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. 10,687,400

PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,687,400

TABLE OF CONTENTS

LIST OF EXHIBITS

Ex. 1001	U.S. Patent No. 10,687,400
Ex. 1002	Declaration of R. Jacob Baker, Ph.D., P.E.
Ex. 1003	Curriculum Vitae of R. Jacob Baker, Ph.D., P.E.
Ex. 1004	Prosecution History of U.S. Patent No. 10,687,400
Ex. 1005	U.S. Patent Application Publication No. 2003/0137258 ("*Piepgras*")
Ex. 1006	U.S. Patent Application Publication No. 2003/0085870 ("*Hinckley*")
Ex. 1007	U.S. Patent Application Publication No. 2002/0158590 ("*Saito*")
Ex. 1008	U.S. Patent No. 4,656,398 ("*Michael*")
Ex. 1009	U.S. Patent Application Publication No. 2003/0144034 ("*Hack*")
Ex. 1010	U.S. Patent No. 7,180,265 ("*Naskali*")
Ex. 1011	U.S. Patent Application Publication No. 2003/0015968 ("*Allen*")
Ex. 1012	U.S. Patent Application Publication No. 2002/0021573 ("*Zhang*")
Ex. 1013	U.S. Reissued Patent No. RE42,161 ("*Hochstein-Re*")
Ex. 1014	Australian Patent Application Publication No. AU 2003/100206 ("*Birrell*")
Ex. 1015	U.S. Patent Application Publication No. 2004/0206970 ("*Martin*")
Ex. 1016	International Application Publication No. WO 01/01385 ("*Reymond*")
Ex. 1017	U.S. Patent No. 5,663,719 ("*Deese*")
Ex. 1018	U.S. Patent No. 5,982,103 ("*Mosebrook*")
Ex. 1019	U.S. Patent No. 6,856,103 ("*Hudson*")
Ex. 1020	U.S. Patent No. 6,510,995 ("*Muthu*")

Ex. 1021	U.S. Patent Application Publication No. 2002/0191029 ("*Gillespie*")
Ex. 1022	U.S. Patent No. 6,636,005 ("*Wacyk*")
Ex. 1023	U.S. Patent Application Publication No. 2002/0086702 ("*Lai*")
Ex. 1024	U.S. Patent Application Publication No. 2004/0108997 ("*Lee*")
Ex. 1025	RESERVED
Ex. 1026	U.S. Patent No. 5,086,294 ("*Kasegi*")
Ex. 1027	U.S. Patent No. 6,061,259 ("*DeMichele*")
Ex. 1028	U.S. Patent No. 5,519,263 ("*Santana*")
Ex. 1029	U.S. Patent No. 4,563,592 ("*Yuhasz*")
Ex. 1030	Watson, J., Mastering Electronics, Third Ed., McGraw-Hill, Inc. (1990) ("*Watson*")
Ex. 1031	U.S. Patent No. 5,463,280 ("*Johnson*")
Ex. 1032	U.S. Patent No. 6,411,045 ("*Nerone*")
Ex. 1033	U.S. Patent No. 7,202,613 ("*Morgan*")
Ex. 1034	Sedra *et al.*, Microelectronic Circuits, Fourth Ed., Oxford University Press (1998) ("*Sedra*")
Ex. 1035	U.S. Patent No. 5,621,225 ("*Shieh*")
Ex. 1036	U.S. Patent Application Publication No. 2003/0035075 ("*Butler*")
Ex. 1037	RESERVED
Ex. 1038	U.S. Patent Application Publication No. 2002/0176259 ("*Ducharme*")
Ex. 1039	U.S. Patent Application Publication No. 2002/0175870 ("*Gleener*")
Ex. 1040	U.S. Patent Application Publication No. 2002/0060530 ("*Sembhi*")

Ex. 1041	U.S. Patent Application Publication No. 2003/0020629 ("*Swartz*")
Ex. 1042	U.S. Patent No. 6,300,725 ("*Zinkler*")
Ex. 1043	U.S. Patent No. 7,019,662 ("*Shackle*")
Ex. 1044	U.S. Patent No. 5,267,134 ("*Banayan*")
Ex. 1045	U.S. Patent No. 6,300,748 ("*Miller*")
Ex. 1046	U.S. Patent No. 6,879,497 ("*Hua*")
Ex. 1047	Excerpts from Chamber's Dictionary of Science and Technology, Chambers Harrap Publishers Ltd. (1999)
Ex. 1048	Excerpts from Dictionary of Scientific and Technical Terms, Sixth Ed., McGraw-Hill, Inc. (2003)
Ex. 1049	U.S. Patent No. 6,412,971 ("*Wojnarowski*")
Ex. 1050	U.S. Patent No. 10,750,583 (Application No. 16/449,273)
Ex. 1051	U.S. Patent No. 10,575,376 (Application No. 16/443,759)
Ex. 1052	U.S. Patent No. 10,492,252
Ex. 1053	U.S. Patent No. 10,492,251
Ex. 1054	U.S. Patent No. 10,091,842
Ex. 1055	U.S. Patent No. 9,615,420
Ex. 1056	U.S. Patent No. 9,198,237
Ex. 1057	International Application Publication No. WO 2011/082168 A1 (Application No. PCT/US2010/062235)
Ex. 1058	U.S. Patent No. 8,179,055
Ex. 1059	U.S. Patent No. 8,148,905
Ex. 1060	U.S. Patent No. 7,489,086

Ex. 1061	International Application Publication No. WO 2010/138211 A1 (Application No. PCT/US2010/001597)
Ex. 1062	International Application Publication No. WO 2010/126601 A1 (Application No. PCT/US2010/001269)
Ex. 1063	U.S. Provisional Application No. 61/333,963
Ex. 1064	U.S. Provisional Application No. 61/284,927
Ex. 1065	U.S. Provisional Application No. 61/335,069
Ex. 1066	U.S. Provisional Application No. 60/997,771
Ex. 1067	U.S. Provisional Application No. 60/547,653
Ex. 1068	U.S. Provisional Application No. 60/559,867
Ex. 1069	U.S. Provisional Application No. 61/217,215
Ex. 1070	U.S. Provisional Application No. 61/215,144
Ex. 1071	U.S. Patent Application Publication No. 2005/0001225 ("*Yoshimura*")
Ex. 1072	U.S. Patent No. 6,717,353 ("*Mueller*")
Ex. 1073	U.S. Patent Application Publication No. 2003/0185005 ("*Sommers*")
Ex. 1074	U.S. Patent Application Publication No. 2003/0102810 ("*Cross*")
Ex. 1075	U.S. Patent Application Publication No. 2003/0043611 ("*Bockle*")
Ex. 1076	Case docket in *Samsung Elecs. Co., Ltd.*, *v. Lynk Labs, Inc.* No. 1:21-cv-2665 (N.D. Ill.) (accessed Nov. 5, 2021)
Exs. 1077-1078	RESERVED

Ex. 1079	Estimated Patent Case Schedule for Northern District of Illinois (available at https://www.ilnd.uscourts.gov/_assets/_documents/_forms/_judges/Pacold/Estimated%20Patent%20Schedule.pdf)
Ex. 1080	Lynk Labs, Inc.'s Preliminary Infringement Contentions in *Samsung Elecs. Co., Ltd. v. Lynk Labs, Inc.*, No. 1:21-cv-2665 (N.D. Ill.) (served July 21, 2021)
Ex. 1081	Lynk Labs, Inc.'s Exemplary Infringement Charts for U.S. Patent No. 10,506,400 (App. K-1) accompanying Lynk Labs, Inc.'s Preliminary Infringement Contentions in *Samsung Elecs. Co., Ltd. v. Lynk Labs, Inc.*, No. 1:21-cv-2665 (N.D. Ill.) (served July 21, 2021)
Ex. 1082	Lynk Labs, Inc.'s Answer and Counterclaims (Dkt. #51) in *Samsung Elecs. Co., Ltd.*, *v. Lynk Labs, Inc.*, No. 1:21-cv-2665 (N.D. Ill. Aug. 3, 2021)
Ex. 1083	Lynk Labs, Inc.'s Amended Preliminary Infringement Contentions in *Samsung Elecs. Co., Ltd. v. Lynk Labs, Inc.*, No. 1:21-cv-2665 (N.D. Ill.) (served Aug. 31, 2021)
Ex. 1084	Lynk Labs, Inc.'s Exemplary Infringement Charts for U.S. Patent No. 10,506,400 (App. K-1) accompanying Lynk Labs, Inc.'s Amended Preliminary Infringement Contentions in *Samsung Elecs. Co., Ltd. v. Lynk Labs, Inc.*, No. 1:21-cv-2665 (N.D. Ill.) (served Aug. 31, 2021)
Ex. 1085	Notification of Docket Entry (Dkt. #50) in *Samsung Elecs. Co., Ltd.*, *v. Lynk Labs, Inc.*, No. 1:21-cv-2665 (N.D. Ill. July 27, 2021)
Ex. 1086	Order (Dkt. #57) in *Samsung Elecs. Co., Ltd.*, *v. Lynk Labs, Inc.*, No. 1:21-cv-2665 (N.D. Ill. Aug. 19, 2021)
Ex. 1087	Supplemental Report of Parties' Planning Meeting (Dkt. #72) in *Samsung Elecs. Co., Ltd.*, *v. Lynk Labs, Inc.*, No. 1:21-cv-2665 (N.D. Ill. Oct. 14, 2021)
Ex. 1088	Notification of Docket Entry (Dkt. #73) in *Samsung Elecs. Co., Ltd.*, *v. Lynk Labs, Inc.*, No. 1:21-cv-2665 (N.D. Ill. Oct. 18, 2021)

Ex. 1089	Williams, T., The Circuit Designer's Companion, First Ed., Butterworth-Heinemann Ltd. (1991) ("*Williams*")
Ex. 1090	U.S. Patent Application Publication No. 2005/0128751 ("*Roberge*")
Ex. 1091	U.S. Patent Application Publication No. 2002/0195968 ("*Sanford*")
Ex. 1092	U.S. Patent Application Publication No. 2003/0122502 ("*Clauberg*")
Ex. 1093	U.S. Patent No. 6,078,148 ("*Hochstein-148*")
Ex. 1094	U.S. Patent No. 6,814,642 ("*Siwinski*")
Ex. 1095	U.S. Patent Application Publication No. 2003/076306 ("*Zadesky*")
Ex. 1096	U.S. Patent Application Publication No. 2003/0231168 ("*Bell*")
Ex. 1097	U.S. Patent No. 6,879,319 ("*Cok*")
Ex. 1098	U.S. Patent No. 4,816,698 ("*Hook*")
Ex. 1099	U.S. Reissue Patent No. RE33285 ("*Kunen*")
Ex. 1100	GB Patent Application Publication No. 2,202,414 ("*Logan*")
Ex. 1101	U.S. Patent No. 7,226,442 ("*Sheppard*")
Ex. 1102	International Application Publication No. WO 2002/023956 ("*Panagotacos*")
Ex. 1103	U.S. Patent No. 6,850,169 ("*Manavi*")
Ex. 1104	U.S. Patent No. 5,739,639 ("*Johnson-639*")

I. INTRODUCTION

Samsung Electronics Co., Ltd. ("Petitioner" or "Samsung") requests *inter partes* review of claims 1-6 and 21-26 ("challenged claims") of U.S. Patent No. 10,687,400 ("the '400 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 Matters: The '400 patent is at issue in the following matters:

- *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 '400 patent and also U.S Patent Nos. 11,019,697, 10,506,674, 10,492,252, 10,499,466, 10,966,298, 10,492,251, 10,750,583, 10,517,149, 10,154,551, and 10,652,979) ("Illinois Litigation").

- Petitioner is concurrently filing another IPR petition challenging claims 7-20 of the '400 patent.[1]

The '400 patent claims priority to, *inter alia*, two provisional applications (U.S. Provisional Application Nos. 60/547,653 filed February 25, 2004 and 60/559,867 filed April 6, 2004. The following patents claim the same benefit of priority to the '653 and '867 applications and have corresponding IPR proceedings:

- U.S. Patent No. 8,531,118 at issue in *Acuity Brands Lighting, Inc., v. Lynk Labs, Inc.*, IPR2016-01133 (terminated);
- U.S. Patent No. 10,506,674 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01299 (pending);
- U.S Patent No. 11,019,697 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01300 (pending);
- U.S Patent No. 10,492,252 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01345 (pending);
- U.S Patent No. 10,499,466 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01346 (pending);

[1] Petitioner concurrently submits a separate paper (consistent with the Trial Practice Guide Update, July 2019), explaining why the filing of multiple petitions should not be a basis for discretionary denial under 35 U.S.C. § 314.

- U.S Patent No. 10,966,298 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01347 (pending);
- U.S Patent No. 10,652,979 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01576 (pending);
- U.S Patent No. 10,154,551 at issue in *Home Depot USA, Inc. v. Lynk Labs, Inc.*, IPR2021-01367 (pending) and *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2021-01575 (pending);
- U.S. Patent No. 10,492,251 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2022-00051 (pending), *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2022-00052 (pending), and *The Home Depot USA, Inc. et al. v. Lynk Labs, Inc.*, IPR2021-01369 (pending);
- U.S Patent No. 10,517,149 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2022-00098 (pending), and *The Home Depot USA, Inc. et al. v. Lynk Labs, Inc.*, IPR2022-00023 (pending);
- U.S. Patent No. 10,750,583 at issue in *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2022-00100 (pending) and *Samsung Electronics Co., Ltd. v. Lynk Labs, Inc.*, IPR2022-00101 (pending).

Counsel and Service Information: 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) Mark Consilvio (Reg. No. 72,065), (4) 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 '400 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 1-6 and 21-26 should be canceled as unpatentable based on the following grounds:

Ground 1: Claims 1-4 are unpatentable under pre-AIA 35 U.S.C. § 103(a) as being obvious over *Piepgras* (Ex. 1005), *Michael* (Ex. 1008), and *Butler* (Ex. 1036);

Ground 2: Claim 5 is unpatentable under § 103(a) as being obvious over *Piepgras*, *Michael*, *Butler*, and *Naskali* (Ex. 1010);

Ground 3: Claim 6 is unpatentable under § 103(a) as being obvious over *Piepgras*, *Michael*, *Butler*, and *Kasegi* (Ex. 1026);

Ground 4: Claims 21-23 and 26 are unpatentable under § 103(a) as being obvious over *Piepgras* and *Butler*;

Ground 5: Claim 24 is unpatentable under § 103(a) as being obvious over *Piepgras*, *Butler*, and *Naskali*; and

Ground 6: Claim 25 is unpatentable under § 103(a) as being obvious over *Piepgras*, *Butler*, and *Zhang* (Ex. 1012).

The '400 patent issued June 16, 2020 from Application No. 16/693,081 filed November 22, 2019, and claims priority via a chain of applications to eight provisional applications. Petitioner does not concede that the priority claim to the foregoing provisional, or any other application in the priority chain, is proper, but for purposes of this proceeding, assumes the critical date for the '400 patent is February 25, 2004, which is the earliest date of one of the provisional applications.

Michael issued April 7, 1987, *Butler* published February 20, 2003, *Kasegi* issued February 4, 1992, and *Zhang* published February 21, 2002, and thus these references qualify as prior art at least under pre-AIA 35 U.S.C. § 102(b).

Naskali, a U.S. patent, was filed October 27, 2003 and published on February 20, 2007, and thus qualifies as prior art at least under pre-AIA 35 U.S.C. § 102(e).

Piepgras published July 24, 2003 from U.S. Application No. 10/245,786 filed September 17, 2002, and thus qualifies as prior art at least under pre-AIA 35 U.S.C. § 102(a) and/or § 102(e).

The references listed above in the grounds were not 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 '400 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 '400 PATENT

While the '400 patent purports to identify an invention directed to an LED device/system having various features (*e.g.*, Ex. 1001, 4:25-10:67, 13:34-67), the claims are broadly directed to a lighting system/device having a combination of known components and features (*id.*, 27:19-29:4). The '400 patent was allowed on first action during prosecution (Ex. 1004, 130-136), and the Examiner's statement of reasons for allowance merely repeated most claims (*compare* Ex. 1004, 135, *with* Ex. 1001, 27:19-35). But the features listed by the Examiner, like all of the other

[2] Petitioner submits the declaration of R. Jacob Baker, Ph.D., P.E. (Ex. 1002), an expert in the field of the '400 patent. (Ex. 1002, ¶¶1-19; Ex. 1003.)

generically claimed features, were 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* §IX; Ex. 1002, ¶¶55-57, 59-90; *see also id.*, ¶¶22-54 (citing, *inter alia*, Exs. 1005, 1007, 1012, 1014, 1030, 1033-1034, 1049, 1089-1099); *see generally* Ex. 1004, Exs. 1050-1070.)

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.)

[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 (November 10, 2020). A comparison of the claims to any accused products in litigation may raise controversies that are not presented here given the similarities between the references and the patent.

IX. DETAILED EXPLANATION OF GROUNDS[4]

A. Ground 1: Claims 1-4 Are Obvious Over *Piepgras*, *Michael*, and *Butler*

1. Claim 1

a) A lighting system comprising:

To the extent limiting, *Piepgras* discloses the preamble of claim 1. (Ex. 1002, ¶¶59-63, 91-96.) For instance, *Piepgras* discloses a lighting system including a spotlight 100 and a remote user interface 102 for remotely controlling the spotlight. (Ex. 1005, ¶[0110] ("FIG. 6 shows a spotlight according to the principles of the invention.").)

[4] §IX references exhibits other than the asserted prior art for each ground. Such exhibits in the respective grounds reflect the state of the art known to a POSITA at the time of the alleged invention consistent with the testimony of Dr. Baker.

Figure 6 of *Piepgras* shows the lighting system:

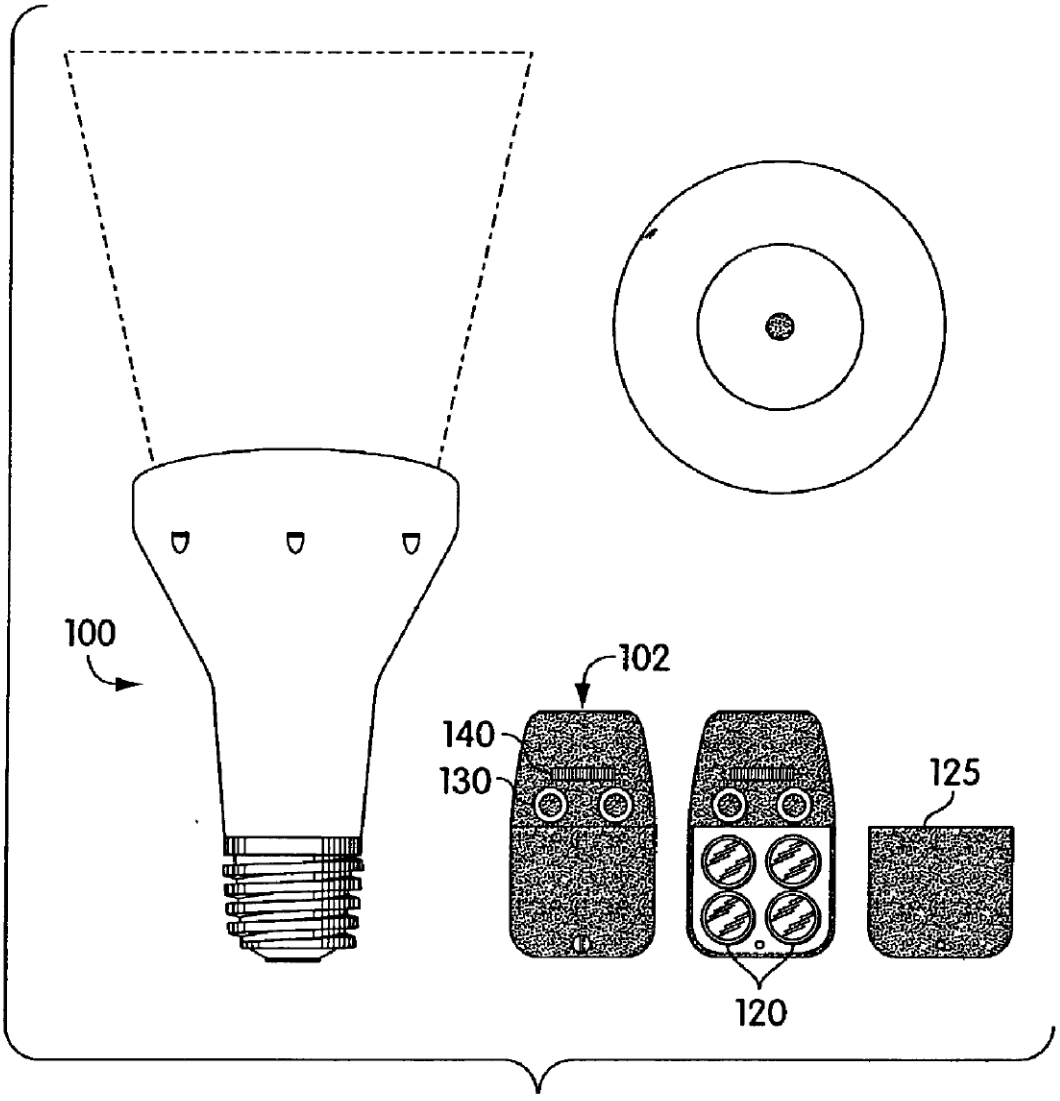


Fig. 6

(*Id.*, FIG. 6; *see also id.*, ¶¶[0038] ("FIG. 6 shows a spotlight according to the principles of the invention"), [0110] (describing Figure 6); Ex. 1002, ¶93.)

Piepgras discloses that the spotlight 100 of Figure 6 is "similar to the spotlight of FIG. 5," shown below. (Ex. 1005, ¶[0110]).)

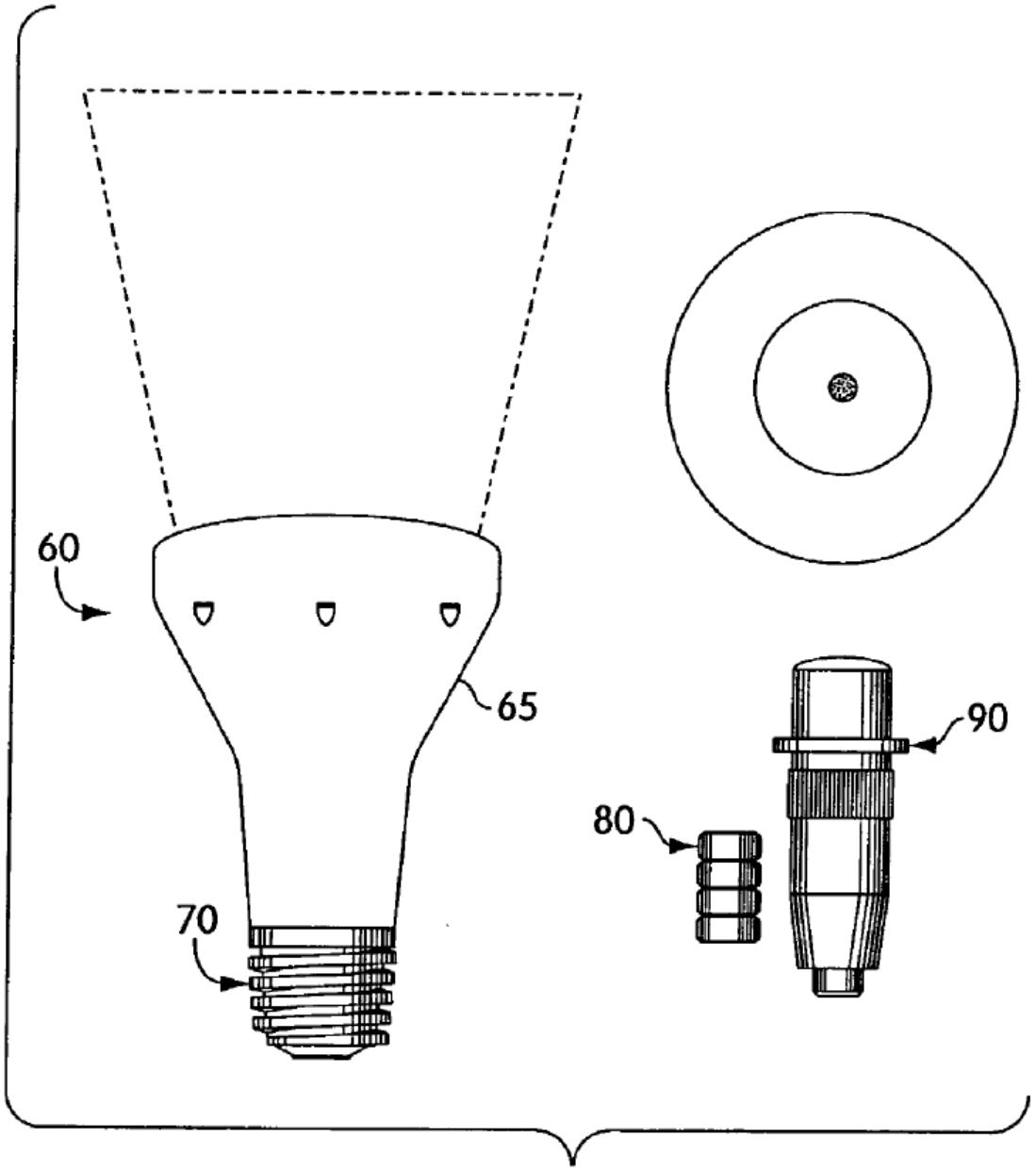


Fig. 5

(Ex. 1005, FIG. 5; Ex. 1002, ¶94.)

Figure 5 of *Piepgras* shows a spotlight 60 that "may include a system such as that depicted in FIG. 1 for controlling a plurality of LEDs within the spotlight 60, and may operate according to the techniques described above with reference to FIGS. 2A-2B." (Ex. 1005, ¶[0108].)[5] Therefore, a POSITA would have understood that spotlight 100 (shown in Figure 6) includes system 500 of Figure 1 of *Piepgras* (shown below). (Ex. 1002, ¶95.)

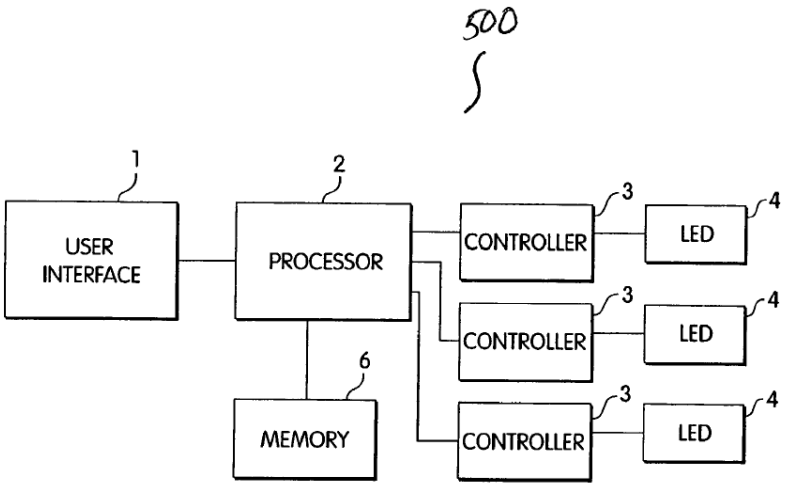


Fig. 1

(Ex. 1005, FIG. 1; *id.*, ¶¶[0033], [0088], ("FIG. 1 is a block diagram of a lighting system or device 500"), [0089]-[0093] (describing Figure 1), [0094]-[0105], FIGS. 2A-2B; Ex. 1002, ¶95.)

[5] A POSITA would have understood that "spotlight 10" at ¶[0110] is a typographical error, based on the description of "spotlight 100" elsewhere in the paragraph. (Ex. 1005, ¶[0110]; Ex. 1002, ¶95.)

Piepgras discloses that "remote user interface 102 may be remote from the spotlight 100, and may transmit control information to the spotlight 100 using, for example, an infrared or radio frequency communication link, with corresponding transceivers in the spotlight 100 and the remote user interface 102." (Ex. 1005, ¶[0110]; *see also id.*, Abstract ("Any of the foregoing devices may be equipped with various types of user interfaces (both 'local' and '**remote'**) to control light generated from the device."); Ex. 1002, ¶96.) (*See also infra* §§IX.A.1(b)-(h).)

b) a data communication circuit comprising an LED circuit and an antenna;

Piepgras in view of *Michael* discloses or suggests this limitation. (Ex. 1002, ¶¶64-68, 97-108.) As discussed for limitation 1(a), *Piepgras*' lighting system comprises spotlight 100, which includes system 500 of Figure 1. (§IX.A.1(a); Ex. 1005, ¶¶[0088], [0108], [0110].) System 500 comprises an LED circuit including "one or more LEDs 4," *e.g.*, as annotated in red below in Figure 1.

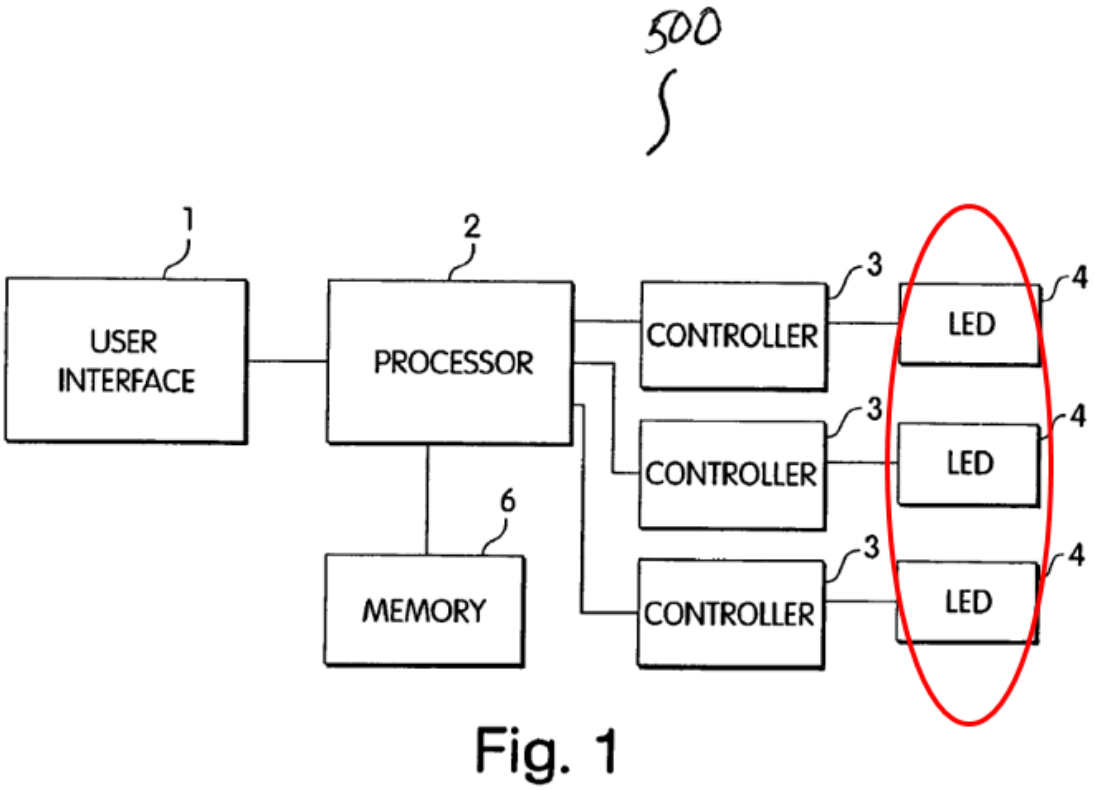


Fig. 1

(Ex. 1005, FIG. 1 (annotated); Ex. 1002, ¶97.)

Piepgras discloses that controller(s) 3 shown above in Figure 1 generate signals in "a form suitable for driving the LEDs 4, which may include controlling the current, amplitude, duration, or waveform of the signals impressed on the LEDs 4." (Ex. 1005, ¶[0088].) Therefore, a POSITA would have understood that *Piepgras*' lighting system, which includes system 500 as explained above, necessarily includes an LED *circuit* providing current and power to controllers 3 and LEDs 4. (Ex. 1002, ¶98.) A POSITA would have had this understanding because LEDs 4 are devices requiring current (and thus power) for light to be emitted and because controllers 3 similarly are electronic devices requiring current (and power)

(*e.g.*, in order to "control[] the current" as described above, Ex. 1005, ¶[0088]), and because is a circuit is needed for current to flow. (*Id.*) Indeed, without a circuit, LEDs 4 would be inoperable for emitting light. (*Id.*)

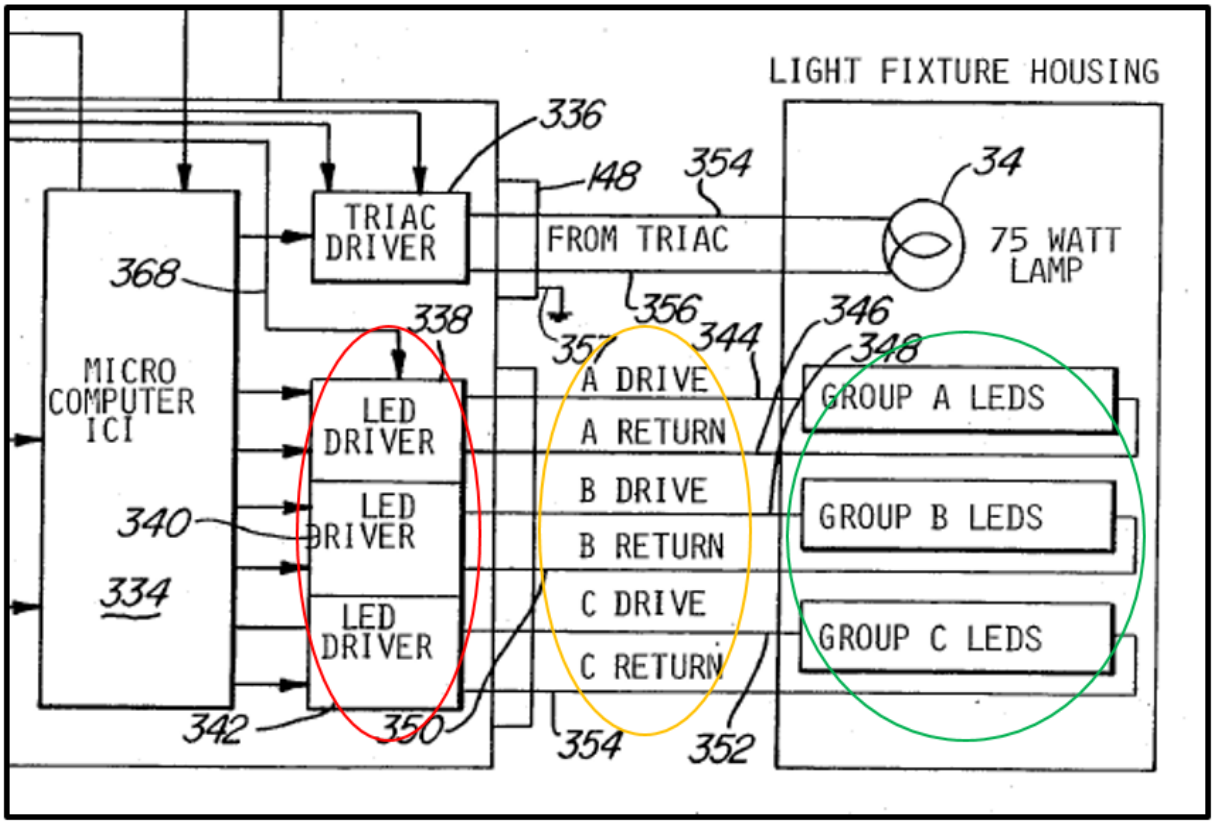
As explained for limitation 1(a), *Piepgras*' spotlight 100 includes an RF transceiver for wireless control of the spotlight. (Ex. 1005, ¶[0110] ("The remote user interface 102 ... may transmit control information to the spotlight 100 using, for example, … [a] **radio frequency communication link, with corresponding transceivers in the spotlight 100** and the remote user interface 102.").) A POSITA would have understood that *Piepgras*' spotlight, which is part of the lighting system and which includes a transceiver for communicating using a radio frequency (RF) communication link, includes a data communication circuit. (Ex. 1002, ¶99.) For example, a POSITA would have known that a transceiver for an RF communication system (as in *Piepgras*) includes electrical components that require current, which must flow in a circuit, and that by disclosing transmission of "control information" for remotely controlling lighting system 500 (Ex. 1005, ¶[0110]), *Piepgras* discloses a *data* communication circuit as claimed. (Ex. 1002, ¶99.)

A POSITA would have understood that *Piepgras*' data communication circuit includes the above-described transceiver of spotlight 100 that transmits and receives data for remotely controlling lighting. (Ex. 1002, ¶100.) A POSITA would further have understood that the data communication circuit includes an antenna. (*Id.*) For

example, a POSITA would have had this understanding because without an antenna to convert received RF radiation to electrical signals, RF communication as described in *Piepgras* cannot occur. (Ex. 1047, 49; Ex. 1048, 110; Ex. 1002, ¶100.) Indeed, a POSITA would have understood that an antenna is a basic requirement of a wireless communication system, especially one using RF communications like that disclosed by *Piepgras*. (Ex. 1002, ¶100.)

Nonetheless, while *Piepgras* does not explicitly disclose that its data communication circuit comprises the LED circuit and an antenna, it would have been obvious in view of *Michael* to implement such features in the lighting system of limitation 1(a). (*Id.*, ¶101.) *Michael* "relates to lighting assemblies" and discloses (like *Piepgras*) LED-based lighting. (Ex. 1008, 1:5-7; *see also id.*, Title ("Lighting Assembly"), 7:20-8:47 (describing circuitry relating to lighting assembly); Ex. 1005, FIG. 1, ¶[0088]; Ex. 1002, ¶101.) Accordingly, a POSITA contemplating implementing *Piepgras*' lighting system would have had reason to consider the teachings of *Michael*. (Ex. 1002, ¶101.)

Michael discloses a lighting assembly that includes LED drivers (red below) coupled to LEDs (green below) via drive/return lines, as shown below in excerpted/annotated Figure 12.



(Ex. 1008, FIG. 12 (excerpted/annotated); *see also id.*, 7:20-21 ("The control assembly for the invention lighting assembly is seen in block diagram in FIG. 12."), 7:35-40 ("Six pin connector 146 includes a drive line 344 controlling the LEDs of light element group A; a return line 346 for light group A; a drive line 348 controlling light group B; a return line 350 for light group B; a drive line 352 controlling light group C; and a return line 354 for light group C."); Ex. 1002, ¶102.)

Michael discloses an antenna 438 (red below) for implementing wireless communication that enables an operator to remotely control the LED lighting assembly. (Ex. 1008, 8:23-24 ("Keyboard 378 performs the operator interface function."), 8:54-58 ("The described lighting fixture assembly ... provide[s] the operator with the ability to ... actuate the various lighting assemblies on the lighting fixture...."), 10:48-61, FIG. 15 (below); Ex. 1002, ¶103.)

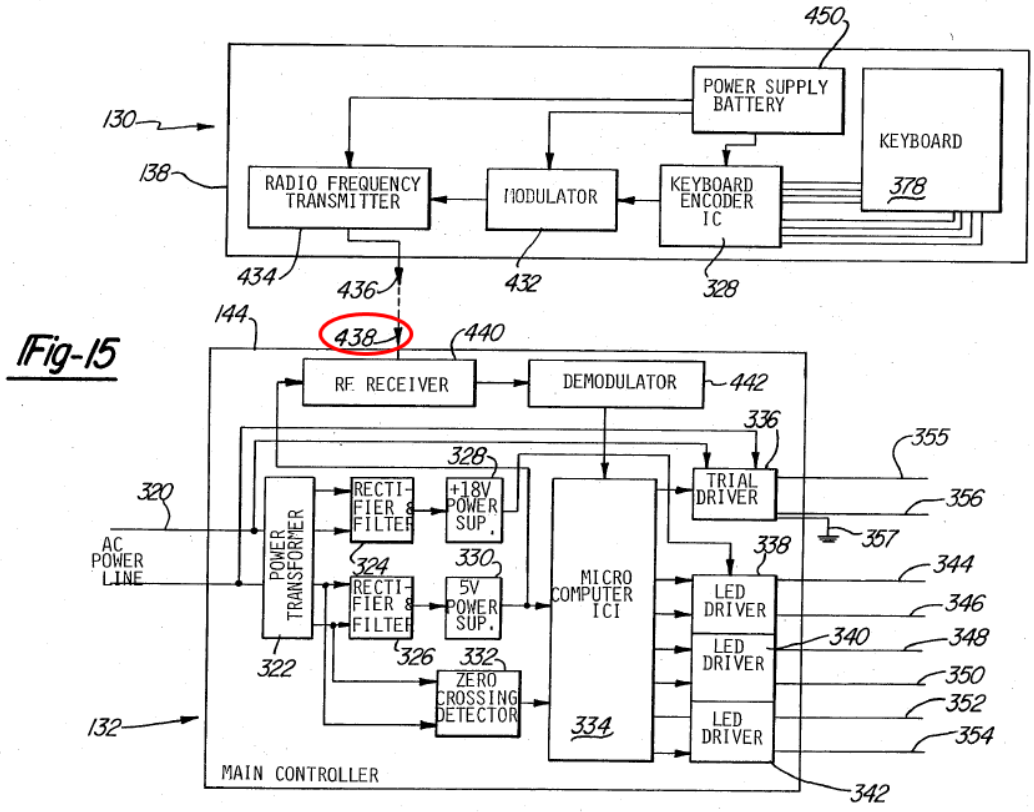


Fig-15

(Ex. 1008, FIG. 15 (antenna annotated in red); Ex. 1002, ¶103.)

Michael describes antenna 438 receiving data that is used to control the LEDs of the lighting assembly. (Ex. 1002, ¶104.) For example, *Michael* explains that keyboard 378 is coupled to keyboard encoder IC 328, which provides an encoded

signal that is modulated and transmitted to antenna 438, and "[t]he signal received on antenna 438 is inputted to a radio frequency receiver 440 ... [which] outputs to a demodulator 442 which outputs to microcomputer 334." (Ex. 1008, 10:48-58.) As shown above in Figure 15, microcomputer 334 is coupled to LED drivers 338/340/342, which drive LEDs shown in Figure 14. (Ex. 1002, ¶104.)

A POSITA would have understood that *Michael* discloses a data communication circuit comprising an LED circuit and antenna 438. (*Id.*, ¶105.) For example, *Michael* discloses AC power lines 320 (at left in Figure 15 above) and a circuit ground 357 (at right in Figure 15). (Ex. 1008, FIG. 15, 7:41-43 ("ground line 357"), 8:11 ("AC line voltage") and describes various aspects of circuitry (*see generally id.*, 4:58-9:37), including describing that "a forward current flows ... from a drive terminal through the circuit board to the appropriate LED load" (*id.*, 9:53-55), and further discloses that the LED drivers shown in Figure 15 are coupled to LEDs as shown in Figure 12. (Ex. 1002, ¶105; *see also* Ex. 1008, FIG. 12 (excerpted/annotated above), 7:35-40 ("Six pin connector 146 includes a drive line 344 controlling the LEDs of light element group A; a return line 346 for light group A; a drive line 348 controlling light group B; a return line 350 for light group B; a drive line 352 controlling light group C; and a return line 354 for light group C.").) Thus, a POSITA would have understood that *Michael*'s controller 132 (Ex. 1008, FIG. 15), in conjunction with antenna 438 and the LEDs of Figure 12, discloses a

data communication circuit comprising an LED circuit and an antenna. (Ex. 1002, ¶105.)

In light of *Piepgras* and *Michael*, a POSITA would have been motivated to configure *Piepgras*' lighting system (discussed above for limitation 1(a)) to include a data communication circuit *comprising the LED circuit and an antenna*. (*Id.*, ¶106.) For example, a POSITA would have found it beneficial and predictable to implement an antenna—a fundamental component (known decades before the alleged invention of the '400 patent) of a wireless communication system—in *Piepgras*' lighting system, which includes a transceiver for RF communication (as discussed above). (Ex. 1005, ¶[0110], FIG. 6.) Given that *Piepgras* discloses remotely controlling its spotlight using an RF communication link, a POSITA would have been motivated to configure a data communication circuit comprising the LED circuit and an antenna. (Ex. 1002, ¶106.) For example, such a skilled person would have recognized that such a configuration (with the data communication circuit comprising both the LED circuit and antenna) would have promoted communication between the antenna and the LED circuit in order to control LEDs based on data received by the antenna. (*Id.*) Moreover, such a configuration would have been recognized to promote a compact design (*e.g.*, because the antenna and the LED circuit that is to be controlled based on the functioning of the antenna are both

comprised in the data communication circuit) and would have been consistent with known circuit designs (*e.g.*, as taught by *Michael*, discussed above). (*Id.*)

A POSITA would have been skilled at circuit design/implementation and would have found such a configuration to be a predictable and feasible implementation for supporting *Piepgras*' wireless remote control of LED lighting (discussed above), particularly because it was well known to configure circuitry in such a manner for wireless control of lighting. (Ex. 1022, FIGS. 2-5, 7 (showing printed circuit board 142 and circuit comprising lamp driver and antenna), 4:7-16, 4:48-50 ("FIG. 7 shows the embedded antenna 140, which is a metal trace put on the printed circuit board (PCB) 142."); Ex. 1002, ¶107.) For example, a POSITA would have recognized that such a configuration would have predictably leveraged existing design principles and technologies. (Ex. 1002, ¶107.) Indeed, *Wacyk* (Ex. 1022) demonstrates the existing approach of implementing a data communications circuit (*e.g.*, as shown by the radio and RF signal below in Figures 7-8) that includes an antenna and a lamp driver. (Ex. 1002, ¶107.)

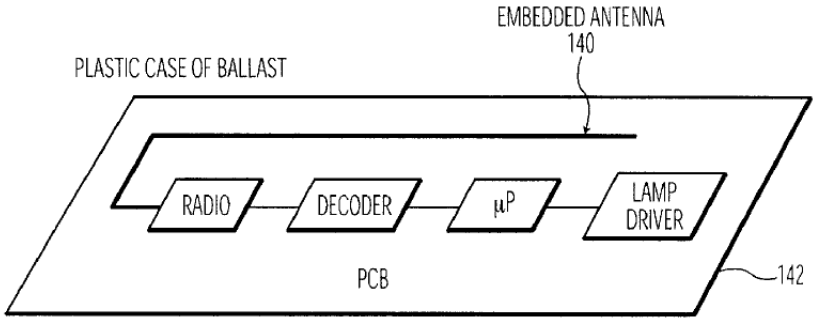


FIG. 7

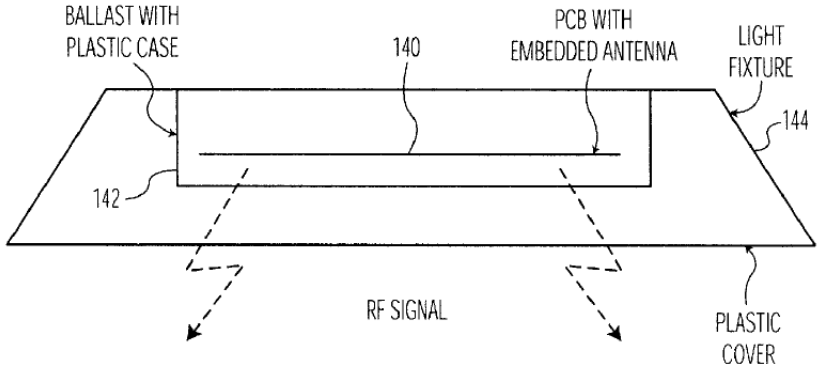


FIG. 8

(Ex. 1022, FIGS. 7-8.)

A POSITA would have found such a configuration of *Piepgras*' system to be a combination of known components and technologies, according to known methods, to produce a predictable circuit arrangement. (Ex. 1002, ¶108.) *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). Moreover, *Piepgras* describes the design approaches of including several components in a single package and integrating several components, and thus a POSITA would have found it feasible and predictable to include both an LED circuit and an antenna in the data communication circuit. (Ex. 1005, ¶¶[0089] ("[A] processor may include discrete

circuitry such as passive or active analog components including resistors, capacitors, inductors, transistors, operational amplifiers, and so forth, as well as discrete digital components such as logic components, shift registers, latches, or any other separately packaged chip or other component for realizing a digital function. Any combination of the above circuits and components, whether packaged discretely, as a chip, as a chipset, or as a die, may be suitably adapted to use as a processor as described herein."), [0090] ("The processor 2 and controller 3 may be incorporated into one device, e.g., sharing a single semiconductor package."), [0160] (describing with reference to a rope light shown in Figure 31 that "three [] LED dies of different colors may be packaged together in each LED subsystem 3102, with each die individually controllable"); Ex. 1002, ¶108.) Accordingly, a POSITA would have had a reasonable expectation of success implementing such a configuration of *Piepgras*' system. (Ex. 1002, ¶108.)

c) wherein the LED circuit comprises a plurality of LEDs connected in series, parallel, or opposing parallel;

Piepgras discloses this limitation. (Ex. 1002, ¶109.) For example, *Piepgras* discloses "a plurality of LEDs within the spotlight 60" (Ex. 1005, ¶[0108]) of Figure 5 and explains (as discussed above for limitation 1(a)) that spotlight 100 of Figure 6 is "similar to the spotlight of FIG. 5" (*id.*, ¶[0110]), so a POSITA would have understood that spotlight 100 comprises a plurality of LEDs. (Ex. 1002, ¶109.)

Piepgras further discloses that its "processor 2 and controller 3 [of system 500] may be incorporated into one device, [which] may drive **several LEDs 4 in series** where it has sufficient power output" (Ex. 1005, ¶[0090]) and provides this disclosure in the context of Figure 1 (*id.*, ¶¶[0088]-[0090]), which shows system 500 that is included in spotlight 60. (Ex. 1002, ¶109.) Since "spotlight [100] may be similar to the spotlight of FIG. 5," a POSITA would have understood that the foregoing disclosure of "several LEDs 4 in series" applies to the LEDs of the LED circuit discussed above for limitation 1(b) (i.e., the LED circuit that the data communication circuit comprises). (*Id.*) Thus, *Piepgras* discloses that the LED circuit comprises a plurality of LEDs connected in series ("connected in series, parallel, or opposing parallel"). (*Id.*)

d) wherein the LED circuit and the antenna are integrated in a package;

The *Piepgras-Michael* combination discloses or suggests this limitation. (Ex. 1002, ¶¶110-113.) *Piepgras* discloses the use of LEDs in a "package." (Ex. 1005, ¶[0095] (disclosing "packaged LEDs" and explaining that "the term 'LED' does not restrict the package type of the LED."); *see also id.*, [0124] (describing LED packages), [0136] ("package").) *Piepgras* further discloses integrating multiple components in a package (*e.g.*, integrating multiple LED dies in a package, and integrating separate components, such as a controller and a processor or components

of constituent components of processor. (*Id.*, ¶¶[0089] ("[A] processor may include discrete circuitry such as passive or active analog components including resistors, capacitors, inductors, transistors, operational amplifiers, and so forth, as well as discrete digital components such as logic components, shift registers, latches, or any other separately **packaged** chip or other component for realizing a digital function. Any combination of the above circuits and components, whether **packaged** discretely, as a chip, as a chipset, or as a die, may be suitably adapted to use as a processor as described herein."), [0090] ("The processor 2 and controller 3 may be incorporated into one device, e.g., sharing a single semiconductor **package**."), [0160] (describing with reference to a rope light shown in Figure 31 that "three [] LED dies of different colors may be **packaged together** in each LED subsystem 3102, with each die individually controllable"); Ex. 1002, ¶110.)

As explained for limitation 1(b) (§IX.A.1(b)), *Piepgras-Michael* discloses/suggests the data communication circuit including the antenna for wirelessly controlling LEDs. In light of *Piepgras*' and *Michael*'s disclosures and the knowledge of a POSITA regarding the state of the art, it would have been obvious to configure the *Piepgras-Michael* system to integrate the LED circuit and the antenna of the above-described data communication circuit in a circuit board ("package"). (Ex. 1002, ¶111.) Such a configuration was known in the art, and a POSITA would have found such an integration of components to be desirable and

beneficial, *e.g.*, to promote a compact, consolidated design, consistent with known design principles. (*Id.*) For example, *Wacyk* (demonstrating the state of the art and discussed above for limitation 1(b)) shows at Figure 7 (below) a lamp driver circuit and an antenna integrated in a printed circuit board ("package"), which a POSITA would have found to be a compact, efficient, and versatile design, and such a skilled person would have found integrating the above-discussed LED circuit and antenna in a package in the *Piepgras-Michael* system to be similarly beneficial. (Ex. 1002, ¶111.)

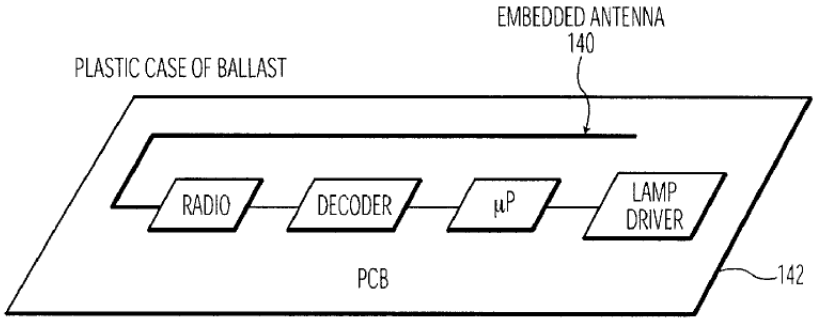


FIG. 7

(Ex. 1022, FIG. 7.)

A POSITA would have additionally recognized that integrating various components (*e.g.*, the LED circuit and antenna discussed above) would have predictably promoted versatility in forming circuitry in a manner suitable for a given desired application (*e.g.*, consistent with *Piepgras*' goal of enabling remote control of lighting). (Ex. 1002, ¶112.) Indeed, it was well known to integrate components that are related in functionality or that cumulatively help achieve a goal of a system.

(*Id.*) A POSITA have been skilled at circuit design/implementation and would have been familiar and knowledgeable about packaging circuit components in various configurations, including the "integrated" configuration described in limitation 1(d). (*Id.*) Indeed, the '400 patent does not describe any criticality associated with integrating the elements recited in limitation 1(d) (*see generally* Ex. 1001), and moreover, *Piepgras* describes various options for integrating components in a package, including integrating different types of components (as discussed above), so a POSITA would have found the configuration of limitation 1(d) to be predictable and feasible. (Ex. 1002, ¶112.)

Indeed, such a configuration would have been a mere combination of known components and technologies, according to known methods, to produce predictable results with a reasonable expectation of success. (*Id.*, ¶113.) *KSR*, 550 U.S. at 416. A POSITA would have found such a configuration compatible with the principles and goals of *Piepgras*' system, including providing remotely controllable LED-based lighting as discussed above. (Ex. 1005, Abstract, ¶¶[0032], [0083]; Ex. 1002, ¶113.)

e) wherein the data communication circuit is integrated into a lighting device;

The *Piepgras-Michael* combination (discussed for limitation 1(b), *see* §IX.A.1(b)) discloses or suggests this limitation. (Ex. 1002, ¶¶114-116.) As discussed above for limitation 1(b), *Piepgras* discloses that that its spotlight 100

includes LEDs and a transceiver. (§IX.A.1(b); *see also* §IX.A.1(a).) As also explained for limitations 1(a) and 1(b), a POSITA would have understood that *Piepgras* additionally discloses that spotlight 100, which is similar to spotlight 60 of Figure 5 of Piepgras, includes system 500 ("a lighting device"). (§§IX.A.1(a)-(b); Ex. 1005, ¶[0108] ("The spotlight 60 may include a system such as that depicted in FIG. 1 for controlling a plurality of LEDs within the spotlight...").) To the extent *Piepgras-Michael* does not disclose that its data communications circuit (*i.e.*, the data communication circuit of the combined *Piepgras-Michael* system, discussed for limitation 1(b)) is *integrated into* system 500 ("lighting device") of the "lighting system" discussed for limitation 1(a), it would have been obvious to configure the *Piepgras-Michael* system to implement this feature. (Ex. 1002, ¶114.)

For example, given that system 500 ("lighting device") includes LEDs 4 and controllers 3 for controlling the LEDs as shown below, a POSITA would have been motivated to, and found it predictable to, configure the *Piepgras-Michael* data communication circuit, which includes the LED circuit and the antenna (for receiving data used for remotely controlling lighting) to be integrated into system 500. (Ex. 1002, ¶115.)

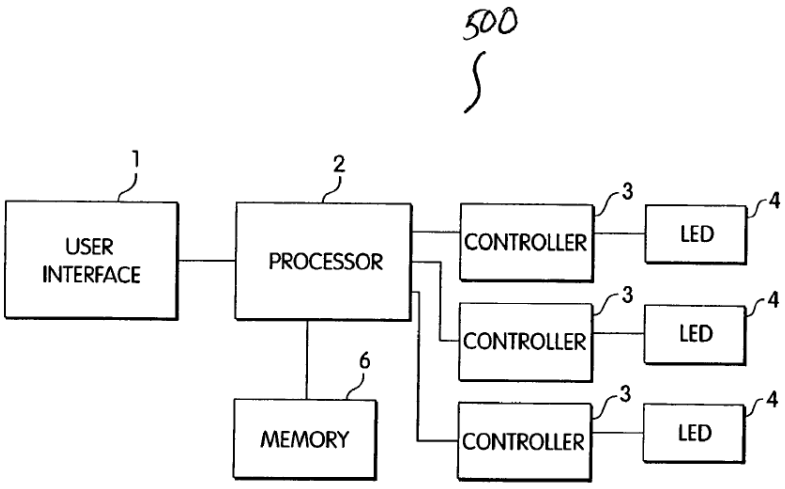


Fig. 1

(Ex. 1005, FIG. 1.)

A POSITA would have recognized the benefits of integrating the above-discussed data communication circuit including the LED circuit and antenna, which receives data for controlling lighting in the above-discussed system, into the system 500 ("lighting device" implemented as part of the lighting system above (*e.g.*, FIGS. 5-6)) in order to enable controllers 3, which are part of system 500, to control LEDs based on such received data.[6] (Ex. 1002, ¶116.) Thus, a POSITA would have appreciated the benefits of implementing the above configuration of the *Piepgras-Michael* system, to allow remote communications with the device in an efficient, and convenient manner. (*Id.*) A POSITA would have been skilled at

[6] The '400 patent does not describe any criticality associated with integrating a communication circuit in a lighting device as claimed. (*See generally* Ex. 1001.)

designing/implementing circuits, would have found integrating various types of circuits into various types of devices to be straightforward and predictable, and similarly would have been able to implement the above configuration with a reasonable expectation of success, especially since such a configuration would have been a mere combination of known components and technologies to achieve predictable results. (*Id.*) *KSR*, 550 U.S. at 416. Providing the "communication circuit" of the *Piepgras-Michael* system to be integrated in a lighting device (*e.g.*, such as system 500 included in the system of Figures 5-6 (limitation 1(a)) would have been one of a finite number of ways of configuring the system to facilitate the remote lighting controls contemplated by *Piepgras*. (Ex. 1002, ¶116.)

f) wherein the lighting device is adapted to be connected to a socket;

Piepgras-Michael discloses this limitation. (Ex. 1002, ¶¶117-118.) For instance, *Piepgras-Michael* discloses that system 500 ("the lighting device") is adapted to be connected to a socket. As discussed for limitation 1(e), *Piepgras* discloses that its spotlight 100 of Figure 6 is "similar to the spotlight of FIG. 5" (Ex. 1005, ¶[0110]), which "draw[s] power for illumination from an external power source through a **connection** 70" (*id.*, ¶[0108]), which is "**adapted for**, for example, a screw **socket**, **socket**, post **socket**, pin socket spade **socket**, wall **socket**, or other interface" (*id.*, ¶[0109]). *Piepgras* discloses with respect to Figure 5 that the LEDs of spotlight 60 are "powered by electrical power received through the connection

70." (*Id.*, ¶[0108]; Ex. 1002, ¶117.) Given that LEDs of spotlight 60 are part of system 500 (as shown in Figure 1), spotlight 60 includes system 500 (*id.*), and spotlight 100 of Figure 6 similarly would have been understood to include system 500, a POSITA would have understood that system 500 ("the lighting device") of the lighting system discussed for limitation 1(a) is adapted to be connected to a socket. (Ex. 1002, ¶118; Ex. 1005, FIGS. 1, 5-6 (below, showing socket connection).)

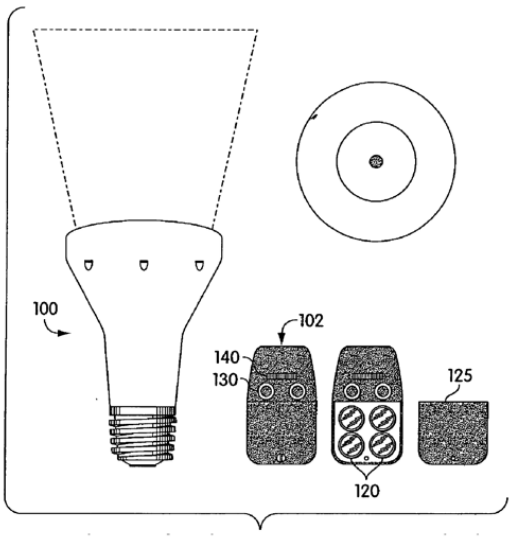


Fig. 6

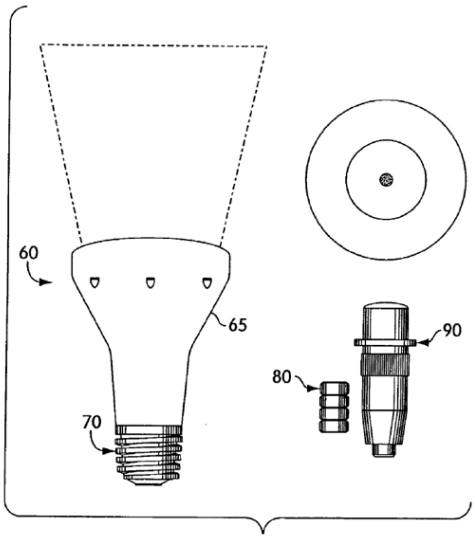


Fig. 5

g) wherein the lighting device is configured to transmit data signals to or receive data signals from at least one telecommunications device;

Piepgras (as modified above) discloses this limitation. (Ex. 1002, ¶¶119-121.) For instance, as discussed for limitations 1(a) and 1(b), *Piepgras* discloses that the lighting system (discussed for limitation 1(a)) includes a remote user

interface 102 ("at least one telecommunications device") (red below) for remotely controlling spotlight 100. (§§IX.A.1(a)-(b); Ex. 1005, ¶[0110] (describing remote user interface 102).)

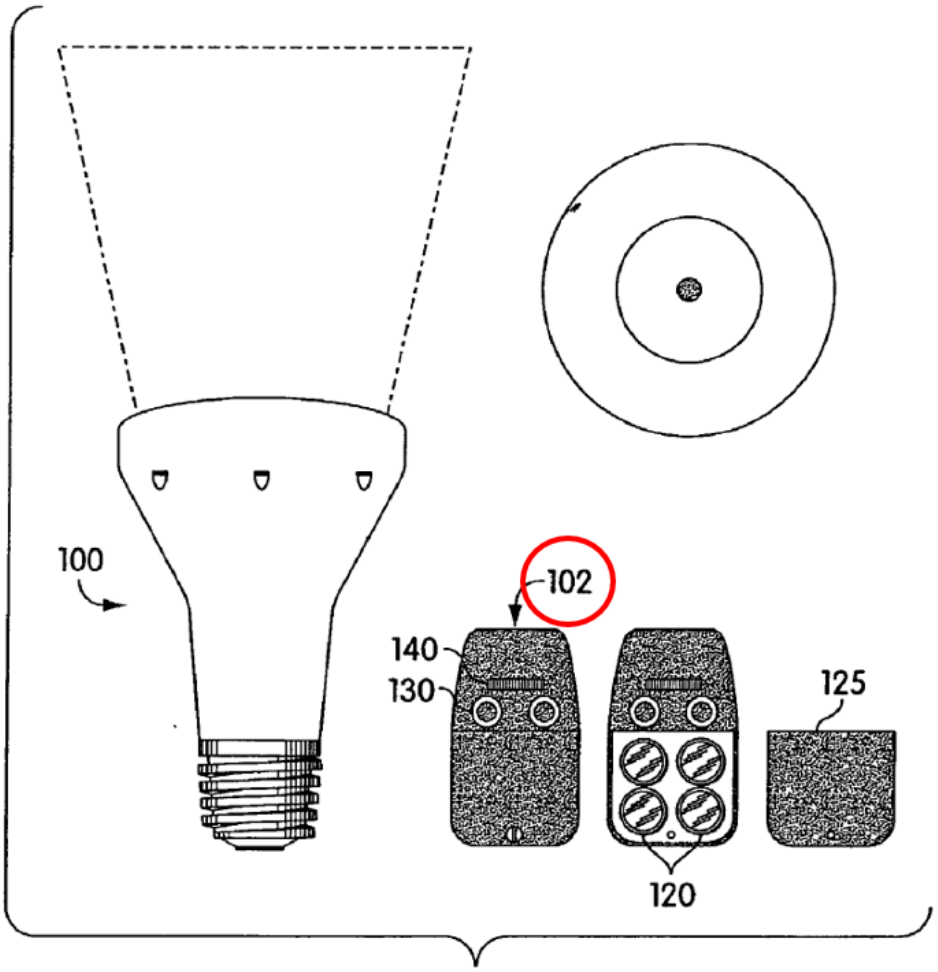


Fig. 6

(Ex. 1005, FIG. 6 (annotated); Ex. 1002, ¶119.) "[R]emote user interface 102 may be remote from the spotlight 100, and may transmit **control information** to the spotlight 100 using, for example, an infrared or radio frequency communication link, with corresponding transceivers in the spotlight 100 and the remote user interface

102." (Ex. 1005, ¶[0110].) A POSITA would have understood that remote user interface 102 is a *telecommunications device*, because it includes a transceiver for communicating control information with spotlight 100. Thus, system 500 ("lighting device" as modified above and included in the lighting system (limitation 1(a))) lighting device is configured to transmit data signals to or receive data signals (*e.g.*, control information which necessarily must include data to facilitate remote control) from remote interface 102, which is a "telecommunications device." (Ex. 1002, ¶119.) A POSITA would have recognized that system 500 includes the controllers 3 that control the LEDs (as described above) and thus the control information (data signals) received by user interface 102 would facilitate such remote control.

Indeed, *Piepgras* explains that "user interfaces for **any of the devices shown in** FIGS. [32-38] **as well as other figures** may be implemented as a software driven graphical user interface, a **personal digital assistant (PDA)**, a **mobile remote-control interface**, etc." (Ex. 1005, ¶[0177]; Ex. 1002, ¶120.) Because *Piepgras* describes the foregoing disclosure as being applicable to "other figures," a POSITA would have understood that *Piepgras*' characterization of user interfaces is applicable to lighting applications of various figures, including the remote **user interface** 102 of Figure 6. (Ex. 1002, ¶120.) Such a user interface may "generate and communicate signals to various lighting devices" (Ex. 1005, ¶[0177]), which is consistent with the "control information" communicated by user interface 102 of

FIG. 6 (*id.*, ¶[0110]), and thus a POSITA would have understood such features to be associated with the remote "control" of the lighting device in the lighting system (*e.g.*, system 500 operations of controlling lighting by the LEDs in the system). (Ex. 1002, ¶120.)

To the extent *Piepgras-Michael* does not explicitly disclose that *system 500* ("the lighting device") is configured to transmit data signals to or receive the data signals from remote user interface 102 ("at least one telecommunications device"), it would have been obvious to implement such a feature. (*Id.*, ¶121.) For example, as discussed above and shown above in Figure 1, system 500 includes controllers 3 for controlling the LEDs and as explained, the Figure 6 lighting system provides a "remote user interface" 102 that communicates "control information" via transceivers in interface 102 and spotlight 100. (Ex. 1005, ¶[0110].) Therefore, given that *Piepgras* discloses remote control of lighting, a POSITA would have been motivated to configure system 500 to receive the data signals from the remote user interface 102, so that such data signals can be appropriately used for controlling the LEDs that provide the lighting. (Ex. 1002, ¶121.) This would have been a straightforward configuration for a POSITA to implement, as a POSITA would have been skilled at designing various types of electronic circuits/systems, and implementing transmission and reception of data signals in various contexts. (*Id.*) Such a skilled person would have found the above configuration to be feasible to

implement with a reasonable expectation of success, particularly because *Piepgras* describes system 500 as being included in spotlight 100. (Ex. 1005, ¶¶[0108], [0110]; Ex. 1002, ¶121.)

h) wherein the telecommunications device comprises a circuit configured to detect human touch via capacitive sensing.

Piepgras-Michael in view of *Butler* discloses or suggests this limitation.[7] (Ex. 1002, ¶¶69-73, 122-131.) As discussed for limitations 1(a)-(b) and 1(g), the *Piepgras-Michael* system discloses/suggests a remote user interface ("the telecommunications device") used for remotely controlling spotlight 100. (§§IX.A.1(a)-(b), (g).)

However, *Piepgras-Michael* does not explicitly disclose that the remote user interface 102 ("telecommunications device") comprises a circuit configured to detect human touch via capacitive sensing. Nonetheless, it would have been obvious

[7] The '400 patent does not describe a "telecommunications device compris[ing] a circuit configured to detect human touch via capacitive sensing." (*See generally* Ex. 1001; Ex. 1002, ¶122.) Petitioner reserves all rights to challenge this claimed feature under 35 U.S.C. § 112 in other proceedings. For purposes of this proceeding, Petitioner demonstrates that the prior art discloses/suggests this limitation based on the language of the claim.

in view of the disclosures of *Piepgras* and *Butler* and the knowledge of a POSITA to configure and use a remote user interface 102 with such features. (Ex. 1002, ¶123.)

As explained, *Piepgras* discloses features that use remote user interfaces, such as a PDA. (§IX.A.1(h); Ex. 1005, ¶[0177].) Thus, a POSITA would have had reasons to contemplate various ways to implement a remote control device to facilitate the remote lighting control of the lighting system discussed above. (Ex. 1002, ¶124.) As such, a POSITA would have found *Butler* as relevant guidance for such configurations. *Butler* describes a handheld remote control device that is used for controlling another device, *e.g.*, a television, and in this manner is similar to *Piepgras*' disclosure of a remote control device (*e.g.*, PDA) for controlling another device (*e.g.*, LED lighting device). (Ex. 1036, Abstract ("providing touch screen capability on interactive television systems and associated remote control devices"), ¶¶[0005] ("The remote control is typically a hand held device that communicates with the television apparatus and/or a set top box by an Infrared (IR) or other link."), [0020] ("remote control"); Ex. 1002, ¶124.) Therefore, a POSITA contemplating implementing the *Piepgras*-*Michael* lighting system would have had reason to consider the teachings of *Butler*, *e.g.*, for guidance regarding implementing *Piepgras*' remote lighting control. (Ex. 1002, ¶124.)

Butler describes techniques for providing improved user input capability via a remote control with touch screen functionalities. (Ex. 1036, Title ("Method and system for providing **improved user input capability** for interactive television"), Abstract ("providing touch screen capability"), ¶¶[0001] ("techniques for providing user input capability for interactive program content over television"), [0029] ("[I]nteractive television system 100 may provide interactivity to users, such as permitting the user to select a program, **turn the system on and off**, and the like. Such capabilities may be provided using an EPG [electronic program guide] displayed...**on the remote control 158**."); Ex. 1002, ¶125.) *Butler* discloses that its remote control detects human touch for acquiring input from a user, and further discloses capacitive sensing as a way to detect the human touch. (Ex. 1036, ¶¶[0020] ("Embodiments provide interactive capability by using a **touch screen** ... . [E]mbodiments ... employ presence sensitive devices [which] can be a ... **capacitive touch screen** ... . [A] touch screen emulates the operation of a mouse to select areas of the screen to activate. Specific embodiments may be preferably implemented on ... a remote control..."), [0026] ("the remote control will also include touch screen capability."), [0028] ("An optional associated remote control 158, which can optionally have a corresponding **touch screen** overlay 159 can be provided."), FIG. 1A (annotated below); Ex. 1002, ¶126.)

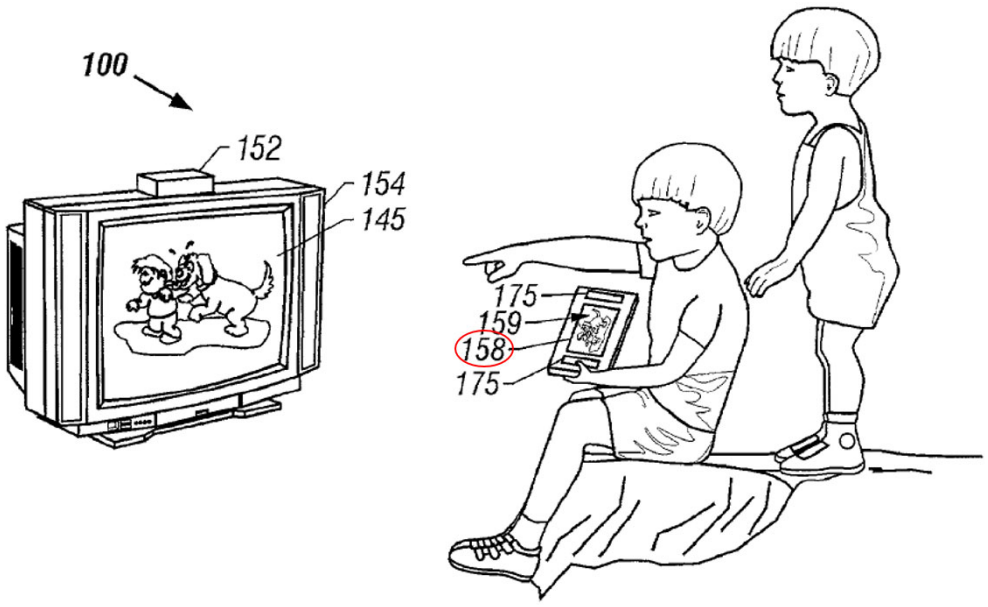


FIG. 1A

(Ex. 1036, FIG. 1A (remote control 158 in red); Ex. 1002, ¶126.)

Butler explains benefits associated with using a touch screen. (Ex. 1036, ¶[0021] ("Touch access enables specific embodiments to be especially suitable for children or adults with impaired motor abilities because children instinctively touch something they want and using a touch screen is much easier than using a mouse or a device with small buttons, such as a standard remote control, for a disabled person. ... People with impaired vision capabilities may use a touch screen to enlarge an area or have the text read to them by the interactive system."); Ex. 1002, ¶127.) Additionally, a POSITA would have recognized that touch screens facilitate convenient user input for a variety of users besides the ones described in *Butler*, because touch screens were well known in the art. (Ex. 1006, ¶[0030] ("Input/output

components 206 include a variety of input devices that have previously been found on mobile devices such as a touch-sensitive screen..."); *id.*, ¶[0024], FIGS. 1 (input/output components 206), 3 (above; display screen 304); Ex. 1002, ¶128.)

A POSITA would have understood that *Butler*'s portable remote control necessarily comprises a *circuit that can* detect a human touch via capacitive sensing, wherein the *circuit is configured to* detect the human touch via capacitive sensing. (Ex. 1036, FIG. 1A, ¶[0005] ("The remote control is typically a hand held device that communicates with the television apparatus and/or a set top box by an Infrared (IR) or other link."); Ex. 1002, ¶129.) A POSITA would have had such an understanding because it was well known that capacitive sensing requires sensing capacitance, which is an attribute of a circuit, and in any event must include touch sensing circuitry to provide such features. (Ex. 1006, ¶[0037] ("[T]he touch sensors are **capacitive touch sensors** that are divided into two regions. ... When a user touches either section 300 or 302, the **capacitance** associated with the touched section changes indicating that the user has touched the device."); Ex. 1002, ¶129.)

In light of *Piepgras*' and *Butler*'s disclosures, a POSITA would have been motivated to configure or implement within *Piepgras-Michael*'s system a remote user interface ("telecommunications device") that includes a circuit configured to detect human touch via capacitive sensing, such as touch sensors or a touch screen. (Ex. 1002, ¶130.) For example, a POSITA would have found providing such human

touch detection features in the remote control interface used by the lighting system (*e.g.*, FIG. 6 of *Piepgras*) would have improved the system because it would have beneficially added versatility in how a user could remotely control the lighting system via well-known user friendly touch sensing technologies. (*Id.*) A POSITA would found such a configuration predictable and feasible, given that *Butler* describes such capacitive touch tensing and particularly given that touch detection was well known for portable devices, including PDAs, which *Piepgras* describes as an example of the remote user interface. (Ex. 1005, ¶[0177]; Ex. 1023, ¶¶[0005] ("display of the PDA is usually a touch-control display"), [0016] ("display 101[] ... can be a touch-control screen"); Ex. 1024, ¶[0005] ("touch panel 11"), FIG. 1 (showing touch panel 11); Ex. 1002, ¶130.) A POSITA would have found using *capacitive* sensing to be to be a predictable way of implementing such touch detection input features in such a remote control device in the *Piepgras-Michael* system, especially in light of *Butler* and a POSITA's state-of-the-art knowledge. (Ex. 1006, ¶[0037]; Ex. 1002, ¶130.)

For similar reasons, a POSITA would have had the capability to implement this configuration with a reasonable expectation of success. (Ex. 1002, ¶131.) Such a configuration would have been straightforward to implement, as it would have involved the use of known components and technologies and techniques (*e.g.*, capacitive touch detection circuitry in a remote control device) that would have

predictably led to a remote user interface (*e.g.*, remote user interface 102) with convenient user touch input features. (*Id.*) *KSR*, 550 U.S. at 416.

2. Claim 2

a) The lighting system of claim 1, wherein the package comprises a reflective material.

The *Piepgras-Michael-Butler* combination discloses or suggests this limitation. (Ex. 1002, ¶¶132-134.) *Piepgras* discloses several examples of lighting systems implemented using system 500 that consider the benefits of reflective materials and components for enhancing lighting effects. (Ex. 1005, Title, Abstract, ¶¶[0083], [0106]-[0241], FIGS. 3-54; Ex. 1002, ¶132.) For example, *Piepgras* discloses "[v]arious optical processing devices which may be used with any of the devices (*e.g.*, **reflectors**...)" (Ex. 1005, ¶[0083]) and further discloses the use of a "reflective material." (*Id.*, ¶¶[0187] ("The optic may also include a **reflective material** to reflect the light received from the ends out of the optic."); *see also, e.g.*, *id.*, ¶¶[0124] ("A reflector may also be associated with one or more LEDs to project illumination in a predetermined pattern."), [0118] ("reflective surface for directing light onto a wall"), [0125] ("A reflector including a front section 1208 and a rear section 1210 may also be included in the device 1200 to project light from the LED. This reflector can be formed as several pieces or one piece of reflective material. The reflector may direct illumination from the at least one LED 1202 in a predetermined direction, or through a predetermined beam angle. The reflector may

also gather and project illumination scattered by the at least one LED 1202."), [0134] ("Optics may be used to alter or **enhance the performance of** illumination devices. For example, **reflectors** may be used to redirect LED radiation..."), [0151] ("reflective material"), [0189]-[0198] (disclosing reflective material and reflector), [0214]-[0218] (same); Ex. 1002, ¶132.)

Section IX.A.1(d) explains that the *Piepgras-Michael* system would have been configured to integrate the LED circuit and the antenna of the above-described data communication circuit in a circuit board ("package"). While the *Piepgras-Michael-Butler* combination does not disclose that the above-discussed "package" comprises a reflective material, it would have been obvious in view of *Piepgras-Michael-Butler* and the state of the art to implement such a feature, *e.g.*, by coating the circuit board with reflective material or using a reflective substrate. (Ex. 1002, ¶133.) For example, a POSITA would have recognized that configuring the circuit board with reflective material (*e.g.*, as disclosed in *Piepgras*) would have been a predictable way to minimize loss of light and thereby enhance lighting, which would have been a desirable feature for a lighting system like *Piepgras*'s system. (*Id.*) A POSITA would have found it beneficial to direct the LED illumination in a desired manner, which would have enhanced the performance of *Piepgras*' lighting system, in a manner consistent with *Piepgras*' above-discussed teachings regarding the use of reflective materials and known in the art. (Ex. 1012, Abstract ("coat a layer of

high reflection material on the [circuit] board to collect light"); *id.*, ¶¶[0018] ("coat a layer of high reflection material on the board to collect light"), [0034] ("coat a reflection layer on the board to collect the back forward light"), [0081] ("coat a layer of high reflection material on the top of the board"); Ex. 1049, FIG. 27, 6:6-7:34 (describing use of a substrate 716 including reflector component assembly 770 in an LED lighting system where "reflector portions 766 and 866 serve both as light reflectors," which aid to ensure "**light is not lost and can be effectively used**") Ex. 1002, ¶133.)[8]

Given that it was known to use/configure a circuit board with a reflective material as demonstrated above, and given *Piepgras*' consideration of reflective materials for enhancing lighting, a POSITA would have found the above configuration to implementation to be simple and feasible, and would have had a reasonable expectation of success implementing it. (Ex. 1002, ¶134.) Indeed, such an implementation would have been a combination of known components, according to known methods, to produce predictable results. (*Id.*) *KSR*, 550 U.S. at 416.

[8] Ex. 1012 is cited in this ground to demonstrate the state of the art.

3. Claim 3

a) The lighting system of claim 1, further comprising the telecommunications device.

The *Piepgras-Michael-Butler* combination discloses or suggests this limitation for reasons similar to those for claim 1. (Ex. 1002, ¶135.) Sections IX.A.1(a)-(b) and IX.A.1(g)-(h) explain how the *Piepgras-Michael-Butler* system includes a "telecommunications device" (*e.g.*, modified user interface 102), which is part of the lighting system discussed for limitation 1(a). (§§IX.A.1(a)-(b), (g)-(h); Ex. 1002, ¶135.)

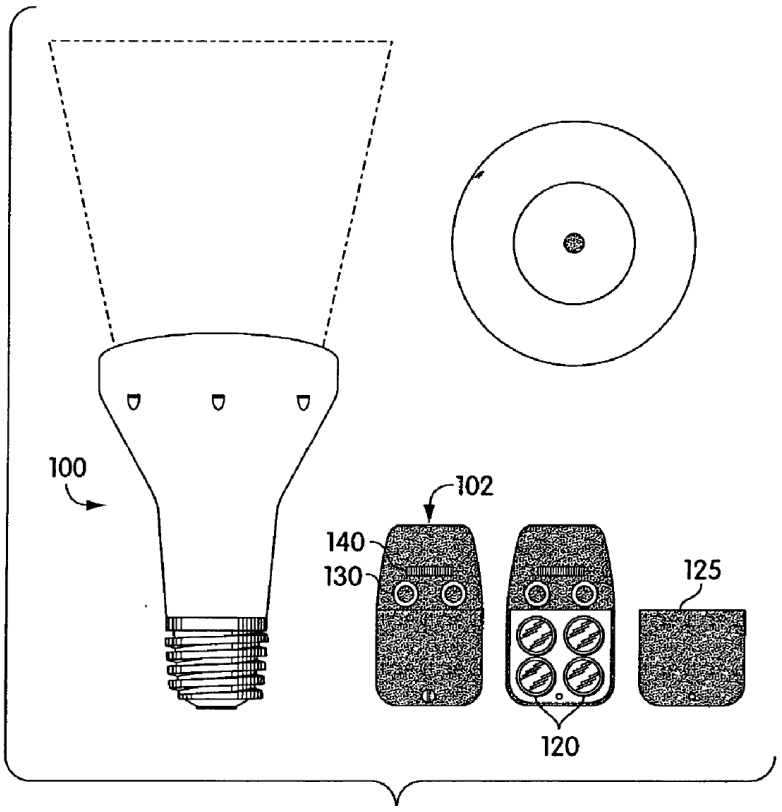


Fig. 6

(Ex. 1005, FIG. 6.)

4. Claim 4

a) The lighting system of claim 1, wherein the telecommunications device is portable.

The *Piepgras-Michael-Butler* combination discloses or suggests this limitation for reasons explained for claim 1. (Ex. 1002, ¶136.) As explained for limitations 1(b) and 1(g)-(h), the *Piepgras-Michael-Butler* lighting system includes a remote control interface (*e.g.*, modified interface 102), which a POSITA would have understood is portable. (§§IX.A.1(b), (g)-(h); Ex. 1002, ¶136.) As explained, *Piepgras* shows a "**remote**" interface 102 (Ex. 1005, FIG. 6), and explains that such user interfaces can be implemented as a **PDA** or "**mobile** remote control interface." (§§IX.A.1(g)-(h); Ex. 1005, ¶[0177].) A POSITA would have further understood that a PDA was known to be a portable telecommunications device. (Ex. 1002, ¶136; Ex. 1023, ¶[0004]; Ex. 1024, ¶[0004] ("With the variety of **portable** electronic products, PDA applications have become more and more popular.").) As such, the "telecommunications device" in the *Piepgras-Michael-Butler* lighting system is portable. And even if not apparent or disclosed, for reasons similar to those explained in Sections IX.A.1(g)-(h), it would have been obvious to implement the "telecommunications device" in the *Piepgras-Michael-Butler* lighting system to be portable to provide known mobile remote control functionality expected with an interface like that contemplated and disclosed by *Piepgras*. (Ex. 1002, ¶136.)

B. Ground 2: Claim 5 Is Obvious Over *Piepgras*, *Michael*, *Butler*, and *Naskali*

1. Claim 5

a) The lighting system of claim 4, wherein the portable telecommunications device further comprises at least one OLED, and

The *Piepgras-Michael-Butler* combination in view of the state of the art discloses or suggests this limitation. (Ex. 1002, ¶¶137-143.) *Piepgras* discloses the known characteristics and types of LEDs, including the use of organic LEDS (OLEDs). (§§IX.A.1(a)-(b); Ex. 1005, ¶[0085] ("[T]he term 'LED' … should be understood to include light emitting diodes of all types, including ... **organic LEDs...")**; Ex. 1002, ¶138.) While the *Piepgras-Michael-Butler* combination does not explicitly disclose that the "portable telecommunications device" (*e.g.*, as discussed for limitations 1(g)-(h) and claim 4), comprises at least one OLED, it would have been obvious to configure the device with OLED technology (*e.g.*, for user display or indicator lighting, etc.). (Ex. 1002, ¶138.)

As noted above, *Piepgras* recognizes the known use of OLEDs. It was also known that like other LED types, OLEDs provide illumination for wide-ranging applications, including use in mobile devices with illumination/lighting features, such as displays, indicator lights, etc. (*e.g.*, in devices such as PDAs, which *Piepgras* provides as an example of a user interface, as explained above). A POSITA would have been well aware of such implementations and applications. Indeed, *Swartz*

discloses features consistent with such state-of-the-art knowledge about the known use of an OLED-based "touch screen display" for a portable computing device. (Ex. 1002, ¶¶139-140; Ex. 1041, ¶[0080], FIG. 17, ¶[0048] (OLED display), ¶[0087] ("[T]he wrist unit and the CPU unit may be combined into a single control unit, which in itself may become a **PDA**..."); Ex. 1009, ¶¶[0014] ("The display can include a plurality of [OLEDs]."), [0063] (disclosing "light emitting elements," which are "[p]referably, ... high efficiency, organic light emitting devices (**OLEDs**)"), [0064], [0066], [0071], [0072] ("[A] flexible **OLED** backlight can be used to illuminate a flexible LCD to provide a flexible backlit LCD."), [0076], FIG. 2A (showing portable computing device), Abstract ("hand-held, portable communications device").) Such disclosures are consistent with that known by a POSITA regarding use of OLED technologies at the time. (Ex. 1002, ¶141; Ex. 1021, FIG. 2 (touch sensor 202), ¶¶[0037] (describing capacitive touch sensor 202), [0038]-[0039] ("display 204 can be [an] **organic light emitting diode (OLED) display**").)

In light of such state-of-the-art knowledge and the disclosures/suggestions by *Piepgras* in context of *Butler*, a POSITA would have been motivated to configure the "portable telecommunications device" of the *Piepgras-Michael-Butler* system to use at least one OLED, *e.g.*, an OLED-based display or indicator lighting. (Ex. 1002, ¶142.) A POSITA would have found such a configuration beneficial. (*Id.*) As

explained, OLEDs were a known, high-performing technology, *e.g.*, for use in an OLED display or for providing backlighting, both of which would have been relevant, predictable features to include in the remote control telecommunications device of the *Piepgras-Michael-Butler* system. (Ex. 1009, ¶¶[0071] (discussing known OLED features such as "high brightness at low power levels"), [0072] ("OLED backlight"), [0076] ("OLED technology is preferred because of the very small pixel size that can be attained (such as the so-called 'nanopixels,' for example)."); Ex. 1002, ¶142.) A POSITA would have sought to leverage an existing, reliable technology (such as OLED) for implementing a display in the above-described "telecommunications device" of the *Piepgras-Michael-Butler* system to provide convenient and improved user interface functionalities known in the art at the time. (Ex. 1002, ¶142.) For instance, usage of an OLED backlight display would have been desirable for promoting readability by the user of the remote control device. (Ex. 1021, ¶[0039] ("backlight 206 ... enhance[s] readability in all lighting conditions"); Ex. 1002, ¶142.)

Given the skills and knowledge of a POSITA at the time, and that such a modification would have involved the use of known technologies and techniques (as demonstrated above), a POSITA would have had ample reasons for implementing the above modification with a reasonable expectation of success. (Ex. 1002, ¶143.) *KSR*, 550 U.S. at 416.

b) wherein the portable telecommunications device is configured to receive power wirelessly.

While the *Piepgras-Michael-Butler* combination does not explicitly disclose that the above "portable telecommunications device" is configured to receive power wirelessly, it would have been obvious in view of *Naskali* to implement this feature. (Ex. 1002, ¶¶74-81, 144-150.) *Naskali* "relates to a charging system and, more particularly, to a charging system for a portable electronic device" such as a PDA. (Ex. 1010, 1:14-16; *see also id.*, Title ("Charging Device With an Induction Coil), Abstract ("A charging device including ... a first induction coil ... ; and an induction core [having] a portion which ... is adapted to removably couple with a second induction coil of a **portable electronic device** ... ."), 1:18-24 ("The use of battery operated **portable electronic devices** has been increasing, such as ... PDAs ... . Problems associated with the discharge of batteries in portable electronic devices has, thus, been increasing. Likewise, the need to recharge batteries of portable electronic devices while away from the home or office has increased."), 4:45-47 ("the second portable electronic device comprises a **PDA 22**"), FIG. 2 (showing PDA 22); Ex. 1002, ¶144.)

Naskali explains that it was known even at the time to charge a portable device wirelessly. (Ex. 1002, ¶145.) For example, Figure 1 of *Naskali* (annotated below) "shows a portable telephone 1 being charged by a contactless charging system, based upon **electromagnetic induction**, which is **known to exist in the prior art**." (Ex.

1010, 1:36-39.) As shown below in Figure 1, telephone 1 includes an induction core 9 (green below) located in an induction coil 2 that wirelessly receives electromagnetic energy from a coil 7 having an induction core 6 (red below), so that charger 3 wirelessly charges telephone 1. (*Id.*, FIG. 1, 1:48-54 ("With the prior art charging system shown in FIG. 1, a spacing 5 is provided between the primary side coil 7 and the secondary side coil 2. The charger 3 comprises a first induction core 6 located in the primary side coil 7. The telephone 1 comprises a second induction core 9 located in the secondary side coil 2. Because of the spacing 5, the induction cores 6, 9 are spaced from each other."); Ex. 1002, ¶145.)

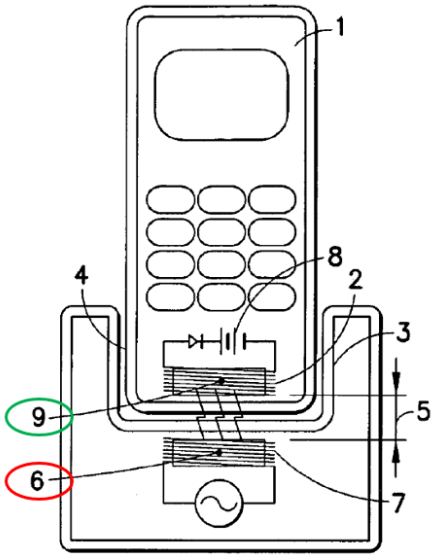


FIG. 1
PRIOR ART

(Ex. 1010, FIG. 1 (annotated); *see also id.*, 3:40-42 ("FIG. 1 is a schematic diagram of a conventional system of a battery charger stand used for charging a battery in a portable telephone by induction[.]"); Ex. 1002, ¶145.)

Naskali discloses with reference to Figure 2 a charging system 10 that includes a charging device 16 for charging a portable electronic device 18, *e.g.*, "PDA 22" (red below). (Ex. 1010, 4:24-26, 4:32-51.)

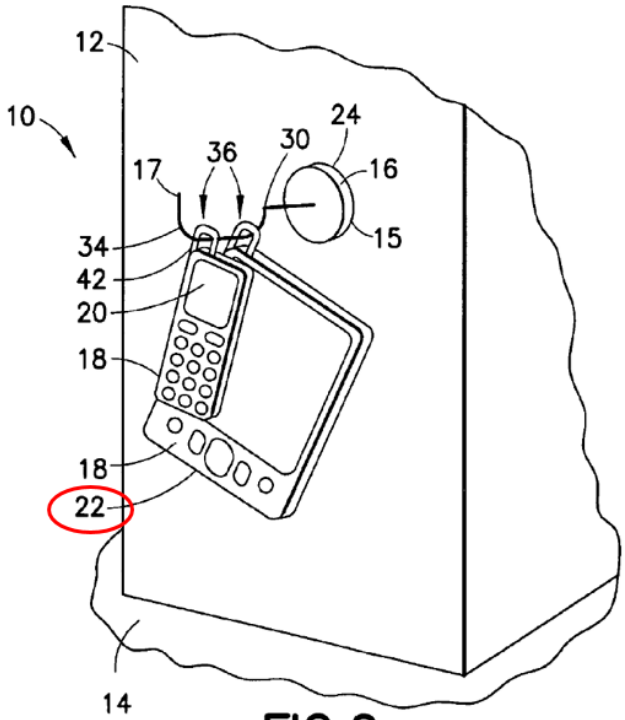


FIG.2

(Ex. 1010 (PDA 22 annotated in red); *see also id.*, 3:44-45 ("FIG. 2 is a perspective view of a charging system incorporating features of the present invention[.]"); Ex. 1002, ¶146.)

Figure 3 of *Naskali* shows coils 26 (green below) and 40 (red below) of charging device 16 and electronic device 18, respectively, for wirelessly charging electronic device 18 based on power from power feed portion 28, *e.g.*, an AC voltage source. (Ex. 1010, 4:52-55 ("the charging device 16 generally comprises a main

section 15 ... compris[ing] ... a primary side coil 26"), 5:35-36 ("Each of the portable electronic devices 18 comprise a ... secondary side coil 40.").)

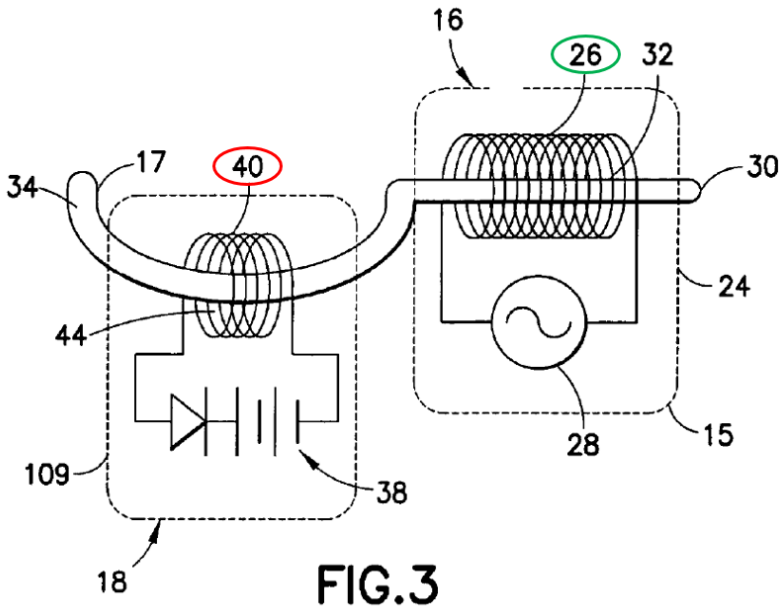


FIG.3

(Ex. 1010, FIG. 3 (annotated); *see also id.*, 3:46-47 ("FIG. 3 is a diagrammatic view of two components of the system shown in FIG. 2[.]"), 4:52-5:52 (describing Figure 3); Ex. 1002, ¶147.)

Naskali explains that charging system 10 implements wireless power transfer to PDA 22 via electromagnetic induction. (Ex. 1010, 5:60-66 ("When the power feed portion 28 provides an AC voltage, a magnetic flux is generated in the induction core 30. A voltage is induced across the secondary side coil 40 by the action of **electromagnetic induction**. Because the secondary side coil 40 is connected to the rechargeable battery 38, the rechargeable battery 38 can be recharged."); Ex. 1002, ¶148.)

In light of *Naskali*'s disclosures, a POSITA would have been motivated to configure the above-described "portable telecommunications device" of the *Piepgras-Michael-Butler* system to use a rechargeable battery that can receive power wirelessly. (Ex. 1002, ¶149.) For example, *Piepgras* explains that user interface 102 can be battery operated (further demonstrating portability). (Ex. 1005, ¶[0108].) Like a PDA (as *Piepgras* explains is an example of a remote control user interface, *see* §IX.A.1(g)) and other mobile electronic devices, such a device requires power. Thus, a POSITA would have found it obvious to configure the "telecommunications device" to use rechargeable battery source that is configured to be recharged (*e.g.*, receive power) wirelessly (*e.g.*, as an alternative to or complementing a wired power approach). (Ex. 1010, 1:18-24; Ex. 1002, ¶149.)

Thus, a POSITA, who would have been knowledgeable of such features/circuits, would have been capable of designing or using a remote control user interface (with touch detection and OLED display as noted above) with wireless power features. (Ex. 1002, ¶150.) Such a POSITA would have found the above configuration feasible and predictable, and would have had a reasonable expectation of success implementing it, particularly given *Naskali*'s disclosures regarding charging system 10 and that wireless power transfer technologies and concepts were well known. (*Id.*)

C. Ground 3: Claim 6 Is Obvious Over *Piepgras*, *Michael*, *Butler* and *Kasegi*

1. Claim 6

a) The lighting system of claim 1, further comprising a current limiting device coupled to the LED circuit.

To the extent the *Piepgras-Michael-Butler* combination does not explicitly disclose a current limiting device coupled to the LED circuit of the *Piepgras-Michael-Butler* system, it would have been obvious in view of *Kasegi* to implement this feature. (Ex. 1002, ¶¶82-83, 151-157.)

Like *Piepgras*, *Kasegi* discloses an LED lighting system that utilizes received AC power. (Ex. 1026, Abstract.) For example, *Kasegi* discloses an LED coupled to a bridge rectifier 3 that receives AC power. (Ex. 1026, 2:34-48, FIG. 1.) Thus, a POSITA implementing the system of *Piepgras* would have had reason to consider the teachings of *Kasegi*. (Ex. 1002, ¶153.)

Kasegi discloses an arrangement where "a constant current diode [5]" is "connected in series with the light emitting diode 4." (Ex. 1026, 2:40-45, 1:53-60.) Thus, constant current diode 5 of *Kasegi*, which is coupled to LED 4, is a "current limiting device" as claimed because that diode 5 limits the current through the LED to a certain value, *e.g.*, "approximately 1.0 mA or less," within "the rated operation voltage range," *e.g.*, "10 to 100 volts" (*Id.*, 2:49-60; *see also* Ex. 1089, 99; Ex. 1002,

¶154.) Thus, *Kasegi* discloses "a current limiting device coupled to [an] LED circuit." (Ex. 1002, ¶154; *see also* Ex. 1026, 3:1-20.)

In light of such disclosures and guidance, POSITA would have been motivated to modify the above-discussed lighting system by implementing a current limiting device coupled to the LED circuit (*see* limitation 1(b), §IX.A.1(b)) to provide a constant current to improve LED operation, as suggested by *Kasegi*. (Ex. 1002, ¶155.) For example, a POSITA would have been motivated by the benefits of configuring the LED circuit with a series-connected current limiting diode (device) to expand "the operable range of the input voltage" of the LED circuit and "keep[] the brightness of the light emitting device constant over a wide input voltage range," as guided by *Kasegi*. (Ex. 1026, Abstract.) Such an implementation would have solved issues associated with LEDs' "sensitiv[ity] to voltage fluctuations" and mitigated or prevented destruction, damage, or insufficient operation of the LED(s) in the LED circuit, as explained by *Kasegi*. (*Id.*, 1:22-32; *id.*, 1:45-48, 1:62-68, 2:58-60 ("a constant brightness can be obtained even when the power source voltage fluctuates"); Ex. 1002. ¶156.)

Given the skills and knowledge of a POSITA at the time, coupled with the disclosures/guidance of *Piepgras* and *Kasegi*, a POSITA would have been motivated to implement the above modification and done so with a reasonable expectation of success. (Ex. 1002, ¶157.) Such a modification would have involved the use of

known technologies and techniques (*e.g.*, known LED circuit and active current limiting device designs/components) to produce the predictable result of coupling a current limiting device to the LED circuit in the *Piepgras-Kasegi* combination for obtaining a constant brightness even when the power source voltage fluctuates. (*Id.*) *KSR*, 550 at 416.

D. Ground 4: Claims 21-23 and 26 Are Obvious Over *Piepgras* and *Butler*

1. Claim 21

a) A lighting device comprising:

To the extent limiting, *Piepgras* discloses the preamble of claim 21 for at least the reasons discussed regarding the preamble of claim 1. (§IX.A.1(a); Ex. 1002, ¶¶158-159.) For example, as discussed for limitation 1(a), *Piepgras* discloses with reference to Figure 6 (below) a spotlight 100 ("lighting device") containing system 500 shown in Figure 1 (below). (§IX.A.1(a); Ex. 1005, ¶¶[0088], [0108], [0110], FIGS. 5-6; Ex. 1002, ¶159.)

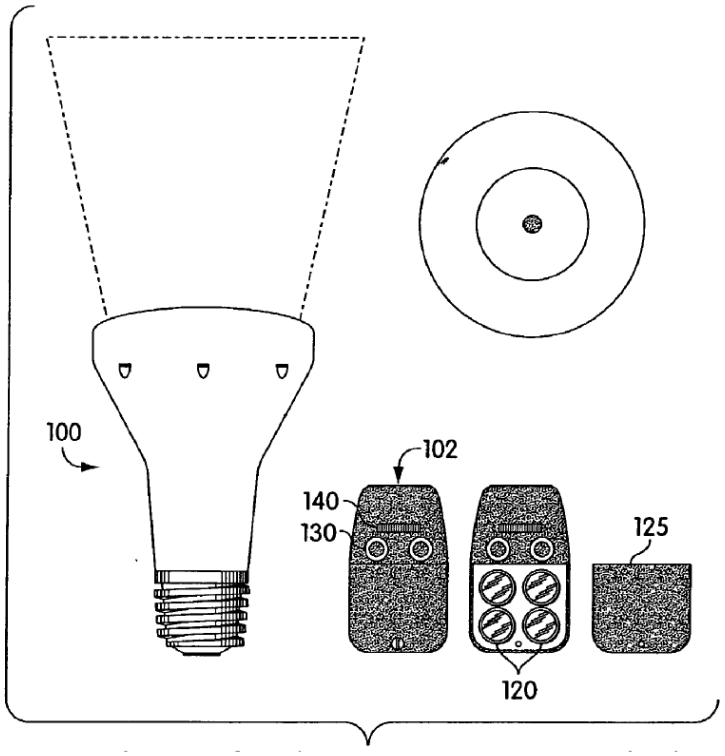


Fig. 6

(Ex. 1005, FIG. 5.)

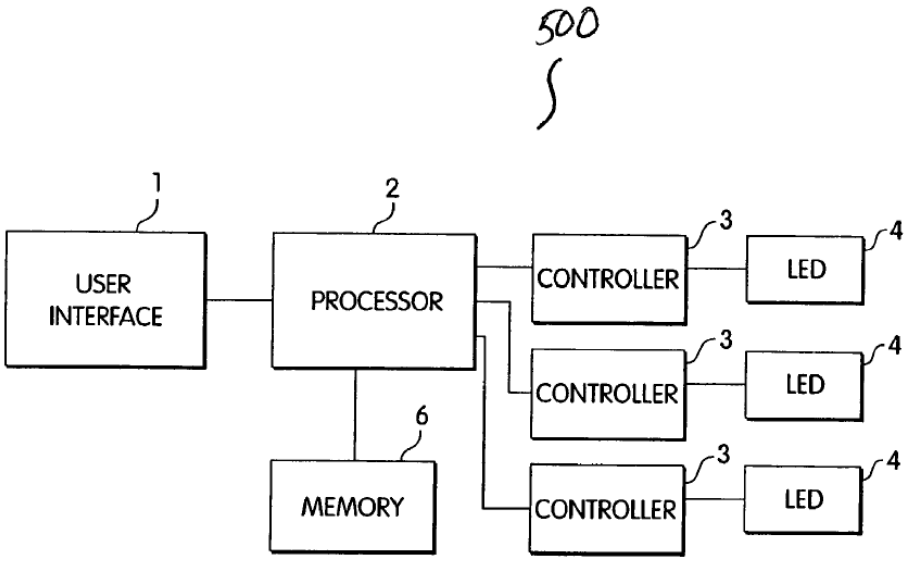


Fig. 1

(*Id.*, FIG. 1; *see also* §§IX.D.1(b)-(g); Ex. 1002, ¶159.)

b) a data communication circuit having at least one LED circuit, wherein the at least one LED circuit has at least two LEDs connected in series, parallel or opposing parallel, and

Piepgras in view of the state of the art discloses or suggests this limitation, for reasons similar to those discussed regarding limitations 1(b) and 1(c), which recite substantially the same features as limitation 21(b). (§§IX.A.1(b)-(c), Ex. 1002, ¶160.) For example, *Piepgras* discloses that its spotlight 100 ("lighting device") includes a data communication circuit and an LED circuit for the reasons discussed for limitation 1(b), and the LED circuit has at least two LEDs connected in series for the reasons discussed for limitation 1(c). (§§IX.A.1(b)-(c); Ex. 1002, ¶160.) As further discussed for limitation 1(b), the *Piepgras-Michael* data communication circuit has an LED circuit and an antenna. (§IX.A.1(b); Ex. 1002, ¶160.) Thus, regarding limitation 21(b), it would have been obvious in view of the state of the art (*e.g.*, as demonstrated by *Michael*) to configure spotlight 100 ("lighting device") to comprise a data communication circuit *having* the LED circuit ("at least one LED circuit"), for reasons similar to those discussed for limitation 1(b). (§IX.A.1(b); Ex. 1008 (*Michael*, demonstrating the state of the art), FIGS. 12, 15,

10:48-61; *see also id.*, 4:58-9:37, 7:35-43, 8:11; Ex. 1002, ¶160.)[9] A POSITA would have had similar appreciation, capabilities, motivation, and reasonable expectation of success regarding the above configuration (for limitation 21(b)) as discussed for limitation 1(b). (Ex. 1002, ¶160.)

c) wherein the at least two LEDs are a same color or different colors;

Piepgras discloses this limitation. (Ex. 1002, ¶¶161-164.) Indeed, "a same color or different colors" spans the entire range of possibilities for colors of *Piepgras*' LEDs, and no other options are possible. (*Id.*, ¶161.) Moreover, *Piepgras* describes its LEDs include "visible color LEDs" (Ex. 1005, ¶[0085]) and that "[t]he term 'color' should be understood to refer to any frequency of radiation, or combination of different frequencies, within the visible light spectrum" (*id.*, ¶[0087]), and a POSITA would have understood that each LED can be any color. (Ex. 1002, ¶161.) Additionally, *Piepgras* describes phosphor that "convert[s] energy from the LED to a different wavelength," which a POSITA would have understood results in a different color. (Ex. 1005, ¶[0085]; Ex. 1002, ¶161.) Such disclosures are provided in *Piepgras* prior to discussion of any of *Piepgras*' figures, and thus a POSITA would have understood that such disclosures are applicable to

[9] Exhibit 1008 is cited for this unpatentability ground to demonstrate the state of the art. (Ex. 1002, ¶160.)

all of *Piepgras*' figures, including Figure 6 showing spotlight 100 ("lighting device"). (Ex. 1002, ¶161.)

Similarly, *Piepgras* discloses with reference to Figure 1 that "**several LEDs 4 with different spectral output** may be used," "**[e]ach of these colors** may be driven through separate controllers 3, and that "[b]y controlling the LEDs 4 independently, **color mixing** can be applied for the creation of lighting effects." (*Id.*, ¶162.) A POSITA would have understood these disclosures are applicable to spotlight 100 ("lighting device") of Figure 6 because spotlight 100 of Figure 6 includes system 500 of Figure 1, as explained above for limitation 1(a). (§IX.A.1(a); Ex. 1002, ¶163.) *Piepgras* further discloses "projecting different colors simultaneously" using LEDs and a POSITA would have understood that different colors are produced by different LEDs. (Ex. 1005, ¶[0124]; Ex. 1002, ¶163.) Thus *Piepgras* discloses that the at least two LEDs are different colors. (Ex. 1002, ¶163.)

Additionally, as discussed for limitation 1(c), *Piepgras* discloses that spotlight 100 includes multiple LEDs. (§IX.A.1(c); Ex. 1005, ¶¶[0108], [0110]; Ex. 1002, ¶163.) A POSITA would have understood that spotlight 100 also includes at least two LEDs of the same color. (Ex. 1002, ¶164.)

d) wherein the data communication circuit having the at least one LED circuit is integrated into the lighting device;

Piepgras discloses or suggests this limitation. (§IX.A.1(e); Ex. 1002, ¶165.)

As explained above for limitation 21(b), the data communication circuit (discussed for limitation 21(b)) is included in the lighting device 100. (§IX.D.1(b); Ex. 1002, ¶165.) Thus, a POSITA would have understood that the data communication circuit (having the at least one LED circuit, as explained for limitation 21(b)) is integrated into the lighting device. (Ex. 1002, ¶165.)

e) wherein the lighting device can transmit data signals to or receive the data signals from at least one portable telecommunications device; and

Piepgras (as modified above) discloses this limitation for similar reasons as those discussed for limitation 1(g) (discussing *Piepgras*' spotlight 100 transmitting data to, and receiving data from, remote user interface 102) and claim 4 (discussing modified interface 102, which is portable). (§§IX.A.1(g), IX.A.4; Ex. 1002, ¶166.) For instance, the modified *Piepgras* spotlight 100 ("lighting device") can transmit data signals and also receive the data signals from (which also meets the limitation "transmit data signals to **or** receive the data signals from") the modified remote user interface 102 ("at least one portable telecommunications device"), for similar reasons as those discussed for limitation 1(g) and claim 4. (§§IX.A.1(g), IX.A.4; Ex. 1002, ¶166.)

f) wherein the portable telecommunications device comprises a circuit that can detect a human touch via capacitive sensing, and

Piepgras in view of *Butler* discloses or suggests this limitation. (Ex. 1002,

¶167.) The discussion for limitation 1(h) at Section IX.A.1(h) explains how and why it would have been obvious to configure the "telecommunications device" in the *Piepgras-Michael* system in view of *Butler* to comprise a capacitive human touch circuit. For similar reasons relating to the disclosures/suggestions of *Piepgras* and *Butler* (and those discussed for limitation 21(e)), a POSITA would have been motivated and found obvious to configure the *Piepgras* lighting device (limitation 21(a)) to work with a portable telecommunications device with similar features as those explained for limitation 1(h). (§§IX.A.1(h), IX.D.1(a)-(e); Ex. 1002, ¶167.) A POSITA would have had similar appreciation, capabilities, motivation, and reasonable expectation of success regarding configuring (for limitation 21(f)) the *Piepgras* portable telecommunications device in view of *Butler*, as discussed for limitation 1(h) regarding configuring the *Piepgras-Michael* telecommunications device in view of *Butler*.

g) wherein the portable telecommunications device further comprises at least one LED that provides light based upon detection of the human touch.

The *Piepgras-Butler* combination in view of the state of the art discloses or suggests this limitation. (Ex. 1002, ¶¶168-172.) As discussed for limitations 1(g) and 21(e), *Piepgras* discloses that its lighting device is remotely controlled by the modified portable telecommunications device, and as discussed for limitations 1(h) and 21(f), the *Piepgras-Butler* combination discloses that the portable

telecommunications device can detect a human touch. (§§IX.A.1(g)-(h), IX.D.1(e)-(f).) While the *Piepgras-Butler* combination does not explicitly disclose that the portable telecommunications device *comprises at least one LED that provides light based upon detection of the human touch*, it would have been obvious in view of the state of the art to configure the portable telecommunications device to implement such features. (Ex. 1002, ¶168.)

It was well known to a POSITA to implement a touch screen as an *LED* touch screen. (*Id.*, ¶169.) For example, *Swartz* and *Hack* disclose features consistent with such state-of-the-art knowledge about the known use of LED touch screens. (Ex. 1041 (*Swartz*), ¶¶[0048] [0080] ("touch screen display") for a portable computing device shown in Figure 17 of *Swartz* (below), and describes using "a flat panel type display," *e.g.*, "**light emitting diode (LED) displays** such as Organic LED" (*id.*, ¶[0048]); Ex. 1009 (*Hack*), ¶¶[0013] ("The display can be touch responsive."), [0014] ("The display can include a plurality of [OLEDs]."), FIG. 2A (showing portable computing device), Abstract ("hand-held, portable communications device"); Ex. 1021, FIG. 2 (showing touch sensor 202), ¶¶[0037] (describing capacitive touch sensor 202), [0038]-[0039] ("display 204 can be [an] organic light emitting diode (OLED) display"); Ex. 1002, ¶169.) *Swartz* further demonstrates that it was known to implement an LED touch screen in a PDA. (Ex. 1041, ¶[0087]

("[T]he wrist unit and the CPU unit may be combined into a single control unit, which in itself may become a PDA..."); Ex. 1002, ¶170.)

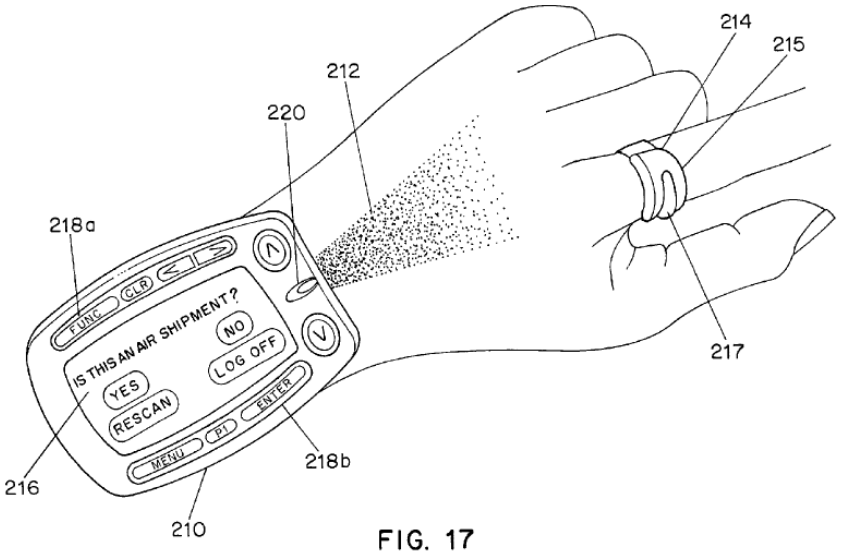


FIG. 17

(Ex. 1041, FIG. 17.)

A POSITA would have understood that configured in the above-described manner, the above-discussed modified portable telecommunications device would use an LED touch display and thus when touched, the LED(s) of the display would change (*e.g.*, turning on and/or changing interface content). (Ex. 1002, ¶171.) Thus, a POSITA would have understood that at least one LED in such a display would provide light based upon detection of the human touch, consistent with that known in the art. (Ex. 1009, ¶[0013] ("The display can provide touch signals to the processor and the processor can perform responsive operations in response to receiving the touch signals."); Ex. 1002, ¶171.)

A POSITA would have recognized that such a configuration of the portable telecommunications device would have been a predictable way to implement a touch screen, and a POSITA would have found such usage of conventional technology to be desirable for promoting reliability and ease of implementation. (*Id.*, ¶172.) A POSITA would have been capable of implementing an LED touch screen, as it was well known, as explained above (including in the context of portable devices such as a PDA), and would have had a reasonable expectation of success implementing such a configuration, as it would have been a mere combination of known components and technologies, according to known methods, to produce predictable results. (*Id.*) *KSR*, 550 U.S. at 416.

2. Claim 22

a) The lighting device of claim 21, further comprising the portable telecommunications device.

The *Piepgras-Butler* combination discloses or suggests this limitation. (Ex. 1002, ¶173.) As explained for limitations 1(b), 1(g), and 21(e), *Piepgras-Butler*'s modified portable telecommunications device controls lighting remotely. (§§IX.A.1(b), IX.A.1(g), IX.D.1(e); Ex. 1002, ¶173.) To the extent *Piepgras-Butler* does not explicitly disclose that its lighting device *comprises* the portable telecommunications device, it would have been obvious to configure the *Piepgras-Butler* lighting device to implement this feature. (Ex. 1002, ¶173.) For example, a POSITA would have recognized that such a configuration would have been a mere

combination of known components and technologies (*e.g.*, a lighting device and another device for controlling it remotely), according to known methods, to produce predictable results. (Ex. 1002, ¶173.) *KSR*, 550 U.S. at 416. A POSITA would have found it beneficial and predictable to arrange a lighting device (such as the *Piepgras-Butler* lighting device) to *comprise* a device that controls it (*e.g.*, the portable telecommunications device discussed above), so that the lighting device can conveniently hold or store its associated remote control device. (Ex. 1002, ¶173.) POSITA would have been skilled at arranging devices in various ways and would have known how to configure a first device to comprise a second device that controls the first device. (*Id.*) Indeed, Figure 6 of *Piepgras* shows a remote control user interface 102 that works with spotlight 100 ("lighting device"), and thus supports the above configuration. (*Id.*) Moreover, the '400 patent does not describe any criticality or novelty regarding a lighting device that *comprises* a portable telecommunications device, so a POSITA would have found the above configuration to be a feasible via a simple physical (*e.g.*, mechanical) alteration of the *Piepgras-Butler* lighting device. (*See generally* Ex. 1001; Ex. 1002, ¶173.)

3. Claim 23

a) The lighting device of claim 21, wherein the portable telecommunications device further includes at least one OLED.

While *Piepgras-Butler* does not explicitly disclose that the above-discussed

portable telecommunications device includes at least one OLED, it would have been obvious in view of the state of the art to implement this feature, for similar reasons as those discussed above for claim limitation 5(a). (§IX.B.1(a); Ex. 1002, ¶174.) A POSITA would have had similar appreciation, capabilities, motivation, and reasonable expectation of success regarding configuring (for claim 23) the *Piepgras-Butler* device in view of the state of the art, as discussed for claim limitation 5(a) regarding configuring the *Piepgras-Michael-Butler* device in view of the state of the art. (Ex. 1002, ¶174.)

4. Claim 26

a) The lighting device of claim 21, wherein the lighting device further comprises: integrated circuitry that allows adjustment of a brightness of the at least one LED circuit.

Piepgras-Butler in view of the state of the art discloses or suggests this limitation. (Ex. 1002, ¶¶175-180.) *Piepgras* discloses with reference to Figure 8 an example lighting application including a light bulb 180, shown below:

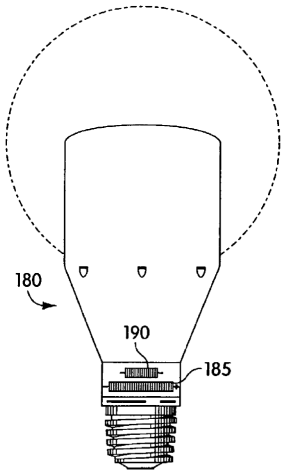


Fig. 8

(Ex. 1005, FIG. 8; *see also id.*, ¶¶[0111]-[0114]; Ex. 1002, ¶175.)

Piepgras explains that "light bulb 180 is similar to the light bulb 150 of FIG. 7" (Ex. 1005, ¶[0112]), which includes LEDs (*id.*, ¶[0111]). *Piepgras* explains that "[m]any incandescent lighting systems have dimming control that is realized through changes to applied voltages," and discloses dimming *Piepgras*' light bulb 180 that includes LEDs. (Ex. 1005, ¶[0114] (disclosing that a "look-up table may contain full brightness control signals and these control signals may be communicated to the LEDs when a **power dimmer** is at 100%"); *see also id.*, ¶[0113].) *Piepgras* explains that "[a] portion of the [look-up] table may contain **80% brightness control signals** and may be used when the input voltage to the lamp is reduced to 80% of the maximum value," and a "**processor** may continuously change a parameter with a program as the input voltage changes." (*Id.*, ¶[0114]; Ex. 1002, ¶176.) *Piepgras* describes that "[t]he lighting instructions could be used to **dim the illumination**

from the lighting system," and a POSITA would have understood that the dimming is achieved by the processor, which must include circuitry because it includes electrical components that require power, which is conveyed using a circuit. (*Id.*; Ex. 1002, ¶177.) *Piepgras* discloses that "light bulb 150 may include a system such as that depicted in FIG. 1," i.e., system 500, and thus a POSITA would have understood that the processor used for dimming is processor 2 of system 500 in light bulb 180, which is described as similar to light bulb 150. (Ex. 1005, ¶[0111]; Ex. 1002, ¶177.)

Thus, *Piepgras*' processor allows adjustment of a brightness of lighting provided by LEDs. (Ex. 1002, ¶178.) A POSITA would have understood that processors, including *Piepgras*' processor that performs dimming, are implemented with *integrated* circuitry. (Ex. 1030, 150 ("Figure 11.7 shows a complex integrated circuit. It is in fact the central processor unit of a computer."), 151 ("an example of a large-scale integrated circuit, a microprocessor"); Ex. 1002, ¶178.)

To the extent the *Piepgras-Butler* combination does not explicitly disclose that spotlight 100 ("the lighting device") comprises integrated circuitry that allows adjustment of a brightness of the at least one LED circuit, it would have been obvious to implement this feature in the *Piepgras-Butler* system. (Ex. 1002, ¶179.) As discussed above, *Piepgras* discloses that its lighting application for Figure 8 includes circuitry that allows adjustment of a brightness of LEDs. (*Id.*) A POSITA would

have been motivated to, and found it predictable to, implement such features in spotlight 100, particularly because spotlight 100, like light bulb 180, includes system 500 comprising LEDs 4 and processor 2. (*Id.*) A POSITA would have thus found it feasible and beneficial to implement such features in spotlight 100. (*Id.*)

Additionally, integrated circuitry design/implementation concepts were well known to a POSITA and indeed were fundamental to numerous electronic systems, including LED lighting systems. (Ex. 1030, 144-153; Ex. 1002, ¶180.) A POSITA would have been skilled at implementing various types of integrated circuits and would have found it predictable to implement, in spotlight 100 ("the lighting device"), integrated circuitry that implements dimming functionality like that claimed in claim 26 and described in *Piepgras*. (Ex. 1002, ¶180.) A POSITA would have found the above implementation straightforward, as it was a basic application of integrated circuitry to achieve known control of an LED circuit. (*Id.*) Similarly, a POSITA would have had a reasonable expectation of success implementing such a configuration. (*Id.*)

E. Ground 5: Claim 24 Is Obvious Over *Piepgras, Butler*, and *Naskali*

1. Claim 24

a) The lighting device of claim 21, wherein the portable telecommunications device is configured to receive power wirelessly.

While the *Piepgras-Butler* combination does not explicitly disclose that the

above-discussed portable telecommunications device is configured to receive power wirelessly, it would have been obvious in view of *Naskali* to implement such features, for similar reasons as explained above regarding limitation 5(b). (§IX.B.1(b); Ex. 1002, ¶¶181-183.) The analysis for limitation 5(b) explains how the disclosures/suggestions in *Piepgras-Michael-Butler* in light of *Naskali* would have motivated a POSITA to configure the telecommunications device of the *Piepgras-Michael-Butler* system to receive power wirelessly. (Ex. 1010, Title, Abstract, 1:14-24, 1:36-45, 1:48-54, 3:46-47, 4:24-26, 4:32-5:52, 5:60-66, FIGS. 1-3; Ex. 1002, ¶182.)

For similar reasons, in light of *Naskali*, a POSITA would have had the same motivation, appreciation, knowledge, skill, and expectation of success in implementing such a modification as discussed for the *Piepgras-Michael-Butler-Naskali* combination for limitation 5(b) in Section IX.B.1(b) for the *Piepgras-Butler-Naskali* combination discussed here for claim 24 (which recites similar features). (Ex. 1002, ¶183.) *KSR*, 550 U.S. at 416.

F. Ground 6: Claim 25 Is Obvious Over *Piepgras, Butler*, and *Zhang*

1. Claim 25

a) The lighting device of claim 21, wherein the at least one LED circuit is mounted on a reflective printed circuit board.

The *Piepgras-Butler* combination in view of *Zhang* discloses or suggests this

limitation. (Ex. 1002, ¶¶84-90, 184-188.) As discussed for limitations 1(b), 1(c), and 21(b), the modified *Piepgras* spotlight 100 ("lighting device") comprises a data communication circuit having an LED circuit. (§§IX.A.1(b)-(c), IX.D.1(b).) *Piepgras* further discloses that "[t]he term 'LED' includes ... chip on **board** LEDs," and a POSITA would have understood that the "board" is a circuit board. (Ex. 1002, ¶185.) A POSITA would have further understood that the LED circuit is mounted on the circuit board, *e.g.*, because mounting circuits on a circuit board was a conventional, expected usage of a circuit board. (*Id.*)

To the extent *Piepgras-Butler* does not explicitly disclose that the LED circuit ("at least one LED circuit") is mounted on a reflective printed circuit board, it would have been obvious in view of *Zhang* to implement such features. (*Id.*, ¶186.) *Zhang*, like *Piepgras*, discloses an LED lighting system. (Ex. 1012, Title ("Lighting Devices Using LEDs"), Abstract, FIG. 2.1, ¶¶[0080]-[0090]; Ex. 1005, Title, Abstract, ¶¶[0032], [0083]; Ex. 1002, ¶186.) Therefore, a POSITA would have had reason to consider the teachings of *Zhang* when contemplating implementing *Piepgras*' LED lighting system. (Ex. 1002, ¶186.) *Zhang* discloses a lighting system (*e.g.*, LED exit sign) that includes a circuit board and various components, including LEDs, as shown below in Figure 2.1. (Ex. 1012, ¶¶[0079] ("Chip-on-board LED Exit Signs"), [0083] ("The circuit board design is shown in FIG. 2.1."), FIG. 2.1 ("Electronic Circuit Board for LED Exit Sign"); Ex. 1002, ¶186.)

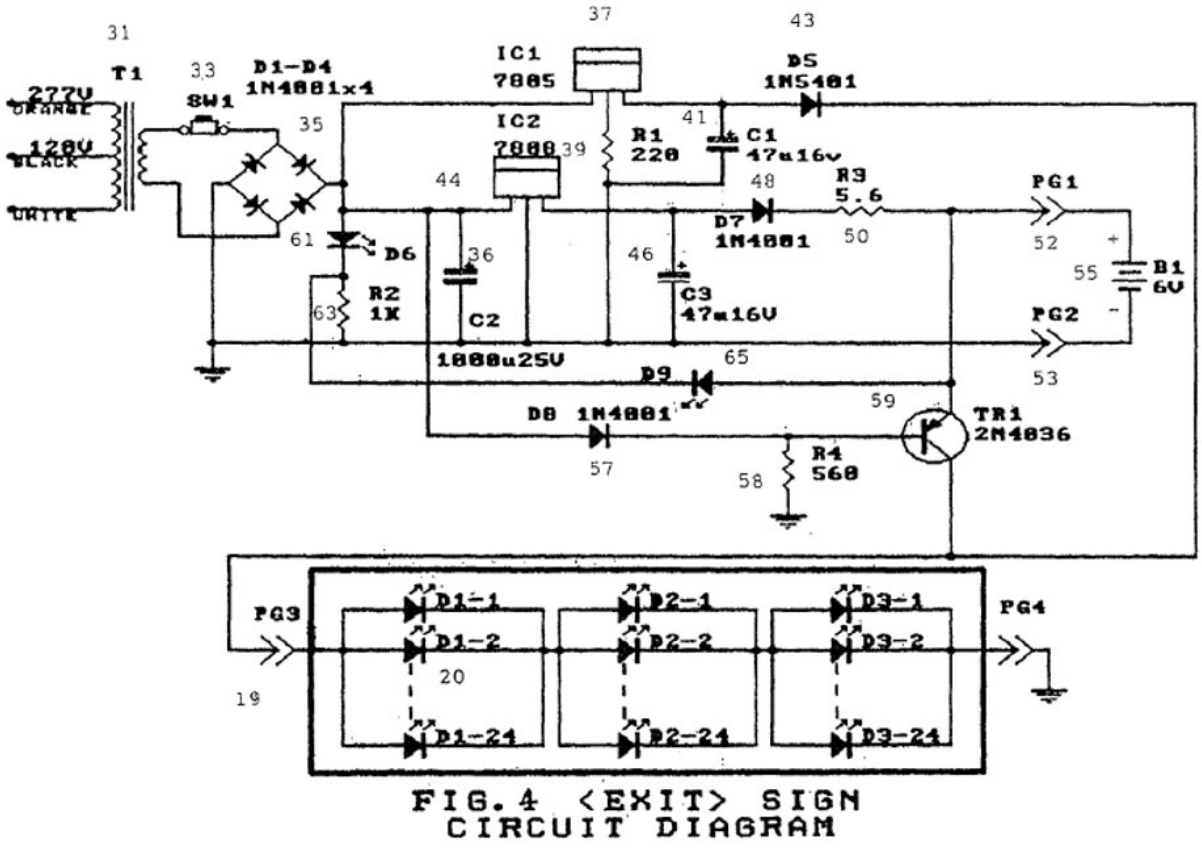


FIG. 4 <EXIT> SIGN CIRCUIT DIAGRAM

Fig. 2.1, Electronic Circuit Board for LED Exit Sign

(Ex. 1012, FIG. 2.1 (annotated); Ex. 1002, ¶186.)

Zhang discloses that its circuit board is coated with a reflective material to collect light. (Ex. 1012, Abstract ("coat a layer of **high reflection material on the board to collect light**"); *see also id.*, ¶¶[0018] ("coat a layer of high reflection material on the board to collect light"), [0034] ("coat a reflection layer on the board to collect the back forward light"), [0081] ("coat a layer of high reflection material on the top of the board"); Ex. 1002, ¶187.) A POSITA would have known that a

printed circuit board was common and conventional. (Ex. 1035, 2:1-5 (disclosing mounting components on a "printed circuit board"); Ex. 1002, ¶187.)

In light of *Zhang* and the state of the art, a POSITA would have been motivated to, and found it predictable and obvious to, mount *Piepgras*' LED circuit on a *reflective printed* circuit board. (Ex. 1002, ¶188.) A POSITA would have found such an implementation to be a predictable way to implement a circuit board in a manner that collects light, thereby reducing loss of light, which would have been recognized as a desirable feature in a lighting system, *e.g.*, to enhance lighting. (Ex. 1012, Abstract; Ex. 1002, ¶188.) A POSITA would have been skilled at circuit design/implementation, would found such an implementation straightforward, and would have had a reasonable expectation of success implementing it. (Ex. 1002, ¶188.)

X. THE CIRCUMSTANCES WEIGH AGAINST DISCRETIONARY DENIAL

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 (§II).

First factor. Petitioner intends to seek a stay of the Illinois Litigation upon institution. The Board has explained it will not speculate as to the outcome of such unresolved issues before a district court, *Google LLC et al. v. Parus Holdings, Inc.*, IPR2020-00847, Paper 9 at 12-13, and this factor is neutral where no such stay

motion has yet been filed, *Hulu LLC v. SITO Mobile R&D IP, LLC*, IPR2021-00298, Paper 11 at 10-11 (May 19, 2021). Accordingly, this factor does not weigh in favor of discretionary denial.

Second factor. Regarding the Illinois Litigation, the court has not set a trial date.[10] (Exs. 1076, 1086-1088.) There has not been significant resource investment by the court and the parties, particularly compared to the resource expenditures leading up to a trial. Moreover, any trial (if it occurs) would likely only occur at least 102 weeks after the service of the complaint (and indeed the complaint has been amended twice)—and thus after a final written decision in this IPR. (*Id.*; Ex. 1079, 1-2 (document available at Northern District of Illinois website, estimating "Case Ready for Trial" 102 weeks after complaint served); Ex. 1076, 8 (Dkt. #16 showing summons returned May 19, 2021).)

Third factor. The minimal investment by the court and parties in the Illinois Litigation weighs against discretional denial. Discovery is at an early stage. Expert discovery is not open, no depositions have occurred, and no substantive efforts toward claim construction have begun. In short, little has happened and the most resource intensive period in the district court case will occur after the institution

[10] PO's motion to transfer the Illinois-Litigation to Texas was denied. (Ex. 1085.)

decision in this proceeding. (*See* Exs. 1076, 1086.) This alone weighs against denial. *See*, *e.g.*, *Hulu*, IPR2021-00298, Paper 11 at 13.

Fourth factor. In the Illinois Litigation, PO has asserted only claims 7-11 of the '400 patent, while this Petition challenges claims 1-6 and 21-26, so there is no overlap of claims between this IPR and the Illinois Litigation. (§IX; Ex. 1083, 5; Ex. 1084, 2-9.) Furthermore, to mitigate any potential concerns, Petitioner stipulates that it will not pursue invalidity of the '400 patent in district court based on any instituted IPR grounds in this proceeding.

Fifth factor. That Petitioner is a party to the Illinois Litigation does not outweigh the other factors that strong weigh against discretionary denial.

Sixth factor. Petitioner diligently filed this Petition with strong grounds (*supra* §IX) **within four months** of PO's assertion of the '400 patent (Ex. 1082, pp. 56-59, 67), **within three months** of PO's amended infringement contentions in the Illinois Litigation (Ex. 1083), and **more than eight months before** the statutory deadline for filing an IPR (Ex. 1082, 67). Such diligence weighs against exercising discretion. *See*, *e.g.*, *Hulu*, IPR2021-00298, Paper 11 at 13; *Facebook, Inc. v. USC IP P'ship, L.P.*, IPR2021-00033, Paper 13 at 13.

Further, the '400 patent issued on first office action without any substantive prior art analysis of the ultimately issued claims. (Ex. 1004, 134-136.) Institution is thus 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 claims 1-6 and 21-26 of the '400 patent before the Board—a "crucial fact" favoring institution. *Google LLC v. Uniloc 2017 LLC*, IPR2020-00115, Paper 10 at 6 (PTAB May 12, 2020).

Accordingly, based on a "holistic view of whether efficiency and integrity of the system are best served," the facts here weigh against exercising discretion denial. *Samsung Elecs. Co. Ltd. v. Dynamics Inc.*, IPR2020-00505, Paper 11 at 15 (Aug. 12, 2020). At a minimum, factors 2, 3, 4, and 6 (or combinations thereof) outweigh factors 1 (neutral) and 5, and thus favor institution.

XI. CONCLUSION

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

Respectfully submitted,

Dated: November 12, 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. 10,687,400 contains, as measured by the word-processing system used to prepare this paper, 13,512 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: November 12, 2021

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

CERTIFICATE OF SERVICE

I hereby certify that on November 12, 2021, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,687,400 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
P.O. Box 1135
Chicago IL 60690

By: /Joseph E. Palys/
Joseph E. Palys (Reg. No. 46,508)