

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LEDUP MANUFACTURING GROUP LTD.,
Petitioner

v.

SEASONAL SPECIALTIES, LLC,
Patent Owner

Case IPR2024-01258
U.S. Patent No. 11,096,252

**PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO.
11,096,252 [Claims 1-14]**

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PETITIONER'S EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 11,096,252 to Altamura ("252 Patent")
1002	Patent Prosecution History of U.S. Patent No. 11,096,252
1003	U.S. Patent Application Publication No. 2005/0168162 ("Inoue")
1004	U.S. Patent No. 1,510,847 ("Holler")
1005	U.S. Patent No. 2,072,337 ("Kamm")
1006	U.S. Patent No. 1,868,689 ("Brander")
1007	U.S. Patent No. 4,675,575 ("Smith")
1008	U.S. Patent No. 2,760,120 ("Fisherman")
1009	U.S. Patent Application Publication No. 2004/0207341 ("Callahan")
1010	U.S. Patent Application Publication No. 2008/0025024 ("Yu")
1011	M. G. Craford "LEDs challenge the incandescents" <i>IEEE Circuits and Devices Magazine</i> , Vol. 8.5, pages 24-29, 1992 ("Craford")
1012	E. F. Schubert "Light Emitting Diodes," 2nd edition, Cambridge University Press, Cambridge UK, 2006 ("Schubert")
1013	Declaration of E. Fred Schubert, Ph.D.
1014	Curriculum Vitae: E. Fred Schubert

I. INTRODUCTION

Petitioner LEDup Manufacturing Group Limited (“Petitioner”) requests inter partes review (“IPR”) and cancellation of claims 1–14 of U.S. Patent No. 11,096,252 (“the ‘252 patent”) issued to Altamura, which is assigned to Seasonal Specialties, LLC (“Patent Owner”). The claims recite a resistor bypass circuit in a series lighting circuit having a plurality of serially connected LED light sources and a bypass resistor connected in parallel with at least one of the light sources.

These claims do not recite a patentable invention. The use of bypass components in parallel with lighting elements, including LEDs, was well known at the time the application for the ‘252 patent was filed, and the additional claimed elements are incidental details that can also be found in the prior art.

Accordingly, there is at least a reasonable likelihood that one claim of the ‘252 patent is unpatentable. Petitioner respectfully requests that the Board institute trial on the grounds herein, and determine that claims 1–14 are unpatentable.

II. STATE OF THE ART PRE-DATING THE ‘252 PATENT

Bypass circuits for series connected illumination devices were well known in the art for decades prior to the ‘252 patent priority date of the provisional application of the ‘252 patent on December 22, 2006. Numerous issued patents and printed publications disclosed bypass circuits prior to the ‘252 patent. Further, claimed subject matter in the ‘252 patent was not disclosed until the filing of the ‘252 non-

provisional application on December 21, 2007, including the concepts of a 100% duty cycle and, 0.2 watt incandescent bulbs. Bypass resistors being able to continuously conduct current if the lamp burns out and becomes an open circuit, and resistors equal to or greater than the resistance of the LED was not introduced until a new matter amendment was filed on May 27, 2021.

The prior art recognized and addressed the problem of using a series circuit, i.e., if any one of the light sources burns out, the entire string will go dark. To address this problem, the prior art included resistive bypass circuitry. For example, U.S. Patent No. 1,510,847, issued on October 7, 1924, to Holler, shows a bulb 5 in a series connected circuit that uses a resistor 6 connected in parallel with the bulb so that “disabling of one of the lamps will not result in extinguishment of others so that the entire illumination will not be destroyed upon the disabling of one of the lamps...” See lines 52-56. Further, U.S. Patent No. 2,072,337, issued on March 2, 1937, to Kamm, uses a resistive element in parallel with a series string light circuit that uses aluminum oxide as the resistive element. See Figures 1-4 and Column 1, lines 27-42, Column 2, lines 13-55, Column 3, lines 1-71 and Column 4, lines 1-28. Also, U.S. Patent No. 1,868,689, issued on July 26, 1932, to Brander, uses a high resistance wire coil to provide a resistive element in parallel with incandescent bulbs 1 in a series circuit. See Figures 1-3 and Column 1, lines 10-42, Column 2, lines 68-100, Column 3, lines 1-65, Column 4, lines 66-127.

Further, the use of LEDs in place of incandescent bulbs was also well known years before the provisional application filing of the '252 patent. *See* Smith, U.S. Patent No. 4,675,575, Column 2, lines 35-46 and Callahan (U.S. Publication 2004/0207341), paragraphs [0003, 0036]. Schubert Dec. pg. 35-38 and 53. The advantages of using LEDs for incandescent bulbs was also well known since at least 1987, as evidenced by Smith et al. [Columns 1-2; Column 6, lines 35-47] and Callahan, paragraphs [0003, 0004, 0036].

The claimed subject matter of the '252 patent primarily consists of the use of a bypass resistor in a series connected LED circuit to keep the circuit from going dark.

III. FILE HISTORY OF THE '252 PATENT

The application for the '252 patent was filed on November 25, 2019, claiming priority to a number of applications and a provisional application having a priority date of December 22, 2006. A first preliminary amendment was filed on November 25, 2019, which cancelled claims 21–25 that related to an incandescent bulb and provided new replacement drawings. A second preliminary amendment was filed on September 3, 2020, amending several of the claims to include twinkle LEDs, a resistor that is greater than the inherent resistance of the light source to minimize burnout of other potential light sources in the light string, and a flashing circuit that causes the entire light circuit to flash. A notice of noncompliant amendment was

then issued by the U.S. Patent and Trademark Office on September 21, 2020. Without any stated reason an unsolicited 37 CFR § 1.131 Declaration was filed by the inventor, Steven Altamura, on August 26, 2020, claiming conception and alleged reduction to practice as of the spring of 2006.

The second preliminary amendment to address the non-compliant objection was, filed on October 14, 2020, again including the unsolicited 37 CFR § 1.131 Declaration. The Declaration refers to Exhibits A–D. As such, these Declarations of Steven Altamura are ineffective Declarations since they do not swear behind any reference of record or establish an earlier priority date. Further, no arguments were made in the second preliminary amendment as to the manner in which the Declarations could claim a priority date in early 2006. The file history of the ‘252 patent simply shows that a § 131 Declaration was submitted. There was no argument made as to why the § 131 Declaration was submitted or what reference was being sworn behind.

An Office Action was then issued on March 4, 2021, rejecting claims 1–3 and 14–20. Claims 4–13 were objected to by the Examiner. In that Office Action, a statutory double patenting rejection was issued for claims 1 and 3 based upon U.S. Patent 10,492,282. There was no reference made by the Examiner to the § 131 Declaration.

Claims 1, 2, 14-16 and 18-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Gershen ('423).

Claim 17 was rejected under 35 U.S.C. § 102(b) as being anticipated by Gershen ('423). The Examiner indicated that claims 4–13 were allowable if rewritten in independent form including all of the limitations of the base claims. Claim 4 (dependent on claim 1) included a limitation of a LED flashing light source that causes the entire light circuit to flash. Claim 5 (dependent on claim 1) included a limitation of the LED light source of being 0.2 watts or less. Claim 6 (dependent on claim 4) included a limitation wherein at least one of the light sources was a semiconductor light source providing a twinkle effect. Claim 7 (dependent on claim 1) included a limitation wherein at least one of the light sources is a semiconductor light source that uses electronic circuits to control the flashing rate of the light source that only affects an individual light source. Claim 8 (dependent on claim 1) included a limitation wherein the resistance of the bypass resistor is greater than the “inherent resistance” of the LED light source. Claim 9 (dependent on claim 5) included a limitation wherein the light source is a semiconducting light source providing color changing characteristics. Claim 10 (dependent on claim 9) included a limitation wherein the semiconductor light source utilizes LED packages that include two or more LED chips and an integrated circuit controlling each LED individually. Claim 11 (dependent on Claim 10) included a limitation wherein the IC controls current

and/or voltage of the LED chips and provides mixing of LED chip colors. Claim 12 (dependent on Claim 11) included a limitation wherein the control only affects individual light elements. Claim 13 (dependent on claim 1) included a limitation wherein the light source is a blinking LED.

Applicant submitted a response on May 27, 2021, cancelling claims 15-25 and amending claims 1, 4, and 8, which became the independent claims in the application. Each of the new independent claims incorporated the limitation that: the bypass resistor is “in circuit” and “conducting current at all times,” regardless of whether the LED light sources are conducting current. The claim 4 amendment included that the resistor is “capable of” operating at 100% duty cycle. It appears as though applicant was attempting to claim that the bypass resistor can carry all the current of the circuit. Claim 8 was amended to include the resistance of the bypass resistor is equal to or greater than the inherent resistance of the light source.

The Applicant argued that the claims were allowable since: (1) there is no disclosure of a bypass resistor solution; (2) Gershen only provides for Zener diodes and silicon control rectifiers with a fixed breakdown voltage as the bypass device, and that Zener diodes and SCRs provide zero resistance, which can result in overloading the current to the circuit and burning out the LEDs; and (3) the claimed invention does not use breakover devices, but rather, has resistive elements which are constant conductors. The Applicant argued that Gershen is fundamentally

different than his claimed invention since it uses “breakover” devices which have no current flow when under the breakover threshold and have zero resistance when conducting.

The Patent Office thereafter issued a Notice of Allowability in response to the amendment of May 27, 2021 allowing claims 1–14. The Examiner stated that the amendments to claims 1, 4, and 8 rendered these claims as well as the dependent claims allowable.

IV. OVERVIEW OF APPLIED ART

The Inoue publication US2005/0168162, having an earliest priority date of February 2, 2004, and published on August 4, 2005, is a § 102(b) reference that discloses, in Figure 3, serially connected LEDs with each LED having a bypass resistor. Inoue, recognizes that the resistive value of the parallel shunt resistances R12 and R13 can be changed to change operating parameters of the circuits of Figure 3, such as the LED turn-on and turn-off voltages and the amount of illumination of each of the LEDs, i.e., LED 1 and LED 2.

Holler, U.S. Patent No. 1,510,847, filed on April 18, 1922, and issued October 7, 1924, discloses incandescent bulbs 5 connected in series and resistive bypass elements 6, as shown in Figure 2. Holler recognizes on lines 32+ that the resistive bypass element 6 allows a circuit to remain lit if one of the incandescent bulbs 5 burns out. Holler also recognizes on lines 96+ that “good results are obtained if each

of the resistances 6 is made of a resistance equal to that of the lamp with which it is in shunt and of approximately twice the current carrying capacity.” That is a disclosure of the use of resistive wires having a 100% duty cycle.

Fisherman, U.S. Patent No. 2,760,120, filed on October 26, 1955, and issued on August 21, 1956, illustrates an incandescent lighting system with bypass resistors 13. A bimetallic strip or any suitable thermally activated strip is connected in series with the lighting filament inside the incandescent lamp 10. The bimetallic strip heats up, as current passes through the bimetallic strip, and disconnects the lamp filament. When the bimetallic strip cools down, the bimetallic strip connects to the lamp filament and current passes through the filament and the bimetallic strip. This process of heating, disconnecting and reconnecting results in the incandescent lamps 10 blinking on and off.

Smith, U.S. Patent No. 4,675,575, filed on July 13, 1984, and issued on June 23, 1987, has a very extensive disclosure that shows color mixing of primary color (RGB) LED light sources, blinking LEDs, the use of different power sources to drive the LED circuit, and an overall teaching of the beneficial effects of replacing incandescent bulbs with LEDs.

Callahan, U.S. Patent Pub. No. 2004/0207341, having an earliest priority date of April 14, 2003, published on October 21, 2004, and later issued as U.S. Patent No. 7,015,825, discloses LED packages, including primary colors that can be driven

by semiconductor chips to have different intensities to create any desired color. Callahan also provides motivation to replace incandescent bulbs with LEDs.

Yu, U.S. Patent Pub. No. 2008/0025024, filed on July 31, 2006, is a § 102(e) reference that discloses, in Figure 3, a decorative light string that has serially connected LEDs with each LED having a bypass resistor. The light string is series-parallel connected.

V. PERSON OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSITA”) in the field of endeavor of the ‘252 patent at the time of its earliest claimed priority date is set forth in the Expert Schubert Declaration. pg. 23.

VI. CLAIM CONSTRUCTION

Claims having terms that have a special meaning that is set forth in the specification or, a special meaning in the lighting industry, are described below.

A. Claim 1

1. “plurality”

A plurality means two or more. See *Dayco Prod. v. Total Containment, Inc.*, 258 F. 3rd 1317 (Fed. Cir. 2001) and *York Products, Inc. v. Central Tractor Farm & Family Center*, 99 F. 3d 1568 (Fed. Cir. 1996). The specification of the ‘252 patent uses “plurality” in a manner consistent with the Dayco decision.

2. “said bypass resistor being in circuit...”

The term “in circuit” is not standard terminology used in electrical engineering or the lighting industry. However, a POSITA would most likely interpret the term “in circuit” as meaning connected in the bypass circuit and not disconnected during operation. Schubert Dec. pg. 34, footnote 4.

3. “conducting current at all times when current is flowing through the circuit regardless of whether the LED light source are conducting current therethrough...”

This is a functional statement in an apparatus claim and is not a limitation in the claims and should not be treated as a distinguishing feature of a claim to determine patentability. See *Hewlett Packard v. Bausch & Lomb Inc.*, 909 Fed. 2d 1464, 1469, 15 USPQ 2d 1525, 1528 (Fed. Cir. 1990) stating “[A]pparatus claims cover what a device is, not what a device does.” Since claim 1 recites a “resistor bypass circuit...” Claim 1 is an article claim, i.e., an apparatus claim.

A functional recitation of a property of a device shown in the prior art does not result in a claim distinguishing over the prior art. In *re Swinehart*, 169 USPQ 226 (CCPA 1971).

In any event, the structure of Inoue is the same as the structure claimed in Claim 1. The circuit of Yu therefore has inherent properties that correspond to the claimed function. (Id)

4. said bypass resistor is capable of operating on a 100% duty cycle.”

Functional statements in a claim, such as, “capable of” or “adapted to” are not limitations in article (apparatus) claims. See *In re Hutchinson*, 69 USPQ 138 (CCPA). Accordingly, this clause is not a limitation in claim 1 and cannot be treated as a distinguishing feature of claim 1 or in determining patentability.

Further, the term 100% duty cycle is not defined in the application and was introduced on November 25, 2019, the filing date of the non-provisional application corresponding to the ‘252 patent. Since 100% duty cycle is not defined, in the specification, under *Philips V. AWH Corp.*, 415 F.3d 1303, 75 USPQ 2d [32], (Fed. Cir. 2005) (en banc) one should consider its plain and ordinary meaning of terms in a claim. The definition from “Oxford Languages” is that a duty cycle is the portion of time occupied by a cycle of operation of a device, especially as a percentage of available time. Since current is constantly flowing through the bypass resistors in a series resistive bypass circuit, current passes through the bypass resistors 100% of the time which is a 100% duty cycle. Schubert pg. 56, paragraph 3.

B. Claim 2

1. Series-parallel circuit.

A series-parallel circuit is a circuit that has both series connected components and parallel connected components, such as shown in Figure 32 of Smith. Schubert

Dec. pg. 40. Figure 2b of the '252 patent discloses a series-parallel circuit described in Col. 6, lines 37-39. Schubert pg. 25, paragraph 5 and pg. 27, paragraph 7.

C. Claim 3

1. “wherein at least one of the light sources is a semiconductor providing a twinkling effect...”

LED light sources are semiconductors. The term “twinkling” refers to the turning on and off of the LED at a rapid rate. The term “twinkling,” “blinking,” and “flashing” are terms that all refer to turning on and off an LED in a rapid manner and these words are used synonymously. Schubert Dec. pg. 94, footnotes 32 and 33, and pg. 96, paragraph 2. Also, see Col. 2, lines 57-67 of the '252 patent which describe “flashing” as creating a “twinkling affect (sic).”

D. Claim 5

This claim should be interpreted in the same manner as claim 3.

E. Claim 8

Claim 8 is a Markush claim that includes a Markush group. See MPEP 2117 and see *In re Harnisch*, 631 Fed. 2nd 716, 719-20, 206 USPQ 300, 302-304 (CCPA 1980). The stated elements comprise a Markush group because the group has a common use, a claimed power source.

F. Claim 9

- 1. “said bypass resistor being in circuit and conducting current at all times when current is flowing through the circuit regardless of whether the LED lights sources are conducting current therethrough...”**

Again, this is the same functional statement that appears in section VI.A.3. (claim 1) and should not be considered to be a limitation in claim 9.

2. “capable of”

“Capable of” is not considered to be a limitation in claims, as set forth in VI.A.4. above.

3. “one hundred percent duty cycle...”

This term is constructed in the same manner as set forth in VI.A.3. (Claim 1)

G. Claim 10

- 1. “where the resistance of the bypass resistor is equal to or greater than the inherent resistance of the light source...”**

For LEDs, the resistance of an LED changes with the amount of current flowing through, and the voltage drop across, the LED. As such, there is no “inherent resistance” of an LED, but only the resistance of the LED at any particular operating current flowing through, and voltage across, the LED. Schubert pg. 29, paragraph 6, 7, 8, and 9. So, LEDs do not have an inherent resistance. Id and pg.

28, paragraph 2. The term “inherent” is not used in the specification of the ‘252 patent.

2. **“said bypass resistor being in circuit and conducting current at all times when current is flowing through the circuit regardless of whether the LED light sources are conducting current therethrough...”**

Again, this is the same functional statement that appears in section VI.A.4. (claim 1) and should not be considered to be a limitation in claim 10.

H. Claim 11

1. **“color changing characteristics.”**

This term refers to multiple color LEDs that can be activated at different luminosities to create color mixing so that the output illumination can be changed to create different colors. Schubert pg. 40, paragraph 1.

I. Claim 12

1. **“LED packages.”**

LED packages are commonly known in the industry as a plurality of LEDs that are packaged together in a single bulb. Packaged LEDs are typically color LEDs that are primary colors as shown in Callahan, Figure 1, reference #14. Schubert pg. 445, footnote 5.

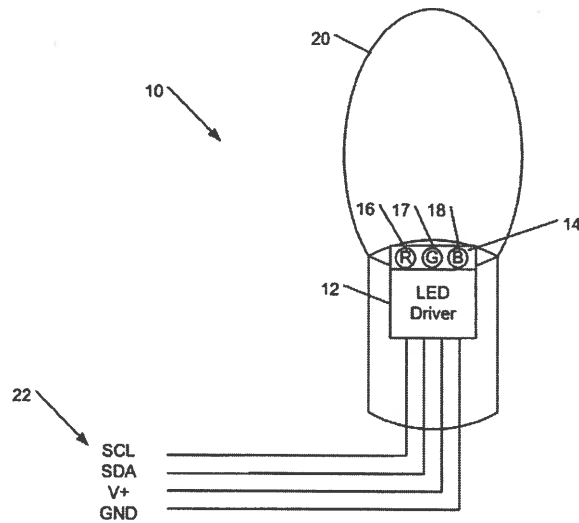


Fig. 1

VII. IDENTIFICATION OF CHALLENGE (37 C.F.R. § 42.104(B))

Ground	Basis	Reference	Claims
1	§ 102	Inoue	1
2	§ 103	Inoue in view of Holler	1, 10
3	§ 103	Holler in view of Smith	1, 10, 11
4	§ 103	Fisherman in view of Callahan	1, 5, 6, 7, 9
5	§ 103	Inoue in view of Smith	2, 3, 4, 5, 6, 8, 9
6	§ 103	Holler in view of Callahan	10, 11, 12, 13, 14
7	§ 102	Yu	1, 2, 10

A. Ground 1: Inoue anticipates Claim 1

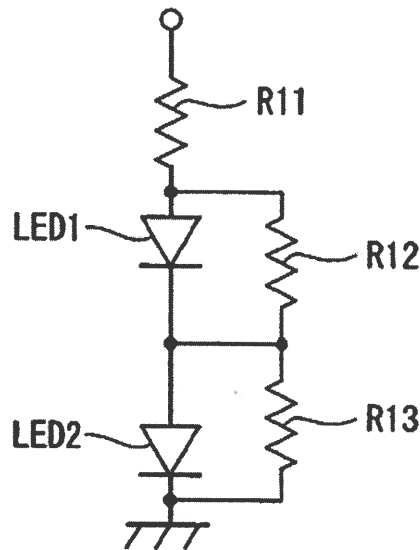
1. Claim 1

2. Preamble: “A resistor bypass circuit for a series lighting circuit comprising...”

Inoue, Figure 3, illustrates a series lighting circuit having two LEDs, LED 1 and LED 2. The series lighting circuit illustrated in Figure 3 of Inoue uses a bypass resistor R12 that by-passes LED 1 and a bypass resistor R13 that by-passes LED 2.

Accordingly, the circuit illustrated in Figure 3 of Inoue is a resistive bypass circuit for a series lighting circuit using two LEDs.

FIG. 3



- 3. “a plurality of serially connected LED light sources and a bypass resistor being connected in parallel with at least one of the respective light sources...”**

Figure 3 of Inoue discloses a plurality of serially connected LED sources. Inoue, Figure 3. Two LED sources are connected in series which constitutes a plurality, which is two or more. See Claim Construction of claim 1, VI.A.1. Figure 3 shows both the LEDs, LED 1 and LED 2, that have bypass resistors R12 and R13, respectively, connected in parallel with each of the LEDs.

4. **“said bypass resistor being in circuit and conducting current at all times when current is flowing through the circuit regardless of whether the LED light sources are conducting current therethrough...”**

See VI. A.4., Claim Construction. As shown in Figure 3, if both LED 1 and LED 2 are conducting current, current also flows through R12 and R13, since LED 1 and LED 2 have a resistance when current is flowing through these LEDs. Inoue, Figure 3. Schubert Dec. pg. 47, paragraph 1 and pg. 50, paragraph 7.

5. **“wherein said bypass resistor is capable of operating on a 100% duty cycle.”**

The term “capable of” is not a proper limitation in claim 1. The term “capable [of]” is not considered to be a limitation.

Current continuously flows through resistors R12 and R13. So, Inoue discloses this limitation. See VI.A.3. Inoue, Figure 3.

B. Ground 2: Inoue in view of Holler Renders Claims 1 and 10 Obvious

1. Claim 1

a. Motivation to Combine

Both Inoue and Holler are in the same field of endeavor, which is series connected illumination devices that have a resistive bypass element connected in parallel. It has been well known that bypass resistors are used to control the illumination characteristics of illumination devices. Schubert Dec. pg. 56, paragraph 2, and pg. 52, paragraph 7. For example, Inoue teaches varying the resistive values

of R12 and R13 in Figure 3 to affect the illumination levels of LED 1 and LED 2. Abstract of Inoue. Similarly, Holler teaches selecting resistive values of resistive elements 6 in Figure 2 to be equal to the resistive value of lamp 5 with which it is in shunt so that the other lamps 5 down the string do not vary in illumination [lines 96+ of Holler]. Additionally, Inoue discloses that its circuit can work equally as well with LEDs or electric bulbs. “[T]he light source used in the present invention is not limited to the LED, and any light emitting object including, for example, a lamp such as an electric bulb can be applied.” Inoue, paragraph 21. As such, using the teachings of Holler regarding the resistive values of bypass resistors in the circuit of Inoue, would produce the same results as the results produced by Holler, even though Inoue uses LEDs. Therefore, there is a **record-supported reason** for combining Inoue and Holler since both Inoue and Holler use bypass resistive elements for directing current in their circuits to convert illumination.

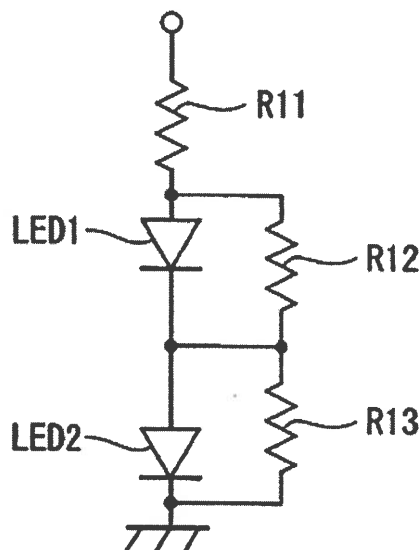
One would be motivated to use the resistive value as taught by Holler in the circuit of Inoue to control the illumination of the light sources so that the other illumination devices in the serial light string will not go dark or change illumination if one of the LEDs fails or becomes disconnected. One would make the modification with a reasonable expectation of success since Holler expressly teaches that the other serially connected LEDs will remain lit with the same illumination if a light source fails. Holler, lines:51+. The combination provides a predictable result of having

serially connected LEDs staying lit with uniform illumination even if one of the LEDs of Inoue goes dark. Schubert Dec. pg. 52, paragraph 1 and pg. 55, paragraph 7. The results of interchanging LEDs and incandescent bulbs is predictable and known in the art, as evidenced by Inoue which teaches the circuit, and therefore, the resistive values of bypass resistors would work the same in the circuit if bulbs or LEDs are employed. Inoue, Figure 3; Schubert Dec. pg. 57, paragraph 1. *See e.g., KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) (“When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability.”)

b. Preamble: “A resistor bypass circuit for a series lighting circuit comprising...”

Inoue, Figure 3, illustrates a series lighting circuit having two LEDs, LED 1 and LED 2. Inoue, Figure 3. The series lighting circuit illustrated in Figure 3 uses a bypass resistor R12 that bypasses LED 1 and a bypass resistor R13 that bypasses LED 2. Accordingly, the circuit illustrated in Figure 3 of Inoue is a resistive bypass circuit for a series lighting circuit using two LEDs. Schubert Dec. pg. 50, paragraph 2 and pg. 51, paragraph 5. This claim limitation is shown in Figure 3 of Inoue.

FIG. 3



- c. **“a plurality of serially connected LED light sources and a bypass resistor being connected in parallel with at least one of the respective light sources...”**

Figure 3 of Inoue discloses a plurality of serially connected LED sources. Two LED sources are connected in series which constitutes a plurality. See Claim Construction for claim 1 VI.A.1. Figure 3 shows LED 1 and LED 2, having bypass resistors R12 and R13, respectively, connected in parallel with each of the LEDs. As such, this claim limitation is shown in Inoue. Inoue, Figure 3.

- d. **“said bypass resistor being in circuit and conducting current at all times when current is flowing through the circuit regardless of whether the LED light sources are conducting current therethrough...”**

As shown in Figure 3 of Inoue, the bypass resistors R12 and R13 are connected “in circuit” and conduct current at all times when current is flowing through the circuit. See VI.A.4. above. Inoue, Figure 3.

e. “wherein the bypass resistor is capable of operating on a 100% duty cycle.”

Current is continually flowing through resistors R12 and R13, so that resistors R12 and R13 are working on a 100% duty cycle in the circuit, as shown in Inoue. Inoue, Figure 3; Schubert Dec. pg. 56, paragraph 3.

Further, Holler states, “[I]t has been found that good results are obtained if each of the resistances 6 is made of a resistance equal to that of the lamp with which it is in shunt and of approximately twice the current carrying capacity” (emphasis added). Holler, 1:96–101. The statement “approximately **twice the current carrying capacity**” indicates that the current carrying capacity of the resistors 6 of Holler are “capable of operating at” full current which by any definition corresponds to a full duty cycle. Schubert Dec. pg. 55, paragraph 1, pg. 56, paragraph 3, pg. 62, paragraph 3 and 4 and pg. 63, paragraph 5. One would be motivated to use the teachings regarding the resistive value of the bypass resistive element, as taught in Holler and applied to Inoue, with a reasonable expectation of success, as set forth above in the motivation to combine Inoue and Holler.

Finally, functional statements in a claim, such as, “capable of” or “adapted to” are not limitations in article (apparatus) claims. See *In re Hutchinson*, 69 USPQ 138 (CCPA). See VI.A.3.

2. Claim 10 (Inoue in view of Holler renders claim 10 obvious)

Claim 10 has the same limitations as claim 1 and the limitations of claim 1 are taught in the prior art (Inoue) as set forth above, except for the last claim element which is considered below.

- a. **“wherein the resistance of the bypass resistor is equal to or greater than the inherent resistance of the light source to which the resistor is attached, thereby minimizing the burn out potential of other light sources in the light string.”**

Holler states, “it has been found that good results are obtained if each of the resistances 6 is made of a resistance equal to that of the lamp with which it is in shunt and of approximately twice the current carrying capacity” (emphasis added). Holler, 1:96-101. Holler clearly teaches that it is advantageous to have the bypass resistor 6 equal to the resistance of the filament of lamp 5. Claim 10 recites “equal to or greater than,” so Holler clearly meets the alternative language of claim 10 by disclosing a resistance equal to the resistance of the lamp 5. Schubert Dec. pg. 65, paragraph 3, and pg. 66, paragraph 7.

The problem with this claim limitation is that LEDs do not have an inherent resistance, only a resistance based upon a voltage drop across the LED divided by the current flowing through the LED at any particular time. Schubert Dec. pg. 29, paragraph 6, 7, 8, and 9. So, this clause does not have meaning except to the extent that the resistances are equal to or greater than the LED resistance at any particular

time which depends on the operating condition of the LED. Schubert Dec. Id and pg. 28, paragraph 2. Holler certainly teaches that the resistance for bypass resistors that bypass incandescent bulbs can be equal to the inherent resistance of the incandescent bulb, and is advantageous to do so, as set forth above (VII.B.1.a.) in the motivation to combine. A PHOSITA would certainly use the teachings of Holler to select the resistors for a series LED circuit. Schubert pg. 58, paragraph 2.

C. Ground 3: Holler in view of Smith Renders Claims 1, 10, and 11 Obvious.

1. Motivation to Combine

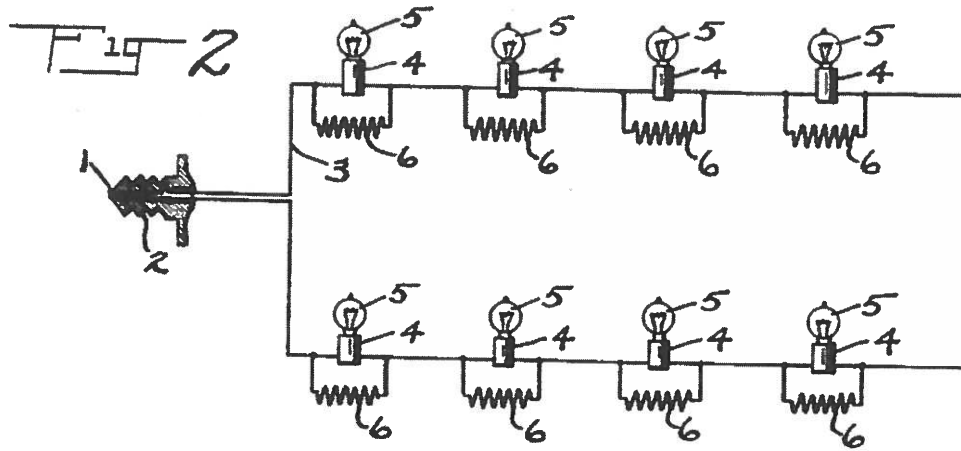
Figure 2 of Holler discloses a serial lighting circuit having incandescent bulbs 5 and bypass resistors 6. Holler, Figure 2. Holler states that the bypass resistors allow the circuit to remain lit if one of the incandescent bulbs 5 goes out. Holler, lines 51-56. Smith teaches the advantageous use of LEDs in lighting circuits. Smith, in the Description of the Prior Art in column 1, the Summary of the Invention in column 2, and Column 6, lines 35+ clearly points out that LEDs can readily replace incandescent bulbs and have superior advantages to incandescent bulbs. Schubert pg. 41, paragraph 4, pg. 69, paragraph 1, pg. 70, paragraph 3, and pg. 71, paragraph 4-6. For example, LEDs have a longer lifespan, generate a much lesser amount of heat, consume less power, and are less expensive than incandescent bulbs, (Column 6, lines 35-47 of Smith); Schubert pg. 41, paragraph 4, pg. 70, paragraph 3, and pg.

71, paragraph 5. Both Holler and Smith are in the same field of endeavor, i.e., decorative lighting circuits. Schubert Dec. pg. 35. Smith makes clear that incandescent bulbs and LEDs are known in the art and are well known to be substitutes for each other. The use of LEDs in a lighting circuit is well known and replacement of LEDs for incandescent bulbs provides a predictable solution for the problems associated with incandescent bulbs disclosed in Smith. Schubert Dec. pg. 41, paragraph 4, pg. 70, paragraph 3, and pg. 71, paragraph 5. The record-supported advantages, set forth in Smith, provides a clear motivation with a reasonable expectation of success for the replacement of incandescent bulbs with LEDs to enjoy the advantages of using LEDs instead of incandescent bulbs, as set forth in Smith.

2. Claim 1 (Holler in view of Smith) (Ground 3)

a. Preamble: “A resistor bypass circuit for a series lighting circuit comprising...”

Holler, in Figure 2, discloses a series lighting circuit comprising conductor 3 that is connected in series to incandescent bulbs 5. Each of the light bulbs has a bypass resistor 6 connected in parallel to the bulbs to provide a bypass so that if a light bulb 5 burns out, the bypass resistor will continue to carry current through the series connected circuit. Schubert pg. 52, paragraph 1, pg. 55, paragraph 7, and pg. 37, paragraph 2. As such, Holler shows a resistor bypass circuit for a series lighting circuit in Figure 2.



- b. “a plurality of serially connected LED light sources and a bypass resistor being connected in parallel with at least one of the respective light sources...”

Holler is silent regarding the use of LEDs since LEDs did not exist in 1922. However, Smith teaches replacing incandescent bulbs with LEDs, and therefore, the replacement of the bulbs 5 of Holler with LEDs is clearly taught in the prior art as evidenced by Smith. Schubert Dec. pg. 41, paragraph 4, and pg. 57, paragraph 1. This constitutes a simple substitution of one known element for another with a reasonable expectation of success with predictable results of solving the problems of incandescent bulbs, as disclosed in Smith. *KSR*, 550 U.S. at 417. Schubert Dec. pg. 37-38 and 53. Smith teaches that the replacement of LEDs for incandescent bulbs is a known technique to improve a product. Schubert Id. As such, the combination of Holler in view of Smith provides a serial light string having LEDs light sources with resistive bypass elements 6. Schubert Dec. pg. 70, paragraph 3, and pg. 71, paragraph 4-6.

c. “a bypass resistor being connected in parallel with at least one of the respective light sources...”

Again, Figure 2 of Holler shows more than one light source connected in series with a bypass resistor 6 connected in parallel to each of the light sources 5. Although the light sources 5 are not LEDs, Smith clearly teaches the advantages of using LEDs, and that LEDs can readily replace incandescent lamps such as lamps 5. Smith interchangeably uses LEDs and incandescent bulbs. See Column 1, paragraph 3 and Column 2, Summary of the Invention.

d. “said bypass resistor being in circuit and conducting current at all times when current is flowing through the circuit regardless of whether LED light sources are conducting therethrough...”

The bypass resistors 6 in Figure 2 of Holler conduct current at all times in accordance with the ratio of the resistive value of the resistor 6 and the lamp 5 or LEDs as taught by Smith. Again, if the lamp 5 of Holler, or the substitute LED from Smith, fails and is an open circuit, all of the current flows through resistor 6. So current continues to flow through resistor 6 whether or not current is flowing through the parallel connected light source.

e. “wherein said bypass resistor is capable of operating on a 100% duty cycle.”

As indicated above, current is flowing through the resistors 6 of Holler at all times, so resistors 6 are operating at a 100% duty cycle. Schubert Dec. pg. 62, paragraph 2-5.

Further, functional statements in a claim, such as, “capable of” or “adapted to” are not limitations in article (apparatus) claims. See *In re Hutchinson*, 69 USPQ 138 (CCPA). See VI.A.3. above.

3. Claim 10 (Holler in view of Smith) (Ground 3)

- a. Preamble: “a resistor bypass circuit for a series lighting circuit comprising...”**

This is described in section VII B.1.b. above.

- b. See VII.C.2.b**

- c. “said bypass resistor being in circuit and conducting current at all times when current is flowing through the circuit regardless of whether the LED light sources are conducting current therethrough...”**

This is described in section D.2.c. above.

- d. “wherein the resistance of the bypass resistor is equal to or greater than the inherent resistance of a light source to which the resistor is attached, thereby minimizing the burnout potential of other light sources in the light string.”**

There is no “inherent resistance” of an LED, but only the resistance of the LED at the particular operating current flowing through the LED, for a particular voltage drop across the LED. See section VI (Claim Construction G). Schubert Dec. pg. 28, paragraph 2, pg. 29, paragraph 5-9. Since the resistance of the LED varies from infinity to very small, most resistive values of resistors 6 of the resistors would

be selected to be in that range, especially in view of the teachings of Holler. Schubert Dec. pg. 30, paragraph 11, and pg. 65, paragraph 3.

In that regard, Holler, on lines 94+ states “[I]t has been found that good results are obtained if each of the resistances 6 is made of a **resistance equal to that of the lamp** with which it is in shunt and of approximately twice the current carrying capacity” (emphasis added). Holler, 1:96-101. As such, Holler discloses that it is best to have the resistive value of the bypass resistor 6 equal to the resistance of the incandescent lamp 5. This is a clear record-supported reason to make the resistance of the bypass resistors equal to an operating resistance of the substituted LED.

4. Claim 11 (Ground 3) (Holler in view of Smith)

- a. The resistor bypass circuit of claim 10, the light source being a semiconductor light source for providing color changing characteristics.**

Here, Smith teaches the use of a semiconductor light source, i.e., a light emitting diode, and also teaches that the light emitting diode can have different colors. Schubert Dec. pg. 24 and footnote 3. Further, Smith teaches in column 6, lines 25+ “color changing characteristics.”

Smith, in column 6, lines 55+ also states

“various types of control circuits are provided for driving the light-emitting diodes or light strings to provide sufficient drive, to revive switching and the like so that a wide variety of sequencing including blinking, alternating between two colors,

sequencing between two, three or more colors, sequentially stepping along a string or around a tree and the like, are possible.”

Smith clearly teaches “color changing characteristics” as recited in claim 11 of the ‘252 patent.

Accordingly, the combination of Holler in view of Smith teaches all the elements of claim 10 and 11 and presents a prima facie case of obviousness of claim 11. This combination is obvious in view of the record-supported reasons for motivation to use the teachings of Smith in view of the advantages of using LEDs in place of incandescent bulbs of Holler. Schubert Dec. pg. 41, paragraph 457 and paragraph 1, pg. 69, paragraph 1, pg. 70, paragraph 3, and pg. 71, paragraph 4-6.

D. Ground 4: Fisherman in view of Callahan Renders Obvious Claims 1, 5, 6, 7, 9

1. Motivation to Combine

Figure 1 of Fishermen discloses a serial lighting circuit having incandescent bulbs 10 and bypass resistors 13. At column 1, lines 43-48 and column 2, lines 26-29, Fisherman states that the bypass resistors 13 allow the remaining lamps in the lighting circuit to continue to function if one of the incandescent bulbs 10 ceases to be illuminated. Callahan discloses the use of LEDs in a lighting circuit. Callahan, in the Background of the Invention at page 1, paragraph [0003], clearly asserts that LEDs can, and are, replacing conventional light sources, including incandescent bulbs, and that LEDs have advantages over incandescent bulbs. Schubert Dec. pg.

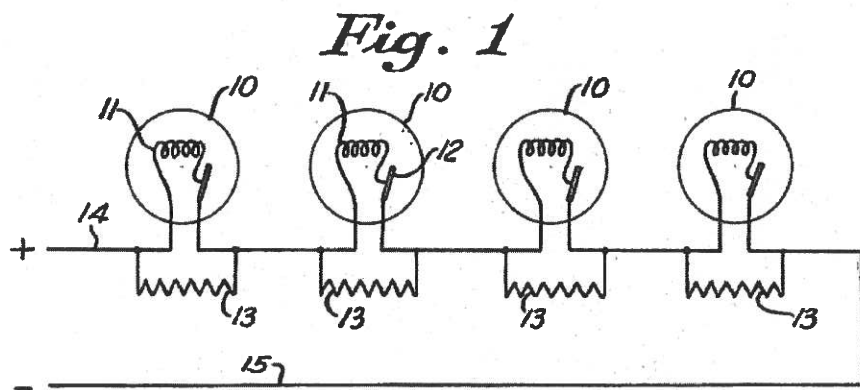
37-38, 53 and 65-67. For example, LEDs have improved power conservation and reliability as well as permitting more latitude of control over decorative lighting solutions in comparison to incandescent bulbs. Callahan, paragraph [0003], Schubert Dec. pg. 41, paragraph 4, pg. 57, paragraph 1, pg. 69, paragraph 1, pg. 70, paragraph 3, and pg. 71, paragraph 4-6. Both Fishermen and Callahan are in the same field of endeavor, i.e., decorative lighting circuits. Schubert Dec. pg. 30. Callahan makes clear that incandescent bulbs and LEDs are known in the art and that LEDs are well known to be substitutes for incandescent bulbs in conventional lighting systems. The use of LEDs in a lighting circuit is well known and replacement of LEDs for incandescent bulbs provides a predictable solution with improved power conservation and reliability. Schubert Dec. pg. 35. The record-supported advantages, set forth in Callahan, provides a clear motivation for the replacement of incandescent bulbs with LEDs to enjoy those advantages of using LEDs instead of incandescent bulbs as set forth in Callahan.

2. Claim 1 (Ground 4) (Fisherman in view of Callahan)

a. Preamble: "A resistor bypass circuit for a series lighting circuit comprising..."

Fishermen, in Figure 1, and also described at column 2, lines 5-17, discloses a series lighting circuit comprising a plurality of lamps 10 interconnected in series, supplied with power by wires 14 and 15, wherein each lamp 10 is connected in parallel with resistors 13. Each of the lamps 10 has a bypass resistor 13 connected

in parallel to the lamp to provide a shunt/bypass so that if a lamp 10 ceases to illuminate, e.g., by being disconnected or by failure, the bypass resistor will continue to carry current through the series connected circuit. Schubert Dec. pg. 52, paragraph 1, pg. 90, paragraph 2, pg. 91, paragraph 4-6, and pg. 92, paragraph 8. As such, Fisherman shows a resistor bypass circuit for a series lighting circuit in Figure 1.



b. “a plurality of serially connected LED light sources and a bypass resistor being connected in parallel with at least one of the respective light sources...”

As shown above, Figure 1 of Fisherman teaches more than one light source 10 connected in series with a bypass/shunt resistor 13 connected in parallel to each of the light sources 10. While the light sources 10 of Fisherman are not LEDs, Callahan clearly discloses that LEDs are capable of, and are, replacing incandescent lamps such as lamps 10. See paragraph [0036] of Callahan.

- c. “said bypass resistor being in circuit in conducting current at all times when current is flowing through the circuit regardless of whether LED light sources are conducting therethrough...”**

A POSITA will recognize that each of the shunt/bypass resistors 13 of Figure 1 of Fisherman are in circuit and are connected in a parallel with each of the corresponding lamps 10. Further, each bypass resistor 13 conducts current at all times as a parallel circuit. Schubert Dec. pg. 92, paragraph 6-8. If the lamp 10 of Fisherman is substituted with an LED as taught by Callahan, each bypass resistor 13 also conducts current at all times in accordance with a parallel circuit operation. Schubert Dec. Id. Accordingly, the current passing through each resistor 13 is the ratio of the resistive value of the resistor 13 and the varying resistive value of the corresponding LED. If the lamp 10 of Fisherman, fails and is an open circuit, all of the current for the lamp 10 and resistor 13 flows through resistor 13. Schubert Dec. pg. 91, paragraph 4-. Thus, current continues to flow through resistor 13 whether or not current is flowing through the parallel connected light source 10.

- d. “and wherein the bypass resistor is capable of operating on a 100% duty cycle.”**

Since current is continuously passing through resistors 13, resistors 13 operate on a 100% duty cycle. Schubert Dec. pg. 43, paragraph 3, pg. 79, paragraph 3. See VI.A.3.

Further, functional statements in a claim, such as, “capable of” or “adapted to” are not limitations in article (apparatus) claims. Accordingly, the claim element “wherein said bypass resistor is capable of operating on a 100% duty cycle” is not a limitation. See VI.A.3.

3. Claim 5 (Fisherman in view of Callahan) (Ground 4)

- a. “The resistor bypass circuit of claim 1, [wherein] at least one of the light sources is a semiconductor light source providing a twinkling effect.”**

The ‘252 patent at column 2, lines 58-59 states “semiconductor light sources, such as light emitting diodes (LEDs),” meaning, as asserted by the ‘252 patent, that an LED is a semiconductor light source. The ‘252 patent at column 10, lines 11-12 states “light sources 66 will cause its LED to blink on and off, creating a twinkling effect.” Consequently, as understood from the ‘252 patent, twinkling is equivalent to blinking. Schubert Dec. pg. 100, footnote 32-33, and pg. 110, footnote 42. Callahan at page 2, paragraph [0023] asserts that “an I²C command controller may select an illumination device with the particular LED driver 12a to be selectively driven to a particular state (color, blink rate, brightness, etc.)” (emphasis added). Callahan at page 2, paragraph [0020] also asserts that “[G]enerally, the LED driver 12 and RGB LEDs 14 are embedded or combined on a single unit within the illumination device.” The illumination device of Callahan is an LED that may be selectively driven to a particular blink rate. A POSITA will recognize that the LEDs

of Callahan substituted for the lamps 10 of Fisherman may be blinking LEDs as also disclosed by Callahan. Schubert pg. 44, paragraph 2 and pg. 89, paragraph 3. Accordingly, the combination of Fisherman in view of Callahan discloses the limitations of claim 5 and presents a prima facie case of obviousness.

4. Claim 6 (Fisherman in view of Callahan) (Ground 4)

- a. “The resistor bypass circuit of claim 1, [wherein] at least one of the light sources is a semiconductor light source utilizing electronic circuits that control the flashing rate of the light source, which would only affect the individual lighting element as the resistive bypass would allow current to continue to flow in remaining lighting elements in the series circuit.”**

Callahan teaches that incandescent light bounces can be “retrofitted” with LEDs. Again, as asserted by the ‘252 patent, a semiconductor light source is a LED. Callahan at page 2, paragraph [0020] asserts that “[G]enerally, the LED driver 12 and RGB LEDs 14 are embedded or combined on a single unit within the illumination device” and that “an LED driver is a single application specific integrated circuit (ASIC).” Further, Callahan at page 2, paragraph [0023] asserts that “an I²C command controller may select an illumination device with the particular LED driver 12a to be selectively driven to a particular state (color, blink rate, brightness, etc.)” (emphasis added). The term ASIC stands for application-specific integrated circuit, which is set forth in the specification of Callahan. Since it is an integrated circuit, it is an electronic circuit. See paragraph [0023] of Callahan.

Therefore, Callahan discloses an LED that blinks and has a blink rate that is controlled by an electronic circuit. Schubert Dec. pg. 44, paragraph 2 and pg. 89, paragraph 3. As described above with respect to claim 1 of the '252 patent at VII.D.2, if the lamp 10 of Fisherman, is an open circuit, all of the current for the lamp 10 and resistor 13 flows through resistor 13. Thus, the remaining lamps 10 will continue to function (Fisherman column 2, lines 26-29). Accordingly, Fisherman, as modified by Callahan, discloses all the claimed elements of claim 6 and provides a prima facie case of obviousness of claim 6.

5. Claim 7 (Fisherman in view of Callahan) (Ground 4)

- a. "The resistor bypass circuit of claim 1, wherein said light source is a blinking LED with a first state allowing current to flow through the device and a second state where the light source is an open circuit, whereby remaining light sources in the light string operate with current passing through the bypass resistor when the light source is in the second state."**

Again, paragraphs [0020] and [0023] on page 2 of Callahan disclose a blinking LED. A POSITA will recognize that a blinking LED is turning on and off such that in the on state (i.e., the first state) current flows through the LED and in the off state (i.e., the second state) current does not flow through the LED as the LED acts as an open circuit in the off state. Again, as described above with respect to claim 1 of the '252 patent at VII.D.2, if the lamp 10 of Fisherman, or the substitute LED, as taught by Callahan (paragraph [0036]), is an open circuit (i.e., in the second

off state), all of the current for the lamp 10 and resistor 13 flows through resistor 13. Thus, current continues to flow through resistor 13 whether or not current is flowing through the parallel connected light source 10 and the remaining lamps 10 will continue to function (Fisherman column 2, lines 26-29). Schubert Dec. pg. 90, paragraph 1-2, pg. 91, paragraph 4-6, and pg. 92, paragraph 8. Accordingly, Fisherman, as modified by Callahan, discloses all the claimed elements of claim 7 and provides a prima facie case of obviousness of claim 7.

6. Claim 9 (Fisherman in view of Callahan)

Claim 9 is the same as claim 1 and the limitations of claim 1 are taught in the prior art (Fisherman in view of Callahan) as set forth in VII.D.3. above, except for the last claim element of claim 9, which is considered below.

a. “...further including an LED flashing light source which includes a flashing circuit which causes the entire light circuit to flash.”

Again, as understood from the ‘252 patent, flashing is equivalent to blinking. The ‘252 states that an object of the invention is “to provide a twinkling affect (sic)...that incorporate integrated circuits or other type of electronic circuits that control the flashing rate of the light source... [I]n another embodiment of the invention, one or more semiconductor light sources, each with a flashing circuit... can be located in the lighting circuit in order to flash all remaining light sources...”

In these passages, the '252 patent states that twinkling can be created by flashing. As such, it appears that these terms are used in the '252 patent to mean the same thing.

Callahan at page 2, paragraph [0023] asserts that “an I²C command controller may select an illumination device with the particular LED driver 12a to be selectively driven to a particular state (color, **blink rate**, brightness, etc.)” (emphasis added). Callahan at page 2, paragraph [0020] also asserts that “[G]enerally, the LED driver 12 and RGB LEDs 14 are embedded or combined on a single unit within the illumination device.” The illumination device of Callahan is an LED that may be selectively driven at a particular blink rate. Schubert Dec. pg. 44, and pg. 89 paragraph 3. A POSITA will recognize that the LED disclosed in Callahan, substituted for the lamps 10 of Fisherman, may be a blinking LED as also disclosed by Callahan. Of course, to cause the whole circuit to flash, a bypass resistor may be removed from one of the flashing LEDs. This is certainly within the skill of a POSITA. Schubert Dec. pg. 31, paragraph 16-17.

E. Ground 5: Inoue in view of Smith Renders Obvious Claims 2-6, 8 and 9.

1. Motivation to Combine

Smith discloses the use of LEDs in a lighting circuit. Smith, in the description of prior art in column 1, and in the Summary of the Invention in column 2, clearly

points out that LEDs can readily replace incandescent bulbs and have superior advantages to incandescent bulbs. Smith, column 2, lines 57-62; Schubert Dec. pg. 41, paragraph 4, pg. 57, paragraph 1, pg. 69, paragraph 1, pg. 70, paragraph 3, and pg. 71, paragraph 4-6. For example, LEDs have a longer lifespan, generate a much lesser amount of heat, consume less power, and are less expensive than incandescent bulbs. Schubert Dec. pg. Id. Both Inoue and Smith are in the same field of endeavor, i.e., decorative lighting circuits. Schubert Dec. pg. 35. Smith makes clear that incandescent bulbs and LEDs are known in the art and are well known to be substitutes for each other. Schubert Dec. pg. 41, paragraph 4, pg. 57, paragraph 1, pg. 69, paragraph 1, pg. 70, paragraph 3 and pg. 71, paragraph 4-6. The use of LEDs in a lighting circuit is well known. Schubert Dec. Id. The numerous record-supported advantages, set forth in Smith provide a clear motivation for use of the teachings of Smith as applied to Inoue, so as to enjoy the advantages set forth in Smith.

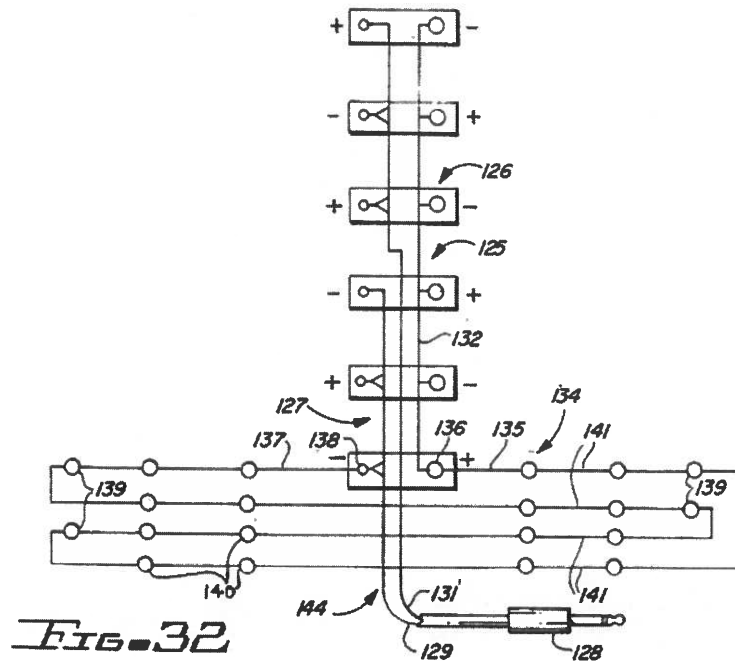
2. Claim 2 (Inoue in view of Smith) (Ground 5)

a. “The resistor bypass circuit of claim 1, wherein the circuit is series-parallel connected.”

Series/parallel circuits were well known as of the priority date of the ‘252 patent. Schubert Dec. pg. 41, paragraph 4. Smith, has a patent date of June 23, 1987. Figure 32 of Smith discloses a series-parallel circuit which is described in column 22 of Smith. Schubert Dec. pg. 40, paragraph 2. Plug 128 supplies power

to a series of connectors. As shown in Figure 2, electrical terminals 136, 138 are connected to a series circuit of a light string. Smith, Figure 2; Schubert Dec. pg. 40, paragraph 2. Each of the terminals illustrated in Figure 32 are connected in parallel. As described in column 22, lines 37+ “each of the strings of individual limb light sets 134 comprises **a single series connected string of light-emitting diodes...**” Figure 32 and the associated description in column 22 is a clear disclosure of a series-parallel connected circuit. In this fashion, Smith discloses the use of a series/parallel circuit. Schubert Dec. pg. 40, paragraph 2. Further, in column 22, lines 3+, Smith describes Figure 32 as showing a series/parallel wiring system 124.

Accordingly, the combination of Inoue and Smith show all of the elements of claim 2 including a circuit which is a series-parallel circuit. Inoue and Smith are properly combined for the reasons set forth above with regard to the motivation to combine these references. As such, the combination of Inoue as modified by Smith provides a prima facie case of obviousness of claim 2.



3. Claim 3 (Inoue in view of Smith) (Ground 5)

- a. "The resistor bypass circuit of claim 1 wherein at least one of the light sources is a semiconductor providing a twinkling effect and wherein the semiconductor light source utilizes electronic circuits that control the flashing rate of the light source"

Column 2, line 52, Smith states "...which can be switched extremely fast due to the solid state nature of a light-emitting diodes for operation in the **blinking mode**, **switching mode**, or any of various types of sequencing modes" (emphasis added). Figure 39 of Smith illustrates circuitry for creating blinking and switching. Column 33, lines 67+ of Smith state "[T]his enables a set of monostable light-emitting diodes to be alternately **blinked on and off**..." (emphasis added). Hence, the circuitry of Figure 39 is designed to create blinking. Schubert Dec. pg. 40, paragraph 3.

Blinking and flashing are considered to be the same. Schubert Dec. pg. 100, footnotes 32 and 33, and pg. 110, footnote 42. Inoue, in view of Smith accordingly presents a prima facie case of obviousness of claim 3 since all of the elements of claim 3 are disclosed in Inoue in view of Smith and there are record-supported reasons that provide motivation for this combination.

4. Claim 4 (Inoue in view of Smith) (Ground 5)

a. The resistor bypass circuit of claim 1, wherein the LED light source uses 0.20 watts or less.

Claim 4 depends upon claim 1 and further adds the limitation “wherein the LED light source uses 0.20 watts or less”.

The combination of Inoue and Smith teach the claimed invention, as indicated in Ground 5 above, but does not explicitly state “wherein the LED light source uses 0.20 watts or less.”

It would have been obvious to one of ordinary skill in the art at the time of the invention to use “LED light source uses 0.20 watts or less” as a matter of design choice, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Moreover, nothing of record, nor known in the art suggests that using the specific claimed range or value yields any previously unexpected results. The patent

holder admits to this in their disclosure (See Column 7, lines 29-37) stating “In addition, as noted with respect to FIG. 2 above, resistor sets **10** may be employed with light sources **26** being LEDs. Such LEDs typically operate at much lower current (20 mA) with a power draw of 0.08 W or less, and therefore allow for very cool operation of the resistor bypass circuit **28**, even when the bypass resistor **28** is continually conducting. In either case, there is substantial energy savings. In another embodiment, higher power LEDs or several LEDs in parallel may be employed across the bypass resistor”. One of ordinary skill would be motivated to use an LED that uses 0.2 watts or less as a matter of convenience since that wattage is typical (as earlier explained by the ‘252 patent) and 0.08 watts falls within the claimed range, as well as having low power consumption, as also taught in Smith (see Smith Columns 35-47). Schubert Dec. pg. 104, paragraph 2 and pg. 103, footnote 35.

5. Claim 5 (Inoue in view of Smith) (Ground 5)

- a. “The resistor bypass circuit of claim 1, at least one of the light sources is a semiconductor light source providing a twinkling effect.”**

In the “Summary of the Invention,” Smith discusses both AC power sources and DC power sources “which can be switched extremely fast due to the solid state nature of the light-emitting diodes for operation in the **blinking mode**, switching mode, or any various types of sequencing modes.” In column 3, lines 16+, Smith states “[I]t is a further object of the present invention to provide single color or multi-

color light strings wherein the colors may be alternated, **blinked**, sequenced in any desired manner, or the like.” In column 6, lines 55+, Smith states “various types of control circuits are provided for driving the light-emitting diodes or light strings to provide sufficient drive, to provide switching and the like so that a wide variety of sequencing including **blinking**, alternating between two colors, sequencing between two, three or more colors, sequentially stepping along a string or around the tree and the like, are possible.” In column 8, lines 9+, Smith states “lastly, various timing circuits, drive circuits, polarity reversing circuits, variable duty cycle control circuits... are provided for producing any desired number of switching signals for sequencing control signals to enable **blinking**, alternating lights, sequencing three lights.” Column 15, line 1, also recites blinking. Figure 39 of Smith discloses circuitry for blinking light-emitting diodes. Column 33 describes the circuit of Figure 39. Column 33, lines 67 and 68, state “this enables a set of monostable light-emitting diodes to be alternately **blinked** on and off...”

Blinking and twinkling are common, interchangeable terms used that refer to an LED turning on and off quickly. Schubert Dec. pg. 100, footnote 32 and 33, pg. 110, footnote 42.

6. Claim 6 (Inoue in view of Smith) (Ground 5)

- a. “the resistor bypass circuit of claim 1, at least one of the light sources is a semiconductor light source utilizing electronic circuits that control the flashing rate of the light source, which would only affect the individual lighting element as a resistive bypass would allow current to continue to flow in remaining lighting elements in the series circuit.”**

Column 33 and Figure 39 of Smith describe a driver circuit 400 that drive light emitting diodes that are alternately blinked on and off. See column 33, lines 67 and 68. Hence, Smith discloses electronic circuitry that controls the flashing of LEDs including the rate of blinking or flashing. Schubert Dec. pg. 36. Inoue shows bypass resistors around both LED 1 and LED 2. When either LED 1 or LED 2 blinks off, current continues to flow through the resistor(s) so that the blinking LED does not affect the rest of the series circuit of Figure 3 of Inoue. Schubert Dec. pg. 26, paragraph 16-17. Accordingly, Inoue, as modified by Smith, discloses all the claimed elements of claim 6 and provides a prima facie case of obviousness of claim 6.

7. Claim 8 (Inoue in view of Smith) (Ground 5)

- a. **The resistor bypass circuit of claim 1 being utilized in AC or DC circuits powered from a power source selected from the list consisting of batteries, step down transformers, AC utility power, or converters from AC to DC or DC to AC power, pulsed DC, and filtered or unfiltered DC, or partially filtered AC.**

Claim 8 states from “a power source selected from the list consisting of...”

Claim 8 is Markush claim since claim 8 recites a list of alternatively usable members.

See *In re Harnisch*, 631 Fed. 2d 716, 719-20, 206 USPQ 300, 302-304 (CCPA 1980). A Markush group requires a selection from a closed group so that the term “consisting of” must be used in the claim. Claim 8 uses the terminology “consisting of.” The members of a group of a Markush group must either share a “single structural similarity” or share “a common use.” (*Id.*) The group recited in claim 8 all pertain to various types of power to form a power source (a common use).

If any one of the members or elements of a Markush group is shown in the prior art, that showing suffices for meeting the terms of the entire Markush group. See *Abbott Labs v. Baxter Pharmaceutical Products, Inc.*, 334 F. 3rd 1274, 1280-1281, 67 USPQ 2d 1191, 1196-1197 (Fed. Cir. 2003) and Manual of Patent Examining Procedure 2117. In that regard, Smith discloses the use of both AC and DC power sources. For example, see the abstract, column 30 lines 33-39, column 36 lines 19-68, column 40 lines 52 and 53, column 39 lines 10-11. As such, Smith discloses various power sources of the Markush group of claim 8. Accordingly,

Inoue as modified by Smith, discloses all the claimed elements of claim 8 and provides a prima facie case of obviousness of claim 8.

8. Claim 9 (Inoue in view of Smith) (Ground 5)

Claim 9 is the same as claim 1 and is taught in the prior art (Inoue) as set forth in VI.A.1. above, except that claim 9 has an additional clause. The additional clause is considered below.

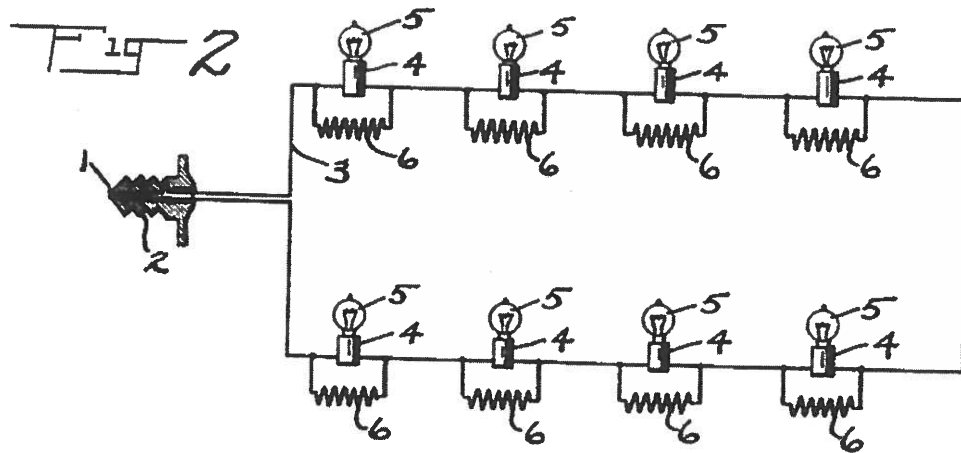
- a. “further including an LED flashing light source which includes a flashing circuit which causes the entire light circuit to flash.”**

Figure 39 of Smith illustrates circuitry for creating blinking and switching. Column 33, lines 67+ of Smith state “this enables a set of monostable light-emitting diodes to be alternately blinked on and off...” Hence, the circuitry of Figure 39 of Smith is designed to create blinking. Blinking and flashing are considered by those skilled in the art to be the same. Schubert Dec. pg. 95 and footnotes 33 and 34, and pg. 105, footnote 45. Of course, to cause the whole circuit to flash, a bypass resistor can be removed from one of the flashing LEDs. This is certainly within the skill of a POSITA. Schubert Dec. pg. 26, paragraph 16-17.

F. Ground 6: Holler in view of Callahan Renders Obvious Claims 10, 11, 12, 13, and 14.

1. Motivation to Combine

Holler discloses Christmas tree lighting using a series circuit having incandescent bulbs 5 with each having a bypass resistor 6 which prevents the series circuit from going dark when one of the bulbs 5 burns out and becomes an open circuit (Figure 2, lines 51-56). Schubert Dec. pg. 37, paragraph 2.



Callahan discloses a decorative lighting system, such as illustrated in Figure 3 of Callahan.

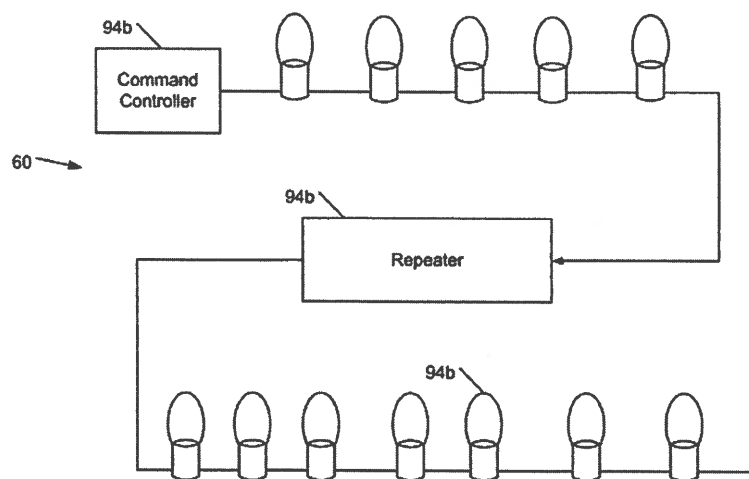


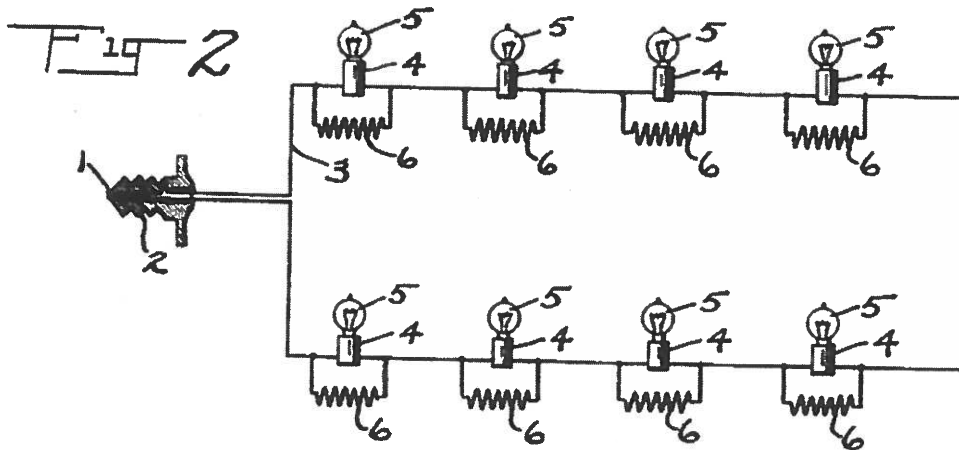
Fig. 3

In the “Background of the Invention,” paragraph [0003], Callahan states that “advances in luminosity of LEDs in white light emitting LEDs will permit large scale applications of LEDs and **replacement of other conventional light sources**” (emphasis added). These other conventional light sources, of course, include incandescent light sources. Schubert Dec. pg. 53. As such, there are record-supported reasons in Callahan for replacing the incandescent bulbs 5 of Holler with LEDs, as taught by Callahan (See Callahan paragraphs 00003, 0004, 0036). For example, Callahan teaches that “light emitting diodes provide advantages over previous incandescent and other types of lighting systems due to improved power conservation and reliability” stated in paragraph [0003]. Schubert Dec. pg. 111, paragraph 2, pg. 41, paragraph 4, pg. 57, paragraph 1, and pg. 70, paragraph 3. These advantages also provide a clear motivation to change the incandescent bulbs 5 of Holler with LEDs, as taught by Callahan. Schubert Dec. pg. Id.

2. Claim 10 (Holler in view of Callahan) (Ground 6)

a. Preamble: “A resistor bypass circuit for a series lighting circuit comprising”

Holler, in Figure 2, discloses a series lighting circuit comprising conductor 3 that is connected in series to incandescent bulbs 5. Each of the light bulbs has a bypass resistor 6 connected in parallel to the bulbs to provide a resistive bypass so that if a light bulb 5 burns out, the bypass resistor will continue to carry current through the series connected circuit (lines 51-56). As such, Holler shows a resistor bypass circuit for a series lighting circuit in Figure 2.



b. “a plurality of serially-connected LED light sources and a bypass resistor being connected in parallel with at least one of the respective light sources.”

The combination of Holler in view Callahan provides record-supported reasons for replacing bulbs 5 of Holler with LEDs, as set forth in paragraphs [0003], [0004], and [00036] of Callahan that expressly teach the advantages of replacing incandescent bulbs with LEDs. Schubert Dec. pg. 111, paragraph 2. The

replacement of the bulbs 5 of Holler with LEDs provides a plurality of serially connected LED light sources with bypass resistor 6 connected in parallel to each of the LED light sources, such that at least one of the light sources is connected in parallel with the resistor 6. Schubert Dec. pg. 111, paragraph 3. As such, the limitations of this clause are shown in the combination of Holler in view of Callahan.

- c. “said bypass resistor being in circuit and conducting current at all times when current is flowing through the circuit regardless of whether the LED light sources are conducting current therethrough.”**

This is described in section D.2.c. above.

- d. “wherein the resistance of the bypass resistor is equal to or greater than the inherent resistance of a light source to which the resistor is attached, thereby minimizing the burnout potential of other light sources in the light string.”**

Holler, on lines 94+ states “[I]t has been found that good results are obtained if each of the resistances 6 is made of a resistance equal to that of the lamp with which it is in shunt and of approximately twice the current carrying capacity.” As such, Holler discloses that the bypass resistor 6 is equal to the resistance of the incandescent lamp 5 or its replacement LED.

Claim 10 uses the term “inherent resistance of the light source.” If the light source is an incandescent bulb, such as bulb 5 of Figure 2 of Holler, the inherent resistance of bulb 5 is the resistance of the filament. Schubert Dec. pg. 30, paragraph

13. For LEDs, the resistance of an LED changes with the amount of current flowing through, and the voltage drop across, the LED. Schubert Dec. pg. 29, paragraph 6-9. If very little current is flowing through the LED, the resistance of the LED may be very high. Schubert pg. 30, paragraph 11. As the current flow increases through the LED, the resistance of the LED becomes less. Schubert Dec. pg. 30, paragraph 11 and 13. The resistance is equal to the slope of the plot of current versus voltage for LEDs. Schubert Dec. pg. 30, paragraph 12. As such, there is no “inherent resistance” of an LED, Schubert pg. 28, paragraph 2, but only the resistance of the LED at the particular operating current flowing through the LED with a particular voltage drop across the LED. So, as best understood, the resistance 6 can be made equal to the resistance of the LED at some particular operating current and voltage, as taught by Holler.

3. Claim 11 (Holler in view of Callahan) (Ground 6)

- a. “[T]he resistor bypass circuit of claim 10, the light source being a semiconductor light source for providing color changing characteristics.**

Callahan discloses color tunable LED’s 14 within an optical bulb. Schubert Dec. pg. 40. See, Figure 6 of Callahan.

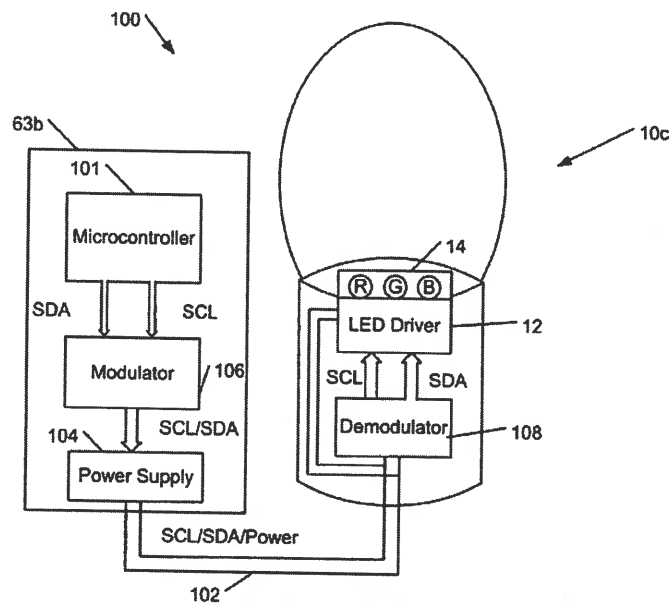


Fig. 6

As disclosed in paragraph [0018] red-green-blue (RGB) LEDs 14 are driven by a command controller 63b using an I²C Bus 102. Any combination of intensities of the RGB package LEDs can be created to create any desired color. Schubert Dec. pg. 40. This is explained in paragraphs [0035-0037] of Callahan. In this case, the light source is a semiconductor light source, i.e., LEDs 14 of Callahan and have color changing characteristics by varying the intensity of each of the RGB LEDs using LED driver 12. Schubert Dec. pg. 44, paragraph 1. Accordingly, the combination of Holler in view of Callahan discloses the limitations of claim 11 and presents a prima facie case of obviousness.

4. Claim 12 (Holler in view of Callahan) (Ground 6)

- a. The resistor bypass circuit of claim 10, the semiconductor light source utilizing LED packages that incorporate two or more LED chips, and an integrated circuit (IC), the integrated circuit controlling each LED chip in respective LED packages independently.**

Callahan teaches a semiconductor light source utilizing LED packages that incorporate two or more LED chips, and an integrated circuit that independently controls each LED chip in each LED package. Schubert Dec. pg. 44, paragraph 2. Paragraph [0006] of Callahan discloses that each illumination device (LED package) has first, second and third LEDs that each emit light having a different wavelength, and an integrated circuit LED driver disposed on each illumination device. See Figure 6. Schubert Dec. pg. 44, paragraph 2. The integrated circuit 63b drives the LEDs at a blink rate and intensity independent of one another. Schubert Dec. pg. 44, paragraph 1 and 2, pg. 111, paragraph 2.

One would be motivated to modify Holler and use the teachings of Callahan regarding LEDs so that the latitude of control of the dynamic effects are increased in decorative lighting applications (see Callahan Paragraph 0004), while also having improved power consumption and reliability of LED's as compared to incandescent bulbs (see Callahan Paragraph 0003). One would have a reasonable expectation of success since Callahan expressly teaches retrofitting older displays with the LED packages taught in Callahan (Callahan Paragraph 0036), and "LEDs will permit

large scale applications of LEDs in replacement of other conventional light sources” (Callahan Paragraph 0003). Accordingly, the combination of Holler in view of Callahan discloses the limitations of claim 12 and presents a prima facie case of obviousness.

5. Claim 13 (Holler in view of Callahan) (Ground 6)

- a. The resistor bypass circuit of claim 12, the IC controlling the current and/or voltage to the individual LED chips in the LED package, the control providing for the mixing of the LED chip colors to get various resultant colors.**

Callahan further teaches the IC controlling the current and/or voltage to the individual LED chips in the LED package in paragraph [0006] which explains that the integrated circuit controls the intensity of each LED (having a chip) independent of each other, and such intensity being a result of the IC controlling the voltage/current, as shown in Figures 2 and 5 of Callahan. Schubert pg. 44, paragraph 1 and 2, pg. 111, paragraph 2. Additionally, Callahan teaches that the control 63b provides mixing of LED colors to get various resultant colors in paragraph [0037]. Schubert Dec. pg. 44, paragraph 1.

One would be motivated to apply the teachings of Callahan to Holler regarding the IC controlling the current/voltage of the LED chips in each LED package to get various resultant colors (Callahan paragraph 0037). Additionally, one would have a reasonable expectation of success for the combination since Callahan expressly teaches retrofitting older displays with the LED packages taught in

Callahan (Callahan Paragraph 0036), as well as stating “LEDs will permit large scale applications of LEDs in replacement of other conventional light sources” (Callahan Paragraph 0003). Accordingly, the combination of Holler in view of Callahan discloses the limitations of claim 13 and presents a prima facie case of obviousness.

6. Claim 14 (Holler in view of Callahan) (Ground 6)

- a. The resistor bypass circuit of claim 13, the control only affecting individual lighting element, the bypass resistor providing for current continuing to flow in remaining lighting elements in the series circuit.**

Callahan Figure 6, illustrates the manner in which the I²C bus 102 provides control instructions from a microcontroller 101 of command controller 63. Figure 3 and Figure 4 illustrate the manner in which command controller 94b, 73a and 73b address each of the individual lamps containing the package RGB LEDs to create a programmed color as well as other effects, including blink rates. See, paragraph [0018]. Schubert Dec. pg. 41. Callahan states “according to one embodiment of an illumination device, variable color, blink rates, and brightness of a single die RGB LED are controlled via an I²C communication integrated circuit, the LED driver.” In this manner, Callahan clearly shows that the control circuit affects individual lighting elements. Schubert Dec. pg. 44, paragraph 1-2 and pg. 111, paragraph 2. For these reasons, the combination of Holler in view of Callahan presents a prima facie case of obviousness of claim 14.

G. Ground 7: Yu anticipates claims 1 and 2

1. Anticipation

Figure 3 of Yu discloses a serial lighting circuit having LEDs 316, 332 and bypass resistors 318, 334, respectively. Yu discloses all of the claim elements of claims 1 and 2 of the '252 patent. Schubert pg. 129, paragraph 1 and pg. 133, paragraph 1.

2. Claim 1 (Anticipated by Yu) (Ground 7)

a. Preamble: “A resistor bypass circuit for a series lighting circuit comprising...”

Yu, in Figure 3, discloses a series lighting circuit comprising a plurality of LEDs 316, 332 interconnected in series, wherein each LED 316, 332 is connected in parallel with a bypass resistor 318, 334, respectively. Schubert Dec. pg. 46, paragraph 2. Each LED 316, 332 has a corresponding bypass resistor 318, 334 connected in parallel. Accordingly, the circuit illustrated in Figure 3 of Yu is a resistive bypass circuit for a series lighting circuit using a plurality of LEDs. Schubert Dec. pg. Id.

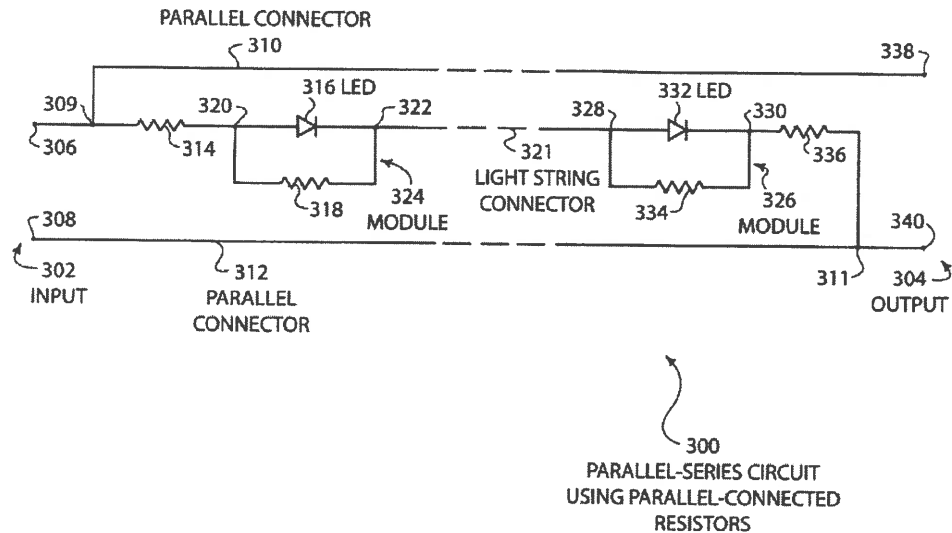


FIG.3

- b. **“a plurality of serially connected LED light sources and a bypass resistor being connected in parallel with at least one of the respective light sources...”**

As shown above, Figure 3 of Yu discloses a plurality of LED light sources 316, 332 connected in series. Each LED has a bypass resistor 318, 334 connected in parallel to each of the LED light source 316, 332. Schubert Dec. pg. 46, Fig. 3 and paragraph 2.

- c. **“said bypass resistor being in circuit and conducting current at all times when current is flowing through the circuit regardless of whether LED light sources are conducting therethrough...”**

Each of the bypass resistors 318, 334 in Figure 3 of Yu are “in circuit” and connected in a parallel with each of the corresponding LEDs 316, 332, respectively. Further, each bypass resistor 318, 334 conducts current at all times in accordance

with parallel circuit operation under Ohm's Law. Schubert Dec. pg. 131, paragraph 1. There is not an inherent resistance value for an LED. Schubert Dec. pg. 28, paragraph 2. The resistance for an LED varies with the current passing through the LED as well as with environmental conditions for the LED. Schubert Dec. pg. 29, paragraph 6-9. The resistance of an LED at any point in time may be determined from Ohm's Law as the voltage measured across the LED divided by the current passing through the LED. Schubert Dec. pg. 29, paragraph 5. Accordingly, the current passing through each resistors 318, 334 is the ratio of the resistive value of the resistor 318, 334 and the varying resistive value of the corresponding LED 316, 332, respectively. Schubert Dec. pg. 132, paragraph 4-6. Yu at page 2 in paragraph [0015] asserts this understanding stating "if any of the LEDs in the light string, such as LEDs 316, 332 go out, the continuity in light string connector 321 is maintained by the parallel connected resistors."

d. "and wherein the bypass resistor is capable of operating on a 100% duty cycle."

Current is continually flowing through the resistors during the operation of Yu. See VI.G.2.c. As such, the bypass resistors of Yu work on a 100% duty cycle. Schubert Dec. pg. 133, paragraph 1.

Additionally, functional statements in a claim, such as, “capable of” or “adapted to” are not limitations in article (apparatus) claims. See *In re Hutchinson*, 69 USPQ 138 (CCPA).

3. Claim 2 (Anticipated by Yu) (Ground 7)

a. “The resistor bypass circuit of claim 1, wherein the circuit is series-parallel connected.”

Figure 3 of Yu discloses a series-parallel circuit 300 (identified as a parallel-series circuit in Yu) connecting the series circuit of LEDs 316, 332 with corresponding bypass resistors 318, 334 being connected in series between parallel connectors 310 and 312. Schubert Dec. pg. 118-119. Furthermore, at page 1 in paragraph [0014], Yu asserts that “FIG. 3 is a schematic circuit diagram of an embodiment of a parallel-series circuit 300 using parallel connected resistors.”

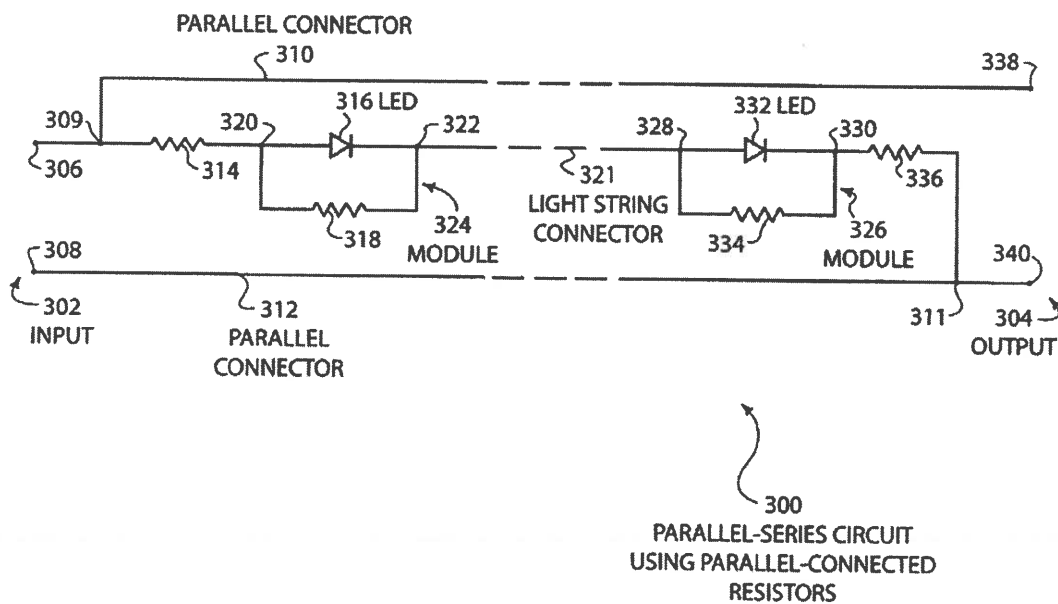


FIG.3

4. Claim 10 (Anticipated by Yu)

The language of claim 10 of the '252 patent, except for the last element (see below), is identical to claim 1 of the '252 patent and is anticipated for the same reasons as described above in sections VII.G.2.a-c. with regard to claim 1 of the '252 patent. Claim 10 also recites:

- a. **“and wherein the resistance of the bypass resistor is equal to or greater than the inherent resistance of a light source to which the resistor is attached...”**

The resistance for an LED varies with the current passing through the LED, the voltage drop across the LED, as well as with environmental conditions for the LED, such that there is no predetermined inherent resistance for an LED. Schubert Dec. pg. 28, paragraph 2. The resistance of an LED at any point in time may be determined from Ohm's Law as the voltage measured across the LED divided by the current passing through the LED. Schubert Dec. pg. 29, paragraph 6-9. Therefore, the resistance of an LED varies, and selection of a bypass resistor for an LED, such as resistors 318 and 334, to be equal to or greater than the “inherent resistance” of an LED, is unknown, i.e., unspecified. Schubert Dec. pg. 28, paragraph 2. Yu in paragraph [0016] states “[I]f the LEDs, such as LEDs 316, 332 are replaceable in a socket, the LEDs that burn out can be readily identified and new ones can simply be plugged in to the socket **without affecting the overall operation of the circuit 300.**” Clearly, Yu contemplates using resistors that have a resistance that matches

the resistance of the LEDs 316, 332 at the LEDs operating parameters since disconnection of the LEDs 316, 332 “does not affect the overall operation of the circuit 300.” Schubert Dec. pg. 131, paragraph 2. In other words, the current in the circuit does not change. Accordingly, Yu teaches all limitations of claim 10 of the ‘252 patent.

b. “thereby minimizing the burn out potential for other light sources in the light string.”

Functional recitation of property of a circuit shown in the prior art does not result in a claim distinguishing over the prior art. In re Swineheart, 169 USPQ 226 (CCPA 1971).

This is a functional statement in an apparatus claim and is not a limitation in claim 1 and cannot be treated as a distinguishing feature of claim to determine patentability. See *Hewlett Packard v. Bausch & Lomb Inc.*, 909 Fed. 2d 1464, 1469, 15 USPQ 2d 1525, 1528 (Fed. Cir. 1990) stating “[A]pparatus claims cover what a device is, not what a device does.” Since claim 1 recites a “resistor bypass circuit...” claim 1 is an article claim, i.e., an apparatus claim. Also, see *In re Swinehart*, 169 USPQ 226 (CCPA 1971).

As such, the recited claim element of claim 10 does not distinguish over the prior art in Yu consequently, anticipates claim 10.

5. The § 131 Affidavit Does Not Properly Swear Behind Yu

In the file history of the ‘252 patent, on October 14, 2020, the patent applicant *sua sponte* submitted a 37 CFR § 1.131 affidavit from Steven Altamura attempting to swear behind their own filing date, without any reference to a prior art rejection. There was no prior art under consideration at the time of the submittal of the 37 CFR § 1.131 Declaration. 37 CFR § 1.131(e) specifically asserts that “the provisions of this section are applicable only with respect to a rejection under 35 U.S.C. 102(g)” such that without an associated rejection and prior art, the Examiner would not consider such an unsolicited Declaration. The Declaration submitted by Steven Altamura also lacked the associated exhibits so, on its face, the Declaration of Steven Altamura failed to meet the requirements of 37 CFR § 1.131(b) for a proper showing of facts. Accordingly, the Yu reference is applicable prior art under 35 USC § 102(e)(pre-AIA).

VIII. THERE IS NO OBJECTIVE INDICIA THAT WEIGHS AGAINST THE STRONG ANTICIPATION AND OBVIOUSNESS SHOWING ABOVE

Petitioner has studied the prosecution file history of the application of the ‘252 patent. Petitioner is not aware of any assertion of objective indicia of non-obviousness that was made during the prosecution of the application.

IX. THE BOARD SHOULD NOT EXERCISE ITS DISCRETION TO DENY THE PETITION

A. The Board should not deny the Petition under *Fintiv*.

The ‘252 patent is in litigation that was filed on August 3, 2023. However, the Board should not deny this Petition under *Fintiv* because the Petition sets forth a compelling unpatentability challenge to at least one claim. Further, if instituted, Petitioner stipulates not to pursue in the district court the grounds in the Petition or any ground that reasonably could have been raised in the Petition. Accordingly, *Fintiv* does not favor denial of institution. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (P.T.A.B. Mar. 20, 2020) (precedential).

B. The Board should not deny the Petition under § 325(d).

Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6, 7-8 (P.T.A.B. Feb. 13, 2020) (precedential) strongly favors institution because the IPR grounds here rely on art that was not presented to, or substantively considered by, the Office during prosecution of the ‘252 patent.

The Office has not considered Inoue, Smith, or Callahan, at least one of which appears in each Ground. Further, neither Inoue or Smith have been asserted in any other challenge to the ‘252 patent before the Office or any other tribunal.

X. Mandatory Notices (37 C.F.R. § 42.8(A)(1)).

A. Real Party-in-Interest (37 C.F.R. § 42.8(A)(1))

The real party-in-interest is Petitioner LEDUP MANUFACTURING GROUP LTD. Petitioner LEDUP MANUFACTURING GROUP LTD. states that the following entities each own 10% or more of its stock: Franco Li, LedUp Manufacturing Group, Ltd. This statement should not be interpreted as an admission or concession that the above-listed parties are real parties-in-interest or in privity with LEDUP MANUFACTURING GROUP LTD.

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

The '252 patent is asserted against LEDUP MANUFACTURING GROUP LTD. in *Seasonal Specialties, LLC v. LEDUP MANUFACTURING GROUP LTD.*, 2:23-cv-06318 (C.D. Cal.), filed on August 3, 2023.

Lead and Back-up Counsel: Pursuant to 37 C.F.R. § 42.8(b)(3) and 42.10(a), Petitioner appoints William W. Cochran (Reg. No. 26,652) as its lead counsel, Christopher P. Whitham (Reg. No. 53,769) and Bridget A. Cochran (Reg. No. 64,599) as its back-up counsel, all at the address: COCHRAN FREUND & YOUNG LLC, 2026 Caribou Drive, Suite 201, Fort Collins, CO 80525; phone number: (970) 492-1100; and facsimile: (970) 492-1101.

Service Information (37 C.F.R. § 42.8(b)(4)): Please direct all correspondence regarding this Petition to counsel at the email addresses:

billc@patentlegal.com, chrisw@patentlegal.com, bridgetc@patentlegal.com.

LEDUP MANUFACTURING GROUP LTD. consents to service by email at the addresses above.

XI. Certification that the patent may be contested via inter partes review by the petitioner and standing (37. C.F.R. § 42.104(A)).

LEDUP MANUFACTURING GROUP LTD. certifies that the ‘252 patent is available for IPR and LEDUP MANUFACTURING GROUP LTD. is not barred or estopped from requesting IPR of any ‘252 patent claim.

XII. CONCLUSION

Claims 1–14 are unpatentable and *inter partes* review is warranted.

Respectfully,

Cochran Freund & Young LLC

A handwritten signature in black ink, appearing to read 'William W. Cochran', written in a cursive style.

William W. Cochran
Registration No. 26,652
Lead Attorney for Petitioner

Date: August 2, 2024

2026 Caribou Drive, Suite 201
Fort Collins, CO 80525
(970) 492-1100

XIII. APPENDIX: CHALLENGED CLAIMS

1. A resistor bypass circuit for a series lighting circuit comprising a plurality of serially connected LED light sources and a bypass resistor being connected in parallel with at least one of the respective light sources, said bypass resistor being in circuit and conducting current at all times when current is flowing through the circuit regardless of whether the LED light sources are conducting current therethrough and wherein said bypass resistor is capable operating on a one hundred percent duty cycle.

2. The resistor bypass circuit of claim 1, where the circuit is series-parallel connected.

3. The resistor bypass circuit of claim 1 wherein at least one of the light sources is a semiconductor providing a twinkling effect, and wherein the semiconductor light source utilizes electronic circuits that control the flashing rate of the light source.

4. The resistor bypass circuit of claim 1, wherein the LED light source uses 0.20 watts or less.

5. The resistor bypass circuit of claim 1, at least one of the light sources is a semiconductor light source providing a twinkling effect.

6. The resistor bypass circuit of claim 1, at least one of the light sources is a semiconductor light source utilizing electronic circuits that control the flashing

rate of the light source, which would only affect the individual lighting element as the resistive bypass would allow current to continue to flow in remaining lighting elements in the series circuit.

7. The resistor bypass circuit of claim 1, wherein said light source is a blinking LED with a first state allowing current to flow through the device and a second state where the light source is an open circuit, whereby remaining light sources in the light string operate with current passing through the bypass resistor when the light source is in the second state.

8. The resistor bypass circuit of claim 1 being utilized in AC or DC circuits powered from a power source selected from the list consisting of batteries, step down transformers, AC utility power, or converters from AC to DC or DC to AC power, pulsed DC, and filtered or unfiltered DC, or partially filtered AC.

9. A resistor bypass circuit for a series lighting circuit comprising a plurality of serially connected LED light sources and a bypass resistor being connected in parallel with at least one of the respective light sources, said bypass resistor being in circuit and conducting current at all times when current is flowing through the circuit regardless of whether the LED light sources are conducting current therethrough and wherein said bypass resistor is capable operating on a one hundred percent duty cycle further including an LED flashing light source which includes a flashing circuit which causes the entire light circuit to flash.

10. A resistor bypass circuit for a series lighting circuit comprising a plurality of serially connected LED light sources and a bypass resistor being connected in parallel with at least one of the respective light sources, said bypass resistor being in circuit and conducting current at all times when current is flowing through the circuit regardless of whether the LED light sources are conducting current therethrough and wherein the resistance of the bypass resistor is equal to or greater than the inherent resistance of the light source to which the resistor is attached, thereby minimizing the burn out potential of other light sources in the light string.

11. The resistor bypass circuit of claim 10, the light source being a semiconductor light source for providing color changing characteristics.

12. The resistor bypass circuit of claim 10, the semiconductor light source utilizing LED packages that incorporate two or more LED chips, and an integrated circuit (IC), the integrated circuit controlling each LED chip in respective LED packages independently.

13. The resistor bypass circuit of claim 12, the IC controlling the current and/or voltage to the individual LED chips in the LED package, the control providing for the mixing of the LED chip colors to get various resultant colors.

14. The resistor bypass circuit of claim 13, the control only affecting individual lighting element, the bypass resistor providing for current continuing to flow in remaining lighting elements in the series circuit.

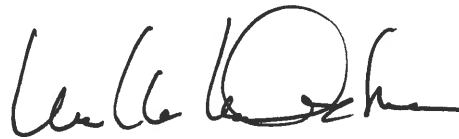
XIV. CERTIFICATE OF WORD COUNT (37 C.F.R. § 42.24(d))

1. This Petition for *Inter Partes* Review complies with the type-volume limitation of 14,000 words, comprising 13,818 words, excluding the parts exempted by 37 C.F.R. § 42.24(a)(1).

2. This Petition for *Inter Partes* Review complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word 2016 in 14-point Times New Roman font.

Respectfully,

Cochran Freund & Young LLC

A handwritten signature in black ink, appearing to read 'William W. Cochran', with a large, stylized circular flourish at the end.

William W. Cochran
Registration No. 26,652
Lead Attorney for Petitioner

Date: August 2, 2024

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Fort Collins, CO 80525
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XV. CERTIFICATE OF SERVICE (37 C.F.R. §§ 42.6(e), 42.105(a))

I certify that the above-captioned **PETITION FOR *INTER PARTES* REVIEW FOR U.S. PATENT NO. 11,096,252** and associated Exhibits 1001-1014 were served in their entireties upon the Patent Owner on August 2, 2024, via FedEx® Express at the following addresses:

HSML P.C.
45 South Seventh Street
Suite 2700
MINNEAPOLIS, MN 55402-1683
UNITED STATES

Respectfully,

Cochran Freund & Young LLC

A handwritten signature in black ink, appearing to read 'William W. Cochran', written over the printed name.

William W. Cochran
Registration No. 26,652
Lead Attorney for Petitioner

Date: August 2, 2024

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