UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.
Petitioner

v.

LYNK LABS, INC.
Patent Owner

Patent No. 10,492,252

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,492,252

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[1] References to Ex. 1059 are to English translation document page:line numbers.

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I. INTRODUCTION

Samsung Electronics Co., Ltd. ("Petitioner" or "Samsung") requests *inter partes* review of claims 1-20 ("challenged claims") of U.S. Patent No. 10,492,252 ("the '252 patent") (Ex. 1001) assigned to Lynk Labs, Inc. ("PO"). For the reasons below, the challenged claims should be found unpatentable and canceled.

II. MANDATORY NOTICES

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

Related Matter: The '252 patent is at issue in the following matter:

- *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, No. 1-21-cv-02665 (N.D. Ill.) (seeking declaratory judgment of non-infringement as to the '252 patent and also U.S Patent Nos. 10,499,466, 10,506,674, 10,966,298, 11,019,697, 10,492,251, 10,750,583, 10,687,400, and 10,517,149) ("Illinois Litigation")

The '252 patent claims priority to two provisional applications (U.S. Provisional Application Nos. 60/574,653 filed February 25, 2004 and 60/559,867 filed April 6, 2004) to which U.S. Patent No. 8,531,118, which was at issue in IPR2016-01133, also claims priority.

<u>Counsel and Service Information</u>: Lead counsel: Naveen Modi (Reg. No. 46,224), and Backup counsel are (1) Joseph E. Palys (Reg. No. 46,508), (2) Arvind Jairam (Reg. No. 62,759), (3) Howard Herr (*pro hac vice* admission to be requested). Service information is Paul Hastings LLP, 2050 M St., Washington, D.C., 20036, Tel.: 202.551.1700, Fax: 202.551.1705, email: PH-Samsung-LynkLabs-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 ’252 patent is available for review and Petitioner is not barred or estopped from requesting review on the grounds identified herein.

V. PRECISE RELIEF REQUESTED AND GROUNDS

Claims 1-20 should be canceled as unpatentable based on the following grounds:

<u>Ground 1</u>: Claims 1-9, 12-16, 18, and 19 are unpatentable under pre-AIA 35 U.S.C. § 103(a) as being obvious over *Hack* (Ex. 1005) and *Garcia* (Ex. 1006);

<u>Ground 2</u>: Claims 10, 11, and 17 are unpatentable under § 103(a) as being obvious over *Hack*, *Garcia*, and *Cordelli* (Ex. 1047); and

Ground 3: Claim 20 is unpatentable under § 103(a) as being obvious over *Hack* and *Porter* (Ex. 1045).

The ’252 patent issued November 26, 2019, from Application No. 16/407,076 filed May 8, 2019, and claims priority via a chain of applications to eight provisional applications, the earliest of which is U.S. Provisional Application No. 60/547,653 filed February 25, 2004, which Petitioner assumes for the purposes of this proceeding is the critical date for the ’252 patent (Petitioner does not concede that the priority claim to the foregoing provisional, or any application in the priority chain, is proper).

Hack published July 31, 2003 from U.S. Application No. 10/313,678 filed December 6, 2002. *Cordelli* published December 18, 2003 from U.S. Application No. 10/173,248 filed June 17, 2002. Therefore, *Hack* and *Cordelli* qualify as prior art under pre-AIA 35 U.S.C. §§ 102(a) and/or (e).

Garcia issued October 5, 1999. *Porter* issued October 23, 2001. Thus, *Garcia* and *Porter* qualify as prior art at least under pre-AIA 35 U.S.C. § 102(b).

None of these references were considered during prosecution. (*See generally* Ex. 1004.)

VI. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art as of the claimed priority date of the ’252 patent (“POSITA”) would have had at least a bachelor’s degree in electrical engineering, computer engineering, computer science, physics, or the equivalent, and two or more years of experience with LED devices and/or related circuit design, or a related field. (Ex. 1002, ¶¶20-21.)[2] More education can supplement practical experience and vice versa. (*Id.*)

VII. OVERVIEW OF THE '252 PATENT

The '252 patent purports to generally relate to "light emitting diodes ('LEDs') and LED drivers," and specifically to "alternating current ('AC') driven LEDs, LED circuits and AC drive circuits and methods." (Ex. 1001, 1:54-59.) While the '252 patent touts its various embodiments provide specific features (e.g., *id.*, 4:8-10:48), the claims are broadly directed to generic apparatuses having compilations of familiar one-off components/features that provide no novel functionality to advance the art. Indeed, the claims recite components like a substrate with LEDs, data receiver, transmission conductor, and proximity sensor, without requiring any unique features related to their compiled existence in the claimed "apparatus." While the '252 patent was allowed on first action during prosecution (Ex. 1004, 62-69), the Examiner's reasons focused on the claimed "transmission conductor configured to wirelessly receive an alternating electromagnetic field that is used to

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[2] Petitioner submits the declaration of R. Jacob Baker, Ph.D., P.E. (Ex. 1002), an expert in the field of the '252 patent. (Ex. 1002, ¶¶1-19; Ex. 1003.)

provide power [to] charge the apparatus" (*id.*, 68). This feature, like all of the other generically claimed features, was already known in the prior art. *See In re Gorman*, 933 F.2d 982, 986 (Fed. Cir. 1991) ("The criterion ... is not the number of references, but what they would have meant to a person of ordinary skill in the field of the invention."). (*Infra* Section IX; Ex. 1002, ¶¶56-57; *see also id.*, ¶¶22-55 (citing, *inter alia*, Exs. 1025, 1054-1055, 1059-1076, 1078-1083, 1088), 59-160; *see generally* Ex. 1004; Exs. 1026-1043.)

VIII. CLAIM CONSTRUCTION

The Board 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)). For purposes of this proceeding, Petitioner believes that no special constructions are necessary to assess whether the challenged claims are unpatentable over the asserted prior art.[3] (Ex. 1002, ¶58.)

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[3] Petitioner reserves all rights to raise claim construction and other arguments, including challenges under 35 U.S.C. §§ 101 or 112, in district court as relevant to those proceedings. *See, e.g.*, *Target Corp. v. Proxicom Wireless, LLC*, IPR2020-00904, Paper 11 at 11–13 (Nov. 10, 2020). A comparison of the claims to any

IX. DETAILED EXPLANATION OF GROUNDS

A. Ground 1: Claims 1-9, 12-16, 18, and 19 Are Obvious Over *Hack* and *Garcia*

1. Claim 1

a) An apparatus comprising:

Hack discloses a portable communications device 100 ("apparatus"). (Ex. 1005, ¶[0010] ("Such display systems can be used as hand-held, portable communications devices."), FIG. 2A (below); *see also id.*, ¶[0029] ("multi-media display communications device 100").)

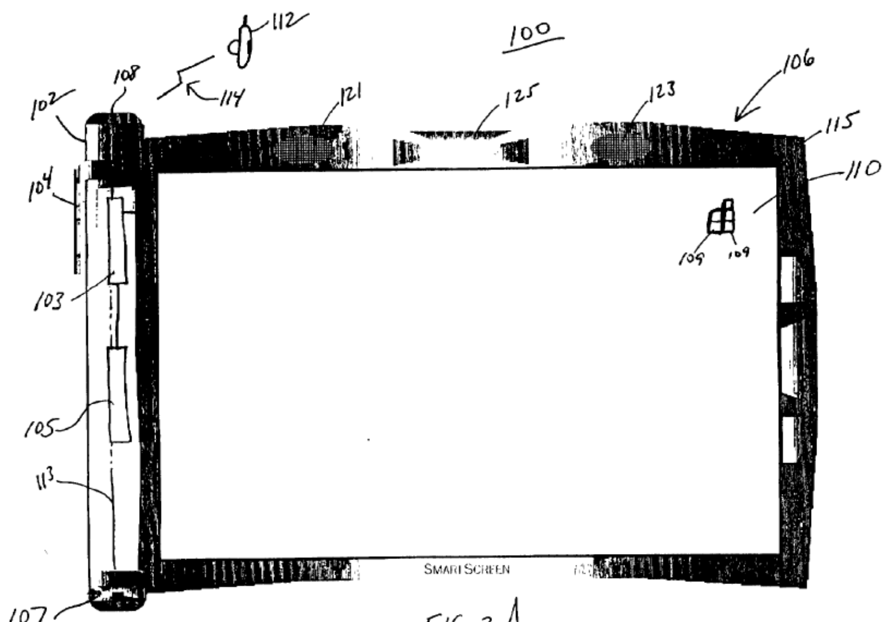


FIG. 2A

accused products in litigation may raise controversies that are not presented here given the similarities between the references and the patent.

(*Id.*, FIG. 2A; *see also id.*, ¶¶[0020], [0029]-[0067] (describing device 100), FIGS. 1A-1C, 3A-3C; *infra* Sections IX.A.1(b)-(e); Ex. 1002, ¶¶75-76.)

b) a flat planar substrate upon which is mounted a plurality of LEDs;

Hack discloses or suggests this limitation. (Ex. 1002, ¶¶77-79.) For instance, *Hack*'s device 100 includes a display 106 having a display screen 110 (Ex. 1005, FIG. 2A, ¶[0063]) "compris[ing] a plurality of pixels 109" (*id.*, ¶[0063]) comprising "light emitting elements," which are "OLEDs." (*Id.*; *see also id.*, ¶¶[0063]-[0064], [0066], [0071]-[0072], [0076].)[4] A POSITA would have understood that "OLED" stands for "organic light emitting diode" and that "OLEDs" are an example of light emitting diodes (LEDs). (Ex. 1002, ¶77; *see also* Ex. 1005, ¶¶[0004] ("light emitting diode (LED)"), [0070] ("diodes").) *Hack* discloses a substrate upon which are mounted the OLEDs ("plurality of LEDs"). (Ex. 1005, ¶[0066] ("The **substrate** onto which the OLEDs are deposited may be any suitable substrate…"); *see also id.*, ¶¶[0062], [0068]-[0071] ("substrate[s]"), [0076] ("substrate"); Ex. 1002, ¶77.)[5] *Hack* further discloses that "display system 106 according to the invention has an **unconstrained form factor**" and that "the **substrate** onto which an intelligent

[4] PO relies on an LED display for this limitation in the Illinois Litigation. (Ex. 1058, 2-3, 18, 38; Ex. 1077, ¶¶28-29; Ex. 1087, 2-3, 15, 29; *see also* Exs. 1057, 1086.)

[5] Emphasis added unless indicated otherwise.

display is formed **can take on any shape**" (Ex. 1005, ¶[0062]) and "can be formed from a smart material that … becomes **rigid** when the display 106 is **extended**" as shown in Figure 3C (*id.*, ¶[0068]). At least when the display is extended, as shown, the plurality of LEDs are mounted on a flat, planar substrate. (Ex. 1002, ¶77.)

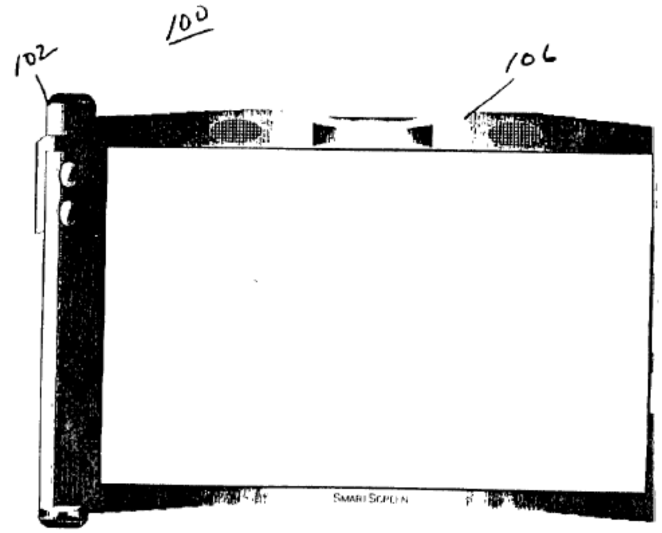


FIG. 3C

(Ex. 1005, FIG. 3C.)

To the extent *Hack* does not explicitly disclose that its substrate is *flat* and *planar*, it would have been obvious to implement such features. (Ex. 1002, ¶78.) For example, given that *Hack*'s substrate "can take on any shape" (Ex. 1005, ¶[0062]) and given that flat, planar substrates were known, including in the context of light-emitting semiconductor devices (Ex. 1009, Abstract, 2:16-19, FIG. 1)[6], it

[6] Exhibit 1009 is cited to demonstrate state of the art. (Ex. 1002, ¶78.)

would have been predictable to implement a flat, planar substrate for *Hack*'s OLEDs, e.g., to leverage an existing type of substrate for implementing LEDs. (Ex. 1002, ¶78.)

A POSITA would have been able to implement a flat, planar substrate and would have had a reasonable expectation of such an implementation operating as intended in the context of *Hack*'s disclosure. (*Id.*, ¶79.) For example, given that flat, planar substrates were known, such an implementation would have been a mere combination of known components and technologies (e.g., a substrate as in *Hack*, and a flat, planar substrate as known in the art), according to known methods, to produce predictable results. (*Id.*) *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). Moreover, the '252 patent does not describe any novelty, criticality, or unexpected results associated with a substrate being flat and planar with a plurality of LEDs mounted thereon. (*See generally* Ex. 1001; Ex. 1002, ¶79.)

c) a data receiver, wherein the data receiver can receive data from an antenna;

Hack discloses this limitation. (Ex. 1002, ¶80.) For instance, *Hack* discloses receiving data, and further discloses that "device 100 includes radio **transceiver** means 104, such as an **antenna**, for example, for transmitting output radio signals and receiving input radio signals." (Ex. 1005, ¶[0035]; *see also id.*, ¶¶[0010], [0034] ("**data** that the device **receives**"), [0035] ("The radio transceiver means 104 can be adapted to transmit and receive communications signals via any electromagnetic carrier…"), [0040] ("[A]ntenna 104 is adapted to transmit and **receive** broadband, audio/video signals for internet access and telephony. That is, the antenna is capable of transmitting and receiving full duplex data and voice, and provides broadband internet access."), [0042] ("**data** rates of up to about 10 Mbps, or more, are anticipated), [0078] ("extract display **data** from the input radio signals"), Abstract.) *Hack* discloses that the data obtained from the antenna is processed by downstream components of device 100. For example, "antenna 104 is electrically coupled to [a] processor 103," which a POSITA would have understood is for processing data obtained from the antenna. (*Id.*, ¶[0039]; *see also id.*, ¶[0043] ("The radio transceiver means 104 can include processing (either in the antenna itself or in the processor 103) for providing diversity."); Ex. 1002, ¶80.) Thus, device 100 includes a data receiver configured to receive data from *Hack*'s antenna, so that the received data can be processed as described in *Hack*. (Ex. 1002, ¶80.)

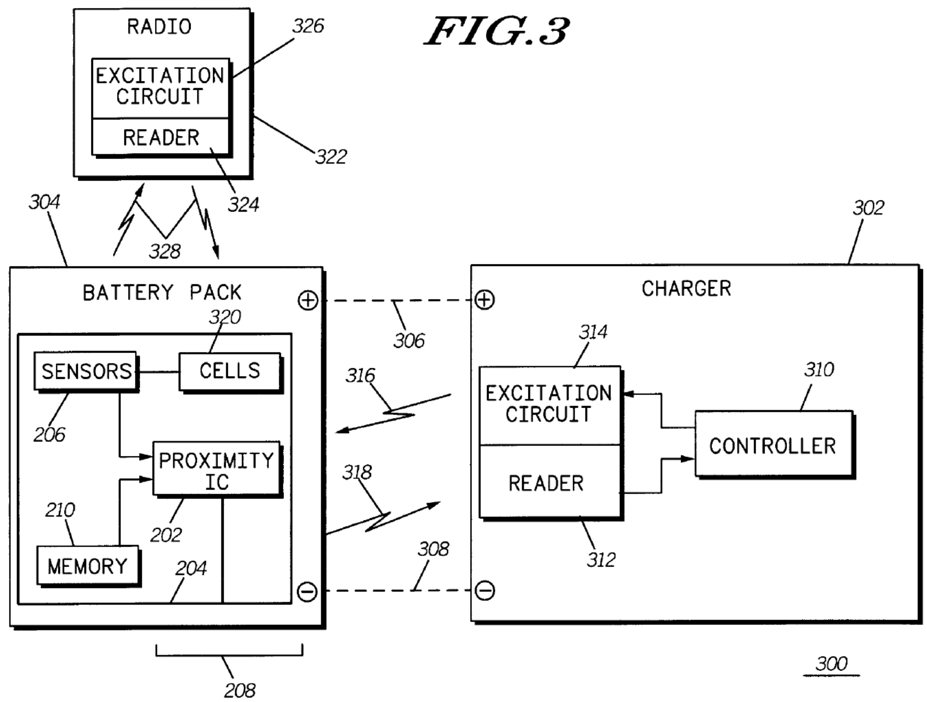
d) a transmission conductor configured to wirelessly receive an alternating electromagnetic field that is used to provide power to charge the apparatus; and

While *Hack* does not explicitly disclose *a transmission conductor configured to wirelessly receive an alternating electromagnetic field that is used to provide power to charge Hack*'s device 100 ("apparatus"), it would have been obvious in view of *Garcia* to configure device 100 to implement such features. (Ex. 1002, ¶¶81-91.)

Garcia "relates to battery charging systems, and more particularly to wireless battery charging systems" for charging batteries of "[p]ortable communications products, [which] are often powered off of rechargeable batteries." (Ex. 1006, 1:6-11; *see also id.*, 2:30-3:41 (describing charging a battery 304), FIGS. 2-3; Ex. 1002, ¶82.) Therefore, a POSITA would have found it relevant to consider the teachings of *Garcia* when implementing *Hack*'s device 100, which is a portable wireless communications device having a rechargeable battery. (Ex. 1005, Abstract, ¶¶[0029], [0035], [0041] ("mobile wireless data transmissions"), [0047] ("wireless"), [0053] ("rechargeable thin film battery"), [0055] ("charge the battery"); Ex. 1002, ¶82.)

Garcia discloses that its "wireless battery charging system" (Ex. 1006, Title) wirelessly charges a battery through a technique described in *DeMuro* (Ex. 1014), which is incorporated by reference into *Garcia*. (Ex. 1006, 1:67-2:4 ("a wireless charging system as described in U.S. Pat. No. 5,596,567 … by deMuro et al. … which is hereby incorporated by reference"); Ex. 1002, ¶83.) For example, *Garcia* discloses with reference to Figure 3 (below) that a battery charging system 300 includes a charger 302 that wirelessly charges a rechargeable battery pack 304 "in the same manner as … described by [*DeMuro*]." (Ex. 1006, 3:19-22; *see also id.*, 2:60-3:41 (describing Figure 3); Ex. 1002, ¶83.)

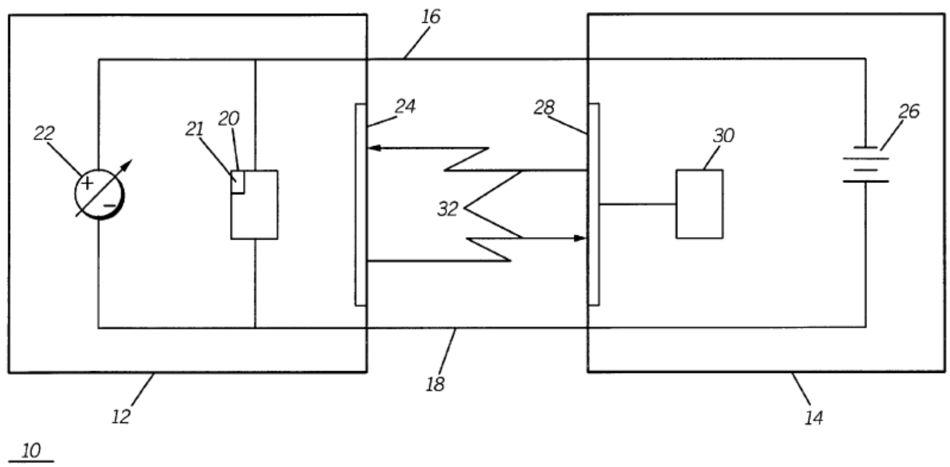
FIG.3



(Ex. 1006, FIG. 3.)

Similarly, Figure 1 of *Garcia* (below), which is identical to Figure 1 of *DeMuro* except for being labeled "PRIOR ART," describes the wireless charging technique of *DeMuro*, which was known at the time of *Garcia*, and which *Garcia* summarizes as follows: "When the battery pack 14 is brought next to the battery charger 12 through a small distance, a communication link is established over the wireless channel 32[, and] [t]he battery charger 12 then commences a recharge process…" (*Id.*, 2:4-18; Ex. 1002, ¶84.)

FIG.1
(PRIOR ART)



(Ex. 1006, FIG. 1; *see also* Ex. 1014, FIG. 1 (same).)

DeMuro provides additional details regarding the wireless charging technique implemented in *Garcia*'s system. (Ex. 1002, ¶85.) For example, *DeMuro* explains that charger 12 wirelessly charges battery pack 14 (both are shown above in Figure 1) through the use of a magnetic flux signal that is transmitted from excitation coil 50 (red below) of charger circuit 40 to coil 58 (blue below) of battery circuit 42. (Ex. 1014, 2:65-3:36, FIG. 2; Ex. 1002, ¶85.)

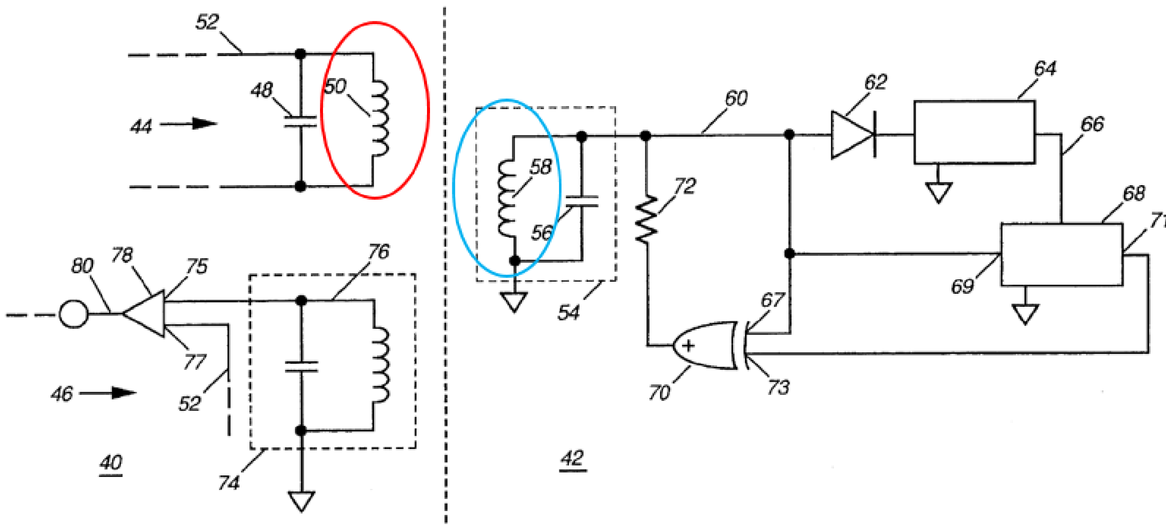


FIG. 2

(Ex. 1014, FIG. 2 (annotated); Ex. 1002, ¶85.)

In particular, *DeMuro* discloses that "[a]n oscillator … provides an excitation signal on line 52 to the excitation circuit to excite it, [and] [a]s a result, the charger excitation coil 50 has an **alternating magnetic flux** [that is] provide[d] … in the wireless channel 32 shown in FIG. 1." (Ex. 1014, 3:8-14; Ex. 1002, ¶86.) "When the **coil 58 encounters the magnetic flux signal** of the charger excitation coil 50…, it is **magnetically coupled** into the charger circuit, 40, [and] [t]he battery tank circuit 54 is stimulated by the magnetic flux signal produced by the charger excitation coil 50, which resonates sympathetically, thus providing a sinusoidal signal on line 60." (Ex. 1014, 3:20-29.) *DeMuro* explains that "[t]his sinusoidal signal is fed to a rectifier 62, and the resulting rectified signal is [further processed to] produce[] a regulated DC voltage on line 66[, which] is used to power components" of the battery circuit 42. (*Id.*, 29-35; Ex. 1002, ¶86.)

Thus, *Garcia* discloses (by virtue of incorporating *DeMuro* by reference with respect to details of *Garcia*'s wireless charging system) wirelessly receiving an alternating electromagnetic field that is used to provide power to charge a battery. (Ex. 1002, ¶87.) For example, *DeMuro*'s "alternating magnetic flux" that is transmitted to coil 58 of battery circuit 42 is an alternating electromagnetic field. (*Id.*) As shown in Figure 2 of *DeMuro*, coil 58 is coupled to other components of battery circuit 42, and the conductor (e.g., wire) (exemplified in red below) coupling coil 58 to resistor 72 is a *transmission conductor configured* in the manner claimed in limitation 1(d). (Ex. 1014, FIG. 2; Ex. 1002, ¶87.) Alternatively, the conductor (e.g., wire) (also exemplified in red below) coupling capacitor 56 to ground is a *transmission conductor configured* in that manner. (Ex. 1014, FIG. 2; Ex. 1002, ¶87.)

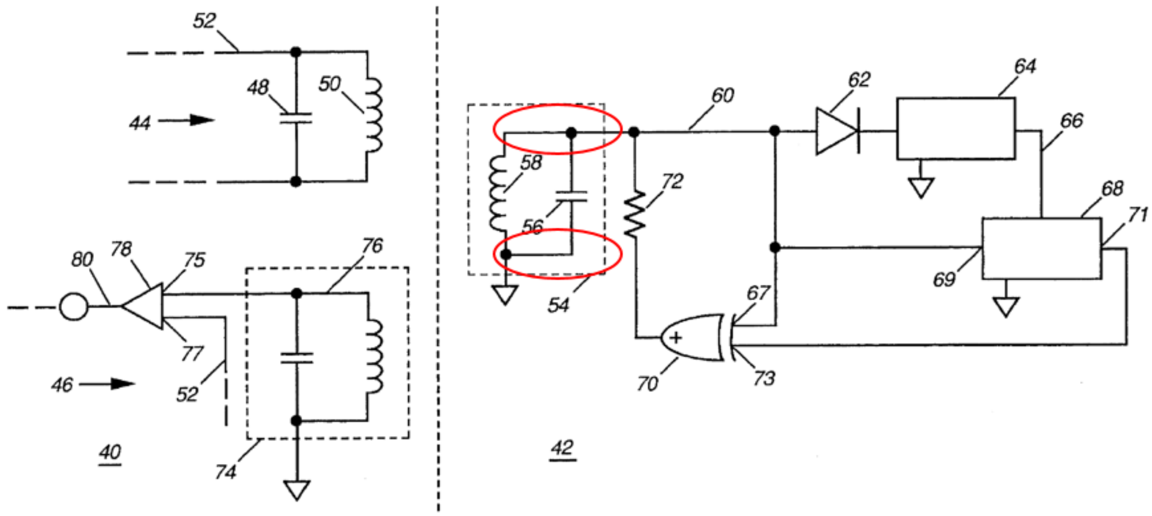


FIG. 2

(Ex. 1014, FIG. 2 (annotated); Ex. 1002, ¶87.)[7]

In light of *Garcia*'s disclosures (incorporating *DeMuro*'s disclosures), a POSITA would have been motivated, and found it predictable, to configure *Hack*'s device 100 ("apparatus") in the manner described above in this section (i.e., resulting in an implementation tracking the features of limitation 1(d)). Ex. 1002, ¶88.) For example, a POSITA would have recognized benefits of wirelessly receiving an

[7] Annotations herein are exemplary. For example, the annotations here (including red ovals) exemplify general identifications and are not intended to reflect precise location of the conductive path that is present via the circuitry disclosed by *Hack-Garcia*). The transmission conductor can be the path between the top two nodes (e.g., between elements 58 and 60). (Ex. 1002, ¶87.)

alternating an electromagnetic field that is used to provide power to charging the battery of *Hack*'s device 100, e.g., to ensure continued supply of power to components of device 100. (Ex. 1002, ¶88.) Indeed, *Hack* discloses that its battery is rechargeable (Ex. 1005, ¶[0053]), and wirelessly receiving such an alternating electromagnetic field, to wirelessly charge the battery, would have been a known and convenient charging technique that would have been compatible with *Hack*'s disclosed apparatus. (Ex. 1002, ¶88.) For example, *Naskali* explained to those skilled in the art the existence and benefit of known technologies for wirelessly charging a battery using a magnetic flux transferred wirelessly from one coil to another. (Ex. 1017, 5:53-66 ("[T]he portable electronic devices 18 do not need to be inserted into the housing 24 of the charging device. In fact, the portable electronic devices 18 can be spaced apart from the housing 24 … ."); Ex. 1002, ¶88.)[8]

Thus, a POSITA would have recognized in view of *Garcia* that the power to charge *Hack*'s device (i.e., to charge the rechargeable battery of the device) can be provided wirelessly. (Ex. 1002, ¶89.)

The above modification to *Hack* would have been feasible and straightforward for a POSITA to implement, e.g., because inductor coils and related circuitry such as those described in *Garcia* were known to be fundamental components used in

[8] Exhibit 1017 is cited to demonstrate state of the art. (Ex. 1002, ¶88.)

electrical engineering and circuit design. (Ex. 1002, ¶90.) A POSITA would have been capable of implementing such a configuration. (*Id.*) For example, a POSITA would have been skilled at circuit design and would have been capable of implementing a transmission conductor and related circuitry, e.g., using known integrated circuit design principles, in a manner compatible with and consistent with the structure and operation of *Hack*'s device 100. (*Id.*) Indeed, integrated circuits (ICs) were commonly used for implementing various types of circuits in a small form factor, and a POSITA would have been able to implement in *Hack*'s device a transmission conductor as recited in limitation 1(e), particularly given that the device already includes circuitry (e.g., because it includes a processor, which requires circuitry). (*Id.*)

A POSITA would have had a reasonable expectation of success implementing such a configuration, e.g., as demonstrated by other state of the art references also using a similar coil-based wireless power transmission technique. (Ex. 1010, Title, Abstract ("power … is transmitted across a panel/bulkhead … by means of a … magnetic coupling between a pair of transmission and receiving coils"), 1:10-12 ("It is … known … to transmit power … using radio waves."), 2:2:1-6, 3:19-28 ("[A]n [oscillator] 10 energis[es] a transmitter coil 12 to create an alternating electromagnetic flux [that] induces an E.M.F. in a receiver coil [and] a basic sinusoidal transmitter could convey power to the receiver…"), FIGS. 1-2 (showing inductive (magnetic) coupling for transmitting power); Ex. 1017, FIGS. 2 (showing charging device 24 that wirelessly charges device 18), 3 (showing transmit/receive coils 26, 40 for wireless charging), 5:53-66 (describing Figures 2 and 3); Ex. 1002, ¶90.)[9]

A POSITA would have been skilled at implementing circuits, including providing power to circuit components, and would have been able to make any necessary technical adaptations to *Hack*'s device to implement the above configuration. (Ex. 1002, ¶91.) For example, *Hack* describes an arrangement in which its display 106 "can be detachably coupled or removably connected to the housing 102, as well as to any number of external devices, such as … laptop or personal computers" (Ex. 1005, ¶[0103]), and thus *Hack* contemplates that its device may operate with various arrangements and sizes. (Ex. 1002, ¶91.) Therefore, it would have been obvious to configure *Hack*'s device as needed to accommodate the above configuration in device 100, to ensure proper wireless reception of power in *Hack*'s device. (*Id.*) Accordingly, a POSITA would have been motivated to implement, and capable of implementing, any needed circuitry or design adjustments to *Hack*'s device 100 for achieving a working system with the above configuration

[9] Exhibit 1010 is cited to demonstrate state of the art. (Ex. 1002, ¶90.)

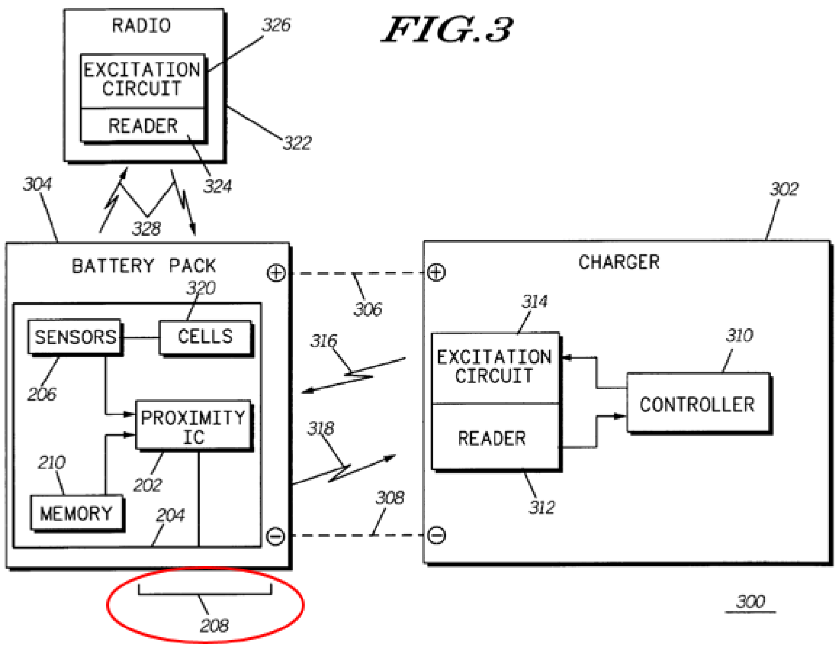
regarding the claimed "transmission conductor…" and would have had a reasonable expectation of its successful operation. (*Id.*)

e) a proximity sensor.

While *Hack* does not explicitly disclose that device 100 includes a proximity sensor, it would have been obvious in view of *Garcia* to implement this generically claimed feature.[10] (Ex. 1002, ¶¶92-94.) At the outset, claim 1 does not recite any specific structure or feature for the "proximity sensor" and is not limited to any specific type of proximity sensor, and the '252 patent does not describe any criticality regarding such a claimed sensor. Proximity sensors were well known to a POSITA, and *Garcia* discloses a proximity sensor. (Ex. 1002, ¶92.) As explained above for limitation 1(d), a POSITA had reason to consider the teachings of *Garcia* when implementing *Hack*'s device 100. (*Supra* Section IX.A.1(d).) *Garcia* discloses that a "**proximity sensor** 208, including proximity IC 202 and coil 204, is coupled to the battery pack 304," as shown below in Figure 3 of *Garcia*. (Ex. 1006, 2:66-3:3; *id.*, Abstract ("proximity sensor (208) is located in the battery pack (304)"), FIG. 3.)

[10] PO refers to a light sensor and GPS antenna as proximity sensors in its contentions. (Ex. 1058, 41; Ex. 1087, 32.)

FIG.3



(Ex. 1006, FIG. 3 (proximity sensor 208 in red); Ex. 1002, ¶92.)

Garcia explains that "proximity sensor 208 [is] known in the art" (Ex. 1006, 2:34-36) and that "proximity sensor 208 (upon activation) dynamically reads battery cell parameters" so that "[t]his battery parameter information can now be transferred back over a wireless link to the external [power] source" (*id.*, 2:53-59). *Garcia* further explains that it was known even at the time of *Garcia* to determine if a battery charger is close (proximate) to a battery, in order to determine if a wireless communication link should be established to support wireless recharging. (*Id.*, 2:8-17 (describing "determin[ing] if a battery pack 14 is **proximally located** to the charger. When the battery pack 14 is brought **next to the battery charger 12 through a small distance**, a communication link is established over the wireless channel 32. The battery charger 12 then commences a recharge process in accordance with the information received from the battery's memory holding device 30."); *see also id.*, 2:47-49, 3:3-5 ("The proximity sensor 208 preferably operates in the same manner as the wireless battery communications module 28 of [*DeMuro*]."), 3:28-32 ("When the **battery 304 is brought within a predetermined distance of the charger 302**, the magnetic flux signal 316 stimulates the battery coil 204 which in turn activates the proximity IC 202 to read the battery parameters"), 3:38-41 ("Mutual induction is established between the two coils **when brought in close proximity to each other** with the modulation providing for a transfer of information."), FIGS. 1-4; Ex. 1002, ¶93.)

Thus, *Garcia*'s proximity sensor supports wireless charging by detecting when a battery is near (proximate to) a charger such that charging-related activities should occur and such that communications relating to such charging can be performed, and a POSITA would have therefore found such a proximity sensor to be useful and predictable to implement in *Hack*'s device 100 to similarly support wireless charging. (Ex. 1002, ¶94.) Given that *Garcia* explains that such a proximity sensor was well known (even at the time of *Garcia*, *see* Ex. 1006, 2:8-16, 2:34-36), it would have been simple to implement a proximity sensor in *Hack*'s device 100, and a POSITA would have had a reasonable expectation of success implementing this configuration, particularly because the '252 patent does not describe any criticality or unexpected results regarding using a proximity sensor. (*See generally* Ex. 1001; Ex. 1002, ¶94.)

2. Claim 2

a) The apparatus of claim 1, wherein the flat planar substrate is a glass substrate.

Hack (as modified above) discloses or suggests this limitation. (Ex. 1002, ¶95.) *Hack* describes that the substrate can be formed from a smart material that can be flexible and rigid when retracted and extended. (Ex. 1005, ¶[0068]; *see also id.*, ¶[0066] ("The substrate onto which the OLEDs are deposited may be any suitable substrate that provides desired structural properties. The substrate may be flexible or rigid.").) *Hack* further describes plastic/glass as examples of flexible and/or rigid substrate materials. (*Id.*, ¶[0066] ("Plastic and **glass** are examples of preferred rigid **substrate** materials."); *see also id.*, ¶[0065] ("**glass** or plastic (**substrate**)").) *Hack* explains that "the display 106 can be formed as a flexible display" that can be extended consistent with the discussions above. (*Id.*, ¶¶[0073]-[0075].) Thus, the substrate onto which OLEDs are deposited (*see* limitation 1(b)) can be formed using different materials, including glass. (Ex. 1002, ¶95.)

Nonetheless, to the extent not disclosed by *Hack*, it would have been obvious to form the substrate discussed for limitation 1(b) from glass. As explained, it would have been obvious to modify *Hack*'s device 100 to include a *flat, planar* substrate. (*Supra* Section IX.A.1(b).) For similar reasons, and in light of *Hack*'s disclosures above (e.g., various ways display substrate 106 can be formed, such as the use of smart material that can be rigid/flexible, use of glass, etc.) and the state of the art, a POSITA would have been motivated, and found obvious, to configure the *flat, planar* substrate of the modified *Hack* device to be a glass substrate. (Ex. 1005, ¶¶[0066]-[0073], FIGS. 2A-2B, 3A-3C; Ex. 1002, ¶95.) A POSITA would have recognized the benefits of using known and available substrate materials for forming components, such as using known materials and substrate design concepts in forming the display device of *Hack*, which uses OLEDs (known to be formed on glass substrates, as even *Hack* recognized). (Ex. 1002, ¶95; Ex. 1005, ¶[0066].) Indeed, flexible glass substrates for similar purposes were known, which would have been compatible with *Hack*'s embodiments. (Ex. 1024, Title ("Flexible Substrate"), Abstract ("substrate comprising a glass sheet" and "[t]his substrate proves to be flexible"); 1:7-11, 1:19-27 ("substrate which is flexible"), 3:25-32; Ex. 1002, ¶95.)[11]

Thus, given the knowledge of a POSITA and the disclosures of *Hack-Garcia*, a POSITA would have had the skills and motivation (with a reasonable expectation of success) to implement *Hack*'s display substrate as a glass substrate. Indeed, such a configuration would have involved the use of known technologies and techniques (use of known substrate materials and designs) to produce the predictable result of

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[11] Exhibit 1024 demonstrates state of the art. (Ex. 1002, ¶95.)

providing a base from known materials from which to mount the LED components of *Hack*'s display. (Ex. 1002, ¶95.)

3. Claim 3

a) The apparatus of claim 1, wherein the plurality of LEDs comprises a plurality of organic LEDs.

Hack discloses this limitation, as discussed above for limitation 1(b). (*Supra* Section IX.A.1(b); Ex. 1005, ¶¶[0063] ("organic light emitting devices (OLEDs)"), [0064], [0066], [0071]-[0072], [0076]; Ex. 1002, ¶96.)

4. Claim 4

a) The apparatus of claim 1 further comprising: an LED circuit comprising at least one LED, wherein the at least one LED is coated with a phosphor to produce a change in color.

Hack discloses or suggests this limitation. (Ex. 1002, ¶¶97-101.) As discussed above for limitation 1(b), *Hack* discloses that its device 100 ("apparatus") includes a display having LEDs, and a POSITA would have understood that device 100 containing LEDs necessarily includes an LED *circuit* comprising at least one LED. (Ex. 1002, ¶97.) For example, a POSITA would have had this understanding because an LED is an electrical component that requires power to operate, and such power is provided via a circuit by which current flows across the LED. (Ex. 1002, ¶97.) Indeed, without an LED circuit, an LED cannot operate. (*Id.*)

Hack further discloses or suggests that the at least one LED is coated with a phosphor to produce a change in color. (*Id.*, ¶98.) For instance, *Hack* discloses that its "light emitting elements are high efficiency, organic light emitting devices (OLEDs) that use phosphorescent emitters such as disclosed in U.S. Pat. No. 6,303,238 B1, which is hereby incorporated herein by reference in its entirety." (Ex. 1005, ¶[0063].) U.S. Patent No. 6,303,238 ("*Thompson*") (Ex. 1015), entitled "OLEDs Doped With Phosphorescent Compounds," discloses "[o]rganic light emitting devices" which include "an emissive layer containing a phosphorescent dopant compound." (Ex. 1015, Abstract; *see also id.*, 11:61-12:5.) *Thompson* incorporates by reference U.S. Patent No. 5,874,803 ("*Garbuzov*") (Ex. 1016) in its entirety (Ex. 1015, 12:6-7, 12:51-54, 13:3-5.) *Garbuzov*, entitled "Light Emitting Device With Stack of OLEDs and **Phosphor Downconverter**," discloses "multicolor light emitting devices which **make use of phosphor layers to downconvert light** emitted from organic light emitting materials **into different, more desired colors**" and explains that its "light emitting devices … are used in a variety of applications to provide displays with high brightnesses and efficiencies." (Ex. 1016, Abstract; *see also id.*, 1:8-11 ("This invention relates to light emitting devices that use layers of organic light emitting materials and **phosphor downconverters to provide** monochromatic or **multicolor displays**."), 2:15-18 ("multicolor light emitting devices that make use of **phosphor layers to downconvert the color of light** emitted from organic light emitting materials **into**

different colors”), 2:64-66 (“light emitting devices that make use of downconversion phosphor layers to provide displays of high efficiency and brightness”); Ex. 1002, ¶98.)

Garbuzov (part of *Hack*’s disclosure) discloses with reference to Figure 2 (below) that “light emitting device 100” includes “a stacked arrangement of organic light emitting layers,” including a “red downconversion phosphor layer 114 [that] is provided over green light emitting layer 113,” and explains that “[t]o emit red light, a voltage is applied between conductive layer 123 and metal contact layer 130 so that second blue light emitting layer 115 emits **blue light, which is then converted to red light by red downconversion phosphor layer 114**.” (Ex. 1016, 3:10-17, 3:61-65.)

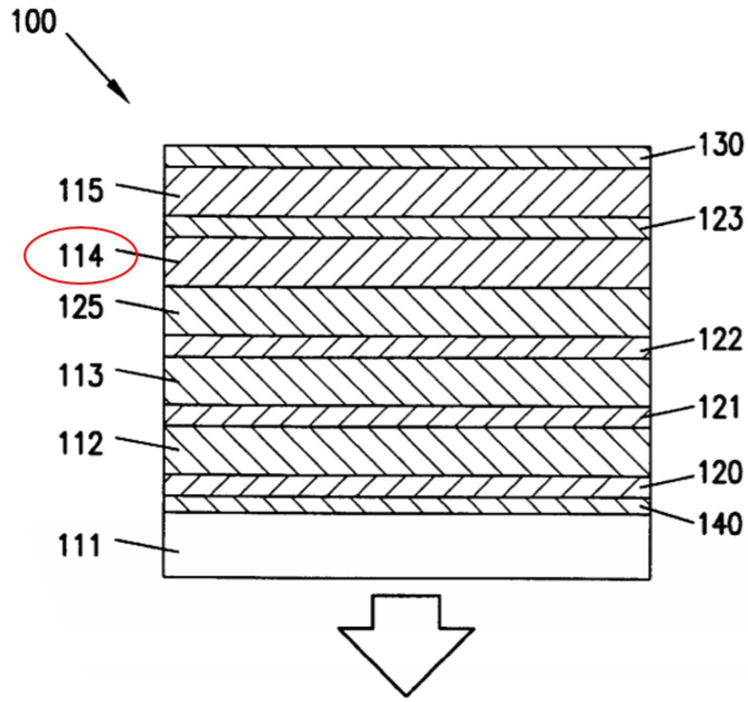


FIG. 2

(*Id.*, FIG. 2 (phosphor layer 114 annotated in red); Ex. 1002, ¶99.)

Thus, *Hack* (by virtue of the above-discussed incorporations by reference) discloses that an LED is coated with a phosphor to produce a change in color. (Ex. 1002, ¶100.) Such disclosure regarding a phosphor layer discloses the LED being *coated with* a phosphor, as this was well-understood terminology in the art of LEDs/lighting. (*Id.*) For example, *Birrell*, similarly relating to LEDs, describes "a mono-chromatic blue semi-conductor LED light activating a phosphor **coating**," where "[t]he phosphor **coating** … converts mono-chromatic light with a wavelength of blue light or shorter to substantially white light containing light of various wavelengths." (Ex. 1011, 12:4-10.)[12]

A POSITA would further have understood that *Hack*'s incorporated disclosure regarding the phosphor coating relates to the at least one LED of *Hack*'s LED circuit, because that is the only context in which *Hack* describes LEDs (i.e., OLEDs of its display) and because *Hack* discloses that its display includes pixels of varying colors. (*Supra* Section IX.A.1(b).) For example, *Hack* discloses that "[t]he display can include a plurality of self-configurable pixels[, which] … can be adapted to configure themselves with respect to color" and "[t]he number of light emitting devices that form a sub-pixel can depend on the color(s) … of the pixel." (Ex. 1005, ¶[0015]; *see also id.*, ¶¶[0016] ("A pixel can include one or more colored or infrared sub-pixels."), [0024] ("full color display"), [0061] ("values that represent pixel … color"), [0087] ("color"), [0094] ("the display screen 110 provides full color display"), [0100] ("In a color display, each pixel can include three sub-pixels—one for each of the primary colors…"); Ex. 1002, ¶101.) Therefore, the incorporated disclosure of *Thompson* in *Hack* (and likewise, the incorporated disclosure of *Garbuzov* in *Thompson*) provides additional details regarding implementation of at least one OLED of *Hack*'s LED circuit. (Ex. 1002, ¶101.) Thus, *Hack*'s OLEDs discussed for limitation 1(b) require an LED circuit, and at least one LED in that

[12] Exhibit 1011 is cited to demonstrate state of the art. (Ex. 1002, ¶100.)

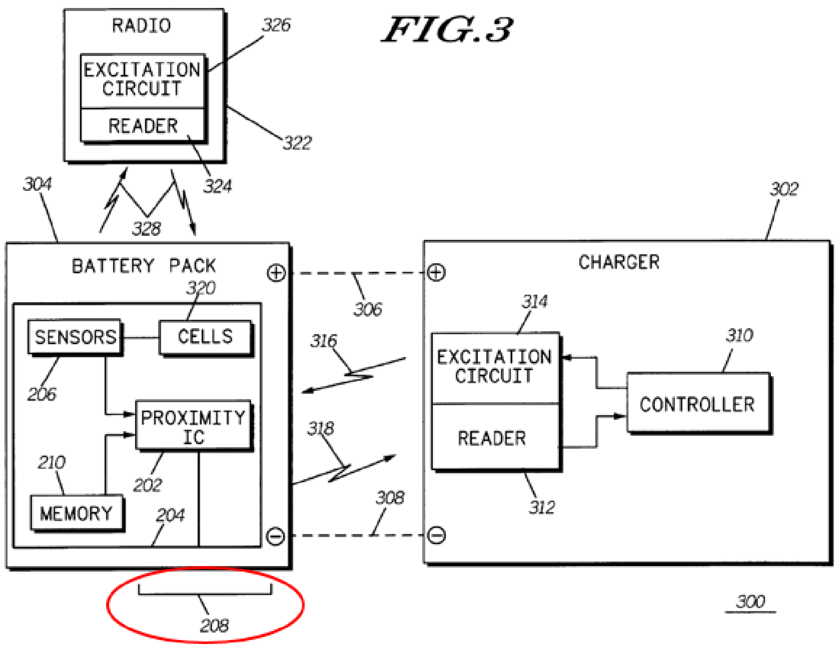
LED circuit is coated with a phosphor to produce a change in color. (*Id.*)

5. Claim 5

a) The apparatus of claim 1, wherein the power provided to charge the apparatus is provided in response to a sensor.

Hack in combination with *Garcia* discloses or suggests this limitation. (Ex. 1002, ¶¶102-105.) As discussed above for limitation 1(d), the combined *Hack-Garcia* system discloses or suggests providing power to charge *Hack*'s device 100 (the "apparatus"). (*Supra* Section IX.A.1(d).) While *Hack* does not explicitly disclose that the power provided to charge device 100 is provided in response to a sensor, it would have been obvious in view of *Garcia* to implement this feature. (Ex. 1002, ¶102.)

As discussed above for limitation 1(e), *Garcia* discloses a proximity sensor 208 coupled to battery pack 304. (*Supra* Section IX.A.1(e); Ex. 1006, Abstract, 2:66-3:3.) The proximity sensor is shown in Figure 3 of *Garcia*:



(Ex. 1006, FIG. 3 (proximity sensor 208 exemplarily annotated in red); Ex. 1002, ¶103.)

As further explained for limitation 1(e), *Garcia* discloses that charging occurs in response to a proximity determination made by proximity sensor. (*Supra* Section IX.A.1(e); Ex. 1006, 2:8-17 (describing "determin[ing] if a battery pack 14 is **proximally located** to the charger. When the battery pack 14 is brought **next to the battery charger 12 through a small distance**, a communication link is established over the wireless channel 32. The battery charger 12 **then commences a recharge process** in accordance with the information received from the battery's memory holding device 30."), 3:38-41 ("Mutual induction is established between the two coils **when brought in close proximity to each other** … ."); *see also id.*, 2:47-49, 3:3-5, 3:28-32, FIGS. 1-4; Ex. 1002, ¶104.)

In light of *Garcia*'s disclosures, a POSITA would have been motivated, and found it predictable, to configure the combined *Hack-Garcia* apparatus so that the power provided to charge the combined apparatus is provided in response to a sensor.[13] (Ex. 1002, ¶105.) As discussed for limitation 1(e), a POSITA would have had reason to consider the teachings of *Garcia* when implementing *Hack*'s device, and would have found various aspects of *Garcia*'s disclosure (e.g., regarding wireless recharging) to be useful and beneficial to implement. (*Supra* Section IX.A.1(e); Ex. 1002, ¶105.) A POSITA would have appreciated that the above configuration would have advantageously leveraged a known approach, as demonstrated by *Garcia*, and a POSITA would have been inclined to pursue such a known approach, e.g., for reliability and rapidity of design. (Ex. 1002, ¶105.) A POSITA would have been skilled at implementing various types of sensors and would have found the above configuration to be a predictable use of a known sensor, like in *Garcia*'s disclosure, and accordingly would have had a reasonable expectation of success implementing such a configuration. (*Id.*)

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[13] PO asserts a wireless charger providing power meets this limitation. (Ex. 1058, 8, 22, 44; Ex. 1087, 7, 18, 34-35.)

6. Claim 6

a) The apparatus of claim 1, wherein the apparatus is portable.

Hack discloses this limitation, as discussed above for the preamble of claim 1. (*Supra* Section IX.A.1(a); Ex. 1005, ¶[0010] ("Such display systems can be used as hand-held, **portable** communications devices."); *see also id.*, Abstract ("portable"), ¶¶[0002]-[0003] (same), [0041] ("wireless data transmissions"), [0103] (same), [0118] (same); Ex. 1002, ¶106.)

7. Claim 7

a) An apparatus comprising:

Hack discloses a communications device 100 ("apparatus"), as discussed above for the preamble of claim 1. (*Supra* Section IX.A.1(a); Ex. 1002, ¶107; *see also infra* Sections IX.A.7(b)-(c) regarding the remaining elements of this claim.)

b) a flat planar substrate upon which is mounted a plurality of LEDs, wherein the flat planar substrate is flexible;

Hack discloses or suggests this limitation. (Ex. 1002, ¶¶108-109.) As discussed above for limitation 1(b), *Hack* discloses that device 100 ("apparatus") comprises a surface upon which is mounted a plurality of LEDs. (*Supra* Section IX.A.1(b).) *Hack* discloses that the substrate is flexible. (Ex. 1005, ¶[0066] ("The substrate may be **flexible** …. Plastic and metal foils are examples of preferred **flexible substrate** materials."); *see also id.*, ¶¶[0012] ("The display can be a flexible display."), [0065] ("A **flexible** … substrate-anode combination is disclosed in U.S. Pat. No. 5,844,363, which is incorporated by reference in its entirety."), [0068] ("the display substrate can be formed from a smart material that is flexible when the display 106 is retracted"), [0069]-[0071] ("flexible substrate[s]"), [0072]-[0073] ("flexible"), [0076] ("the components that are deposited onto the substrate should be small enough and flexible enough to provide for a sufficiently small radius of curvature").)

As discussed for limitation 1(b), it would have been obvious to implement *Hack*'s substrate to be *flat* and *planar*. (*Supra* Section IX.A.1(b).) It would also have been obvious to implement the modified *Hack* device's substrate that is *flat and planar* to be flexible, as recited in limitation 7(b). (Ex. 1002, ¶109.) For example, a POSITA would have been skilled at processing a substrate in numerous ways, and given the knowledge of a POSITA and *Hack*'s explicit disclosures regarding flexible substrate materials (e.g., plastic and metal), a POSITA would have been able to, and found it predictable to, configure such flexible substrate materials to be flat and planar (like in the modified *Hack* device). (Ex. 1020, FIG. 10A (showing flat, planar substrate 11), ¶[0090] ("In FIG. 10A, a substrate 11 may be … a plastic substrate (including a plastic film), a metal substrate"); Ex. 1021, 2:19-22 ("substrate is preferably fabricated of polycarbonate, but other **soft plastic** materials may be suitable"), 3:39-41 ("generally **flat or planar substrate** 46"); Ex. 1023, 8:42-44 ("a flexible plastic substrate 902 on which is formed a portion of an OLED structure"), 4:17-19, FIG. 9A (showing flat, planar substrate 902); Ex. 1002, ¶109.)[14] A POSITA would have had a reasonable expectation of the above implementation operating successfully, because such an implementation involved simple issues regarding shape and material selection that would have been within ordinary skill. (Ex. 1002, ¶109.)

c) a data receiver, wherein the data receiver is configured to receive data from an antenna;

d) a transmission conductor configured to wirelessly receive an alternating electromagnetic field that is used to provide power to charge the apparatus; and

e) a proximity sensor.

Hack in combination with *Garcia* discloses or suggests these limitations for the reasons discussed above regarding limitations 1(c)-(e), which are substantially the same as limitations 7(c)-(e). (*Supra* Sections IX.A.1(c)-(e); Ex. 1002, ¶110.)

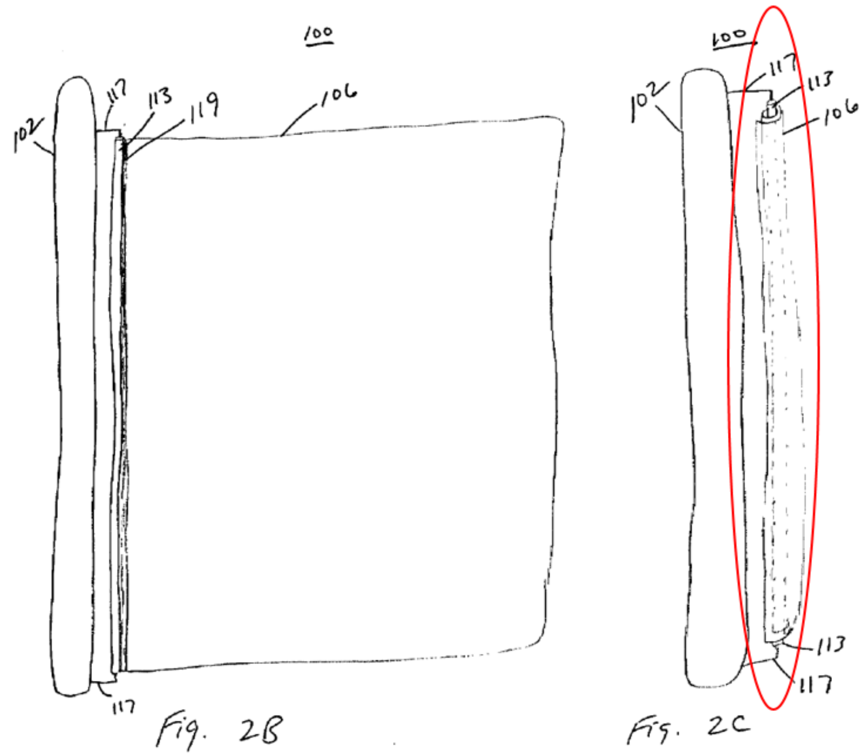
[14] Exhibits 1020 and 1021 are cited to demonstrate state of the art. (Ex. 1002, ¶109.)

8. Claim 8

a) The apparatus of claim 7, wherein the flat planar substrate is sufficiently flexible to be bent around a cylindrical shape.

Hack discloses or suggests this limitation.[15] (Ex. 1002, ¶¶111-114.) As discussed above for limitation 7(b), *Hack* discloses that its substrate is "flexible." (Ex. 1005, ¶¶[0012], [0065], [0069]-[0073], [0076]; *supra* Section IX.A.7(b).) *Hack* further discloses that "display 106 can be formed as a flexible display that can be **rolled around a rod** 113, for example, such as shown in FIGS. 2A-2C." (Ex. 1005, ¶[0073].) "To collapse the display 106, the user can simply **wind the display 106 around the rod 113 (as shown in FIG. 2C)**." (*Id.*; *see also id.*, ¶[0076] ("display 106 could be thin and **flexible enough to roll or fold into a housing 102** that is about the size of an ordinary pen or pointer, **or onto a rod** that is connected to the housing…").)

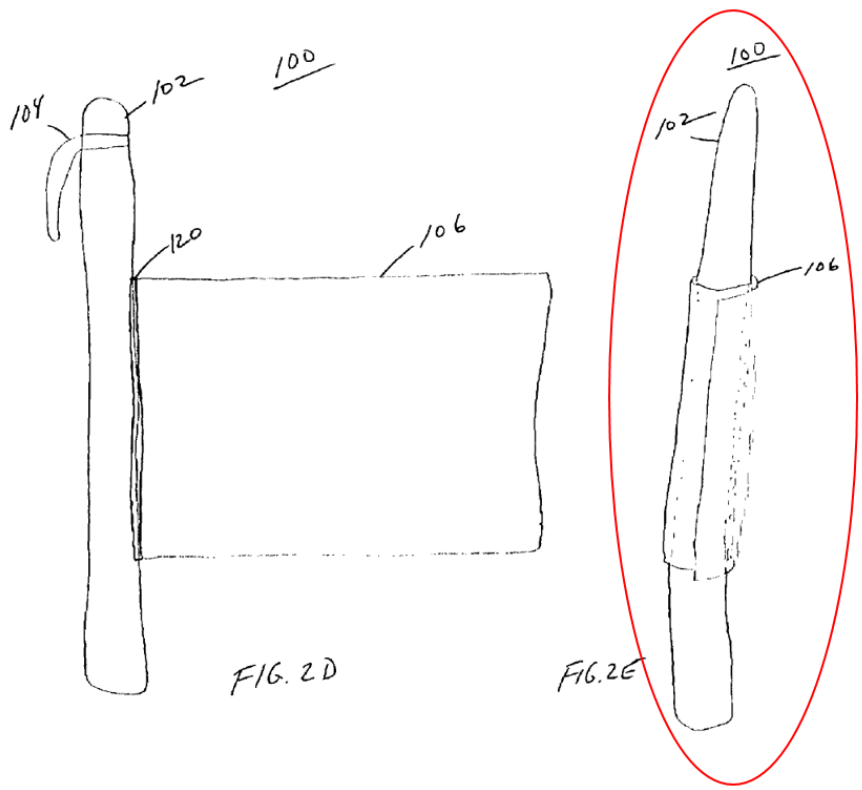
[15] Petitioner reserves the right to challenge this and other claims under 35 U.S.C. § 112 in other proceedings.



(Ex. 1005, FIGS. 2B (showing display 106, including *Hack*'s substrate, in an extended configuration), 2C (annotated, and showing display 106 wound around rod 113); *see also id.*, [0012] ("The communications device can include a rod that is coupled to the housing and to the display such that the display can be wound around the rod."); Ex. 1002, ¶111.)

Thus, *Hack*'s substrate is sufficiently flexible to be bent around a cylindrical shape, e.g., because rod 113 has a cylindrical shape, as shown above at the top of Figure 2C. (Ex. 1005, FIG. 2C, ¶[0076] (describing "a display having as small a **radius of curvature** as possible" and that "the components that are deposited onto the substrate should be small enough and flexible enough to provide for a sufficiently small **radius of curvature**"); Ex. 1002, ¶112.)

Similarly, *Hack* discloses with reference to Figure 2E (below) that "display 106 can be rolled around the housing 102," which similarly has a cylindrical shape (e.g., as shown in Figures 2D and 2E, and also because *Hack* describes with reference to Figure 2 that "device 100 is a hand-held or pocket-sized device that has an overall shape similar to that of a pen or pointer"). (Ex. 1005, ¶[0029]; *see also id.*, FIGS. 2D-2E; Ex. 1002, ¶113.)



(Ex. 1005, FIGS. 2D-2E (annotated); Ex. 1002, ¶113.)

As discussed for limitation 1(b), it would have been obvious to implement *Hack*'s substrate to be *flat* and *planar*. (*Supra* Section IX.A.1(b).) It would also have been obvious to implement the modified *Hack* device's substrate that is *flat and planar* to be sufficiently flexible to bend around a cylindrical shape, as recited in claim 8. (Ex. 1002, ¶114.) For example, it would have been beneficial, feasible, and predictable to implement the flat and planar substrate of the modified *Hack* device to be sufficiently flexible to bend around a cylindrical shape, given that *Hack* describes benefits and feasibility of such flexibility (*see, e.g.*, Ex. 1005, ¶[0076]) and given a POSITA's knowledge which would have enabled the POSITA to configure the flat and planar substrate of the modified *Hack* device (discussed for limitation 7(b)) to be made of a material (as described in *Hack*) that affords such flexibility. (Ex. 1002, ¶114.) Similarly, a POSITA would have had a reasonable expectation of the above implementation operating successfully, given a POSITA's knowledge regarding processing substrates and *Hack*'s teachings regarding flexible substrate materials. (*Id.*)

9. Claim 9

a) The apparatus of claim 7, wherein the flat planar substrate is sufficiently flexible to be folded without breaking.

Hack discloses or suggests this limitation[16], for at least the reasons discussed

[16] PO asserts an AMOLED display meets this limitation. (*See* Ex. 1058, 26; Ex. 1087, 21-22.)

above regarding claim 8 and also because *Hack* discloses that display 106, including LEDs deposited on *Hack*'s substrate, is "flexible enough to roll or **fold** into a housing 102 that is about the size of an ordinary pen or pointer, or onto a rod that is connected to the housing," as shown above (*supra* Section IX.A.8) in Figures 2C and 2E of *Hack*. (Ex. 1005, ¶[0076]; *see also id.*, FIGS. 2C, 2E, ¶[0012] ("The display can be a **foldable** display."); Ex. 1002, ¶¶115-116.) Thus, *Hack*'s flat, planar substrate is sufficiently flexible to be folded without breaking, in order to accommodate the foldability of display 106. (Ex. 1002, ¶115.) Thus, *Hack* necessarily discloses this substrate characteristic (non-breaking) because if *Hack*'s disclosed rolled or folded aspects resulted in the substrate breaking, the disclosed apparatus would not operate as described. (*Id.*)

As discussed for claim 8, it would have been obvious to implement the modified *Hack* device's substrate that is *flat and planar* to be sufficiently flexible to bend around a cylindrical shape, as recited in claim 9. (*Supra* Section IX.A.8.) Similarly, it would have been obvious to implement the modified *Hack* device's substrate that is *flat and planar* to be sufficiently flexible to be folded without breaking. (Ex. 1002, ¶116.) For example, similar to as discussed above for claim 8 (*supra* Section IX.A.9), a POSITA would have found it beneficial, feasible, and predictable to implement the flat and planar substrate of the modified *Hack* device (discussed for claim 8) to be sufficiently flexible to be folded without breaking, given that *Hack* describes benefits and feasibility of such flexibility (*see, e.g.*, Ex. 1005, ¶[0076]) and given a POSITA's knowledge which would have enabled the POSITA to configure the flat and planar substrate of the modified *Hack* device to be made of a material (as described in *Hack*) that affords such flexibility. (Ex. 1002, ¶116.) Similarly, a POSITA would have had a reasonable expectation of the above implementation operating successfully, given a POSITA's knowledge regarding processing substrates and *Hack*'s teachings regarding flexible substrate materials. (*Id.*)

10. Claim 12

a) The apparatus of claim 7, wherein the apparatus is portable.

Hack discloses this limitation, as discussed above for claim 6. (*Supra* Section IX.A.6; Ex. 1002, ¶117.)

11. Claim 13

a) The apparatus of claim 7 further comprising: an LED circuit comprising at least one LED, wherein the at least one LED is coated with a phosphor to produce a change in color.

Hack discloses or suggests this limitation for the same reasons discussed above regarding claims 4 and 7 (the base claim from which claim 13 depends). (*Supra* Sections IX.A.4, IX.A.7; Ex. 1002, ¶118.)

12. Claim 14

a) The apparatus of claim 7, wherein the plurality of LEDs comprises a plurality of organic LEDs.

Hack discloses this limitation, as discussed above for claim 3. (*Supra* Section IX.A.3; Ex. 1002, ¶119.)

13. Claim 15

a) The apparatus of claim 7, wherein the power provided to charge the apparatus is provided in response to a sensor.

Hack in combination with *Garcia* discloses or suggests this limitation for at least the same reasons discussed above regarding claim 5 and claim 7 (the base claim from which claim 15 depends). (*Supra* Sections IX.A.5, IX.A.7; Ex. 1002, ¶120.)

14. Claim 16

a) An apparatus comprising:

Hack discloses a communications device 100 ("apparatus"), as discussed above for the preamble of claim 1. (*Supra* Section IX.A.1(a); Ex. 1002, ¶121; *see also infra* Sections IX.A.14(b)-(e) regarding the remaining elements of this claim.)

b) a flat planar substrate upon which is mounted a plurality of organic LEDs;

Hack discloses this limitation for the reasons discussed above for limitation 1(b) and claim 3. (*Supra* Sections IX.A.1(b), IX.A.3; Ex. 1002, ¶122.)

c) a data receiver, wherein the data receiver is configured to receive data from an antenna;

d) a transmission conductor configured to wirelessly receive an alternating electromagnetic field that is used to provide power to charge the apparatus; and

e) a proximity sensor.

Hack-Garcia discloses these limitations for the reasons discussed above regarding limitations 1(c)-(e), which are substantially the same as limitations 16(c)-(e). (*Supra* Sections IX.A.1(c)-(e); *see also supra* Sections IX.7(c)-(e) (identical limitations as here); Ex. 1002, ¶123.)

15. Claim 18

a) The apparatus of claim 16 further comprising: an LED circuit comprising at least one LED, wherein the at least one LED is coated with a phosphor to produce a change in color.

Hack discloses or suggests this limitation for the same reasons discussed above regarding claims 4 and 16 (the base claim from which claim 18 depends). (*Supra* Sections IX.A.4, IX.A.14; Ex. 1002, ¶124.)

16. Claim 19

a) The apparatus of claim 16, wherein the apparatus is portable.

Hack discloses this limitation, as discussed above for claim 6. (*Supra* Section IX.A.6; Ex. 1002, ¶125.)

B. Ground 2: Claims 10, 11, and 17 Are Obvious Over *Hack*, *Garcia*, and *Cordelli*

1. Claim 10

a) The apparatus of claim 7, wherein the apparatus is capable of receiving the power from a second power source that comprises a power supply configured to receive a first AC voltage from an AC mains and to output an output voltage lower than the first AC voltage, wherein the power supply includes a three-way switch for adjusting the output voltage.

Hack in combination with *Garcia* and *Cordelli* discloses or suggests this limitation. (Ex. 1002, ¶¶126-140.) As discussed above for limitation 1(b) (Section IX.A.1(b)), *Hack*'s device 100 ("the apparatus") includes a battery. (Ex. 1005, ¶[0053] ("housing 102 … contains a low voltage power supply 107 such as a … battery"); *see also id.*, ¶[0055] ("solar battery").) *Hack* further discloses that its battery is "rechargeable." (*Id.*, ¶[0053]; *see also id.*, ¶[0055] ("additional power … can be used to charge the battery").) Thus, *Hack* discloses that its device is capable of receiving the power from a battery ("second power source"), because the battery is not a wireless power source (and the wireless power source, discussed above for limitation 7(d), is a first power source). (Ex. 1002, ¶127.) However, *Hack* and *Garcia* do not explicitly disclose that the "apparatus" is capable of receiving power from a second power source *that comprises a power supply configured to receive a first AC voltage from an AC mains and to output an output voltage lower than the first AC voltage, wherein the power supply includes a three-way switch for adjusting* *the output voltage*. Nevertheless, it would have been obvious in view of *Cordelli* to configure the combined *Hack-Garcia* device to implement such features. (Ex. 1002, ¶127.)

At the outset, it was well known to supply AC power (e.g., from AC mains readily available via a wall outlet) via an AC adapter (also referred to as an AC-DC converter) that converts the AC power to DC power, to a portable electronic device such as *Hack*'s device 100. (Ex. 1012, 1:9-28 ("Many different electronic devices are powered by [DC] voltage, as well as [AC] voltage. ... AC voltage must be conve[rt]ed to a DC voltage by an AC adapter to be used in these electronic devices. …"), 1:35-48 (describing known AC adapter of Figure 1), FIG. 1 (showing known AC adapter); Ex. 1022, 1:10-25 ("Many consumer and commercial devices require [DC] power. Since [AC] power is readily available, power supply circuits which convert AC power to DC power are desirable. ..."), FIG. 1 (showing known AC-DC converter); Ex. 1002, ¶128.)[17] [18]

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[17] Exhibits 1012 and 1022 are cited to demonstrate state of the art. (Ex. 1002, ¶128.)

[18] PO has stated in district court that "DC voltage" or "rectified AC voltage" may be provided to LEDs. (*Compare* Ex. 1056, ¶46 *with id.*, ¶58.)

For example, a known, state of the art AC adapter is shown below, with a plug at left (AC input receptacle 52) and a connector 56 at right that supplies DC voltage to an electronic device:

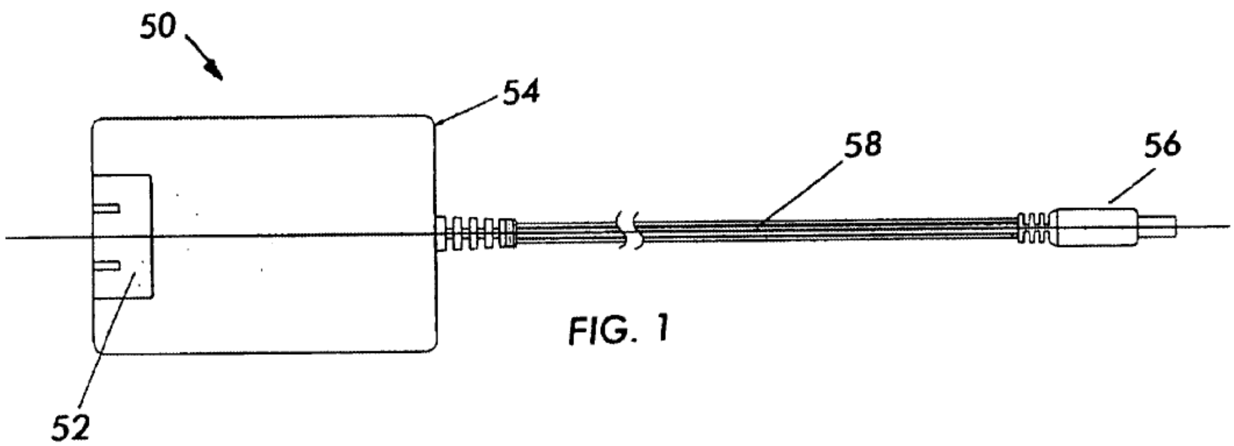

FIG. 1

(Ex. 1012, FIG. 1 (demonstrating known AC adapter); Ex. 1002, ¶128.)

Armed with such knowledge of the state of the art, a POSITA would have looked to *Cordelli*—which, like *Hack*, describes a portable device—and found teachings leading the POSITA to configure the combined *Hack-Garcia* device in the manner described above. (Ex. 1002, ¶129.) *Cordelli* describes a "system which allows [users] of multiple electronic computing and communications devices to power these devices with a single, small, lightweight supply, customized for the power requirements of their particular set of devices." (Ex. 1047, ¶[0003].) *Cordelli* discloses a power supply that charges an electronic device (e.g., a portable device such as a laptop computer) using a "commonly available AC" power source. (Ex.

1047, Title, Abstract, ¶¶[0003] ("[Cordelli] relates to the field of power supplies for low-voltage electronic devices and portable computers and computer peripherals. In particular, this invention relates to a system for the efficient generation of multiple and various low-level AC and DC voltages, from commonly available AC and/or DC power sources."), [0004]-[0005], [0008], [0014], [0041], [0045]-[0046], FIGS. 1A (below), 1B, 6; Ex. 1002, ¶129.) For example, *Cordelli* discloses that its system supplies power to a "laptop computer" 101 or "portable printer" 102, shown in Figure 1A. (Ex. 1047, ¶[0041].)

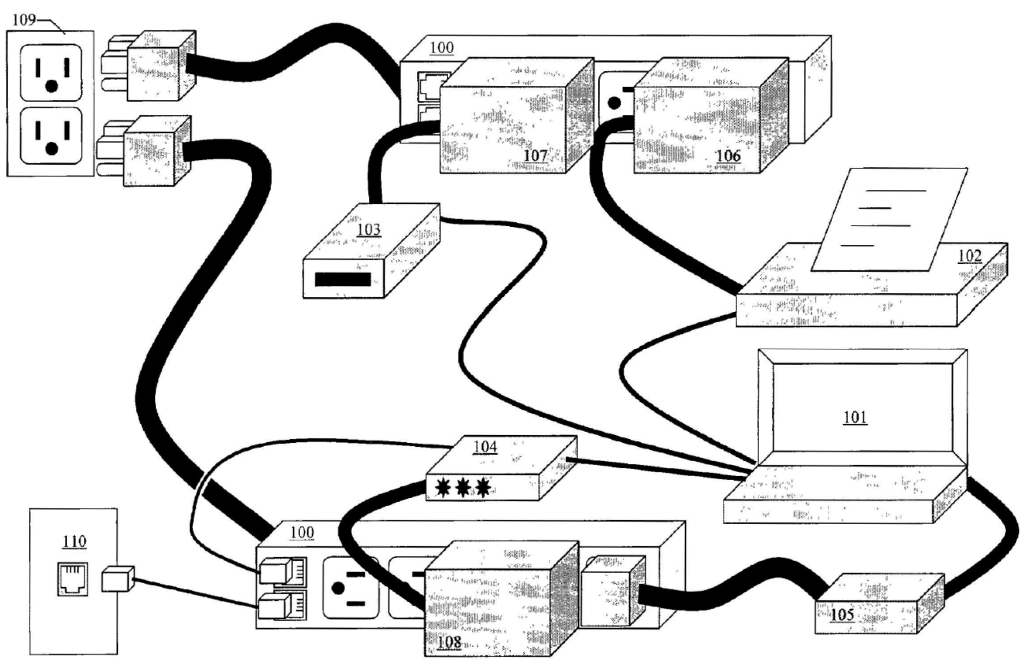

FIG. 1A

(Ex. 1047, FIG. 1A.)

Therefore, a POSITA would have had reason to consult the teachings of *Cordelli*, which describes a power supply for powering a portable device such as a laptop computer, printer, or other types of portable electronic computing and communications devices, when implementing *Hack*'s portable communications device 100 that includes a battery. (Ex. 1005, Title, Abstract, ¶¶[0003], [0029], [0053], [0055]; Ex. 1002, ¶130.) For example, *Cordelli* explains that "[e]lectronic appliances, devices, computers and computer peripherals are becoming smaller and more portable every day" and "[m]any of these types of equipment are powered by internal batteries … with an external power supply providing recharging current to said batteries," so a POSITA would have found *Cordelli* to be relevant regarding powering *Hack*'s hand-held device containing a rechargeable battery. (Ex. 1047, ¶[0004]; *see also* Ex. 1005, ¶¶[0053], [0055]; Ex. 1002, ¶130.)

Cordelli discloses in its background section that it was known that portable electronic appliances "are powered by an external power supply providing, via a simple transformer circuit, a low-level AC voltage source, which is internally rectified and filtered by the equipment to create the required DC voltage or voltages for device operation." (Ex. 1047, ¶[0004]; *see also id.*, ¶¶[0005] (describing known power supplies "plugged into AC wall outlets"), [0014] (describing power supply with AC transformer, rectifier for AC-DC conversion, filter capacitor, and DC/DC conversion circuit); Ex. 1002, ¶131.) *Cordelli* also discloses a system including portable devices (e.g., "laptop computer," "portable printer") "connected via external power supplies" to an "available mains AC outlet (109)" as shown above in

Figure 1A. (Ex. 1047, ¶[0041]; *see also id.*, FIGS. 1A, 1B (depicting another system that uses power from mains AC).)

Cordelli explains that its Figure 1 system includes “external power supplies (105-108) of the ‘wall wart’ or ‘table-top’ style” that are described in *Cordelli*’s background section as being known. (*Id.*, ¶[0041].) Thus, *Cordelli* discloses an electronic device (e.g., laptop computer) that is capable of receiving power from a power source that comprises a power supply 105 (bottom right in Figure 1A) (“a power supply”) configured to receive an AC voltage (“first AC voltage”) from an AC mains. (Ex. 1002, ¶132.)

Cordelli further discloses that its power supply is configured to output an output voltage lower than the first AC voltage. (*Id.*, ¶133.) For example, *Cordelli* explains that its power supply “provid[es], **via a simple transformer circuit, a low-level AC voltage** source, which is internally rectified and filtered by the equipment to create the required DC voltage or voltages for device operation.” (Ex. 1047, ¶[0004].) *Cordelli* further discloses that “[m]ost of these [known power] supplies … comprise an AC/DC transformation circuit followed by a DC/DC conversion circuit,” where “[t]he AC/DC circuit generally consists of an **AC power transformer**, a rectifier for changing the AC into DC and a large “filter” capacitor to smooth the output into a relatively ‘flat’ DC level” and “[t]he DC/DC conversion circuit may consist of a ‘linear’ regulator and additional ‘filter’ capacitor for

converting the DC voltage from the AC/DC circuit down to the desired DC output level and further smoothing out the 'ripple' in the signal." (*Id.*, ¶[0014].) Thus, *Cordelli* discloses that its power supply is configured to output a low-level AC voltage and a low-level DC voltage (each of which constitutes "an output voltage") lower than the first AC voltage. (Ex. 1002, ¶133.)

In light of *Cordelli*'s disclosures, a POSITA would have been motivated to, and found it predictable to, modify the combined *Hack-Garcia* apparatus to be capable of receiving power from *a second power source that comprises a power supply configured to receive a first AC voltage from an AC mains and to output an output voltage lower than the first AC voltage*. (*Id.*, ¶134.) For example, a POSITA would have recognized the desirability of enabling the combined apparatus to receive an AC voltage ("first AC voltage") from an AC mains and output an output voltage lower than the AC voltage, in order to leverage a "commonly available AC … power source" (Ex. 1047, ¶[0003]) and prepare it in a way that consumer electronics devices would have expected (namely, lower voltage than AC mains voltage). (Ex. 1012, 1:9-28; Ex. 1007, ¶¶[0082], [0099]; Ex. 1022, 1:10-25; Ex. 1002, ¶134.) [19] Indeed, *Cordelli* describes taking into account the power

[19] Exhibits 1007 and 1022 are cited to demonstrated state of the art. (Ex. 1002, ¶134.)

requirements of specific devices to which power is to be supplied, so a POSITA would have found it desirable and predictable to implement the above modification of *Hack*'s device, to provide an output voltage (lower than an AC mains voltage) appropriate for the modified *Hack* device. (Ex. 1047, ¶[0023] ("The modular power supply of the present invention … provides users with a multiplicity of power sources with various output voltages, customizable for the specific requirements of the particular set of equipment being powered, all derived from a commonly available power source."); Ex. 1002, ¶134.) As explained above, *Cordelli* discloses the foregoing features (implemented in the above modification of *Hack*'s device), so a POSITA, who would have been skilled at circuit design and configuring electrical components, would have found the above modification to be a straightforward combination of known components and technologies, according to known methods, to produce predictable results with a reasonable expectation of success. (Ex. 1002, ¶134.) The above modification would have been particularly predictable because *Hack* describes its battery as being rechargeable and because power from AC mains was well known as a convenient way to charge rechargeable batteries. (Ex. 1005, ¶[0053]; Ex. 1002, ¶134.)

Moreover, as discussed above in this section regarding the state of the art, it was well known to use AC power from AC mains to power a handheld device (like *Hack*'s handheld device), so a POSITA would have found the above modification to be feasible. (Ex. 1002, ¶135.) For example, it was known to use "[p]ower adapters for **mobile computers, cell phones**, game systems, as well as many other applications comprised of an input side DC or AC connection, and/or a transformer, and/or AC to DC electronics, or other appropriate electronics for filtering, etc., and a low voltage DC connection on the output side," and a POSITA would have therefore found the above modification of *Hack*'s handheld device to be feasible and straightforward, with a reasonable expectation of success. (Ex. 1013, ¶[0005]; *see also id.*, ¶[0014] ("adapter for ... cell phones"), FIGS. 2-3 (showing power adapter); Ex. 1002, ¶135.)[20]

Cordelli further discloses adjusting the output voltage of its power supply. (Ex. 1002, ¶136.) For example, *Cordelli* describes that there are "many different devices each with different voltage requirements." (Ex. 1047, ¶[0008]; *see also id.*, ¶[0004] ("the required DC voltage or voltages for device operation").) Therefore, a POSITA would have found it predictable and obvious to configure the power supply of the combined *Hack-Garcia-Cordelli* device to adjust the output voltage, to promote operability with a variety of devices having different voltage requirements. (Ex. 1002, ¶136.) *Cordelli* discloses "setting … the particular output voltage" by using a "universal end connector that uses one of several terminal connectors,"

[20] Exhibit 1013 demonstrates state of the art. (Ex. 1002, ¶135.)

"where "[t]he connector inserted into this universal end connector is chosen to mate with the connector on the equipment being powered." (Ex. 1047, ¶[0024].)

Additionally, in light of the knowledge regarding the state of the art in context of the teachings and suggestions of *Cordelli*, a POSITA would have found it predictable and obvious to configure a power supply (as described above in the modified *Hack*-*Garcia*-*Cordelli* apparatus) to use known circuit design concepts and elements to configure the power source (providing power to the combined apparatus discussed above) to provide the adjusting and selecting of output voltage features discussed above, and like that described by *Cordelli*. (Ex. 1002, ¶137.) Accordingly, a POSITA would have been motivated to consider and implement known design elements and configurations in the second power source for the *Hack*-*Garcia*-*Cordelli* combination, including the use of switches and similar mechanisms such as a *three-way switch for* adjusting the output voltage provided by the power source to the *Hack*-*Garcia* apparatus. (Ex. 1002, ¶137.) Indeed, three-way switches were known mechanisms to control circuits and related features, including controlling the voltage supplied to an OLED and the brightness of a lighting source. (*Id.*; Ex. 1051 (*Sanford*), FIG. 2, ¶[0032] (disclosing switch for switching between multiple possible voltages, and thus power levels, supplied to OLED); *see also* Ex. 1049, 2:1-15 ("three-way toggle dimmer switch ... for variably controlling the brightness of lamps or lighting systems"); Ex. 1019, FIG. 8, ¶¶[0009], [0048] (three-way switch in wireless communication device); Ex. 1048, FIGS. 1, 5, 7, 5:43-46, 6:46-56, 7:15-27; Ex. 1050, Abstract ("Each time the lamp is touched the power to the bulb increases by one step, typically in the sequence OFF, DIM, INTERMEDIATE, FULL, OFF."), 8:32-33 ("This circuit produces the sequence OFF-DIM-INTERMEDIATE-FULL-OFF.").) Figure 8 of U.S. Patent Application Publication No. 2004/0207484 ("*Forrester*") demonstrates the exemplary use of a known three-way switch 270 for switching between three possible components to which an antenna 110 is connected.

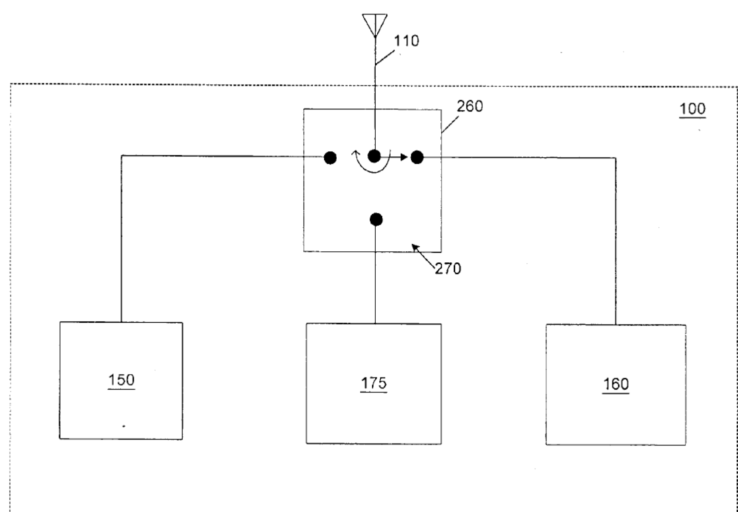

Fig. 8

(Ex. 1019, FIG. 8; *see also id.*, ¶[0049].) Similarly, three-way switches in the context of a portable device and LED circuits were known. (*See, e.g.*, Ex. 1018, FIG. 15D, ¶[0075] (describing three-way switch in portable ear device); Ex. 1044, 7:53-57 ("A selector switch 160 provides a sequential selection of which conductor of the extension cord test is being tested. The selector switch 160 has generally three positions with indicia marking the ground (GND), neutral, and hot conductor selections."); *see also id.*, FIGS. 9 (showing switch 160), 10, 9:59-61 ("The selector switch 160 is turned to sequentially select the ground, neutral and hot conductors."); Ex. 1002, ¶137.)[21]

A POSITA would thus have recognized and appreciated that the use of a three-way switch would complement circuit designs that provide multiple output signals from a source signal, like for example the multiple output voltage features described by *Cordelli*. (Ex. 1002, ¶138.) Thus, a POSITA would have known that a three-way switch would have been a predictable way to enable selection between available outputs, like that demonstrated by *Forrester* and *Sanford* (describing the state of the art). (*Id.*)

With such knowledge, and in light of *Cordelli*'s disclosure that "an individual user might customize their combined supply to provide the specific voltage outputs required by their own particular set of equipment" (Ex. 1047, ¶[0020]), a POSITA would have been motivated to configure a power supply including a three-way

[21] Exhibits 1018, 1019, 1044, 1048, 1049, 1050, and 1051 are cited to demonstrate state of the art. (Ex. 1002, ¶137.)

switch for adjusting the output voltage provided in the combined *Hack-Garcia-Cordelli* apparatus. (Ex. 1002, ¶139.)

A POSITA would have found the above configuration to be straightforward and conventional, because as demonstrated the use of three-way switches and typical design elements in circuits like those discussed above for the combined *Hack-Garcia-Cordelli* apparatus were well known. (*Id.*, ¶140.) Thus, a POSITA would have found the above configuration to be a mere combination of known components and technologies, according to known methods, (e.g., use of known circuit design elements and techniques (use of a three-way switch)) to produce the predictable result of providing switch controlled selection of output voltages in the modified *Cordelli* inspired second power source that would have provided power to the *Hack-Garcia* apparatus as discussed above. (*Id.*) For similar reasons, a POSITA would have had a reasonable expectation of success implementing such a modification, especially given that it would have involved the use of basic circuit principles and elements familiar to a POSITA. (*Id.*) *KSR*, 550 U.S. at 416.

2. Claim 11

a) The apparatus of claim 10, wherein the output voltage is a relatively constant DC voltage.

The *Hack-Garcia-Cordelli* combination discloses or suggests this limitation.

(Ex. 1002, ¶141.)[22] As explained for claim 10 (*supra* Section IX.B.1), *Cordelli*'s power supply includes "an AC/DC circuit ... [including a] capacitor to smooth the output into a relatively 'flat' DC level" and a "DC/DC conversion circuit" that includes a "capacitor for converting the DC voltage from the AC/DC circuit down to **the desired DC output level** and further **smoothing out the 'ripple'** in the signal. Thus, in light of such disclosures, a POSITA would have found it predictable and obvious to configure the output voltage provided by the power supply of the combined apparatus to be a relatively constant DC voltage, to comport with devices expecting such voltage. (Ex. 1002, ¶141.) This would have been a straightforward configuration that a POSITA would have reasonably expected to be successful, because *Cordelli* discloses providing such a constant voltage and also because a POSITA would have been skilled at electrical engineering and circuits and would have known how to convert AC mains voltage into a constant DC voltage for operation of a DC device, which was within the state of the art as explained for claim 10. (*Supra* Section IX.B.1; Ex. 1002, ¶141.)

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[22] Petitioner explains in this section that the prior art teaches an output voltage that is a constant DC voltage, which encompasses an output voltage that is a "relatively" constant DC voltage, regardless of the scope of "relatively" in this claim. Petitioner reserves the right to assert invalidity under 35 U.S.C. § 112 in other proceedings.

3. Claim 17

a) The apparatus of claim 16, wherein the apparatus is capable of receiving the power from a second power source that comprises a power supply configured to receive a first AC voltage from an AC mains and to output a relatively constant DC voltage.

The *Hack*-*Garcia*-*Cordelli* combination discloses or suggests this limitation for at least the reasons discussed above regarding claims 10 and 11, which explains how the combination discloses or suggests how the *Hack-Garcia* combination would have been modified to be capable of receiving power from a second power source (e.g., similar to types of sources described by *Cordelli*) that includes a power supply configured to receive a first AC voltage from an AC mains and outputs a relatively constant DC voltage, like that recited in claim 17. (*Supra* Sections IX.B.1-2; Ex. 1002, ¶142.)

C. Ground 3: Claim 20 Is Obvious Over *Hack* and *Porter*

1. Claim 20

a) An apparatus comprising:

As explained for claim 1, *Hack* discloses a portable communications device 100 (“apparatus”). (Ex. 1005, ¶[0010] (“Such display systems can be used as hand-held, portable communications devices.”), FIG. 2A (below); *see also id.*, ¶[0029] (“multi-media display communications device 100”).)

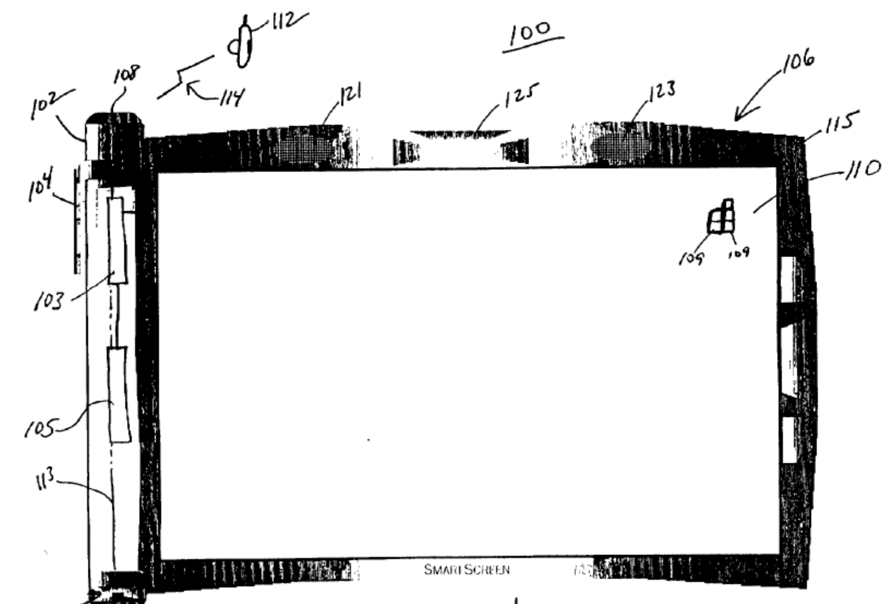


FIG. 2A

(*Id.*, FIG. 2A; *see also id.*, ¶¶[0020], [0029]-[0067] (describing device 100 and Figure 2A), FIGS. 1A-1C; Ex. 1002, ¶¶143-144.)

Additionally, *Hack* explains,

> It is also contemplated that a display system 106 according to the invention can be detachably coupled or removably connected to the housing 102, as well as to any number of external devices, such as portable phones, laptop or personal computers, personal digital assistants (PDAs), internet appliances, televisions, or the like.

(Ex. 1005, ¶[0103]; *see also id.*, ("In this context, the display system 106 can be coupled to an external device in any fashion that provides for the transfer of information either directly or remotely, between the display system 106 and the external device").) *Hack* describes that in this way, its display "assumes the attributes of the display included with the external device, and thus can provide a better display than the display included with the external device." (*Id.*; Ex. 1002, ¶ 145.)

Thus, *Hack* discloses embodiments where the disclosed display system 106 can be coupled/connected to, for example, a personal computer. In such a configuration, the personal computer with the detachably coupled or removably connected display 106, as described in *Hack,* is an "apparatus" as claimed. (Ex. 1002, ¶146; *see also infra* Sections IX.C.1(b)-(d) regarding the remaining elements of this claim.)

b) a flat planar substrate upon which is mounted a plurality of LEDs, wherein the flat planar substrate is sufficiently flexible to be folded without breaking;

Hack discloses or suggests this limitation. (Ex. 1002, ¶¶147-149.) As discussed above in Section IX.C.1(a), *Hack* discloses a configuration where a personal computer is detachably coupled or removably connected to display 106. (*Supra* Section IX.C.1(a); Ex. 1005, ¶[0103].) As also explained for claims 1 and 7 in Ground 1, *Hack's* display 106 includes a substrate upon which is mounted a plurality of LEDs. (*Supra* Sections IX.A.1(b), IX.A.7(b); Ex. 1002, ¶147.) Further, as explained for limitation 7(b) and claim 9, *Hack*'s substrate is sufficiently flexible to be folded without breaking.[23] (*Supra* Sections IX.A.7(b), IX.A.9; Ex. 1002, ¶147.) A POSITA would have found it obvious to implement such features with the personal computer ("apparatus") configuration discussed above for limitation 20(a). (Ex. 1002, ¶147.)

Indeed, *Hack* describes implementing the "display system 106 according to the invention" such that it is removably/detachably connected/coupled to, for example, a personal computer (Ex. 1005, ¶[0103]), and discusses how the display system 106 works to recognize "the display characteristics of the system to which it is connecting," so that it can display information in connection with the connected device (*id.*, ¶¶[0104]-[0105]). As such, a POSITA would have had reasons to make use of the flexible screen provided with display system 106 while connected/coupled to the personal computer (which collectively forms the "apparatus") so that a user of the device has the option of viewing information on the rolled out display via display system 106 or viewing information on "a different display (having a better resolution) under different circumstances" (*id.*, ¶[0105]), such as the main display of the personal computer. (Ex. 1002, ¶148.) A POSITA would have appreciated the benefits of such a configuration, including providing the combined display system

[23] PO asserts an AMOLED display meets this limitation. (*See* Ex. 1058, 34-35; Ex. 1087, 26.)

106 and personal computer arrangement to extend display capabilities of the personal computer's main display to display. (*Id.*; Ex. 1005, ¶¶[0105]-[0111].) Such a configuration would have involved the application of known components and techniques (e.g., the arrangements described/suggested by *Hack* already and the knowledge and skills of a POSITA would have provided guidance in implementing the modification), which would have led a POSITA to having a reasonable expectation of success in the implementing such features. (Ex. 1002, ¶148.)

Accordingly, for the reasons discussed above, and those for limitations 1(b), 7(b) and claim 9, it would have been obvious to configure *Hack*'s disclosed display system 106 having a flat and planar display while being sufficiently flexible to be folded without breaking such that it is connected as part of a personal computer to provide additional and/or alternate display mechanisms for conveying information to a user of the device. (Ex. 1002, ¶149; *supra* Sections IX.A.1(b), IX.A.7(b), IX.A.9.) In such a configuration, *Hack* discloses or suggests the features of limitation 20(b). (Ex. 1002, ¶149.)

c) a data receiver, wherein the data receiver is configured to receive data from an antenna; and

Hack discloses or suggests this limitation. (Ex. 1002, ¶¶150-152.) As discussed for limitation 1(c), *Hack* discloses that "device 100 includes radio **transceiver** means 104, such as an **antenna**, for example, for transmitting output radio signals and receiving input radio signals." (*Supra* Section IX.A.1(c); Ex. 1005,

¶[0035]; *id.*, ¶¶[0010], [0034]-[0035], [0040], [0042], [0078], Abstract.) As explained, a POSITA would have understood that a transceiver includes a transmitter and a receiver, and would further have understood that *Hack*'s receiver receives data from *Hack*'s antenna, because the "radio transceiver means 104 … **receive[s] communications signals** via any electromagnetic carrier, such as **radio-frequency (RF)**" and it was known that RF signals are received from an antenna. (Ex. 1005, ¶[0035]; Ex. 1002, ¶150.)

Moreover, in context of the configuration where display system 106 is coupled/connected to a personal computer (as discussed above for limitations 20(a)-(b) (Sections IX.C.1(a)-(b)), the collective "apparatus" would include a data receiver that was configured to receive data from an antenna, as claimed. (Ex. 1002, ¶151.) For example, *Hack* discloses that in such configurations (including where a personal computer has a connected display), that "[i]n this context, the display system 106 can be coupled to an external device in any fashion that provides for the transfer of information, either directly or remotely, between the display system 106 and the external device" and that "[e]xamples of wireless connectivity that could be used for this purpose include, without limitation, radio, optical, infra-red, or other such communications carriers." (Ex. 1005, ¶[0103]; *see also id.* ("external devices, such as ... personal computers").) To the extent *Hack*'s disclosure of such wireless radio communication does not explicitly disclose that the personal computer coupled/connected to the display system 106 ("apparatus") comprises a data receiver configured to receive data from an antenna, it would have been obvious to implement this feature in such a configuration. (Ex. 1002, ¶151.)

For example, as discussed above for limitation 1(c), *Hack* discloses that "device 100 includes radio transceiver means 104, such as an antenna, for example, for ... receiving input radio signals." (Ex. 1005, ¶[0035]; *see also id.*, ¶[0039]; *supra* Section IX.A.1(c).) Given that *Hack*'s configuration involving, for example, a personal computer, would also communicate wirelessly with the display device 106, a POSITA would have been motivated, and found it predictable, to similarly implement a data receiver configured to receive data from an antenna at the personal computer. (Ex. 1002, ¶152.) For example, a POSITA would have recognized that such an implementation would have predictably enabled the personal computer to achieve its wireless communication functionality as disclosed in *Hack*. (*Id.*) Indeed, *Hack* describes the use of wireless communications using an antenna (Ex. 1005, ¶[0035]), and thus a POSITA would have been motivated to provide such features to facilitate the wireless communications with the personal computer configuration discussed above. (Ex. 1002, ¶152.) Given the suggestions and disclosures provided by *Hack*, and a POSITA's knowledge of the state of the art and experience, such a skilled person at the time would have been capable of implementing the above discussed personal computer-display system 106 combination to include a data receiver that is configured to receive data from an antenna, and would have had a reasonable expectation of success in doing so. (*Id.*)

d) a driver comprising an input of a first AC voltage from an AC mains and a driver output of DC voltage, wherein the driver includes a voltage regulator and the driver output is relatively constant.

While *Hack* does not explicitly disclose that its personal computer-display system 106 configuration ("apparatus") includes a driver including a first AC voltage input from an AC mains and a driver output of relatively constant DC voltage, and a voltage regulator, like that recited in limitation 20(d), it would have been obvious in view of *Porter* to configure *Hack*'s personal computer arrangement discussed above to include such features.[24] (Ex. 1002, ¶¶153-160.)

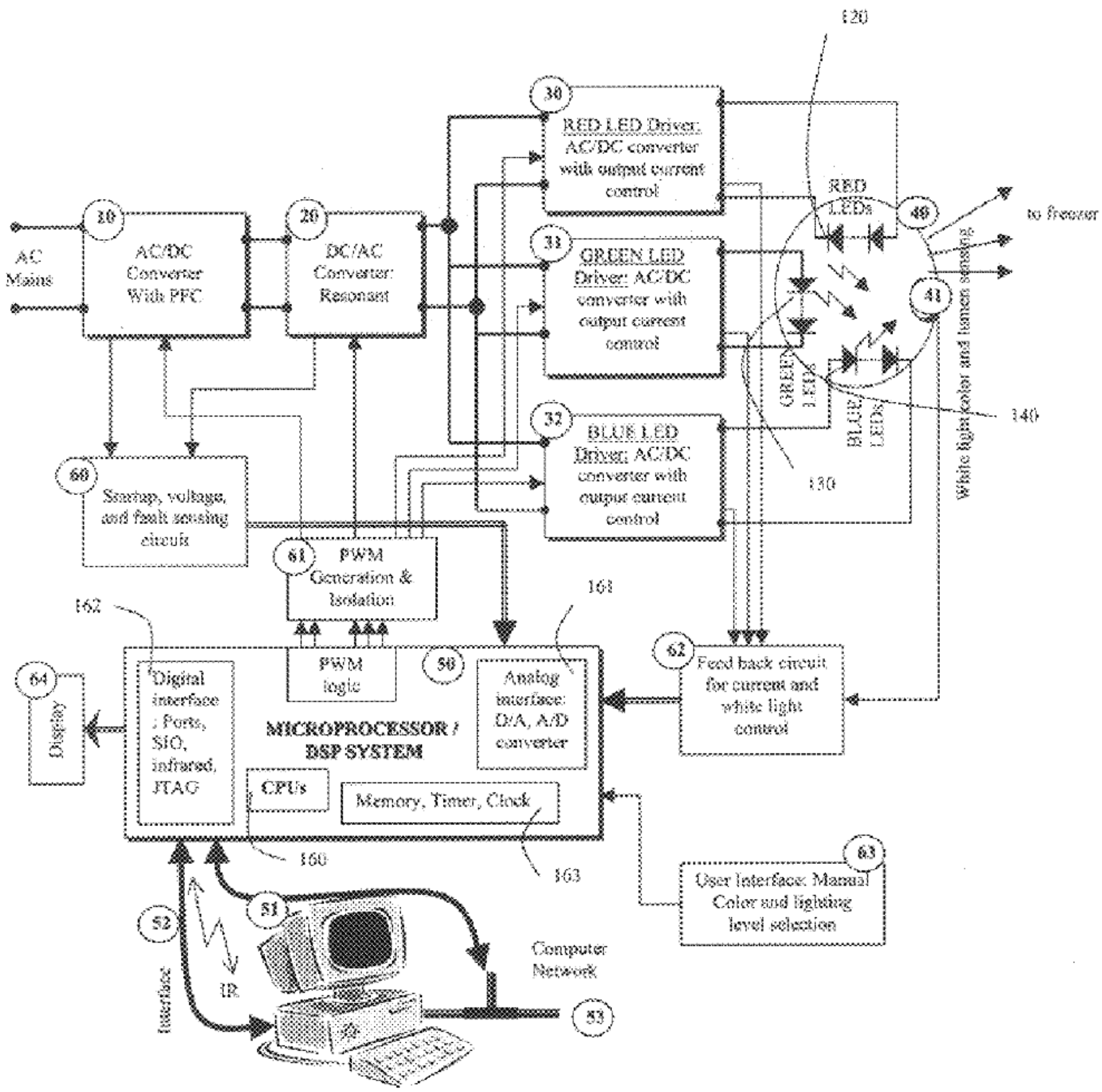
Porter discloses mechanisms for providing power to computer systems, such as "desktop personal computers," and thus a POSITA would have had reason to consider the teachings of *Porter* when contemplating an implementation of *Hack*'s personal computer ("apparatus"), which also would require power as typical with personal computer systems. (*See, e.g.*, Ex. 1045, 4:14-18; *see also id.*, 1:13-15 ("[t]his invention specifically relates to powering computer systems where switch-mode DC is created to power the internal components of the system"), 1:17-36

[24] PO asserted a driver comprising a voltage regulator meets this limitation. (Ex. 1058, 35; Ex. 1087, 27.)

(discussing how the invention is applicable in the "field of computing," and also to "a wide variety of circumstances"); Ex. 1002, ¶154.)

Having looked to *Porter*, a POSITA would have been inspired by *Porter*'s descriptions concerning mechanisms and technologies for powering a personal computer by converting AC voltage from an AC mains into an output of relatively constant, regulated DC voltage that is supplied to components of the computer. (Ex. 1045, 4:10-23 ("Many modern electronics circuitry ... are powered by switchmode power conversion systems .... In low power business and consumer electronics, such as desktop personal computers, the incoming power is supplied as an **alternating voltage** .... Such **utility power** must be **converted to low voltage steady (direct) current, or dc**, and **regulated** to a few percent in order to be useful as power for the electronic circuits. The device which performs such conversion is called a 'power supply'."); Ex. 1002, ¶155.) A POSITA would have understood that such conversion of utility AC voltage to DC voltage discloses an input of a first AC voltage from an AC mains (e.g., because utility AC power is power from an AC mains) and an output of DC voltage. (Ex. 1002, ¶155.) A POSITA would further have understood that *Porter*'s "regulated" voltage necessarily discloses a voltage regulator (because such disclosed features could not be provided without a voltage regulator of some fashion), and that a "steady" DC voltage that is "regulated" as described necessarily discloses that the DC output provided by such known features is a DC regulated output that is relatively constant. (Ex. 1045, 4:20-22; *see also id.*, 9:31-36 ("Referring to FIG. 1-1, utility power 101, typically at 110 or 220 volt nominal ac power alternating at 50 or 60 cycles, is converted by power supply 106 to standard dc voltages, usually ±12 and +5 volts."); Ex. 1002, ¶155.)

Limitation 20(d) additionally recites a "driver" comprising an input of a first AC voltage from an AC mains and a "driver" output of DC voltage, where the "driver" output is relatively constant, but a POSITA would have recognized that such "driver" features were well known and predictable to implement. (Ex. 1002, ¶156.) A POSITA would have known that a system or subsystem that drives current or power to a given component is a driver circuit (or simply "driver") for that given component. (*Id.*) For example, *Muthu* demonstrates it was known by a POSITA (state of the art) to implement (e.g., with reference to Figure 1, below) a driver circuit (e.g., drivers 30, 31, 32) for driving LEDs:



(Ex. 1008, FIG. 1.)[25]

In light of *Porter*'s disclosures and knowledge of a POSITA regarding the state of the art, a POSITA would have been motivated to, and found it predictable to, configure *Hack*'s personal computer (integrated with the display device 106 as

[25] Exhibit 1008 is cited to demonstrate state of the art. (Ex. 1002, ¶156.)

discussed above) to include power supply components that includes, *inter alia*, a driver comprising an input of a first AC voltage from an AC mains and a driver output of DC voltage, wherein the driver includes a voltage regulator and the driver output is relatively constant. (*Id.*, ¶157.) A POSITA would have understood that *Porter*'s disclosure of conversion of AC power to DC power discloses a driver having an AC voltage input and a DC voltage output, because the AC-DC converter drives downstream components requiring DC power. (*Id.*) A POSITA would have recognized that personal computers, like those described by *Hack*'s configuration discussed above, would necessarily have power supply components that receive power from an AC power source and provide DC power to internal components, such as processor components and other circuitry, as was widely known in the art. Indeed, *Porter*'s disclosures would have guided a POSITA to recognize the need for such features. (Ex. 1002, ¶157.)

In light of such knowledge and disclosures, a POSITA would have appreciated that configuring *Hack*'s modified personal computer arrangement with such features would have beneficially leveraged AC power for the computer, which was readily available as utility power, and that such DC voltage would have been required for various components of *Hack*'s personal computer. (Ex. 1045, 4:12-14 (describing "convert[ing] incoming power from the utility line to the voltages and currents required by the electronic circuitry"); *see also* Ex. 1022, 1:10-25 ("Many consumer and commercial devices require direct current (DC) power. Since alternating current (AC) power is readily available...”); Ex. 1002, ¶157.)[26] Likewise, a POSITA would have recognized that a *relatively constant* output voltage would have been desirable for promoting a steady, reliable source of power for the computer components of *Hack*’s personal computer arrangement discussed above. (Ex. 1002, ¶157.)

It would have been obvious to configure such a driver in the modified *Hack-Porter* computer to include a voltage regulator, which was a known electrical device for regulating voltage for system components. (Ex. 1007, ¶[0293] (“28 VDC voltage regulator”); *see also id.*, ¶¶[0115] (“voltage regulator”), [0138]-[0139], [0155], [0157], [0166], [0192], [0224], [0375], [0381], [0389], [0418], [0469]; Ex. 1002, ¶158.)[27] Thus, use of a voltage regulator was known and recognized as being desirable (e.g., for providing voltage in a predictable manner to downstream component(s) expecting a particular voltage), and a POSITA would have found such a basic electrical device (voltage regulator) to be useful and predictable in the combined *Hack* personal computer configuration discussed above to ensure reliable voltage (and thus power) is delivered to the computer components, even where the

[26] Exhibit 1022 is cited to demonstrate state of the art. (Ex. 1002, ¶157.)

[27] Exhibit 1007 is cited to demonstrate state of the art. (Ex. 1002, ¶158.)

AC input voltage varies over a range of voltage values. (*See*, *e.g.*, Ex. 1007, ¶[0293] (describing a "28 VDC voltage regulator"); Ex. 1002, ¶158.)

A POSITA would have found implementing such features discussed above in the *Hack* modified personal computer arrangement to be straightforward and likewise would have had a reasonable expectation of success in implementing such features such that the combined apparatus would regulate and provide power in a manner that ensured proper operation of the personal computer components, as was known in the art. (Ex. 1002, ¶159.) Indeed, it was well known to a POSITA at the time to include a power supply including an AC-DC converter within a personal computer, such as a desktop computer. (*Id.*; *see also*, *e.g.*, Ex. 1046, FIGS. 1 (showing desktop computer with base 1), 6 (showing power supply adapter within base), ¶¶[0028] ("FIG. 6 is a schematic diagram of a structure of the base, after the LCD control board and the **power supply board are moved into the base**...."), [0036] ("Referring to FIG. 6, **the space in the base is very large**, and there is a lot of space left after ... the power supply board for feeding a DC supply directly converted from the commercial supply ... is settled therein.")[28].) Moreover, a POSITA would have recognized that a personal computer structure (such as the one for *Hack*'s personal computer) would have provided sufficient room for various

[28] Ex. 1046 is cited to demonstrate the state of the art. (Ex. 1002, ¶159.)

components to be housed therein, and thus a POSITA would have been motivated, and found it predictable and feasible, to implement the above "driver" features within *Hack*'s personal computer arrangement ("apparatus"). (Ex. 1002, ¶159.) Indeed, such an implementation would have been a mere combination of known components and technologies, according to known methods, to produce predictable results (e.g., implementation of known power supply components for personal computers to convert AC voltage to proper DC voltage levels for use by known internal personal computer components). (*Id.*) *KSR*, 550 U.S. at 416.

Accordingly, the modified *Hack* personal computer arrangement, as discussed above, in light of *Porter* and the state of the art, discloses or suggests the features of limitation 20(d). (Ex. 1002, ¶160.)

X. DISCRETIONARY DENIAL IS NOT APPROPRIATE HERE

An evaluation of the factors under *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (Mar. 20, 2020) (precedential), favors institution notwithstanding the concurrent Illinois Litigation (Section II).

The **first *Fintiv* factor** favors institution. Petitioner will seek a stay of the Illinois Litigation upon institution. At minimum, the Board should not speculate regarding the likelihood of stay, particularly because courts routinely issue stays after institution. *Western Digital Corp. et al v. Kuster*, IPR2020-01391, Paper 10 at 8-9 (PTAB Mar. 11, 2021; *Samsung Elec. Am., Inc. v. Snik LLC*, IPR2020-01427, Paper 10 at 10 (PTAB Mar. 9, 2021).

The **second and third *Fintiv* factors** also favor institution. The Illinois Litigation is at an early stage.[29] A trial date has not been set, and there has not been significant resource investment by the court and the parties, particularly compared to the resource expenditures leading up to a trial. (Exs. 1052, 1085.) Moreover, any trial (if it occurs) would likely only occur at least 102 weeks after the service of the complaint—and thus after a final written decision in this IPR. (Ex. 1053, 1-2 (document available at Northern District of Illinois website, estimating "Case Ready for Trial" 102 weeks after complaint served); Ex. 1052, 5 (Dkt. #16 showing summons returned May 19, 2021).)

The **fourth *Fintiv* factor** similarly favors institution. In the Illinois Litigation, PO has asserted claims 1-3, 5-7, 9, 14, and 16-17 of the '252 patent, while this Petition challenges all 20 claims, so the Illinois Litigation will not resolve all disputed validity issues. (Section IX; Ex. 1086, 2-3; Ex. 1087, 2-40.) Furthermore, Petitioner stipulates it will not pursue in the Illinois Litigation invalidity based on any instituted IPR grounds in this proceeding.

Finally, the **sixth *Fintiv* factor** favors institution. Petitioner diligently filed

[29] Although PO moved to transfer the Illinois Litigation to Texas, that motion was denied. (Ex. 1084.)

this Petition **within one week of PO's amended infringement contentions** in the Illinois Litigation (Ex. 1086), with strong unpatentability grounds, as demonstrated above. (*Supra* Section IX.) Institution is consistent with the significant public interest against "leaving bad patents enforceable." *Thryv, Inc. v. Click-To-Call Techs., LP*, 140 S. Ct. 1367, 1374 (2020). Moreover, this Petition is the ***sole*** challenge to the '252 patent before the Board—a "crucial fact" favoring institution. *Google LLC v. Uniloc 2017 LLC*, IPR2020-00115, Paper 10 at 6 (May 12, 2020).

XI. CONCLUSION

Accordingly, Petitioner requests institution of IPR for the challenged claims based on the specified grounds.

Respectfully submitted,

Dated: September 7, 2021 By: /Joseph E. Palys/
Joseph E. Palys (Reg. No. 46,508)
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. 10,492,252 contains, as measured by the word-processing system used to prepare this paper, 13,943 words. This word count does not include the items excluded by 37 C.F.R. § 42.24 as not counting towards the word limit.

Respectfully submitted,

Dated: September 7, 2021 By: /Joseph E. Palys/
Joseph E. Palys (Reg. No. 46,508)
Counsel for Petitioner

CERTIFICATE OF SERVICE

I hereby certify that on September 7, 2021, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,492,252 and supporting exhibits to be served via express mail on the Patent Owner at the following correspondence address of record as listed on PAIR:

K&L Gates LLP-Chicago
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By: /Joseph E. Palys/
Joseph E. Palys (Reg. No. 46,508)