (*Id.*, 1:32-35). A POSITA would have understood that when an inductor is exposed to changing magnetic flux, a current is induced in the inductor such that it operates as a "receiver." (Ex. 1002, ¶98.) Therefore, such current induction in a receiver circuit including the inductor is wireless power reception, as current is a component of power (*e.g.*, power (P) = current (I) * voltage (V), $P=I^2$ * resistance (R)). (*Id.*)

Moreover, a POSITA would have understood that Kita's inductor is capable of transmitting and receiving power as it is an inherent characteristic of such an inductor. (Ex. 1002, ¶99.) Therefore, a POSITA would have understood that such an inductor ("coil unit") is "for wirelessly transmitting or receiving power." (*Id.*) Such an understanding is supported by the demonstration that Kita's discloses all of the claimed features of claim 1. (*Infra* Sections IX.C.1(b)-(f).)

**b) "a first coil;"**

Kita discloses this feature. (Ex. 1002, ¶¶100-105.) For example, Kita discloses that the variable inductor is a multi-layer inductor that includes a plurality of coils stacked vertically and interconnected. (Ex. 1007, 2:33-36 ("A first aspect of the present invention is applied to a characteristic adjustment method for an inductor formed by laminating a plurality of coils and electrically connecting these coils by a through hole."); Ex. 1002, ¶100.) For example, figure 1 of Kita shows a plan view of the Kita's inductor that includes a spiral coil 110. (Ex. 1007, 3:50-52, 3:64, FIG. 1.)

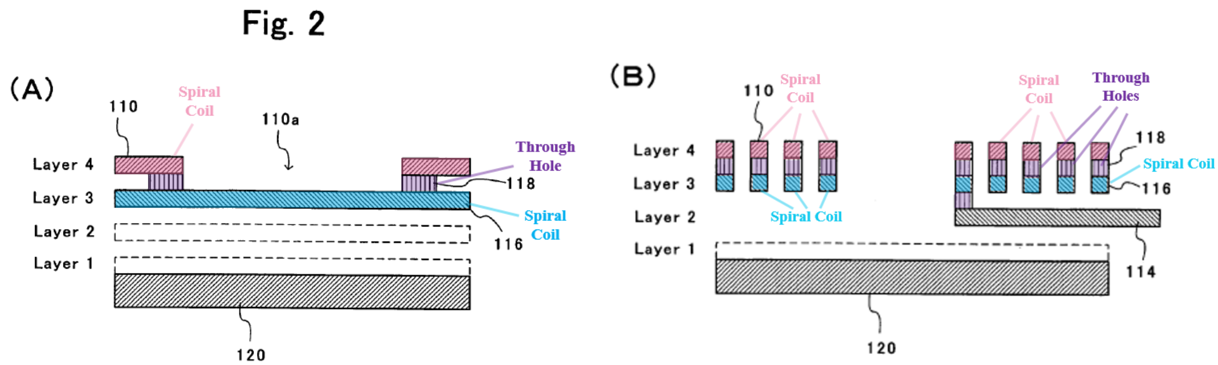



(*Id*., FIG. 1 (annotated); Ex. 1002, ¶100.)

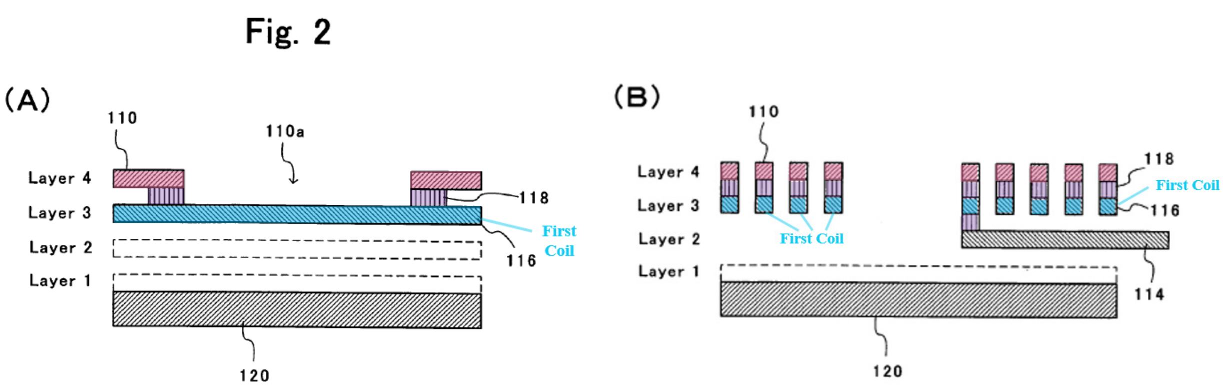
Kita further discloses that the inductance of the multi-layer inductor can be adjusted by providing an adjustment area in the uppermost spiral coil 110, where a portion of the coil is removed (as shown in figure 1 on the right above) in order to adjust the inductance. (Ex. 1007, 4:13-24, 4:39-40 ("the adjustment area 110a of the spiral coil 110 is removed (cut down)").) Characteristics of the inductor may be adjusted by selecting an appropriate length and location of the adjustment area. (*Id*., 2:52-3:3, 4:24-27, 4:48-55; Ex. 1002, ¶101.)

Annotated figures 2(A) and 2(B) of Kita below provide cross sectional views of the inductor having the multiple layers, where the cross-sectional views are taken along the A-A and B-B lines in figure 1 above, respectively. The example inductor shown in figures 2(A) and 2(B) includes two coils 110 and 116 connected by through holes 118. (Ex. 1007, 4:6-8.)




(Ex. 1007, FIGs. 2(A)(left), 2(B)(right) (annotated); Ex. 1002, ¶102.)

Kita explains that while only two coils are shown, the inductor can include more layers with more coils. (Ex. 1007, 3:57-67; Ex. 1002, ¶103.) Therefore, a POSITA would have understood that Kita discloses variable inductors with two or more coils formed in a stack structure, where each of the coils in the stack is a spiral coil like that shown in figure 1 above. (Ex. 1002, ¶104.) The spiral coil 116 highlighted below in annotated figures 2(A) and 2(B) constitutes "a first coil." (*Id.*)




(Ex. 1007, FIGs. 2(A)(left), 2(B)(right) (annotated); Ex. 1002, ¶104.)

Figure 1 of Kita is modified and annotated on the left below to show the spiral coil 116 ("first coil") on the third layer, whereas annoated figure 1 on the right shows the coil 110 on the fourth layer, where a portion of the coil 116 is visible through the removed portion of the coil 110. (Ex. 1002, ¶105; Ex. 1007, 4:1-4 ("The two spiral coils 110 and 116 are respectively, a rectangular spiral coil made of aluminum, copper, or the like, and have **substantially the same shape**.") (emphasis added).)

Fig. 1

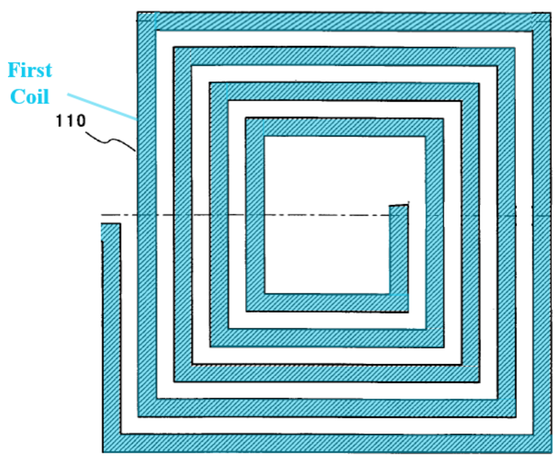
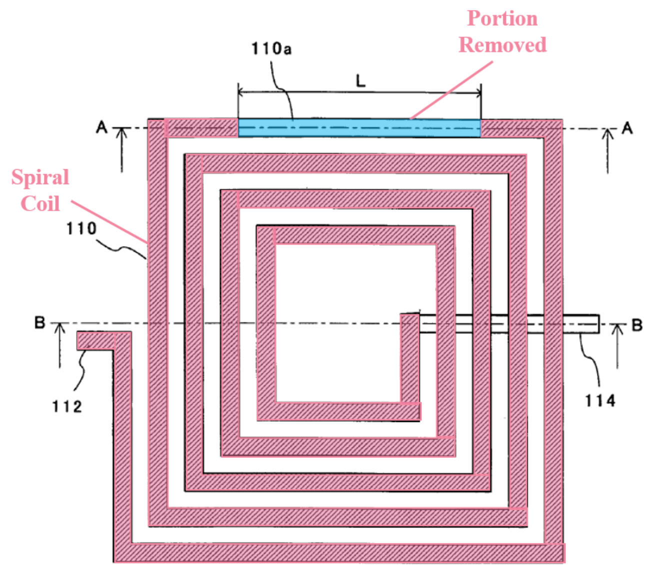



Fig. 1

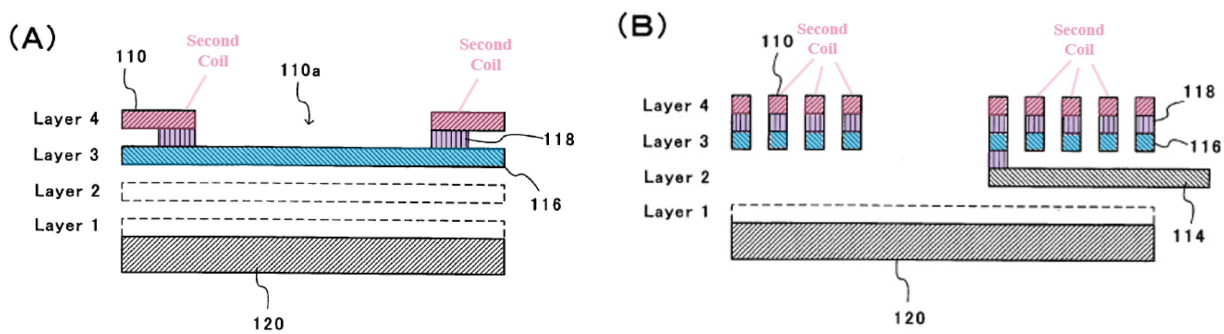



(Ex. 1007, FIG. 1 (modified, annotated); Ex. 1002, ¶105.)

### c) "a second coil comprising an open section;"

Kita discloses this feature. (Ex. 1002, ¶¶106-108.) For example, as discussed above in Section IX.C.1(b), Kita discloses a multi-layer inductor that includes a plurality of coils stacked vertically and interconnected. (Ex. 1007, 2:33-36.) As shown in annotated figures 2(A) and 2(B) below, Kita discloses spiral coil 110 ("second coil") that is on the uppermost layer of the inductor.

Fig. 2




(*Id.*, FIGs. 2(A)(left), 2(B)(right) (annotated); Ex. 1002, ¶106.)

Kita further discloses that the inductance of the multi-layer inductor can be adjusted by providing an adjustment area in the uppermost spiral coil 110 ("first coil"), where a portion of the coil is removed in order to adjust the inductance. (Ex. 1007, 4:13-24, 4:39-40 ("the adjustment area 110a of the spiral coil 110 is removed (cut down").) Characteristics of the inductor may be adjusted by selecting an appropriate length and location of the adjustment area. (*Id.*, 2:52-3:3, 4:24-27, 4:48-55; Ex. 1002, ¶107.) The adjustment area, where part of the spiral coil 110 is removed, is shown in annotated figures 1 and 2A below, where the removed section creates a gap in the coil that constitutes an "open section" of the coil 110 ("second coil").

Fig. 1

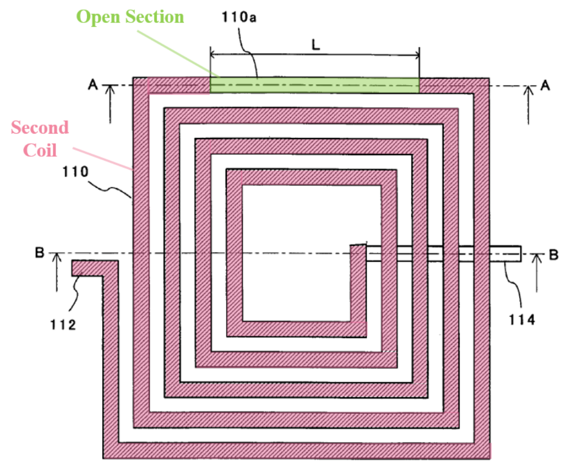
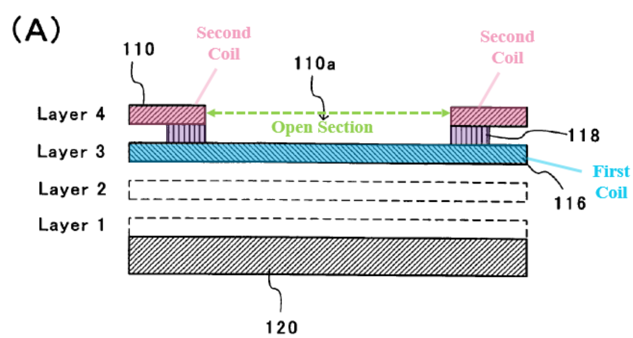


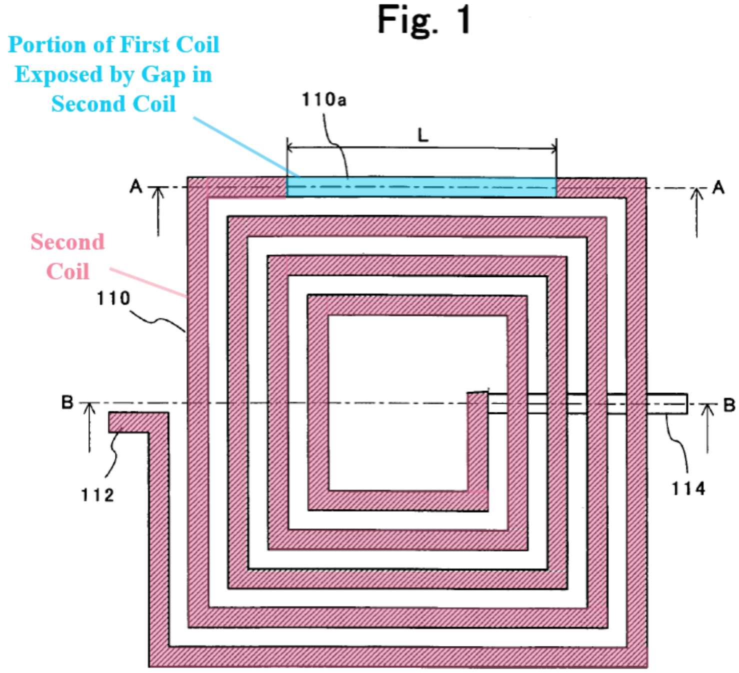

Fig. 2




(Ex. 1007, FIGs 1 (left), 2A (right) (annotated); Ex. 1002, ¶107.)

Annotated figure 1 below shows the plan view after a section of the top coil 110 ("second coil") on layer 4 has been removed, thereby revealing a portion of the coil 116 ("first coil") that is below on layer 3. (Ex. 1002, ¶108.)

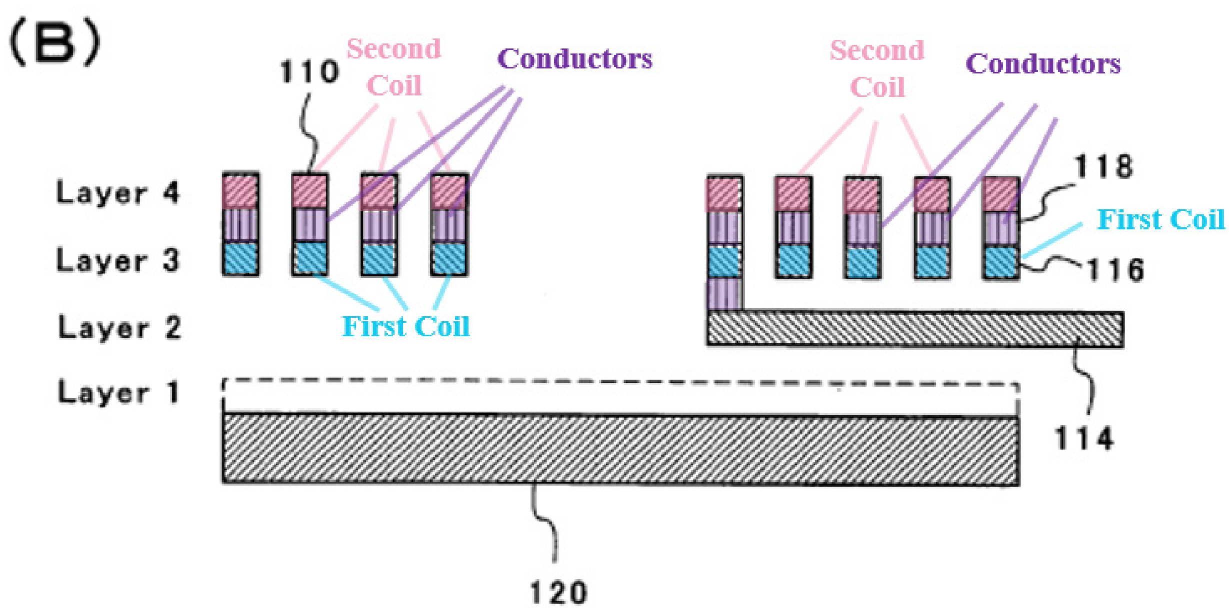
Fig. 1




(Ex. 1007, FIG. 1 (annotated); Ex. 1002, ¶108.)

**d) "a first conductor connecting the first coil and the second coil; and"**

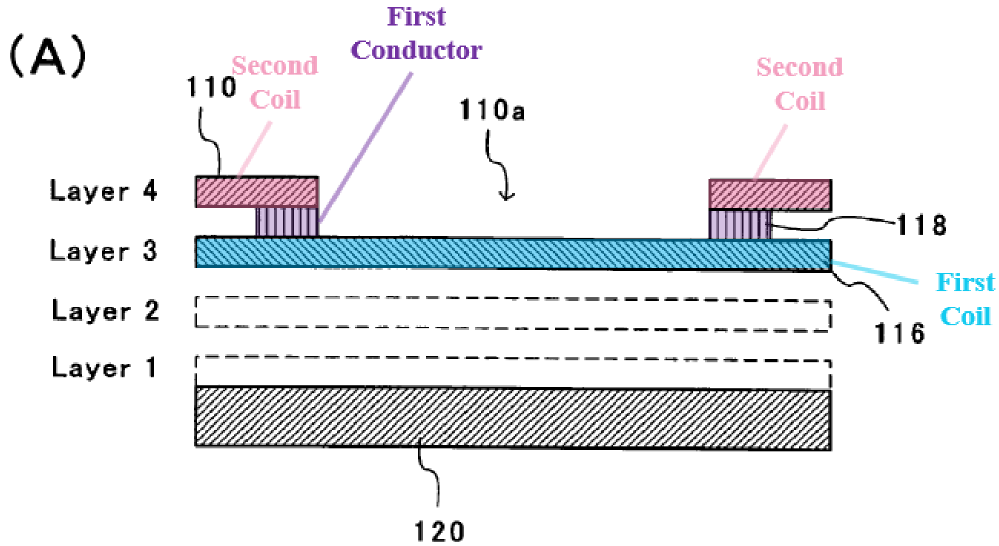
Kita discloses this feature. (Ex. 1002, ¶¶109-110.) For example, Kita discloses that "[t]he spiral coils 116 and 110 formed in the third and the fourth wiring layers are electrically connected by a through hole 118 formed in the insulating layer." (Ex. 1007, 4:6-8.) Specifically, "the spiral coils 110 and 116 are electrically connected to each other by a conductive material such as tungsten filled in the through hole." (*Id*., 4:8-11.) Indeed, as is shown in figure 2(B), many through holes that include conductive material ("conductors") are used to connect the coils, where Kita explains that "[a] plurality of through holes 118 is formed over the entire coil at predetermined intervals." (*Id*., 4:11-12; Ex. 1002, ¶109.)




(Ex. 1007, FIG. 2(B) (annotated); Ex. 1002, ¶109.)

As shown in annotated figure 2(A) below, the conductive material in the highlighted through hole constitutes a "first conductor connecting the first coil and the second coil" as recited in claim 1. (Ex. 1002, ¶110.)

Fig. 2

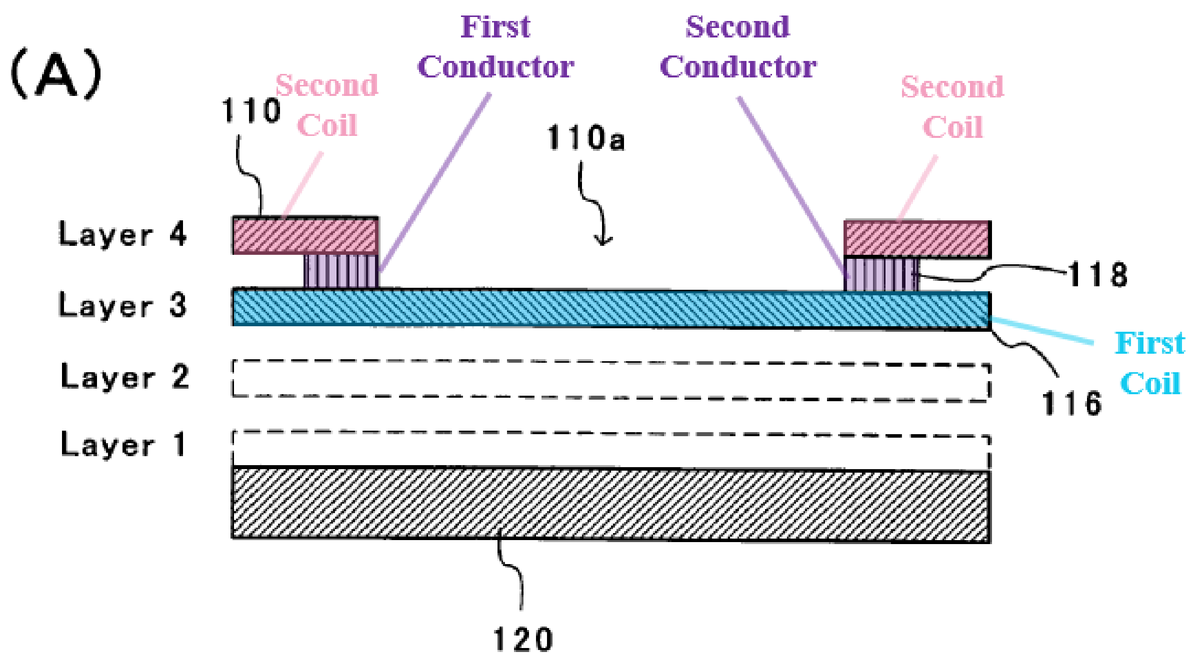



(Ex. 1007, FIG. 2(A) (annotated); Ex. 1002, ¶110.)

**e) "a second conductor connecting the first coil and the second coil and positioned adjacent to the first conductor,"**

Kita discloses this feature. (Ex. 1002, ¶111.) For example, Kita discloses that spiral coils 116 and 110 are electrically connected by a conductive material in through holes 118 as discussed above in Section IX.C.1(d). (Ex. 1007, 4:6-11.) As illustrated in annotated figure 2A below, the conductive material in the labeled through hole ("second conductor") connects the first and second coils and is positioned "adjacent to" the first conductor. (Ex. 1002, ¶111.)

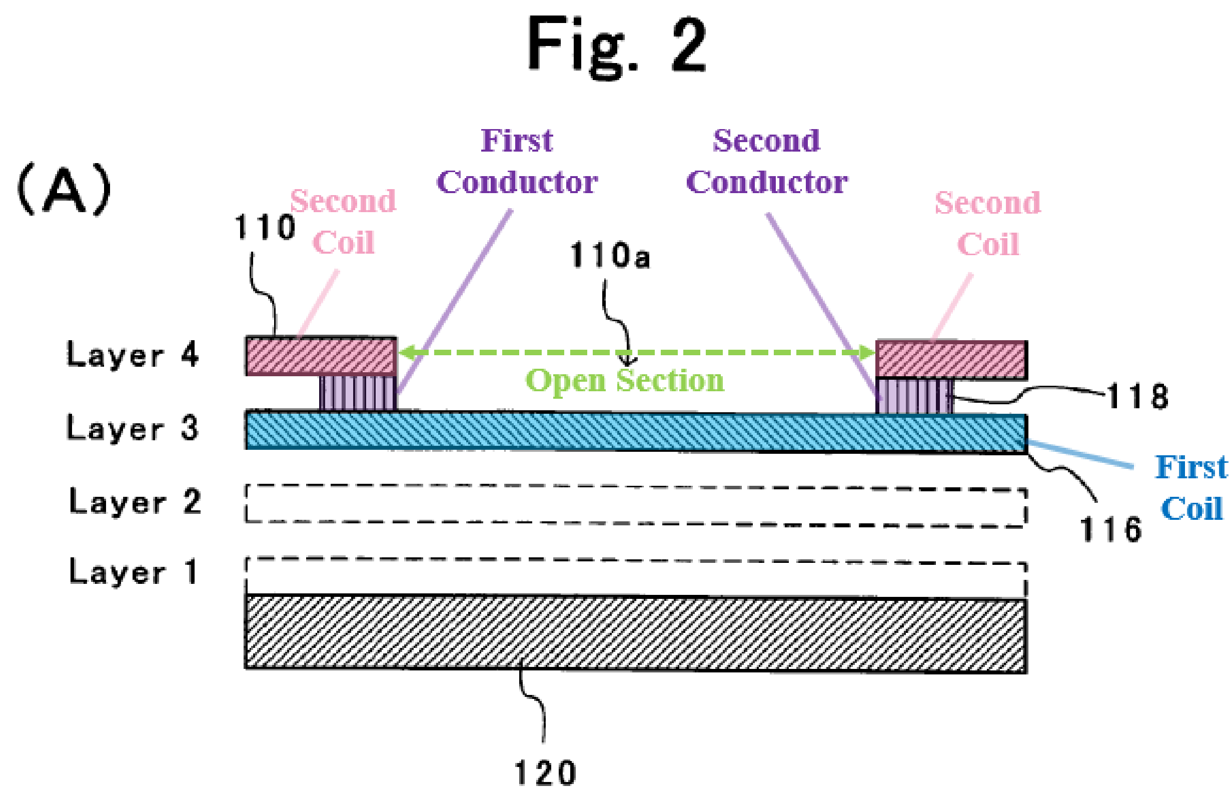
Fig. 2




(Ex. 1007, FIG. 2A (annotated); Ex. 1002, ¶111.)

**f) "wherein the open section is positioned between the first conductor and the second conductor"**

Kita discloses this feature. (Ex. 1002, ¶¶112-113.) As shown in annotated figure 2A, the gap in the second coil ("open section") is "positioned between the first conductor and the second conductor." (Ex. 1002, ¶112.)




(Ex. 1007, FIG. 2(A) (annotated); Ex. 1002, ¶112.)

Further, Kita specifically teaches that "[a] plurality of through holes 118 is formed over the entire coil at predetermined intervals" (Ex. 1007, 4:11-12) and the adjustment area 110a, which is where the gap in the second coil ("open section") is located, is an area where through holes are not formed (*id*., 2:49-50, 4:15-18, 4:22-24). As a result, the adjustment area logically falls between through holes as Kita illustrates in FIG. 2A. (Ex. 1002, ¶113.)

### 2. Claim 2

**"The coil unit of claim 1, wherein the first coil and the second coil are electrically connected in parallel with each other."**

Kita discloses this feature. (Ex. 1002, ¶114.) For example, Kita discloses that the coils 116 and 110 ("first coil" and "second coil," respectively) are electrically connected by through holes 118 that include conductive material, where the through holes are formed over the entire coil at predetermined intervals. (Ex. 1007, 4:6-12.) A POSITA would have understood that coils connected in such a manner, where connectors connect the coils at numerous locations over the entire coil, are connected in parallel with each other. (Ex. 1002, ¶114.) Therefore, Kita discloses claim 2.

### 3. Claim 3

**a) "The coil unit of claim 1, comprising an insulator between the first coil and the second coil,"**

Kita discloses this feature. (Ex. 1002, ¶115.) For example, Kita discloses "an insulating layer interposed between the first and the second coils." (Ex. 1007, 2:44-45; *see also id*. 3:56-61, 4:6-8 ("The spiral coils 116 and 110 formed in the third and fourth wiring layers are electrically connected by a through hole 118 formed in the insulating layer."), 6:10-11; Ex. 1002, ¶115.) The insulating layer is an "insulator" between the first coil and the second coil. (Ex. 1002, ¶115.)

**b) "wherein the first conductor and the second conductor pass through the insulator, and"**

Kita discloses this feature. (Ex. 1002, ¶116.) For example, Kita discloses that the through holes filled with the conductive material ("conductors") are formed in the insulating layer. (Ex. 1007, 4:6-8 ("The spiral coils 116 and 110 formed in the third and the fourth wiring layers are electrically connected by a through hole 118 formed in the insulating layer."), 4:8-11 ("a conductive material … fill[s] in the through hole.").) A POSITA would have understood that, in order to connect the coils on either side of the insulating layer, the through holes pass through the insulating layer ("insulator"). (Ex. 1002, ¶116.)

**c) "wherein the insulator comprises holes through which the first conductor and the second conductor pass."**

Kita discloses this feature. (Ex. 1002, ¶117.) For example, as discussed above in Sections IX.C.2 and IX.C.3(b), the insulating layer ("insulator") between the coils includes through holes that are filled with conductive material in order to provide electrical connections between the coils. (*Supra* Sections IX.C.2, IX.C.3(b).) As discussed above in Sections IX.C.1(d)-(e), the first and second conductors are included in the via holes that connect the coils. Therefore, Kita discloses claim element 3[c]. (*Supra* Sections IX.C.1(d)-(e); Ex. 1002, ¶117.)

**4. Claim 4**

**"The coil unit of claim 1, wherein the first conductor and the second conductor are positioned at a predetermined interval."**

Kita discloses this feature. (Ex. 1002, ¶118.) For example, Kita discloses that "the spiral coils 110 and 116 are electrically connected to each other by a conductive material … filled in the through hole" and "[a] plurality of through holes 118 is formed over the entire coil **at predetermined intervals**." (Ex. 1007, 4:8-12.) Therefore, the first and second conductors discussed above in Sections IX.C.1(d)-(e), which correspond to conductive material included in the through holes formed at predetermined intervals, are "positioned at a predetermined interval" as recited in claim 4. (*Supra* Sections IX.C.1(d)-(e); Ex. 1002, ¶118.)

**5. Claim 5**

**"The coil unit of claim 1, wherein a plurality of the first conductors and a plurality of the second conductors are positioned throughout an entirety of the first coil and the second coil."**

Kita discloses this feature to the extent it can be understood.[7] (Ex. 1002, ¶119.) For example, Kita discloses that "the spiral coils 110 and 116 are electrically

[7] *See* note 5. To the extent PO argues that the plurality of first and second conductors recited in claim 5 must be adjacent and have an open section in between, Kita teaches

connected to each other by a conductive material … filled in the through hole" and "[a] plurality of through holes 118 is **formed over the entire coil** at predetermined intervals." (Ex. 1007, 4:8-12 (emphasis added).) Therefore, Kita discloses through holes that include conductive material formed "over the entire coil," and discloses the features of claim 5. (Ex. 1002, ¶119.)

#### 6. Claim 11

##### a) "A coil unit for wirelessly transmitting or receiving power, comprising:"

The preamble of claim 11 is not limiting for the same reasons discussed above for the preamble of claim 1. (*Supra* Section IX.A.1(a).) Moreover, to the extent the preamble is limiting, Kita discloses this feature for at least the same reasons as presented above for the preamble of claim 1. (*Supra* Section IX.C.1(a); Ex. 1002, ¶120; *see also infra* Sections IX.C.6(b)-(e) for the remaining elements of this claim.)

##### a) "a first coil;"

##### b) "a second coil comprising an open section;"

Kita discloses these features for at least the same reasons as presented above for claim elements 1[b] and 1[c], respectively. (*Supra* Sections IX.C.1(b), (c); Ex. 1002, ¶121.)

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the use of more than one adjustment area (open areas), where the through holes on either side would constitute adjacent conductors. (Ex. 1002, ¶119, n. 4.)

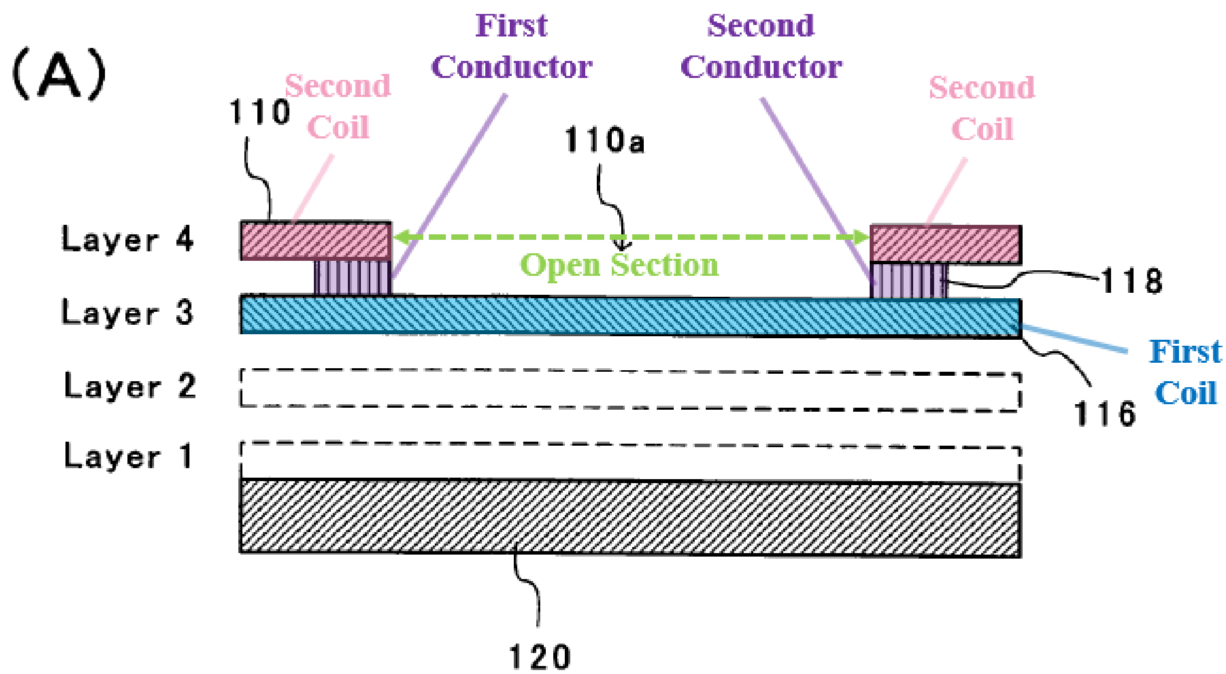
**c) "a plurality of conductors connecting the first coil and the second coil,"**

Kita discloses this feature for at least the same reasons as presented above for claim elements 1[d] and 1[e], where the first and second conductors are a "plurality of conductors.") (*Supra* Sections IX.C.1(d), (e); Ex. 1002, ¶122.).

**d) "wherein the plurality of conductors is absent in the open section."**

Kita discloses this feature. (Ex. 1002, ¶123; *see also supra* Section IX.C.1(f).) For example, as shown in annotated figure 2(A) below, there are no through holes that include conductive material ("conductors") in the open section. Kita teaches that the adjustment area 110a, which is where the gap in the second coil ("open section") is located, is an area where through holes are not formed. (Ex. 1007, 2:49-50 ("Moreover, the through hole is not formed below the adjustment area."), 4:15-18 ("The adjustment area 11a is an area to be cut after completion of the inductor (after finishing a wafer process), and the through hole 118 is not formed below the adjustment area 110a."); 4:22-24 ("In other words, the adjustment area 110 is just an area scheduled to be cut, and can be considered as an area below which the through hole is not formed."); Ex. 1002, ¶123.)

Fig. 2




(Ex. 1007, FIG. 2(A) (annotated); Ex. 1002, ¶123.)

#### 7. Claim 12

**"The coil unit of claim 11, wherein the first coil and the second coil are electrically connected in parallel with each other."**

#### 8. Claim 13

**a) "The coil unit of claim 11, comprising an insulator between the first coil and the second coil,"**

**b) "wherein the plurality of conductors passes through the insulator, and"**

**c) "wherein the insulator comprises holes through which the plurality of conductors passes."**

#### 9. Claim 14

**"The coil unit of claim 11, wherein the plurality of conductors is positioned at predetermined intervals."**

#### 10. Claim 15

**"The coil unit of claim 11, wherein the plurality of conductors is positioned throughout an entirety of the first coil and the second coil."**

Kita discloses the features of claims 12-15 for at least the same reasons as presented above for claims 2-5, respectively. (*Supra* Sections IX.C.2-5; Ex. 1002, ¶124.)

### D. Ground 4 – Kita and Partovi Render Obvious Claims 1-20

#### 1. Claims 1-5 and 11-15

As discussed above in Section IX.C, the preambles of independent claims 1 and 11 are not limiting. To the extent the preambles are limiting and Kita does not disclose the features therein, Partovi discloses using an inductor like that disclosed by Kita for wireless power transfer, and in view of Kita, a POSITA would have found it obvious to include Kita's inductor in a coil unit or wireless power apparatus for wirelessly transmitting or receiving power. (Ex. 1002, ¶¶125-134.)

As discussed above in Section IX.B, Partovi discloses multi-layer inductors where a plurality of coil patterns are stacked to form the inductor, where the coil patterns are interconnected by "a via or contacts." (Ex. 1010, ¶[0212], [0224]; Ex. 1002, ¶126.) This arrangement is structurally and functionally similar to Kita's stacked coils connected with through holes filled with conductive material. (Ex. 1002, ¶126.) Hence, a POSITA would have had reason to consider the teachings of Partovi and Kita together.

As also discussed above in Section IX.B, Partovi is directed to "a system and method for inductive charging of portable devices." (*Supra* Section IX.B, Ex. 1010, ¶¶[0003]-[0004], [0013]; Ex. 1002, ¶127.) Partovi discloses that using a multi-layer coil, like that depicted in figure 18 of Partovi, in wireless power transfer applications provides for efficient power transfer using a compact arrangement that achieves "higher flux densities." (Ex. 1010, ¶¶[0212], [0224], FIG. 18.) Partovi further discloses that such stacked coils can provide low resistance, which is desirable. (*Id.*, ¶[0224] ("The resulting overall stack is a thin multi-layer PCB that contains many turns of the coil. In this way, wide coils (low resistance) can be used, while the overall width of the coil is not increased."; *see also id.*, ¶¶[0167] ("[I]n order for the power efficiency to be maximized and to minimize losses in the coil, the coils should be manufactured to have as low a resistance as possible."), [0473] ("To design a high efficiency inductive power transfer coil, the resistivity of the coil must be minimized while the resulting induction is kept at desired levels."), [0224]; Ex. 1002, ¶127.)

In view of Partovi, a POSITA would have found it obvious to use Kita's inductor that includes stacked coils in wireless power transfer systems like those disclosed by Partovi. (Ex. 1002, ¶128.) A POSITA would have had good reason to combine the teachings of Kita and Partovi, as described above, to implement a coil unit or wireless power apparatus that includes an inductor like that shown in figures 1 and 2 of Kita and discussed above in Section IX.C. (*Id.*) Partovi discloses that inductors made of stacked coils, like that shown in figures 1 and 2 of Kita, provide advantages such as high flux density and low resistance, which results in more efficient power transfer. (*Id.*; Ex. 1010, ¶¶[0212], [0224].) Indeed, a POSITA would have understood that by connecting the coils in parallel (*see supra* Section IX.C.2), the resistance of the inductor is reduced in comparison to a series connection of the coils. (Ex. 1002, ¶128.) Therefore, a POSITA would have understood that Kita's inductor would be appropriate for use in wireless power transfer systems like those disclosed by Partovi, as the inductor has the characteristics Partovi teaches are advantageous in such systems. (*Id.*)

Moreover, Kita discloses that the inductance of its inductor can be adjusted by removing a portion of one of the coils in the designated "adjustment area." (Ex. 1007, 2:52-3:3, 4:13-27, 4:39-40, 4:48-55; *supra* Section IX.C.1(b); Ex. 1002, ¶129.) Kita further discloses that the ability to adjust the inductance of the inductor to arrive at the expected inductance value can be particularly valuable in high-frequency operations. (Ex. 1007, 1:42-52.) In particular, Kita notes that "as the operation frequency increases, the circuit become more complicated, and hence, narrow deviation is required for the parts used therein." (*Id*., 1:42-45.) Kita further discloses that variable type parts that can be finely adjusted can help to ensure that the circuits that include those variable type parts function as expected. (*Id*., 1:45-52.)

Partovi discloses wireless charging systems that operate at high frequencies, including the charging system depicted in figure 2 below. (Ex. 1010, ¶[0177] ("the circuit in FIG. 2 above, can be … tuned to operate at 1.3 MHz."; Ex. 1002, ¶130.)

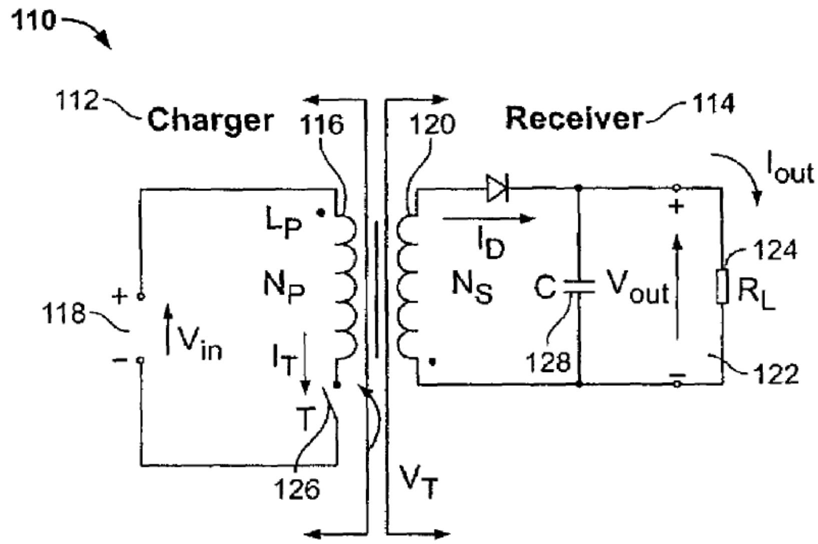



FIG. 2

(Ex. 1010, FIG. 2.)

With respect to operating the charging system shown above at 1.3 MHz, Partovi further discloses that matching coils are used on the transmit and receive portions of the wireless transfer system. (Ex. 1010, ¶[0177]; Ex. 1002, ¶131.) Therefore, a POSITA would have understood that the fine tuning of the inductors disclosed by Kita would have been particularly useful in high-frequency application such as the wireless power transfer system shown in figure 2 of Partovi above, which operates and high frequencies (*e.g.*, 1.3 MHz) and uses "matched coils." (Ex. 1002, ¶132.) By allowing each of the inductors included in the system of figure 2 to be adjusted, better matching of their inductances can be achieved, where the matched inductance values can be set to correspond to the desired inductance for the coils, where, as disclosed by Kita, deviations from that desired inductance can have a greater impact at higher frequencies. (*Id*.) Therefore, in order to achieve these additional advantages, a POSITA would have had good reason to include the inductor like the one disclosed by Kita in a wireless power transfer system like that disclosed in figure 2 of Partovi. (*Id*.)

Including an inductor as disclosed by Kita in a wireless power transfer system as disclosed by Partovi would have been straightforward for a POSITA to implement, because Partovi discloses how to implement such a wireless power transfer system that includes a multi-layer inductor as disclosed by both Kita and Partovi. (*Id*., ¶133.) Moreover, a POSITA would have understood how to select the appropriate dimensions, materials, and other inductor characteristics for the multi-layer inductor as described by Kita for use in a particular application according the Kita-Partovi combination. (*Id*.) The wireless power transfer apparatus/coil unit would have been a predictable combination of known components according to known methods (e.g., applying the teachings of Partovi regarding using multi-layer inductors in wireless power transfer systems to Kita's multi-layer inductor), and would have been produced the predictable result of an wireless power transfer apparatus with numerous advantages described by Partovi and Kita. (*Id*.) *See KSR* at 416 ("The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.").

Therefore, the Kita-Partovi combination discloses or suggests each of the preambles of claims 1 and 11, whereas the remaining features of claims 1-5 and 11-15 are disclosed by Kita for the reasons presented above in Section IX.C. (Ex. 1002, ¶134.)

#### 2. Claim 6

##### a) "A wireless power apparatus for wirelessly transmitting or receiving power, comprising:"

As discussed above in Section IX.A.6(a), the preamble of claim 6 is not limiting. (*Supra* Section IX.A.6(a).) To the extent the preamble is limiting and Kita does not disclose the features therein, as discussed above in Section IX.D.1, a POSITA would have found it obvious to include Kita's inductor in a wireless power transfer system. (*Supra* Section IX.D.1; Ex. 1002, ¶¶135-136.) Moreover, as also discussed above in Section IX.D.1, Kita's inductor is particularly suited for use in a high-frequency power transfer system like that shown in figure 2 of Partovi, where matched inductors on the transmit and receive side are used to achieve wireless power transfer. (*Id.*; Ex. 1002, ¶135.)

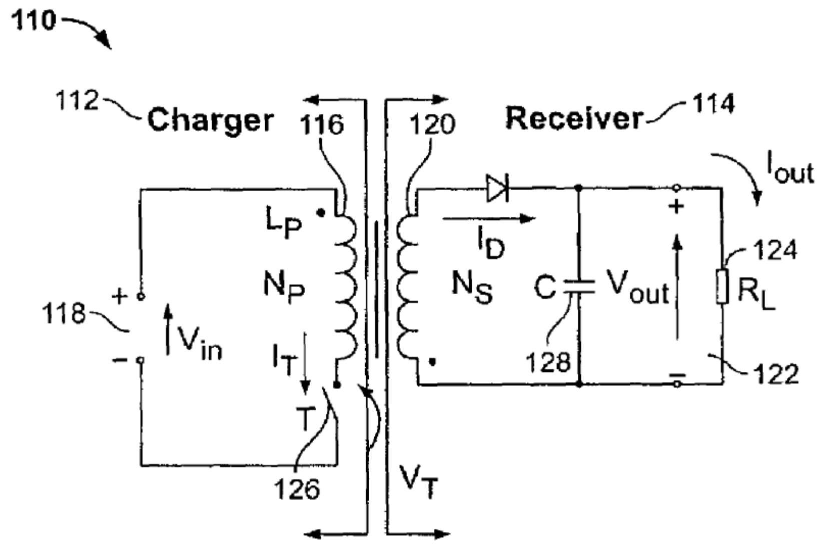



FIG. 2

(Ex. 1010, FIG. 2.)

In the Kita-Partovi combination corresponding to an embodiment like that shown in figure 2 above, an inductor like that disclosed by Kita is included in each of the charger 112 and receiver 114 in order to promote inductance matching between the inductors. (*Id.*, ¶[0177] ("with matching coils in the primary and secondary in the receiver"); *supra* Section IX.D.1; Ex. 1002, ¶136.) Therefore, the receiver 114 of the Kita-Partovi combination constitutes a "wireless power apparatus for wirelessly transmitting or receiving power" as recited in claim 6. (Ex. 1002, ¶136.)

**b) "a first coil;"**

**c) "a second coil comprising an open section;"**

The Kita-Partovi combination discloses or suggests these features. (Ex. 1002, ¶137.) As discussed above in Section IX.D.2(a), the Kita-Partovi apparatus includes an inductor like that disclosed by Kita and discussed above in Section IX.C. Therefore, the Kita-Partovi combination discloses or suggests these features for the same reasons presented for claim elements 1[b] and 1[c] in Sections IX.C.1(b) and IX.C.1(c), respectively. (Ex. 1002, ¶137.).

**d) "a capacitor connected to the first coil and the second coil;"**

The Kita-Partovi combination discloses or suggests this feature. (Ex. 1002, ¶138.) As discussed above in Sections IX.D.1 and IX.D.2(a), a POSITA would have found it obvious to use inductors as disclosed by Kita in the wireless power transfer system shown in figure 2 of Partovi. As shown in annotated figure 2 of Partovi below, the inductor included in the receiver is connected to a capacitor. (Ex. 1010, ¶[0177], FIG. 2.) Because the inductor of the Kita-Partovi combination includes the first and second coils connected in parallel as disclosed by Kita, the capacitor shown in figure 2 of Partovi is connected to both the first and second coils. (Ex. 1002, ¶138.)

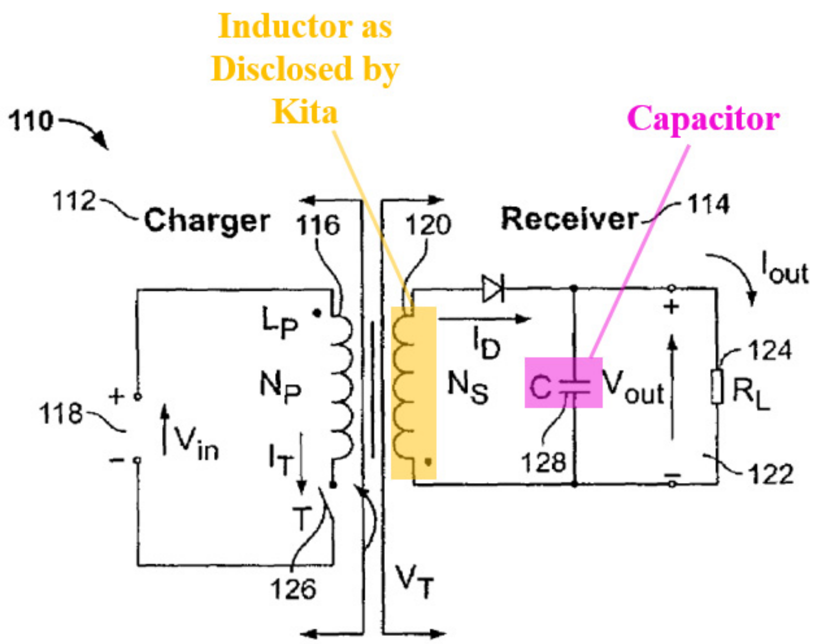



FIG. 2

(Ex. 1010, FIG. 2 (annotated); Ex. 1002, ¶138.)

**e) "a first conductor connecting the first coil and the second coil; and"**

**f) "a second conductor connecting the first coil and the second coil and positioned adjacent to the first conductor,"**

**g) "wherein the open section is positioned between the first conductor and the second conductor"**

The Kita-Partovi combination discloses or suggests these features. (Ex. 1002, ¶139.) As discussed above in Section IX.D.2(a), the Kita-Partovi apparatus includes an inductor like that disclosed by Kita and discussed above in Section IX.C. Therefore, the Kita-Partovi combination discloses or suggests these features for the same reasons presented for claim elements 1[d]-1[f] in Sections IX.C.1(d)-(f), respectively. (*Supra* Sections IX.C.1(d)-(f); Ex. 1002, ¶139.).

### 3. Claims 7-10

The Kita-Partovi combination discloses the features of claims 7-10 for at least the same reasons as presented above for claims 2-5, respectively. (*Supra* Sections IX.C.2-5; Ex. 1002, ¶140.)

### 4. Claim 16

#### a) "A wireless power apparatus for wirelessly transmitting or receiving power, comprising:"

As discussed above for claim 6, this preamble is not limiting. (*Supra* Section IX.A.6(a).) Nevertheless, to the extent the preamble is limiting, the Kita-Partovi combination discloses or suggests this feature for at least the same reasons as presented above for the preamble of claim 6. (*Supra* Section IX.D.2(a); Ex. 1002, ¶141; *see also infra* Sections IX.D.4(b)-(f) for the remaining elements of this claim.)

#### b) "a first coil;"

#### c) "a second coil comprising an open section;"

The Kita-Partovi combination discloses or suggests these features. (Ex. 1002, ¶142.) As discussed above in Section IX.D.2(a), the wireless power apparatus of the Kita-Partovi combination includes an inductor like that disclosed by Kita and discussed above in Section IX.C. Therefore, the Kita-Partovi combination discloses or suggests these features for the same reasons presented for claim elements 1[b] and 1[c] in Sections IX.C.1(b) and IX.C.1(c), respectively. (Ex. 1002, ¶142.)

**d) "a capacitor connected to the first coil and the second coil;"**

The Kita-Partovi combination discloses or suggests this feature for at least the same reasons presented above for claim element 6[d]. (*Supra* Section IX.D.2(d); Ex. 1002, ¶143.).

**e) "a plurality of conductors connecting the first coil and the second coil,"**

**f) "wherein the plurality of conductors is absent in the open section."**

The Kita-Partovi combination discloses or suggests these features. (Ex. 1002, ¶144.) As discussed above in Section IX.D.2(a), the wireless power apparatus of the Kita-Partovi combination includes an inductor like that disclosed by Kita and discussed above in Section IX.C. Therefore, the Kita-Partovi combination discloses or suggests these features for the same reasons presented for claim elements 11[c] and 11[d] in Sections IX.C.6(c) and IX.C.6(d), respectively. (Ex. 1002, ¶144.)

**5. Claims 17-20**

The Kita-Partovi combination discloses the features of claims 17-20 for at least the same reasons as presented above for claims 12-15, respectively. (*Supra* Sections IX.C.7-10; Ex. 1002, ¶145.)

## X. DISCRETIONARY DENIAL IS NOT APPROPRIATE

As explained below, the six factors set out in *Fintiv* do not justify denying institution. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential).

The **first factor** (stay) is at best neutral because Petitioner has not yet moved to stay the parallel district court case and the PTAB does not infer how the district court would rule should a stay be requested. *See*, *e.g.*, *Hulu LLC v. SITO Mobile R&D IP, LLC et al.*, IPR2021-00298, Paper 11 at 10-11 (PTAB May 19, 2021).

The **second factor** (proximity of trial dates) is neutral. While jury selection is currently set for June 26, 2023, "an early trial date" is "non-dispositive" and simply means that "the decision whether to institute will likely implicate other factors," which, as explained, favor institution. *Fintiv*, IPR2020-00019, Paper 11 at 5, 9; *see also Intuitive Surgical, Inc. v. Ethicon LLC*, IPR2018-01703, Paper 7 at 12 (Feb. 19, 2019) (recognizing that, even if a trial will come before a final decision, institution is appropriate to "give[] the district court the opportunity, at its discretion, to conserve judicial resources by staying the litigation until the review is complete," which helps "satisfy[] the AIA's objective"); *cf. Unilioc USA, Inc. v. RingCentral, Inc.*, No. 2-17-cv-00354-JRG (E.D. Tex. Feb. 12, 2018), at *1 (observing that staying the case pending IPR will "streamline the scope of th[e] case to an appreciable extent" regardless of the IPR outcome).

The **third factor** (investment in parallel proceedings) weighs strongly in favor of institution. The district court case is in its infancy and the Parties' have made little investment to date. PO filed its complaint in the Eastern District of Texas on January 10, 2022, Petitioner filed its answer just over a month ago on April 14, 2022, and PO served its infringement contentions on May 4, 2022. Petitioner's diligence in pursuing this petition only four months after PO's Complaint and shortly after receiving the infringement contentions weighs in favor of institution third *Fintiv* factor. *Facebook, Inc. v. USC IP P'ship*, *L.P.*, IPR2021-00033, Paper 13 at 13 (PTAB April 30, 2021) (finding it was reasonable for Petitioner to wait to file the Petition until shortly after receiving infringement contentions).

Moreover, the most cost-intensive period in the case will occur after the Board's institution decision, including the January 25, 2023, *Markman* hearing, close of fact and expert discovery, and dispositive motions. *See Precision Planting, LLC. v. Deere & Co.*, IPR2019-01044, Paper 17 at 14-15 (Dec. 2, 2019) (where the district court has not issued a claim construction ruling, fact discovery and expert discovery are not closed, and dispositive motion briefing has not yet occurred, that weighs against finding that case is at "an advanced stage"); *Abbott Vascular, Inc. v. FlexStent, LLC*, IPR2019-00882, Paper 11 at 30 (Oct. 7, 2019) (same).

Because the investment in the trial has been minimal and Petitioner acted diligently, this factor favors institution. *See*, *e.g.*, *Hulu*, Paper 11 at 13.

The **fourth factor** (overlap) also weighs in favor of institution, because Petitioner has not yet served its invalidity contentions in the parallel district court proceeding, and thus there is currently no overlap.

Regarding the **fifth factor**, the Board should give no weight to the fact that Petitioner and PO are the same parties as in district court. *See Weatherford U.S., L.P., v. Enventure Global Tech., Inc.*, Paper 16 at 11-13 (April 14, 2021).

The **sixth factor** (other circumstances) weighs heavily in favor of institution given the undeniable similarity between Petitioner's references and the '043 patent. *See Align Technology, Inc. v. 3Shape A/S*, IPR2020-01087, Paper 15 at 42-43 (PTAB Jan 20, 2021); *see also* Section IX. There is also a significant public interest against "leaving bad patents enforceable," and institution will further that interest. *Thryv, Inc v. Click-To-Call Techs., LP*, 140 S. Ct. 1367, 1374 (2020).

## XI. CONCLUSION

For the foregoing reasons, Petitioner requests IPR and cancellation of claims 1-20 of the '043 patent.

Respectfully submitted,

Dated: May 26, 2022 By: /Naveen Modi/
Naveen Modi (Reg. No. 46,224)
Counsel for Petitioner

**CERTIFICATE OF COMPLIANCE**

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,491,043 contains, as measured by the word-processing system used to prepare this paper, 13,137 words. This word count does not include the items excluded by 37 C.F.R. § 42.24(a).

Respectfully submitted,

Dated: May 26, 2022

By: /Naveen Modi/
Naveen Modi (Reg. No. 46,224)
Counsel for Petitioner

**CERTIFICATE OF SERVICE**

I hereby certify that on May 26, 2022, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,491,043 and supporting exhibits to be served via express mail on the Patent Owner at the following correspondence address of record as listed on PAIR:

Vorys, Sater, Seymour and Pease LLP
1909 K Street, NW, 9th Floor
Washington, DC 20006-1152

The Petition and exhibits were also served upon counsel of record for Patent Owner in the litigation pending before the U.S. District Court for the Eastern District of Texas entitled *Scramoge Technology Ltd. v. Samsung Electronics Co. Ltd. et al.*, Case No. 2:22-cv-00015-JRG-RSP (E.D. Tex.) by electronic mail at the following addresses:

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