

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BMW OF NORTH AMERICA, LLC,

Petitioner,

v.

SCRAMOGE TECHNOLOGY LTD.,

Patent Owner.

Case No. IPR2023-01048
U.S. Patent No. 10,546,685

PETITION FOR *INTER PARTES* REVIEW

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Ex. 1001	U.S. Patent No. 10,546,685 (“the ’685 patent”)
Ex. 1002	File History of U.S. Patent No. 10,546,685
Ex. 1003	Declaration of Dr. Avestruz (“Decl.”)
Ex. 1004	Curriculum Vitae of Dr. Avestruz
Ex. 1005	U.S. Patent Application Publication No. 2013/0069586 to Jung et al. (“Jung”)
Ex. 1006	U.S. Patent Application Publication No. 2010/0007215 to Sakuma (“Sakuma”)
Ex. 1007	U.S. Patent No. 10,186,912 to Stamenic et al. (“Stamenic”)
Ex. 1008	U.S. Patent Application Publication No. 2012/0154086 to Willemsen et al. (“Willemsen”)
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Ex. 1013	Complaint in <i>BMW of North America, LLC v. Scramoge Technology Ltd.</i> , No. 2:23-cv-10561 (E.D. Mich. Mar. 9, 2023).
Ex. 1014	U.S. Patent Application Publication No. 2012/0161535 to Jung et al. (“Jung 535”)

Exhibit	Description
Ex. 1015	U.S. Patent Application Publication No. 2013/0181668 to Tabata et al. (“Tabata”)
Ex. 1016	U.S. Patent Application Publication No. 2013/0300204 to Partovi (“Partovi”)
Ex. 1017	U.S. Patent Application Publication No. 2011/0050382 to Baarman et al. (“Baarman”)
Ex. 1018	U.S. Patent Application Publication No. 2012/0313742 to Kurs et al. (“Kurs”)
Ex. 1019	U.S. Patent Application Publication No. 2013/0249302 to An et al. (“An”)

I. Relief Requested

BMW of North America, LLC (“Petitioner”) requests *inter partes* review of claims 1-18 of U.S. Patent No. 10,546,685 (“the ’685 patent”) based on the following grounds:

Ground	Claim(s) Challenged	35 U.S.C. §	References
1	1-18	103	Jung and Sakuma
2	6, 12, and 18	103	Jung, Sakuma, and Kurs

II. The ’685 Patent

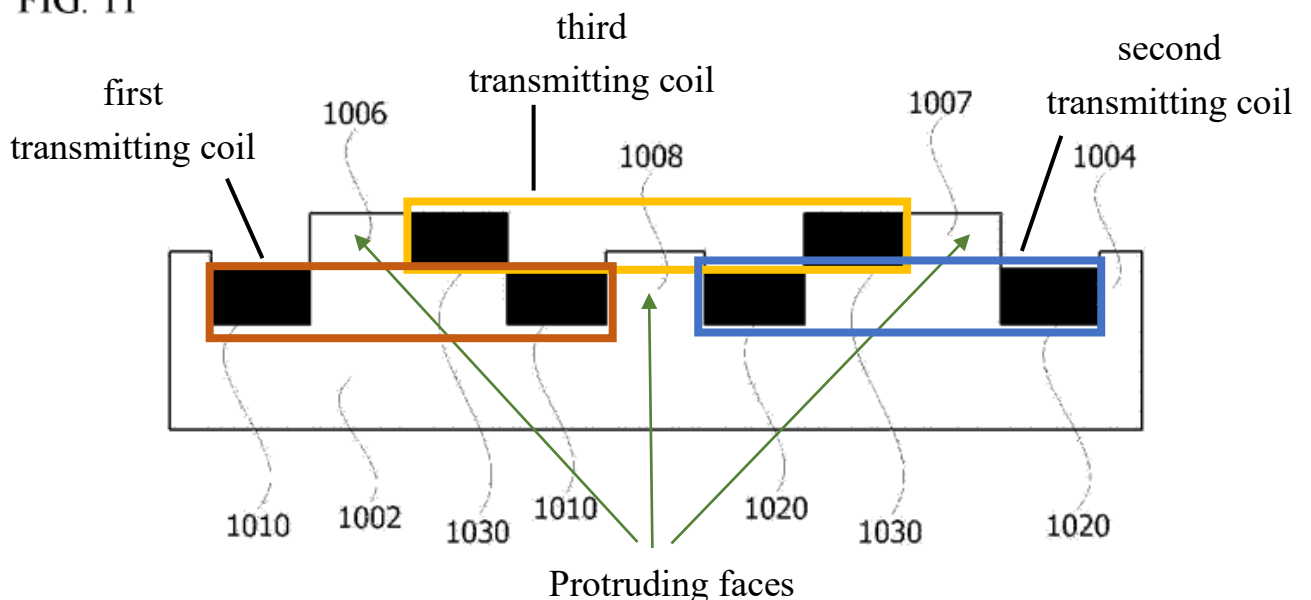
The ’685 patent was filed May 7, 2019, and is a continuation of U.S. application Ser. No. 15/835,009, filed on December 7, 2017, which is a continuation of U.S. application Ser. No. 14/677,164, filed on April 2, 2015, which claims priority under 35 U.S.C. § 119(a) to Korean Patent Application No. 10-2014-0040009, filed on April 3, 2014. Ex. 1001, cover.

The ’685 patent generally relates to a wireless power transmitter including “a transmitting coil and a soft magnetic substrate.” Ex. 1001, 1:52-58. As illustrated in FIGS. 10-13, the wireless power transmitter may include transmitting coils 1010, 1020, and 1030 and a soft magnetic substrate 1000. Ex. 1001, 7:1-3, FIGS. 10-13. The substrate includes a wall 1004 “surround[ing] at least a part of the outer circumference” of the transmitting coils and “may further

include at least one of protruding faces 1006, 1007, and 1008.” Ex. 1001, 7:31-35, 7:51-53.

As seen in Figure 11 below, “[t]he protruding face 1006 may be surrounded by an inner circumference 1014 of the transmitting coil 1010 and an outer circumference 1032 of the transmitting coil 1030, and the protruding face 1007 may be surrounded by an inner circumference 1024 of the transmitting coil 1020 and the outer circumference 1032 of the transmitting coil 1030, and the protruding face 1008 may be surrounded by an outer circumference 1012 of the transmitting coil 1010, an outer circumference 822 of the transmitting coil 1020 and an inner circumference 1034 of the transmitting coil 1030.” Ex. 1001, 7:53-62.

FIG. 11



Ex. 1001, FIG. 11 (annotated).

III. Claim Construction

No terms need to be construed to resolve unpatentability. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019). The plain meaning should be applied for all claim terms.

IV. Level of Ordinary Skill

A person of ordinary skill in the art (“POSITA”) of the ’685 patent would have had at least a bachelor’s degree in electrical engineering or related engineering discipline, and at least two years of experience in power transmitters and circuit design. Decl. ¶ 53. Relevant work experience can substitute for formal education and additional education could substitute for work experience. Decl. ¶ 53.

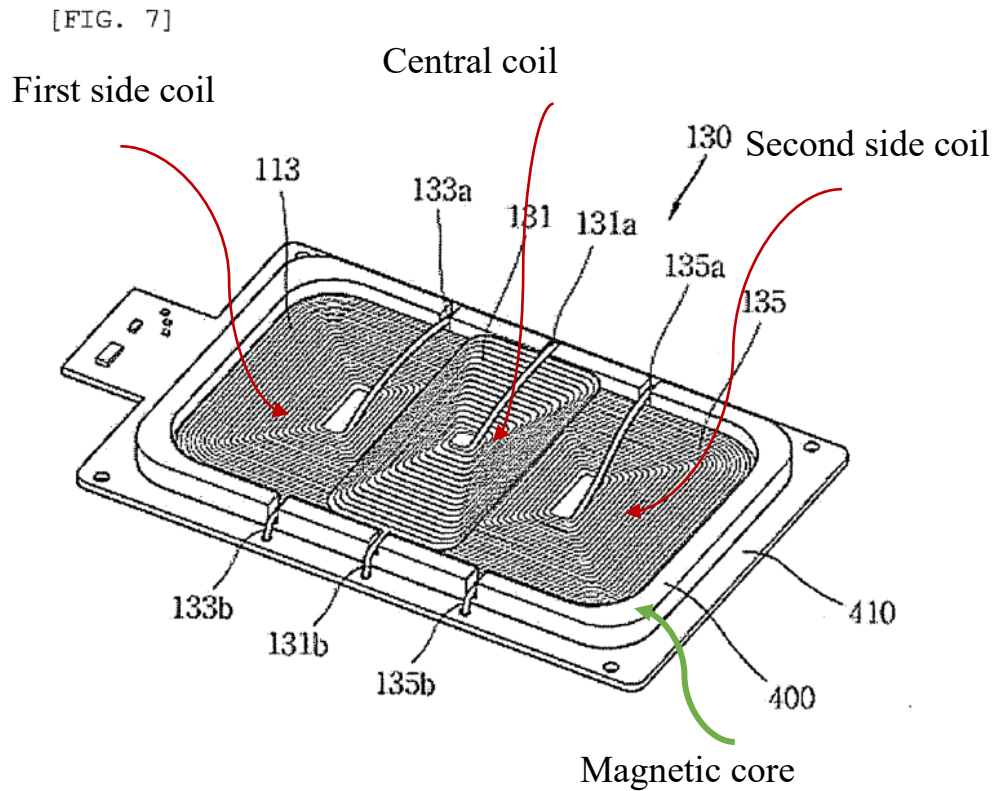
V. Claims 1-18 Are Unpatentable and Should Be Cancelled

A. Overview of the Prior Art

1. Jung

Jung published on March 21, 2013, making Jung prior art under 35 U.S.C. § 102(a)(1). Jung discloses “a wireless power transmitting apparatus.” Jung, Abstract, [0003], FIG. 7. The apparatus includes “a core assembly including one central coil, and two side coils to transmit a power to a power receiving apparatus” and “a magnetic core formed to receive the central coil, the first side coil, and the second side coil therein,” whereby the side coils are disposed on a different “level”

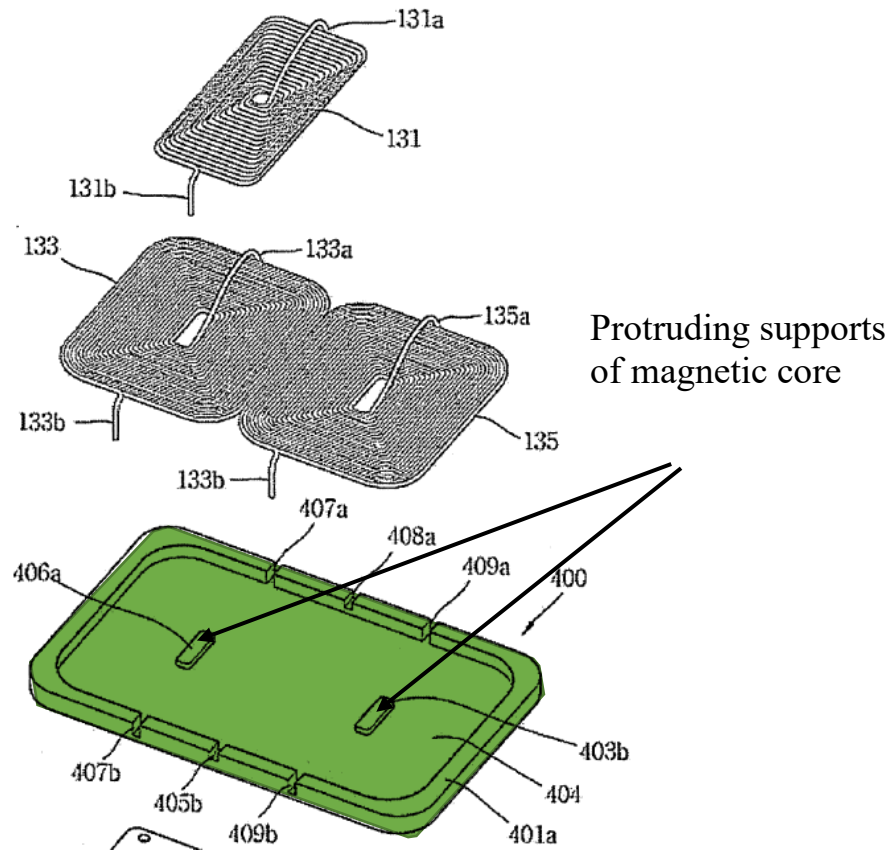
than the central coil so that “portions” of the side coils “are overlapped with the central coil.” Jung, [0020], [0025], FIG. 7.



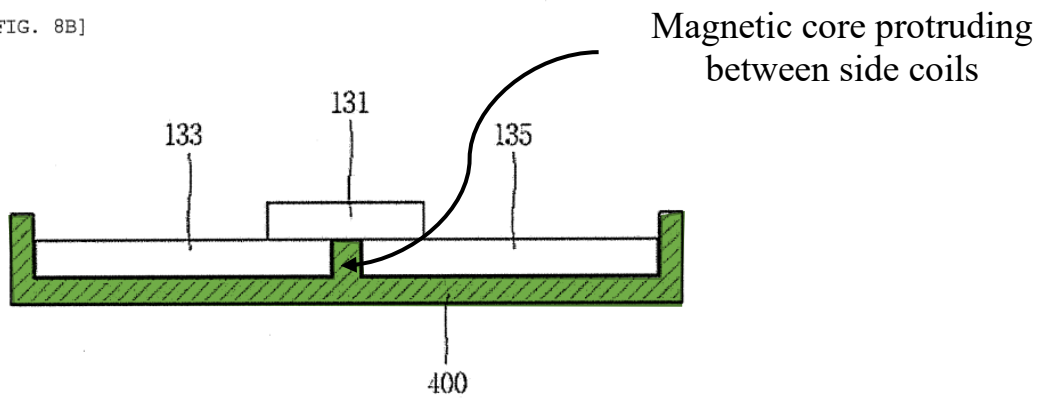
Jung, FIG. 7 (annotated).

The magnetic core includes supports “protrudedly formed on a bottom surface thereof” and located “at positions at which they may be inserted into hollow parts formed at the center of the first and second side coils.” Jung, [0140]. The first and second side coils “may be installed to be spaced apart from each other by a predetermined interval, as shown in FIG. 8B,” and the magnetic core “may be protrudedly formed between the first and second side coils.” Jung, [0145]-[0146].

[FIG. 6]



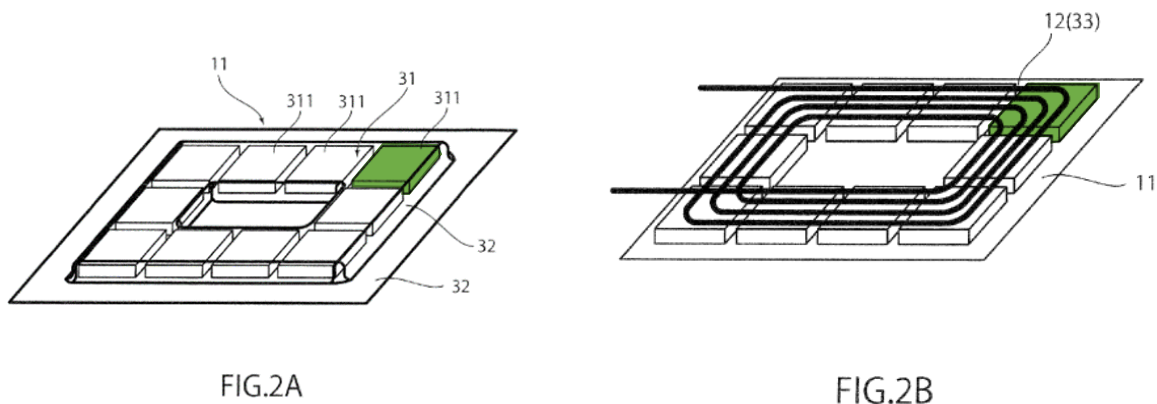
[FIG. 8B]



Jung, FIGS. 6, 8B (annotated).

2. Sakuma

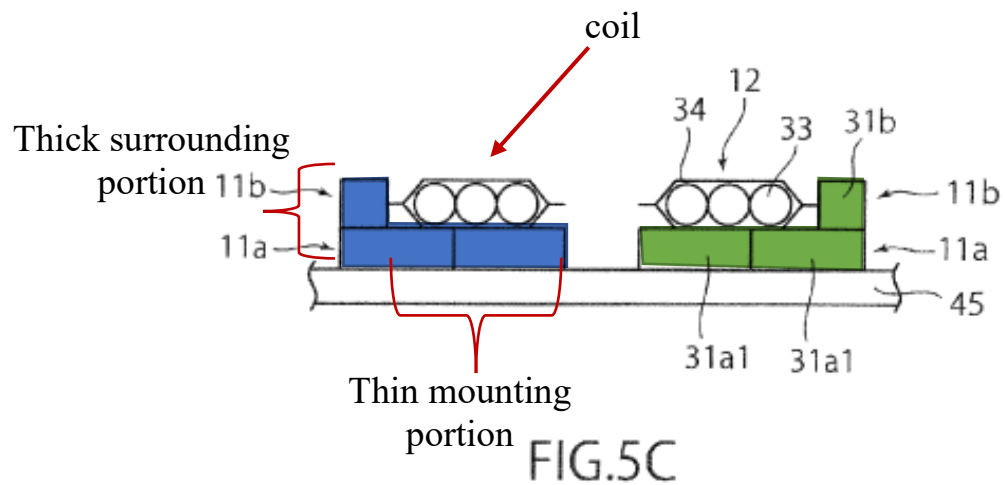
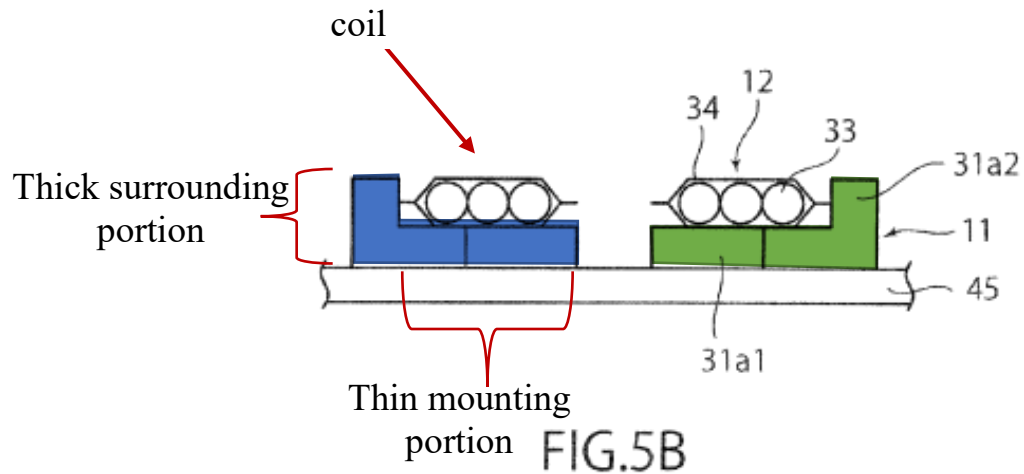
Sakuma published on January 14, 2010, making Sakuma prior art under at least 35 U.S.C. § 102(a)(1). Sakuma teaches a “power transmitter” including a “soft magnetic sheet” 21 including multiple “soft magnetic pieces” 311 protruding from a surface of the substrate, and a power transmitter coil. Sakuma, [0034], [0037]-[0039], [0042], FIGS. 1, 2A, 4. Soft magnetic sheet 21 has “the same structure as the soft magnetic sheet 11” of the power receiver illustrated in Figures 2A and 4. Sakuma, [0033]. The soft magnetic protrusions, like the first and second supports of Jung, support the power transmitter coil. Sakuma, Abstract, [0033], FIG. 2B.



Sakuma, FIGS. 2A-2B (annotated).

Sakuma further teaches an alternate embodiment having “L-shaped” protrusions configured to not only support, but surround, a portion of the coil. Sakuma, [0038], FIGS. 5B-5C. The L-shaped magnetic piece “has a thinner section

and a thicker section, wherein the thinner section serves as the mount portion, while the thicker portion serves as the surrounding portion.” Sakuma, [0038].



Sakuma, FIGS. 5B-5C (annotated).

3. Kurs

Kurs published on December 13, 2012, making Kurs prior art under at least 35 U.S.C. § 102(a)(1).

Kurs teaches a “resonator coil structure for wireless energy transfer.” Kurs, claim 1, [0018]. The structure includes an inductive element such as a coil, “a (gapped or ungapped) core made of magnetic material,” i.e., a substrate, and an “external circuit (e.g. a driving circuit)” for “delivering power to the inductive element,” which in turn “deliver[s] power to the external circuit (e.g. a driven load).” Kurs, [0247], [0335]-[0336]. Kurs further teaches that “it may be preferable to use a flexible form of magnetic material which may prevent or reduce vibration or shock transfer between resonators.” Kurs, [0808].

B. Jung, Sakuma, and Kurs Are Analogous Art

Jung and Sakuma are analogous art to the '685 patent because each reference, like the '685 patent, is directed to the same technical field: “wireless charging, and more specifically, a wireless power transmitting apparatus included in a wireless charging system.” *Compare* Ex. 1001, 1:21-23, *with* Jung, [0003] (“The present invention relates to a wireless power transmitting apparatus and method of selecting at least one of one central coil disposed at the center of a core and two side coils each disposed at left and right sides of the core as a power transmitting coil”); Sakuma, [0002] (“This invention relates to a non-contact or contactless power transmission system based on electromagnetic induction between coils.”); Kurs, [0009] (“This disclosure relates to wireless energy transfer, also referred to as wireless power transmission.”); Decl. ¶ 64.

C. Ground 1: Claims 1-18 Are Obvious over Jung and Sakuma

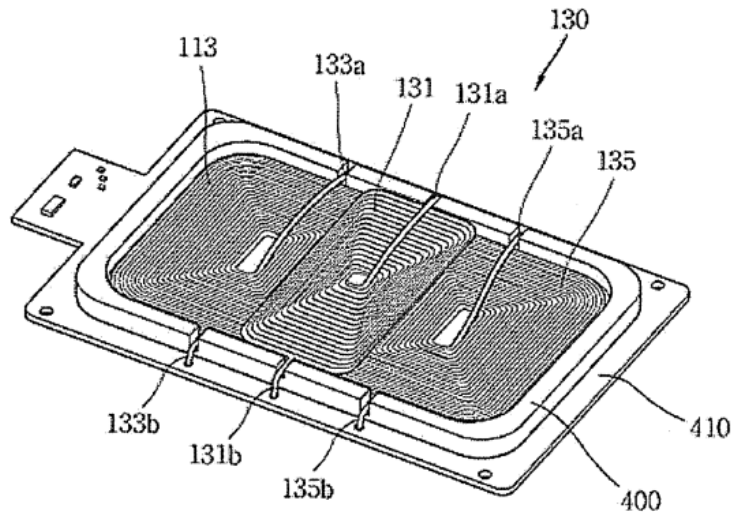
1. Independent Claim 1

Jung and Sakuma render obvious claim 1. Decl. ¶¶ 68-95.

a. [1Preamble]. “A wireless power transmitting apparatus, comprising:”¹

Jung discloses [1Preamble] because Jung discloses a “wireless power transmitting apparatus.” Jung, Abstract, [0003], FIG. 7; Decl. ¶ 69.

[FIG. 7]



Jung, FIG. 7.

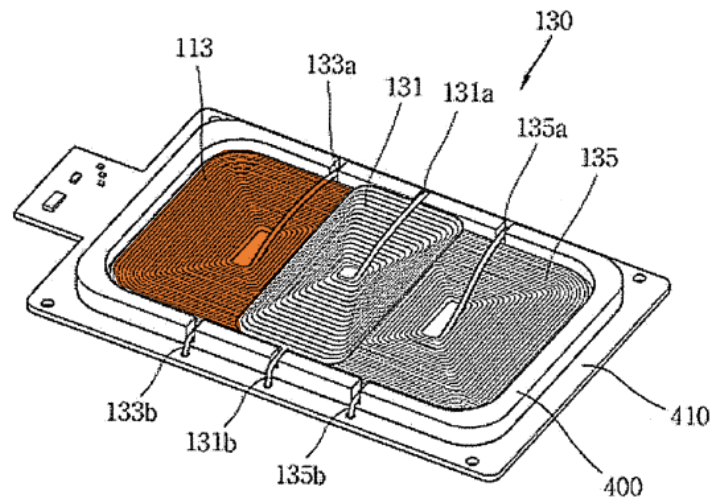
b. [1a] “a first transmitting coil;”

Jung discloses [1a]. Decl. ¶¶ 70-71.

¹ Petitioner does not concede the preamble is limiting. If Patent Owner argues it is, Jung discloses it.

The power transmitting apparatus has a core assembly 130 including “one central coil, and two side coils to transmit a power to a power receiving apparatus.” Jung, [0020]. For example, the core assembly includes a central coil 131, “a first side coil 133 and a second side coil 135” for transmitting power to a power receiving apparatus. Jung, [0020], [0056] (emphasis added), FIGS. 7-8B. The **first side coil** is a first transmitting coil. Jung, [0056], [0059]; Decl. ¶ 71.

[FIG. 7]



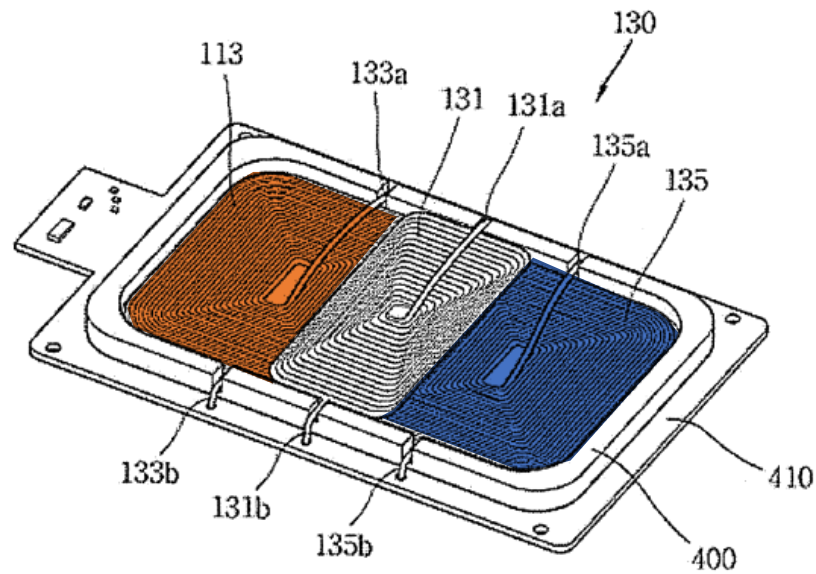
Jung, FIG. 7 (annotated).

c. [1b] “a second transmitting coil;”

Jung discloses [1b]. Decl. ¶¶ 72-73.

As explained for [1a], the transmitting coils include “a second side coil 135.” Jung, [0020], [0056], FIGS. 7-8B. **Second side coil 135** is a second transmitting coil. Jung, [0056], [0059].

[FIG. 7]



Jung, FIG. 7 (annotated).

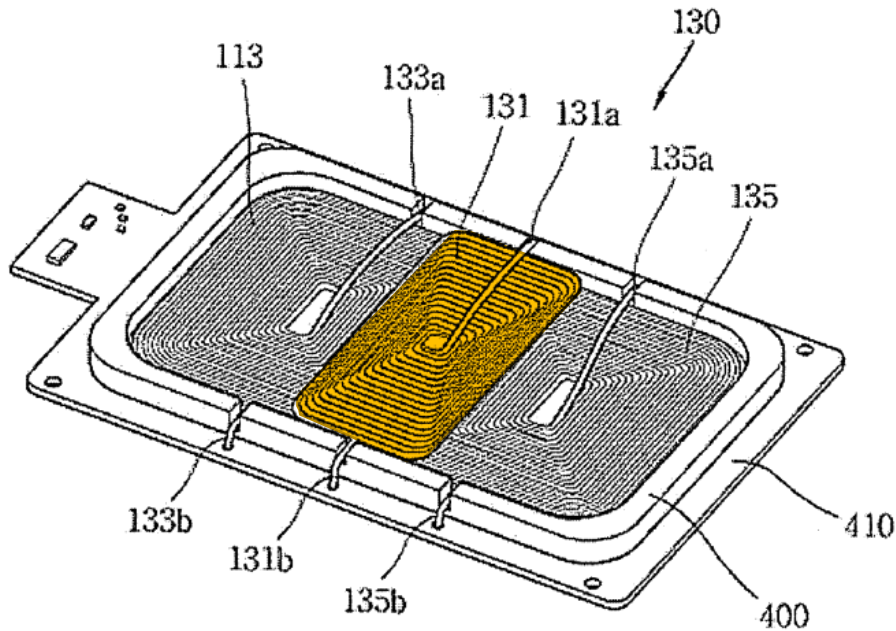
d. [1c] “a third transmitting coil on the first transmitting coil and the second transmitting coil;”

Jung discloses [1c]. Decl. ¶¶ 74-75.

As explained for [1a], the transmitting coils include a “central coil 131.”

Jung, [0020], [0056]. **Central coil 131** is a third transmitting coil on the first and second side coils (transmitting coils) 133, 135. Jung, [0025], [0056], FIGS. 7-8B; Decl. ¶ 75.

[FIG. 7]



Jung, FIG. 7 (annotated).

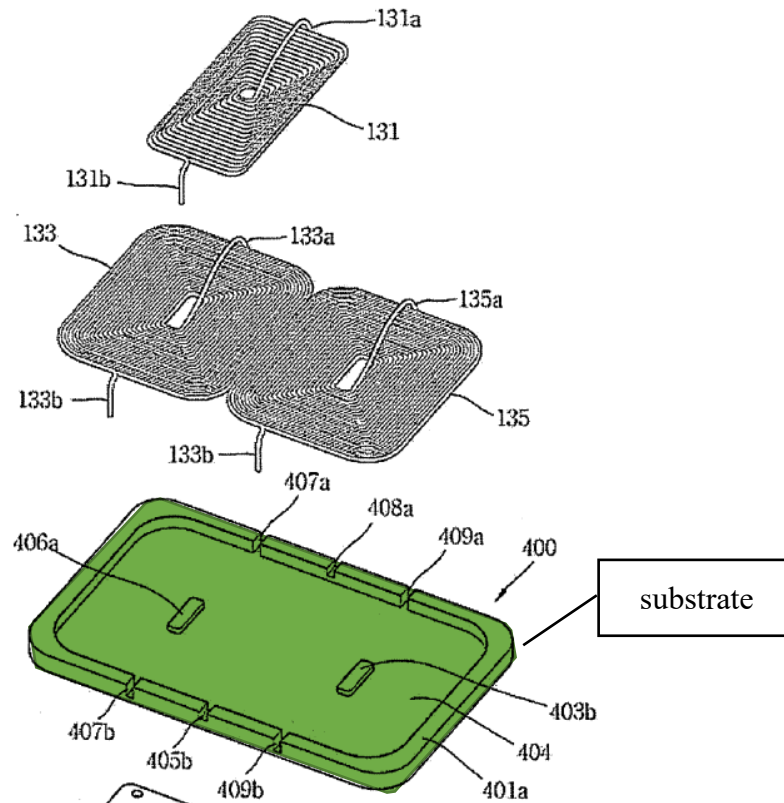
- e. [1d] “and a substrate to accommodate the first transmitting coil, the second transmitting coil, and the third transmitting coil, wherein the substrate comprises:”

Jung discloses [1d]. Decl. ¶¶ 76-77.

The power transmitting device also includes a “magnetic core formed to receive the central coil, the first side coil, and the second side coil therein.” Jung, [0025]. For example, as illustrated in Figure 7, core 400 forms a substrate “made of a magnetic material and receives the one central coil 131 and the two side coils 133 and 135 therein.” Jung, [0025], [0127], FIGS. 6-8B; Decl. ¶ 77. The ’685

patent does not define “substrate” but explains that the “magnetic substrate 1000,” like Jung’s magnetic core 400, “accommodates transmitting coils 1010, 1020, and 1030.” Ex. 1001, 7:1-3.

[FIG. 6]



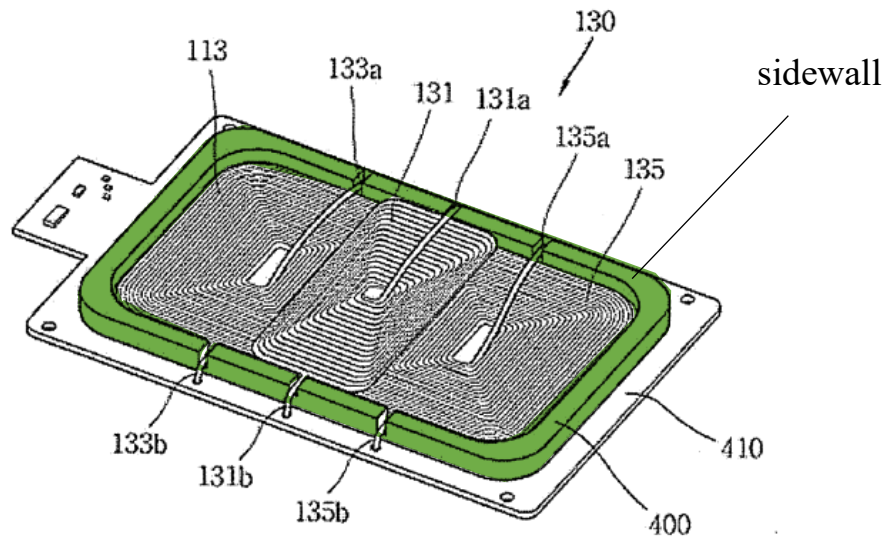
Jung, FIG. 6 (annotated).

- f. [1e] “a wall to surround a part of an outer circumference of the first transmitting coil and a part of an outer circumference of the second transmitting coil;”

Jung discloses [1e]. Decl. ¶¶ 78-79.

As explained for [1d], Jung's power transmitting device includes a magnetic core (substrate). Jung, [0025], [0127], FIGS. 6-8B; Decl. ¶ 79. As illustrated in annotated Figure 7 below, the core (substrate) includes "a **sidewall 401a** protruding upwardly along an outer circumferential edge of the core 400" that surrounds an outer circumference of the central and side transmitting coils. Jung, [0133], [0137], [0138], FIGS. 6-7. Thus, Jung discloses a wall surrounding a part of an outer circumference of the first and second transmitting coils. Decl. ¶ 79.

[FIG. 7]



Jung, FIG. 7 (annotated).

- g. [1f] “a first protrusion inside an inner circumference of the first transmitting coil;”**

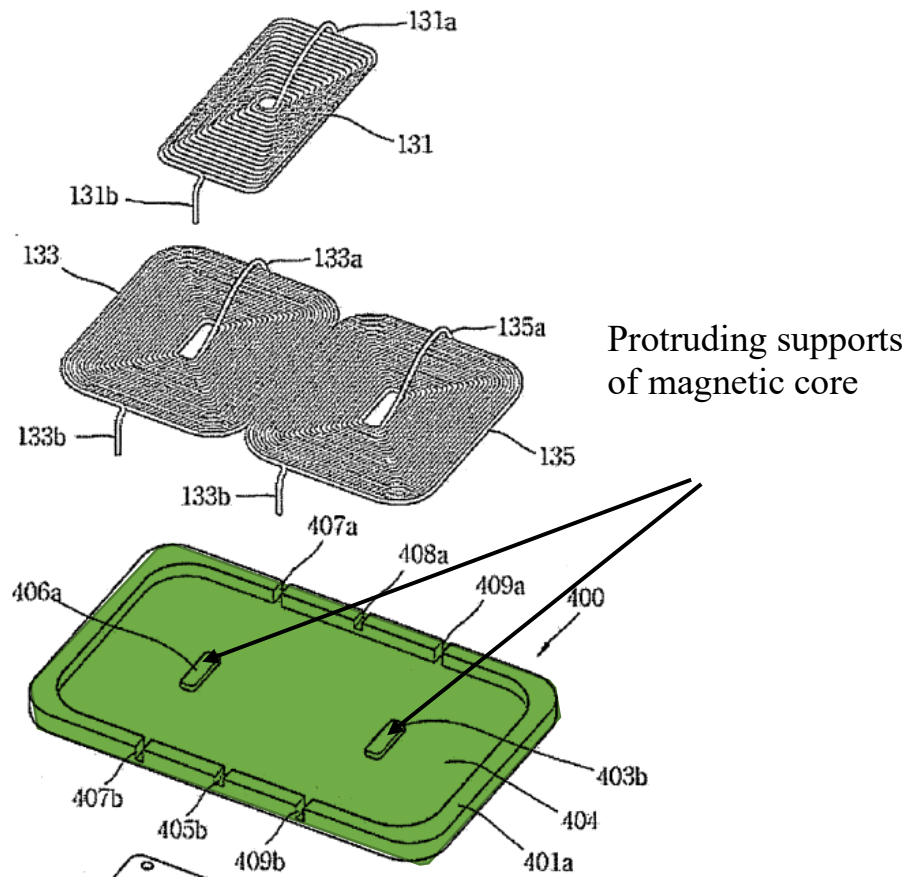
Jung discloses [1f]. Decl. ¶¶ 80-82.

As explained for [1d]-[1e], Jung's power transmitting device includes a magnetic core (substrate) comprising a wall surrounding the central and side coils. Jung, [0025], [0127], [0133], [0137], [0138], FIGS. 6-8B; Decl. ¶ 81. The core also includes a first support (protrusion) 403a² inside a hollow part (inner circumference) of the first side coil 133. Jung, [0140]-[0141], FIGS. 6-7.

More specifically, the core includes "two supports 403*a* and 403*b* protrudedly formed on a bottom surface thereof" and "formed at positions at which they may be inserted into hollow parts formed at the center of the first and second side coils 133 and 135, respectively." Jung, [0140]-[0141], FIGS. 6-7; Decl. ¶ 82.

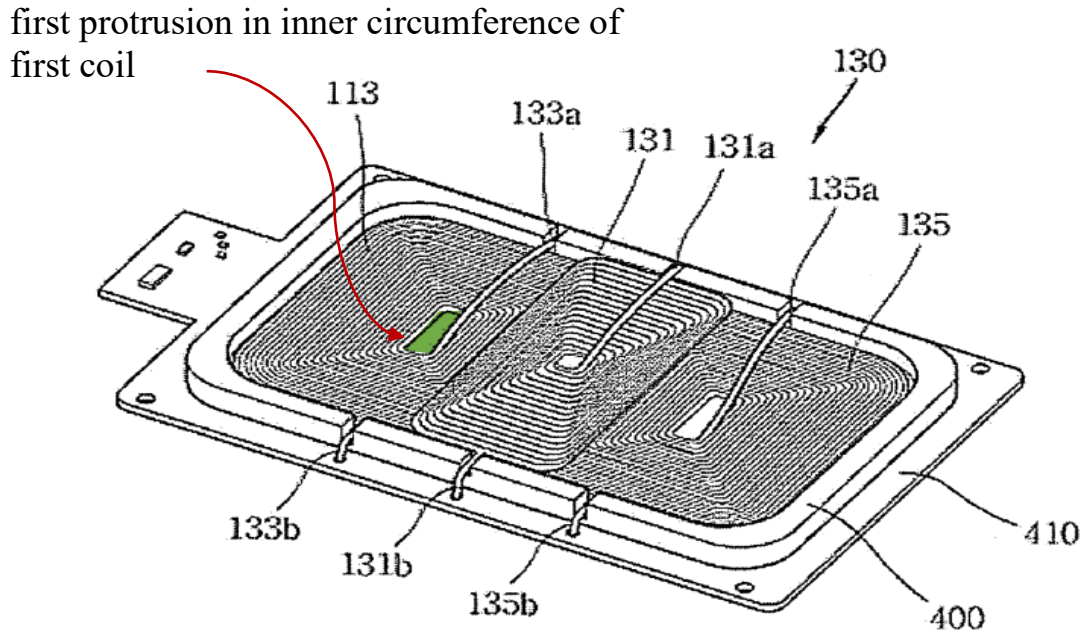
² In Figure 6, element 406a is in error of 403a.

[FIG. 6]



Jung, FIG. 6 (annotated, excerpted).

[FIG. 7]



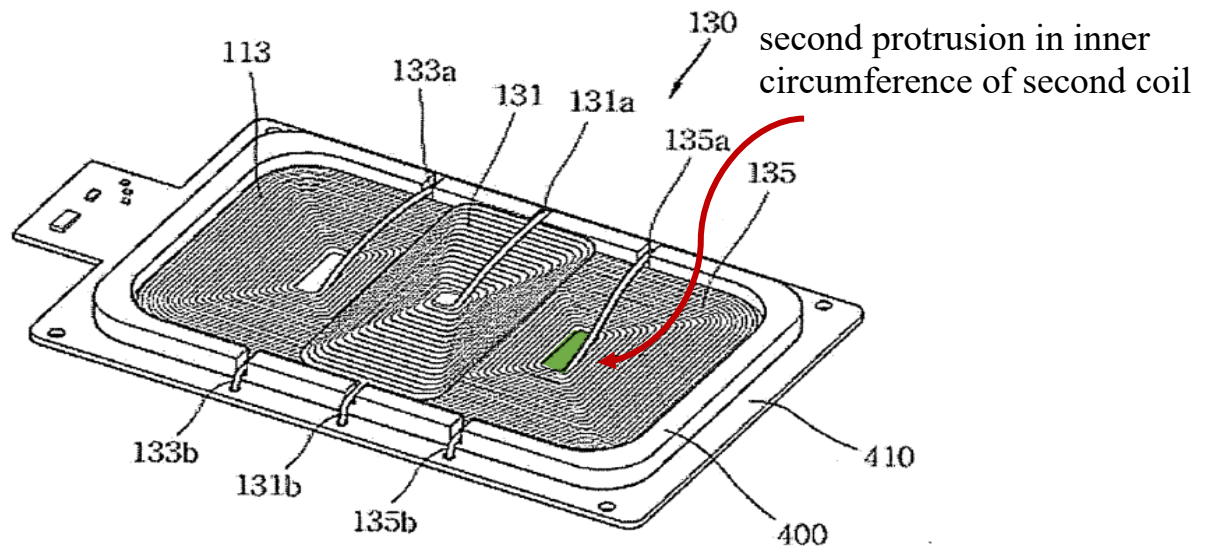
Jung, Fig. 7 (annotated).

h. [1g] “and a second protrusion inside an inner circumference of the second transmitting coil,”

Jung discloses [1g]. Decl. ¶¶ 83-84.

As explained for [1f], the core includes “two supports 403a and 403b protrudedly formed on a bottom surface thereof” and “formed at positions at which they may be inserted into hollow parts formed at the center of the first and second side coils 133 and 135, respectively.” Jung, [0140]-[0141], FIGS. 6-7. Thus, Jung discloses a second protrusion 403b inside a hollow part (inner circumference) of the second side coil 135. Decl. ¶ 84.

[FIG. 7]



Jung, Fig. 7 (annotated).

- i. [1h] “wherein the third transmitting coil is disposed between the first protrusion and the second protrusion,”**

Jung discloses 1[h]. Decl. ¶¶ 85-86.

As seen in Figures 6-7, the central (third) transmitting coil is disposed between the first and second supports (protrusions) 403*a* and 403*b*. Jung, [0140]-[0141], FIGS. 6-7.

and the second side coil may have the same size,” and that “the one central coil 131 may also have a size equal to or larger than that of each of the first and second side coils 133 and 135, as needed.” Jung, [0028], [0031], [0131], [0153].

A POSITA would have understood that for configurations in which the central coil is the same size or larger than the side coils, the central coil at least partially overlaps the first and second supports. Decl. ¶ 90. Thus, Jung discloses that the first and second supports (protrusions) support the central (third) coil because the central coil rests on the protrusions. Decl. ¶ 90. Indeed, it was well known in the art at the time of the invention to use magnetic protrusions to support a transmission coil. Jung 719, [0064]-[0065], FIGS. 2-3 (illustrating supports 154, 155 protruding from a magnetic core and supporting a main (central) coil 111); Sakuma, FIGS. 2B, 5B-5C (illustrating magnetic protrusions for supporting a transmission coil).

FIG. 2

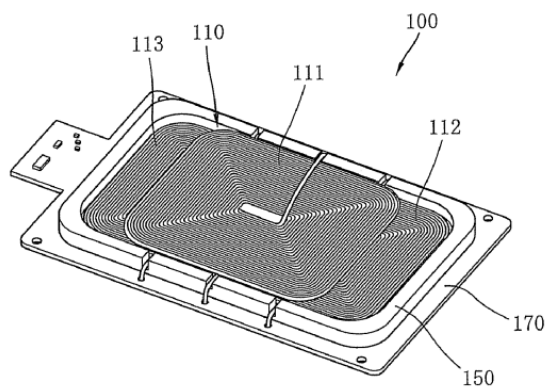
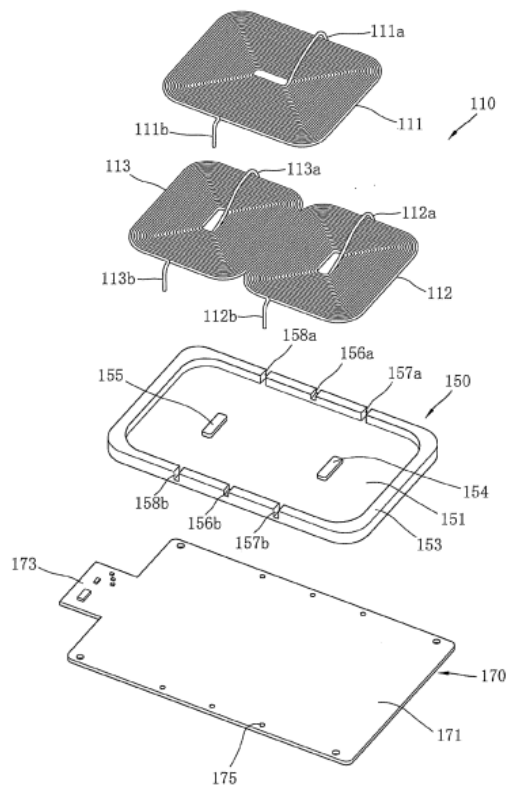


FIG. 3



Jung 719, FIGS. 2-3.

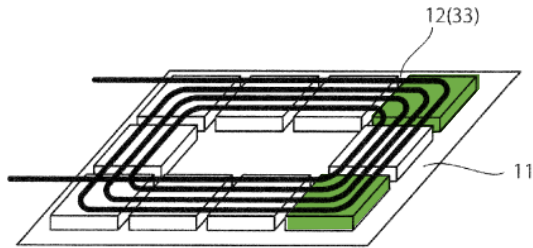


FIG.2B

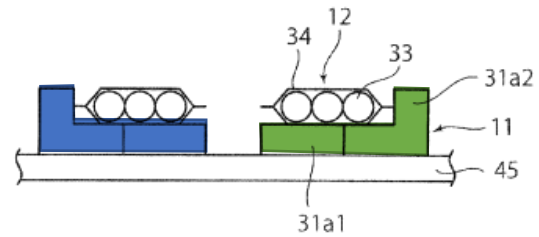


FIG.5B

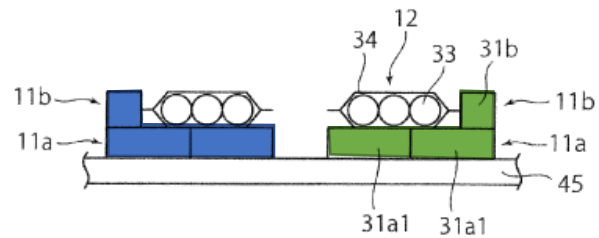


FIG.5C

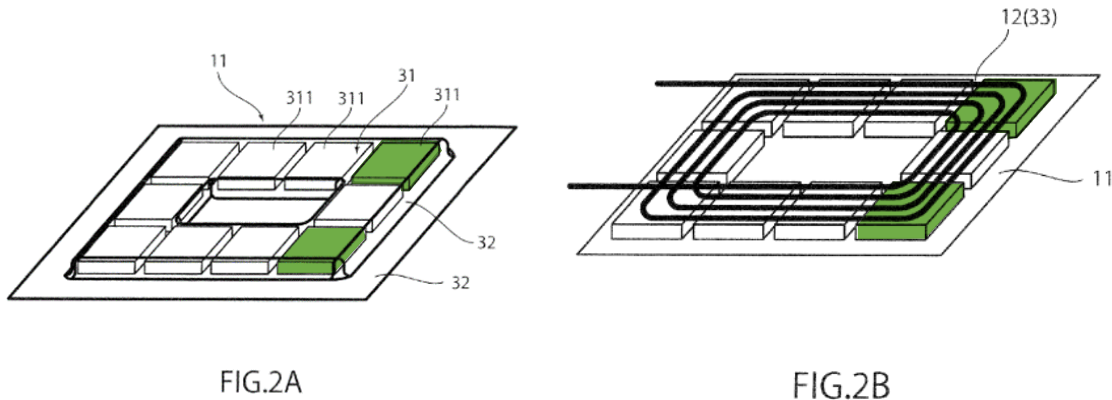
Sakuma, FIGS. 2B, 5B-5C (annotated).

Jung does not expressly teach that the protrusion has a stepped portion, but Sakuma renders this feature obvious. Decl. ¶¶ 9195.

Sakuma teaches a “power transmitter” including a “soft magnetic sheet” 21, i.e., substrate, including multiple “soft magnetic pieces” 311 protruding from a surface of the substrate, and a power transmitter coil. Sakuma, [0034], [0037]-[0039], FIGS. 2A, 4. Soft magnetic sheet 21 has “the same structure as the soft magnetic sheet 11” of the power receiving apparatus illustrated in Figures 2A and 4. Sakuma, [0033], FIGS. 1, 2A, 4. The **soft magnetic protrusions**, like the first

and second supports (protrusions) of Jung, support the power transmitter coil .

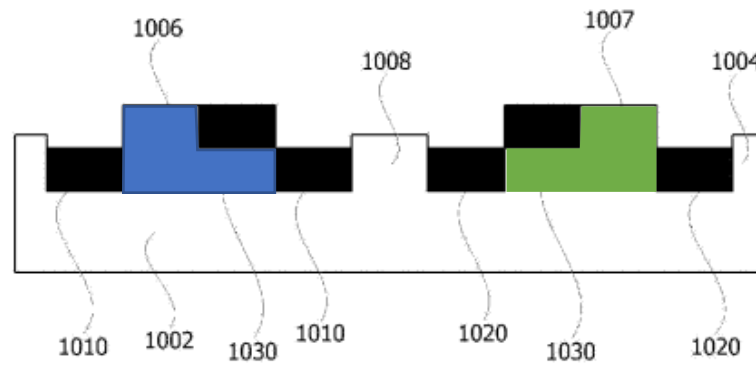
Sakuma, Abstract, [0033], FIG. 2B.



Sakuma, FIGS. 2A-2B (annotated).

Sakuma further teaches an alternate embodiment having “L-shaped” protrusions. Sakuma, [0038]. The L shape forms a stepped portion and is configured to not only support, but surround, a portion of the coil. Sakuma, [0038], FIGS. 5B-5C; Decl. ¶ 93. More specifically, the L-shaped magnetic piece (protrusion) “has a thinner section and a thicker section, wherein the thinner section serves as the mount portion, while the thicker portion serves as the surrounding portion.” Sakuma, [0038]. The change in thickness that gives rise to the L shape “enhances power transmission characteristics” and forms a stepped portion for supporting the transmission coil. Sakuma, [0038]; Decl. ¶ 93; *compare* Ex. 1001, FIG. 11 (annotated), *with* Sakuma, FIGS. 5B-5C (annotated).

FIG. 11



Ex. 1001, FIG. 11 (annotated).

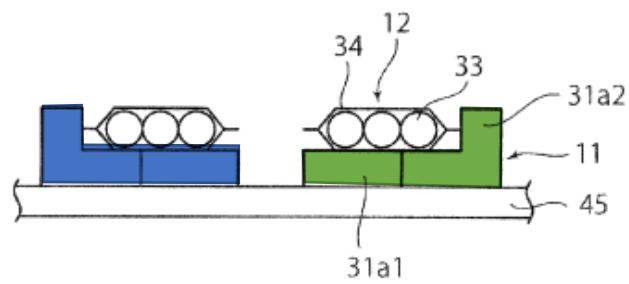


FIG. 5B

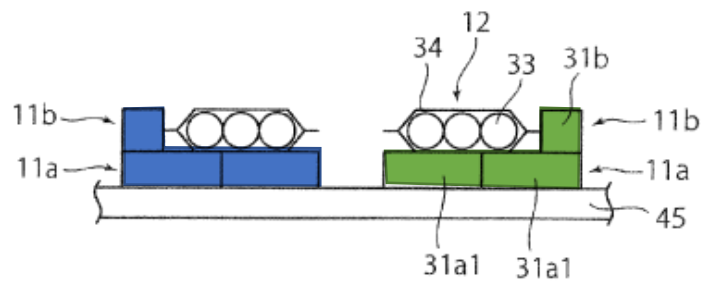


FIG. 5C

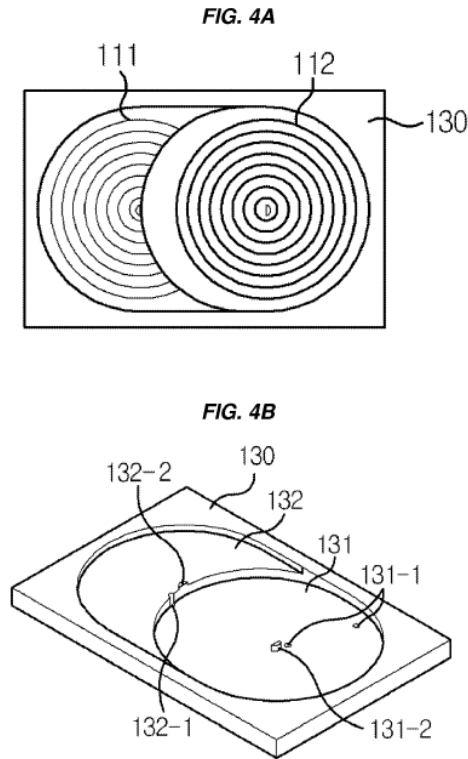
Sakuma, FIGS. 5B-5C (annotated).

A POSITA would have found it obvious to substitute the first and second supports of Jung with the L-shaped supports of Sakuma, or to alternatively modify the supports of Jung to have a thinner section and a thicker section, wherein “the thinner section serves as the mount portion” for supporting the main coil, and “the thicker portion serves as the surrounding portion” surrounding the main coil. Sakuma, [0038]; Decl. ¶¶ 93-95.

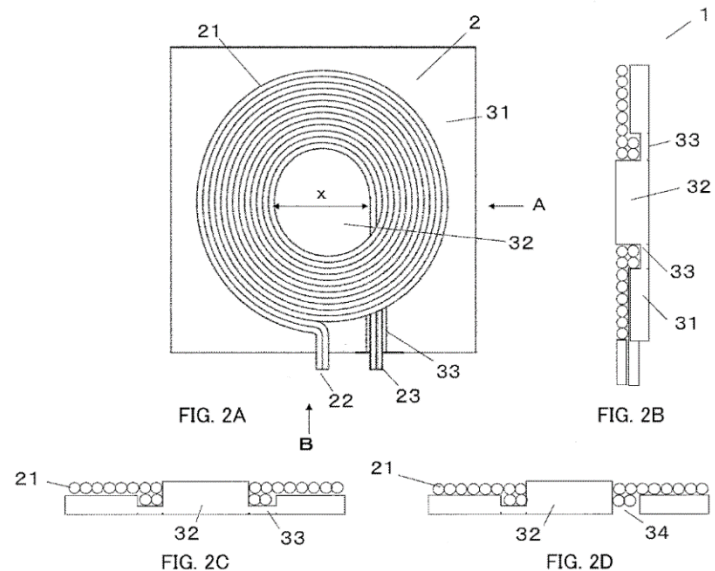
i. Motivation to Combine

Jung’s central coil is secured using “double-sided tape,” (Jung, [0141]); but such adhesives were known to degrade over time and upon repeated exposure to heat and vibration caused by e.g., placing, adjusting, and charging a power receiving device. Decl. ¶ 94. A POSITA would have been motivated to substitute (or modify) the planar protrusions of Jung with the stepped L-shaped protrusions that surround at least a portion of the transmission coil to avoid the known drawbacks of adhesives, and to further stabilize the position of the central coil by surrounding, and thereby preventing, e.g., lateral movement of the central coil. Decl. ¶ 94. Indeed, it was well known in the art at the time of the invention to implement a stepped structure (instead of a planar one) to ensure the proper placement of transmission coils on a substrate. Jung 535, [0062] (describing a “step difference” “formed between” overlapping transmission coils); Tabata, FIGS. 2A-2D (illustrating a magnetic sheet of a non-contact charging station

including a stepped structure formed by recess 33 for receiving and retaining a transmission coil 21); Decl. ¶ 94.



Jung 535, FIGS. 4A-4B.



Tabata, FIGS. 2A-2D.

ii. Expectation of Success

A POSITA would have had a reasonable expectation of success in making the modification or substitution because it would have merely required altering the protrusion's shape and/or dimensions using known techniques such as injection molding. Decl. ¶ 95. Furthermore, the L-shape protrusion is a suitable alternative to planar protrusions (as taught by Sakuma) and to the adhesive method of securing a transmission coil to a core (substrate), as evidenced by Jung. Decl. ¶ 95;

Intel Corp. v. PACT XPP Schweiz AG, 61 F.4th 1378, 1381 (Fed. Cir. 2023)

(finding obviousness where the proposed modification provided a “suitable option”

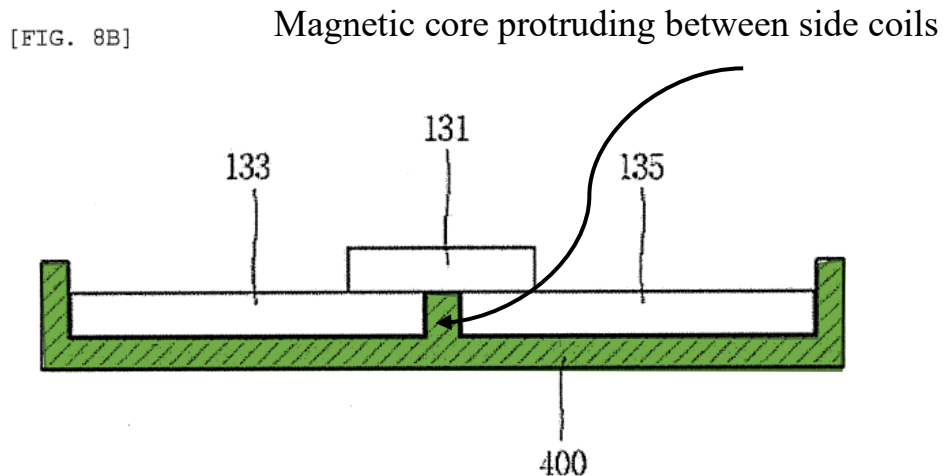
(quoting *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 800 (Fed. Cir. 2021)).

2. Claim 2: “The wireless power transmitting apparatus of claim 1, wherein the substrate comprises a third protrusion disposed between the first transmitting coil and the second transmitting coil.”

Jung discloses the additional limitations of claim 2. Decl. ¶¶ 96-98.

As discussed for [1a]-[1b], the wireless power transmitting device includes first and second side coils (transmission coils) 133 and 135. Jung, [0056].

Jung further discloses that the substrate (core) forms a third protrusion disposed between the first and second side coils when they are spaced apart. Jung, [0145]-[0146], FIG. 8B. Specifically, Jung discloses that “the first and second side coils 133 and 135 may be installed to be spaced apart from each other by a predetermined interval, as shown in FIG. 8B,” such that “the core 400 may be protrudedly formed between the first and second side coils 133 and 135.” Jung, [0145]-[0146] (emphasis added), FIG. 8B.



Jung, FIG. 8B (annotated).

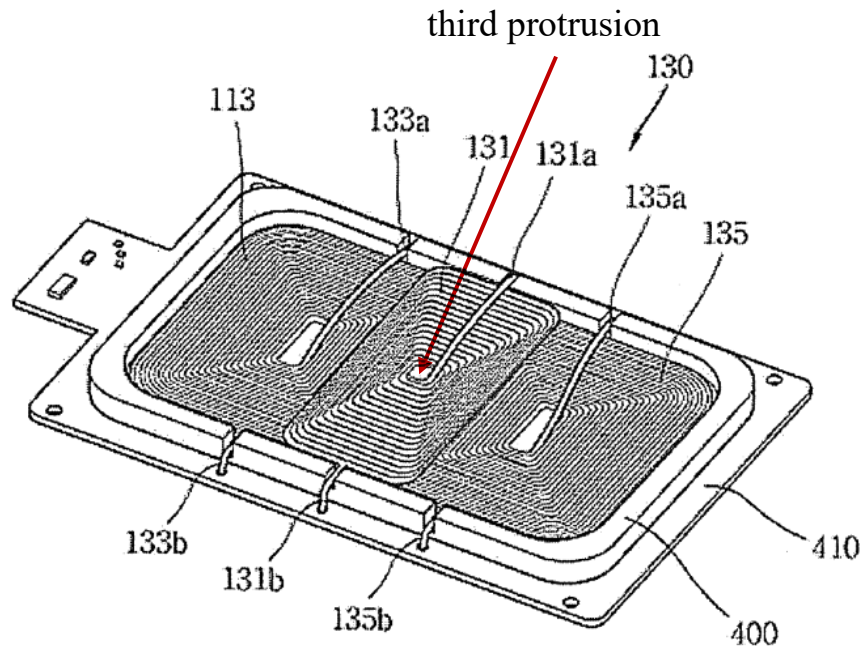
3. **Claim 3: “The wireless power transmitting apparatus of claim 2, wherein the third protrusion is disposed in an inner circumference of the third transmitting coil.”**

Jung discloses or renders obvious the additional limitations of claim 3. Decl.

¶¶ 99-104.

As discussed for claim 2, the core forms a third protrusion disposed between the first and second side coils. Jung, [0145]-[0146], FIG. 8. The protrusion is also aligned with the center and inner circumference of the main coil (third transmission coil) such that it is disposed in the inner circumference of the main coil. Jung, FIGS. 7, 8B; Decl. ¶ 100.

[FIG. 7]



Jung, FIG. 7 (annotated).

To the extent Patent Owner disputes that the third protrusion extends in an inner circumference of the main coil, as recited in claim 3, a POSITA would have found it obvious to do so. Decl. ¶ 101.

As explained for [1g]-[1h], Jung discloses first and second supports (protrusions) 403a, 403b extending into the “inner circumferential surfaces of the hollow parts of the first and second side coils.” Jung, [0140]-[0141], FIGS. 6-7. By protruding into inner circumferential surfaces of the hollow parts, the supports ensure that the positions of the side coils are “fixed” so that they do not “deviate[] from set positions.” Jung, [0140].

a. Motivation to Combine

A POSITA would have found it obvious and been motivated to similarly configure the third protrusion to extend into the inner circumferential surface of the hollow part of the main coil to provide the added benefit of ensuring that the main coil remains centered and fixed in its position. Jung, [0141]; Decl. ¶ 103. Such a modification would have further enhanced the securement of the third coil. Decl. ¶ 103.

b. Expectation of Success

A POSITA would have had a reasonable expectation of success in configuring the third protrusion to be disposed in an inner circumference of the main coil, because the modification would have only required the use of known parts (protruding substrate) in accordance with their known functions. Jung, [0145]-[0146], [0174] (describing a third support 403c “corresponding to the hollow part of the central coil 111 and be[ing] formed at the center of the bottom surface of the concave part 401”); Tabata, FIGS. 2A-2D (illustrating a magnetic sheet of a non-contact charging station including a central convex portion (protrusion) 32 disposed in an inner surface of a transmission coil 21, and a stepped structure formed by recess 33 for receiving and retaining another portion of the transmission coil); Decl. ¶ 104.

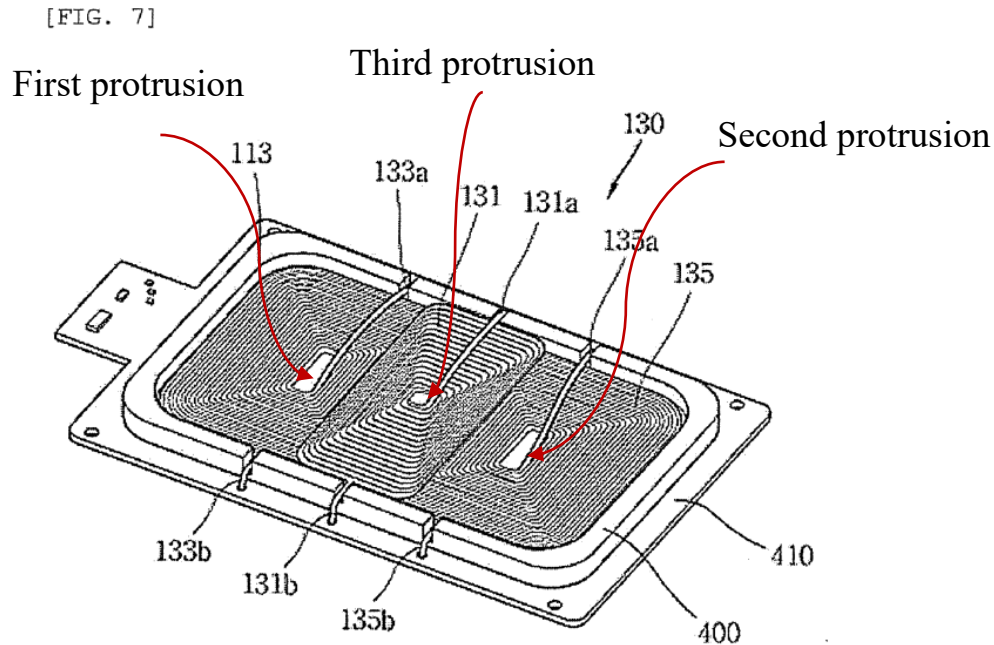
4. **Claim 4: “The wireless power transmitting apparatus of claim 2, wherein a width of the third protrusion is less than a width of the first protrusion and a width of the second protrusion.”**

Jung discloses or renders obvious the additional limitations of claim 4. Decl. ¶¶ 105-107.

As explained for claim 3, Jung renders obvious a protrusion disposed in an inner circumference of the main coil. Decl. ¶ 106.

A POSITA would have understood that the width of the third protrusion disposed in the inner circumference of the central coil, like the width of the first and second protrusions disposed in the inner circumference of the second and third coils, is limited by the width of the inner circumference of the central coil because it needs to fit securely within the coil to fix it in a set position, and the protrusions “have shapes corresponding to those of inner circumferential surfaces of the hollow parts” of the coils. Jung, [0140]-[0141], FIGS. 6-7; Jung 719, [0065] (also disclosing transmission coil supports “formed to correspond to the shapes of inner peripherals of the hollow portions of the coils 112 and 113”); Decl. ¶ 107. The width of the inner circumference of the central coil, as seen in Figure 7, is smaller than the width of the inner circumference of the first and second coils and their corresponding protrusions; thus, a POSITA would have also understood that a width of the third protrusion is smaller than a width of the first and second

protrusions. Jung, FIGS. 6-7, 12 (illustrating a width of a protrusion 403c configured to fix the position of the main coil); Decl. ¶ 107.



Jung, FIG. 7 (annotated).

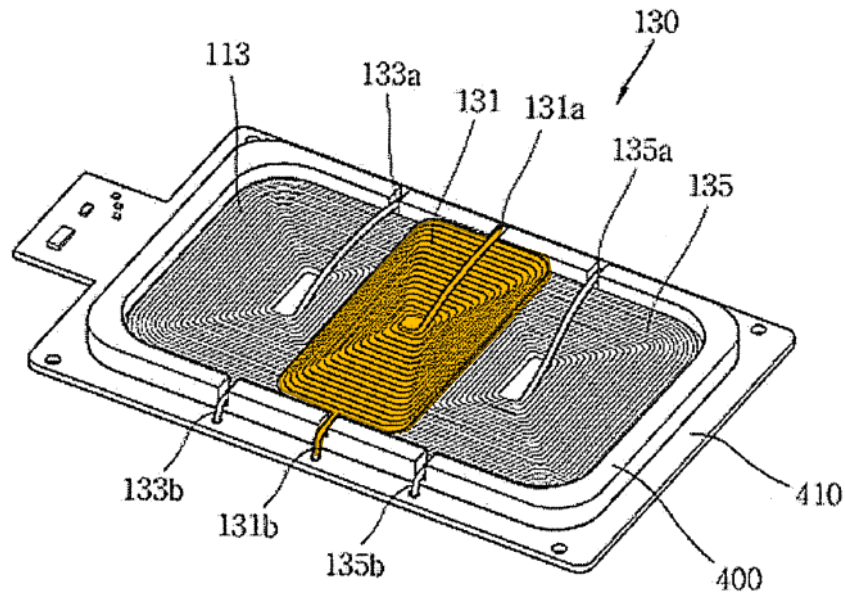
5. **Claim 5: “The wireless power transmitting apparatus of claim 1, wherein terminals of the third transmitting coil are disposed between the first transmitting coil and the second transmitting coil.”**

Jung discloses the additional limitations of claim 5. Decl. ¶¶ 108-109.

Jung further discloses that the central (third) transmitting coil includes end portions (131a, 131b), i.e., terminals, “connected to circuit patterns (not shown) formed on a lower surface of the circuit board 410.” Jung, [0132], [0143], FIGS. 6-7. The end portions 131a and 131b of the central coil are disposed between the

first and second side (transmission coils), as illustrated in Figure 7. Jung, [0142], [0143], FIG. 7.

[FIG. 7]



Jung, FIG. 7 (annotated).

6. **Claim 6: “The wireless power transmitting apparatus of claim 1, wherein the substrate is a soft magnetic substrate.”**

Jung and Sakuma render obvious the additional limitations of claim 6. Decl.

¶¶ 110-112.

As explained for [1d], Jung’s core (substrate) is “made of a magnetic material.” Jung, [0127]. Jung does not expressly disclose that the magnetic substance is soft, but Sakuma further renders obvious this feature. Decl. ¶ 111.

As discussed for [1i], Sakuma teaches a “power transmitter” including a “soft magnetic sheet” 21, i.e., substrate, including multiple “soft magnetic pieces” 311 protruding from a surface of the substrate. Sakuma, [0037]-[0039], [0042], FIGS. 2A, 4. Sakuma further teaches that the “soft magnetic” material may be, for example, “Mn—Zn ferrite or Ni—Zn ferrite,” “sendust,” or “sendust flakes dispersed and arranged into [a] resin binder,” and “prevent[s] magnetic leakage.” Sakuma, [0041] (emphasis added). Sakuma’s materials are consistent with those disclosed in the ’685 patent. Ex. 1001, 2:20-21 (“The soft magnetic substrate may include a composite having a metal powder and a polymer resin.”); Decl. ¶ 112.

a. Motivation to Combine

A POSITA would have found it obvious and been motivated to make the magnetic substrate of Jung a “soft magnetic” substrate to prevent magnetic leakage as taught by Sakuma. Sakuma, [0037]-[0039], [0041]; Decl. ¶ 113. Indeed, it was well known in the art to form substrates from soft magnetic material to “improve the inductive coupling between the primary and secondary coil.” Willemsen, [0001]-[0003], [0007] (describing an “inductive power transmission” electronic device having a base including a soft magnetic layer with primary and secondary coils disposed therein). It was well known in the art to form substrates from soft magnetic material “for use with a wireless power transfer system.” Baarman, [0003]-[0007] (describing “common” “soft magnetic materials” for

“manufacturing flux concentrators” and “suitable for use with a wireless power transfer system”); Jung 535, [0036], [0065], [0068] (describing a “wireless power transmission device” having a magnetic core (substrate) including “at least one of amorphous ferrite, Mn—Zn (50:50 parts by weight), Ni—Fe (80:20 parts by weight), and fine-metal (Fe—Si—Cu—Nb),” and “configured to receive the plurality of power transmission coils”). Furthermore, it is *prima facie* obvious to select a known material based on its suitability for its intended purpose. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 335 (1945); *Intel*, 61 F.4th at 1378, 1381 (finding obviousness where the proposed modification provided a “suitable option” (quoting *Intel*, 21 F.4th at 800)).

b. Expectation of Success

A POSITA would have had a reasonable expectation of success in using a soft material because of its known suitability for use in wireless power transmitting applications and because such a modification would have required no more than combining known technologies with predictable results. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418-421(2007); Decl. ¶ 114. As explained above, it was well known in the art to form substrates from soft magnetic material “for use with a wireless power transfer system.” Baarman, [0006]-[0007]; Jung 535, [0036], [0065], [0068] (describing a “wireless power transmission device” having a magnetic core (substrate) including “at least one of amorphous ferrite, Mn—Zn

(50:50 parts by weight), Ni—Fe (80:20 parts by weight), and fine-metal (Fe—Si—Cu—Nb),” and “configured to receive the plurality of power transmission coils”).

It was also known to use such materials to “improve the inductive coupling between the primary and secondary coil” and to “prevent magnetic leakage.”

Willemsen, [0001]-[0003], [0007]; Sakuma, [0037]-[0039], [0041]; Decl. ¶ 114.

7. Independent Claim 7

Claim 7 is similar to claim 1 except it does not recite “a wall to surround a part of an outer circumference of the first transmitting coil and a part of an outer circumference of the second transmitting coil,” as recited in [1e]. Claim 7 is obvious over Jung for the reasons discussed in claim 1. Decl. ¶¶ 115-123.

a. [7Preamble] “A wireless power transmitting apparatus, comprising:”

Jung discloses [7Preamble] for the same reasons discussed for [1Preamble]. Decl. ¶ 116.

b. [7a] “a first transmitting coil;”

Jung discloses [7a] for the same reasons discussed for [1a]. Decl. ¶ 117.

c. [7b] “a second transmitting coil;”

Jung discloses [7b] for the same reasons discussed for [1b]. Decl. ¶ 118.

d. [7c] “a third transmitting coil on the first transmitting coil and the second transmitting coil;”

Jung discloses [7c] for the same reasons discussed for [1c]. Decl. ¶ 119.

- e. **[7d] “and a substrate to accommodate the first transmitting coil, the second transmitting coil, and the third transmitting coil, wherein the substrate comprises:”**

Jung discloses [7d] for the same reasons discussed for [1d]. Decl. ¶ 120.

- f. **[7e] “a first protrusion inside an inner circumference of the first transmitting coil;”**

Jung discloses [7e] for the same reasons discussed for [1f]. Decl. ¶ 121.

- g. **[7f] “and a second protrusion inside an inner circumference of the second transmitting coil,”**

Jung discloses [7f] for the same reasons discussed for [1g]. Decl. ¶ 122.

- h. **[7g] “wherein the third transmitting coil is disposed between the first protrusion and the second protrusion,”**

Jung discloses [7g] for the same reasons discussed for [1h]. Decl. ¶ 123.

- i. **[7h] “wherein the first protrusion comprises a first stepped portion to support the third transmitting coil, and wherein the second protrusion comprises a second stepped portion to support the third transmitting coil.”**

Jung and Sakuma render obvious [7h] for the same reasons discussed for [1i]. Decl. ¶ 124.

- 8. **Claim 8: “The wireless power transmitting apparatus of claim 7, wherein the substrate comprises a third protrusion disposed between the first transmitting coil and the second transmitting coil.”**

Jung discloses the additional limitations of claim 8 for the same reasons discussed for claim 2. Decl. ¶ 125.

- 9. Claim 9: “The wireless power transmitting apparatus of claim 8, wherein the third protrusion is disposed in an inner circumference of the third transmitting coil.”**

Jung discloses or renders obvious the additional limitations of claim 9 for the same reasons discussed for claim 3. Decl. ¶ 126.

- 10. Claim 10: “The wireless power transmitting apparatus of claim 8, wherein a width of the third protrusion is less than a width of the first protrusion and a width of the second protrusion.”**

Jung discloses or renders obvious the additional limitations of claim 10 for the same reasons discussed for claim 4. Decl. ¶ 127.

- 11. Claim 11: “The wireless power transmitting apparatus of claim 7, wherein terminals of the third transmitting coil are disposed between the first transmitting coil and the second transmitting coil.”**

Jung discloses the additional limitations of claim 11 for the same reasons discussed for claim 5. Decl. ¶ 128.

- 12. Claim 12: “The wireless power transmitting apparatus of claim 7, wherein the substrate is a soft magnetic substrate.”**

Jung and Sakuma render obvious the additional limitations of claim 12 for the same reasons discussed for claim 6. Decl. ¶ 129.

13. Independent claim 13

Claim 13 is similar to claim 1, except it does not recite “a wall to surround a part of an outer circumference of the first transmitting coil and a part of an outer circumference of the second transmitting coil,” as recited in [1e], or that “the third

transmitting coil is disposed between the first protrusion and the second protrusion,” as recited in [1h]. Decl. ¶ 130. Jung and Sakuma render obvious claim 13 for the reasons discussed in claim 1. Decl. ¶¶ 130-138

a. [13Preamble] “A wireless power transmitting apparatus, comprising:”

Jung discloses [13Preamble] for the same reasons discussed for [1Preamble]. Decl. ¶¶ 69, 131.

b. [13a] “a first transmitting coil;”

Jung discloses [13a] for the same reasons discussed for [1a]. Decl. ¶¶ 70-71, 132.

c. [13b] “a second transmitting coil;”

Jung discloses [13b] for the same reasons discussed for [1b]. Decl. ¶¶ 72-73, 133.

d. [13c] “a third transmitting coil on the first transmitting coil and the second transmitting coil;”

Jung discloses [13c] for the same reasons discussed for [1c]. Decl. ¶¶ 74-75, 134.

e. [13d] “and a substrate to accommodate the first transmitting coil, the second transmitting coil, and the third transmitting coil, wherein the substrate comprises:”

Jung discloses [13d] for the same reasons discussed for [1d]. Decl. ¶¶ 76-77, 135.

- f. [13e] “a first protrusion inside an inner circumference of the first transmitting coil;”**

Jung discloses [13e] for the same reasons discussed for [1f]. Decl. ¶¶ 80-82, 136.

- g. [13f] “and a second protrusion inside an inner circumference of the second transmitting coil,”**

Jung discloses [13f] for the same reasons discussed for [1g]. Decl. ¶¶ 83-84, 137.

- h. [13g] “wherein the first protrusion comprises a first stepped portion to support the third transmitting coil, and wherein the second protrusion comprises a second stepped portion to support the third transmitting coil.”**

Jung and Sakuma render obvious [13g] for the same reasons discussed for [1i]. Decl. ¶¶ 87-95, 138.

- 14. Claim 14: “The wireless power transmitting apparatus of claim 13, wherein the substrate comprises a third protrusion disposed between the first transmitting coil and the second transmitting coil.”**

Jung discloses the additional limitations of claim 14 for the same reasons discussed for claim 2. Decl. ¶¶ 96-98, 139.

- 15. Claim 15: “The wireless power transmitting apparatus of claim 14, wherein the third protrusion is disposed in an inner circumference of the third transmitting coil.”**

Jung discloses or renders obvious the additional limitations of claim 15 for the same reasons discussed for claim 3. Decl. ¶¶ 99-104, 140.

- 16. Claim 16: “The wireless power transmitting apparatus of claim 14, wherein a width of the third protrusion is less than a width of the first protrusion and a width of the second protrusion.”**

Jung discloses or renders obvious the additional limitations of claim 16 for the same reasons discussed for claim 4. Decl. ¶¶ 105-107, 141.

- 17. Claim 17: “The wireless power transmitting apparatus of claim 13, wherein terminals of the third transmitting coil are disposed between the first transmitting coil and the second transmitting coil.”**

Jung discloses the additional limitations of claim 17 for the same reasons discussed for claim 5. Decl. ¶¶ 108-109, 142.

- 18. Claim 18: “The wireless power transmitting apparatus of claim 13, wherein the substrate is a soft magnetic substrate.”**

Jung and Sakuma render obvious the additional limitations of claim 18 for the same reasons discussed for claim 6. Decl. ¶¶ 110-114, 143.

D. Ground 2: Claims 6, 12, and 18 Are Obvious over Jung, Sakuma, and Kurs

- 1. Claim 6: “The wireless power transmitting apparatus of claim 1, wherein the substrate is a soft magnetic substrate.”**

To the extent Patent Owner argues that Sakuma does not render obvious a soft magnetic substrate because claim 6 requires a flexible or otherwise elastic magnetic substrate, claim 6 is further obvious over Kurs. Decl. ¶¶ 144-147.

Kurs teaches a “resonator coil structure for wireless energy transfer.” Kurs, claim 1, [0018]. The structure includes an inductive element such as a coil, “a (gapped or ungapped) core made of magnetic material,” i.e., a substrate, and an “external circuit (e.g. a driving circuit)” for “delivering power to the inductive element,” which in turn “deliver[s] power to the external circuit (e.g. a driven load).” Kurs, [0247], [0335]-[0336]. Kurs further teaches that “it may be preferable to use a flexible form of magnetic material which may prevent or reduce vibration or shock transfer between resonators.” Kurs, [0808].

a. Motivation to Combine

Kurs’s materials are consistent with the objectives disclosed in the ’685 patent. Ex. 1001, 10:1-4 (“Further, by improving elasticity and shock resistance of a soft magnetic substrate on which a transmitting coil is disposed, a breakage phenomenon of the soft magnetic substrate can be reduced.”); Decl. ¶ 146. And a POSITA would have found it obvious and been motivated to make the magnetic substrate of Jung a soft (flexible) magnetic substrate to “prevent or reduce vibration or shock transfer” as taught by Kurs. Kurs, [0808]; Decl. ¶ 145. Furthermore, it is *prima facie* obvious to select a known material based on its suitability for its intended purpose. 325 U.S. at 335; *Intel*, 61 F.4th at 1378, 1381 (finding obviousness where the proposed modification provided a “suitable option” (quoting *Intel*, 21 F.4th at 800)).

b. Expectation of Success

A POSITA would have had a reasonable expectation of success in using a soft material because of its known suitability for use in wireless power transmitting applications and because such a modification would have required no more than combining known technologies with predictable results. *KSR*, 550 U.S. at 418-421; Decl. ¶ 147. Indeed, it was well known in the art to form substrates from soft (flexible) magnetic material to “enhance the desired magnetic, thermal, or mechanical properties” (Baarman, [0082]) for wireless charging applications. Kurs, [0529]-[0547] (describing numerous wireless power transmitting applications benefiting from the instant disclosure); Partovi, [0209] (explaining that “[m]any materials that are typically used in transformer cores include materials described above, soft iron, Silicon steel, laminated materials (to reduce eddy currents), Silicon alloyed materials, Carbonyl iron, Ferrites, Vitreous metals, alloys of Ni, Mn, Zn, Fe, Co, Gd, and Dy, nano materials, and many other materials in solid or flexible polymer” (emphases added)); An, [0049], [0059] (describing a “wireless power receiver” including a magnetic substrate and a coil unit, wherein “[t]he magnetic substrate 100 may be prepared in the form of a sheet and may have a flexible property”); Decl. ¶ 147.

1. **Claim 12: “The wireless power transmitting apparatus of claim 7, wherein the substrate is a soft magnetic substrate.”**

Jung, Sakuma, and Kurs render obvious the additional limitations of claim 12 for the same reasons discussed for claim 6. Decl. ¶¶ 144-148.

2. **Claim 18: “The wireless power transmitting apparatus of claim 13, wherein the substrate is a soft magnetic substrate.”**

Jung, Sakuma, and Kurs render obvious the additional limitations of claim 18 for the same reasons discussed for claim 6. Decl. ¶¶ 144-147, 149.

VI. Discretionary Denial Is Not Warranted

A. Discretionary Denial Is Not Warranted Under 35 U.S.C. § 325(d)

Petitioner acknowledges that certain references relied upon herein are cited on the face of the '685 patent. Ex. 1001, cover & p. 2. This point is trivial, however, because the Examiner neither applied these references in any rejection nor evaluated the particular combination of references set forth in this Petition. *See generally* Ex. 1002. In fact, the Examiner never rejected any claim during prosecution. *See generally* Ex. 1002. Accordingly, the arguments presented herein do not overlap with arguments presented during prosecution, and Petitioner submits that the first part of the *Advanced Bionics* framework is not satisfied because this Petition includes grounds based on combinations of prior art not previously presented to the Office.

To the extent the Board determines that an analysis under part two of *Advanced Bionics* is warranted, Petitioner submits that the grounds asserted herein demonstrate that the Examiner erred in his evaluation of the prior art. Accordingly, Petitioner submits that the evidence and facts presented in the Petition warrant reconsideration of the prior art, and respectfully requests the Board decline to exercise its discretion to deny institution under § 325(d).

B. Discretionary Denial Is Not Warranted Under *Fintiv*

Apple Inc. v. Fintiv, Inc., IPR2020-00019, Paper 11 at 5-6 (PTAB Mar. 20, 2020) (precedential), and the Office’s interim guidelines dated June 21, 2022 (“Guidance Memo”) favor institution.

Petitioner is plaintiff in the pending case captioned *BMW of North America, LLC v. Scramoge Technology Ltd.*, No. 2:23-cv-10561 (E.D. Mich.). Ex. 1013.

Factor 1 is neutral. The parties have not requested a stay.

Factors 2 and 3 strongly favor institution. A trial date has not been set and the parties have not made substantial investments, as only the complaint has been filed.

Factor 4 is at least neutral. Petitioner has not yet served invalidity contentions, and so no overlap exists. Moreover, there is no scheduling order setting the date for final invalidity contentions or deadlines for when the parties

will meet and confer. As such, any overlap between this proceeding and the district court trial is speculative because the final contentions have not been determined.³

Factor 5 is neutral. Petitioner is plaintiff in the related district court proceeding.

Factor 6 favors institution. This Petition presents a compelling case on the merits. If the Board finds that factors 1-5 favor denial of institution, the compelling merits should still result in institution. Guidance Memo 3-5 *CommScope Techs. LLC v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 at 3-5 (PTAB Feb. 27, 2023) (precedential).

C. Discretionary Denial Is Not Warranted Under *General Plastic*

The *General Plastic* factors weigh in favor of institution. *Gen. Plastic Indus. Co. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 8-10 (PTAB Sept. 6, 2017).

IPR2022-01354 (“the Volkswagen IPR”) does not preclude institution. Scramoge accused Bayerische Motoren Werke AG (“BMW AG”), a real party-in-interest to this Petition, of infringement on December 14, 2022. Ex. 1010. Neither Petitioner nor BMW AG was involved in the Volkswagen IPR. The *General Plastic* factors favor institution because neither Petitioner nor BMW AG has a

³ Petitioner reserves the right to submit a stipulation at a later time.

significant relationship with Volkswagen, and the Volkswagen IPR was dismissed before consideration of its merits.

Factors 1 and 3 favor institution. Petitioner and BMW AG do not have a significant relationship with Volkswagen. Furthermore, there is no danger of road mapping—the only previously filed petition was voluntarily dismissed and the proceeding terminated on April 10, 2023, before a final written decision was issued. Ex. 1012; *Code200, UAB v. Bright Data Ltd.*, IPR2022-00861, IPR2022-00862, Paper 18 at 5 (PTAB Aug. 23, 2022).

Factor 2 favors institution. Because Petitioner and BMW AG were not aware of Scramoge’s infringement allegations at the time of the Volkswagen IPR, Petitioner had no reason to perform any prior art searches at that time and did not perform any prior art searches at that time. For this reason, factor 2 is irrelevant.

Factors 4 and 5 favor institution. Petitioner first learned of Scramoge’s infringement allegations when BMW AG received an infringement complaint on December 14, 2022 (Ex. 1010), and diligently conducted prior art searching shortly after. Petitioner ceased its preparations for filing an IPR in anticipation of Patent Owner terminating the case *with* prejudice, but quickly resumed its preparations after finding that the case would be dismissed *without* prejudice. Ex. 1011.

Factors 6 and 7 favor institution. The merits of this Petition are strong, asserting obviousness grounds not considered during prosecution and not

previously presented to the Board. There is significant value for the Board to consider the invalidity grounds in this Petition “to improve patent quality and restore confidence in the presumption of validity that comes with issued patents.” *Code200*, Paper 18 at 5 (citation omitted).

VII. Mandatory Notices

A. Real Parties-in-Interest Under 37 C.F.R. § 42.8(b)(1)

The real parties-in-interest are BMW of North America, LLC; BMW Manufacturing Co., LLC; and Bayerische Motoren Werke, AG.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

To the best of Petitioner’s knowledge, the ’685 patent is/was involved in the following district court litigations and PTAB proceedings:

Name	Number	Court	Filed
<i>Scramoge Technology Ltd. v. Bayerische Motoren Werke AG</i>	2:22-cv-00472	E.D. Tex.	Dec. 14, 2022
<i>BMW of North America, LLC v. Scramoge Technology Limited</i>	2:23-cv-10561	E.D. Mich.	Mar. 9 2023
<i>Scramoge Technology Limited v. Volkswagen AG et al.</i>	2:22-cv-10730	E.D. Mich.	Apr. 6, 2022
<i>Volkswagen Group of America, Inc. v. Scramoge Technology Ltd.</i>	IPR2022-01354	PTAB	Aug 5, 2022

C. Lead and Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Lead Counsel	Back-up Counsel
Lionel M. Lavenue (Reg. No. 46,859) lionel.lavenue@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 1875 Explorer Street, Suite 800 Reston, VA 20190-6023 Tel.: 571-203-2750 Fax: 202-408-4400	Kara A. Specht (Reg. No. 69,560) kara.specht@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 271 17th Street, NW, Suite 1400 Atlanta, GA 30363-6209 Tel.: 404-653-6481 Fax: 202-408-4400 Cory C. Bell (Reg. No. 75,096) cory.bell@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 2 Seaport Lane, 6th Floor Boston, MA 02210-2001 Tel.: 617-646-1641 Fax: 202-408-4400 Safiya Aguilar (Reg. No. 77,212) safiya.aguilar@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner, LLP 901 New York Avenue, NW Washington, DC 20001-4413 Tel.: 202-408-4160 Fax: 202-408-4400

D. Service Information Under 37 C.F.R. § 42.8(b)(4)

Please address correspondence to lead and back-up counsel at the addresses above and BMW-Scramoge-IPR@finnegan.com. Petitioner consents to electronic service by e-mail.

VIII. Standing

Petitioner certifies that the '685 patent is available for *inter partes* review and Petitioner is not barred or estopped from requesting *inter partes* review to challenge the claims on the grounds herein.

IX. Conclusion

Petitioner has established a reasonable likelihood of prevailing for the challenged claims and requests the Board institute *inter partes* review and cancel each challenged claim as unpatentable.

Date: June 30, 2023

Respectfully submitted,

/Lionel Lavenue/

Lionel M. Lavenue

Lead Counsel

Reg. No. 46,859

CERTIFICATE OF COMPLIANCE

The undersigned hereby certifies that the foregoing **Petition for *Inter Partes* Review** contains 7,039 words, excluding those portions identified in 37 C.F.R. § 42.24(a), as measured by the word-processing system used to prepare this paper.

/Lionel Lavenue/
Lionel M. Lavenue
Lead Counsel
Reg. No. 46,859

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§42.6(e) and 42.105(a), the undersigned certifies that on June 30, 2023, a copy of the foregoing **Petition for *Inter Partes* Review, Petitioner's Power Of Attorney, and Exhibits 1001-1019** were served by Priority Overnight FedEx on the correspondence address of record indicated in the Patent Office's Patent Center system for U.S. Patent No. 10,546,685:

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

A courtesy copy has been served on litigation counsel at:

Brett Cooper
BC Law Group P.C.
200 Madison Avenue
24th Floor
New York, NY 10016

Date: June 30, 2023

/Daniel E. Doku/
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