

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

**RETROLED COMPONENTS, LLC,
Plaintiff,**

v.

**PRINCIPAL LIGHTING GROUP,
LLC
Defendant.**

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Civil Case No. 6:18-cv-55-ADA

JURY TRIAL DEMANDED

PLAINTIFF RETROLED’S INITIAL DISCLOSURES OF INVALIDITY

Plaintiff RetroLED Components, LLC (“RetroLED”), hereby provides, by and through its attorneys, these Initial Disclosures of Invalidity Contentions pursuant to the Joint Order Governing Proceedings - Patent Case [Dkt. No. 34]. The following Contentions are based upon information and writings presently available to or located by RetroLED and its attorneys. Plaintiff RetroLED has not yet completed its investigation of the facts relating to this case, has not completed discovery in this action, has not completed preparation for trial and the Court has not construed the claims. Additionally, the contentions are made in the alternative and a contention regarding invalidity should not be read as an admission of the presence of a feature, the absence of a feature or the meaning of a term except when stated that such is the case. Note that there may be more than one contention of invalidity as to a certain reference or combination of prior art. Further, as to some contentions, various combinations of prior art references are stated as rendering specified claims invalid and where such combinations in one contention of invalidity might be interpreted as

presenting an inconsistency with another contention of invalidity, the potentially inconsistent contentions and the offered combinations should be deemed to be offered in the alternative. Further, for example, some contentions of invalidity are offered with certain terms construed under 35 U.S.C. § 112 ¶ 6 while others are not. Such contentions, where they may appear to be inconsistent, shall be interpreted as being offered in the alternative. These Contentions are offered without prejudice to Plaintiff RetroLED's rights to revise these Contentions if discovery, the Court's Claim Construction or further case developments so warrant. These Contentions are not admissions. Without limiting the generality of the foregoing, Plaintiff RetroLED reserves the right to amend these Contentions as permitted by the Joint Order Governing Proceedings - Patent Case [Dkt. No. 34].

SUMMARY OF THE PRINCIPAL LIGHTING GROUP (PLG) CONTENTIONS:

On March 6, 2019, PLG served RetroLED with its contentions of infringement alleging that RetroLED has infringed and continues to infringe directly under 35 U.S.C. Sec 271(a) and indirectly under 35 U.S.C. Sec 271(b), (c), and (f), claims 1, 8-10, 12-14, 16-17 and 19 of U.S. Patent No. 9,311,835 to Breihof (the "*Breihof* '835 patent").

I. RETROLED CONTENTIONS OF INVALIDITY UNDER 35 U.S.C. § 102 AND 35 U.S.C. § 103:

These contentions of invalidity start with narrative contentions describing various ways the *Breihof* '835 patent is invalid under 35 U.S.C. § 102 and/or

35 U.S.C. § 103. Selected claim charts are then offered as exhibits as are the enumerated items of prior art.

NARRATIVE CONTENTIONS:

A. Independent claims 1, 13 and 19 and dependent claims 9, 10, 12, 16, and 17 of U.S. Patent No. 9,311,835 (the “*Breihof*’835 patent”) are invalid under 35 U.S.C. § 102(b). Each and every limitation of independent claims 1, 13, and 19 and dependent claims 9 and 10 of the *Breihof*’835 patent is disclosed in U.S. Patent Application Publication No. 2009/0027916 to Huang (“*Huang*”). *Huang* was published on January 29, 2009, which is more than one year before November 24, 2010, the earliest claimed priority date of the *Breihof*’835 patent. Narrative Contention A (*i.e.*, *Huang* 35 U.S.C. § 102(b)) is charted in *Exhibit Huang – Section 35 U.S.C. § 102(b) and 35 U.S.C. § 103* and *Huang* is appended as “*Exhibit Huang*.”

B. Independent claims 1, 13 and 19 and dependent claims 8, 9, 10, 12, 15, 16 and 17 of the *Breihof*’835 patent are invalid under 35 U.S.C. § 102(e) and § 102(a). Each and every limitation of independent claims 1, 13, 19 and dependent claims 8, 9 and 10 of the *Breihof*’835 patent is disclosed in U.S. Patent No. 8,419,223 to Withers issued on April 16, 2013 with a priority date of April 23, 2009 (“*Withers Patent*”). They are also disclosed in the Withers Publication, US 2010/0270925 published October 28, 2010 (“*Withers Publication*”).

The *Withers Patent* priority date of April 23, 2009 is prior to the earliest claimed priority date of November 24, 2010 of the *Breihof*’835 patent. Narrative Contention B is charted in *Exhibit Withers I – 35 U.S.C. §§ 102(a) and 102(e)* and the

Withers References including the *Withers Patent* and the *Withers Publication* are appended as Exhibit *Withers Patent* and *Withers Publication*.

C. Independent claims 1, 13 and 19 and dependent claims 9 and 10 of the *Breihof* 835 patent are invalid under 35 U.S.C. § 102(e). Each and every limitation of each of independent claims 1, 13, and 19 and dependent claims 9 and 10 of the *Breihof* 835 patent is disclosed in Japanese Publication 2010-123097 published June 3, 2010 from an application filed November 17, 2008 to Saito Riichi as inventor and Royal Lighting Co Ltd as Applicant (“*Royal Lighting*”).

Two translations are provided – and identified as *Royal Lighting Translation #1* and *Royal Lighting Translation #2* respectively.

The *Royal Lighting* priority date of November 17, 2008—as well as the publication date of June 3, 2010—is prior to the earliest claimed priority date of November 24, 2010 of the *Breihof* 835 patent.

As disclosed, *Royal Lighting* is directed to reducing power consumption, reducing CO2 gas and extending the life by replacing fluorescent lamps with an “LED line lamp” for use particularly in vending machine displays. (*See Royal Lighting Translation #2* at PROBLEM TO BE SOLVED.) The *Royal Lighting* line lamp is devised to replace fluorescent bulbs “by adopting a cap of the same shape as a fluorescent lamp tube as a light source for illumination of a vending machine for this LED luminant, and using substitution with an established fluorescent lamp as possible.” (*Royal Lighting Translation #1* at ¶ 4.) FIG. 1 of *Royal Lighting* is said to depict,

an overall view of the LED line lamp of the present invention, wherein FIG. 1 shows a front view and FIG. 1 shows a side view. * * * The reference numeral (1) in the figure is an elongated flat plate made of aluminum and constituted by two upper and lower sheets, both ends are joined in a U-shape and a cap (5) is crowned thereon.

(Royal Lighting Translation #2 at ¶ 8.)

The resulting structure is called a “base 1” in *Royal Lighting*. Base 1 and one of its respective “caps 5” is shown in Fig. 6.

Royal Lighting Translation #2 (done by machine) appears to sometimes translate what should be “cap” as “die” – as an example compare the first sentence of Paragraph 10 of *Royal Lighting Translation #2* with the corresponding first sentence of Paragraph 10 in *Royal Lighting Translation #1*. *Royal Lighting Translation #2* states as to sentence 1 of Paragraph 10, “FIG. 4 is an exploded explanatory view of the inside of the die (5)” while *Translation #1* states as to sentence 1 of Paragraph, “Fig. 4 is a decomposition explanatory view inside a cap (5).”

As the depiction of Fig. 5 is clearly a cross section of the “cap,” it is believed that the translation as to the cap 5 in *Royal Lighting Translation #1* is more accurate and so offers the *Translation #1* description of Fig. 4 as follows:

Fig. 4 is a decomposition explanatory view inside cap (5). In the figure, the I figure shows the end face of the base made from aluminum of two upper and lower sides (1), has connected it with the U shape, applies the disk made of a synthetic resin shown in a RO figure to this U-shaped end, and binds tight and fixes it to base (1) with two fixing screws from outward.

(Royal Lighting Translation #1 at ¶ 10).

The structure disclosed in *Royal Lighting* that corresponds to the recited

“elongate support member” of claims 1, 13 and 19 is base 1 with the resin disk appended to each end. This structure supports plural electric lamp units in *Royal Lighting*. This is shown in multiple places in *Royal Lighting*, including for example in the text of *Translation #1* at Paragraph 5 where the base 1 is described as “*having mounted many LED chip P in the long base made from aluminum of two sheets (1) as shown in Fig. 1.*” (*Royal Lighting Translation #1* at ¶ 5.)

The “caps (5)” at each end correspond to and are disclosure of the recited “end caps” of claims 1, 13, and 19. The caps 5 (“end caps” in the *Breihof*’835 Patent Claim 1 vernacular) of *Royal Lighting* have inner and outer sides as recited in claim 1 of *Breihof* and emergent as part of the inner side of the caps are screws or pins ((53) (*See, e.g., Royal Lighting Translation #2* at Fig. 6; *Royal Lighting Translation #1* at Fig. 6.)

The screws or pins 53 serve as a “mechanical coupling element” for engagement with a “single electro mechanical mount” (Claim1) of the gas discharge lamp (*e.g.*, the fluorescent mount in the vending machine display). As *Royal Lighting Translation #2* states,

The figure (2) shows the socket pin (53), which penetrates the base (5) shown in figure (5) and is made into a screw, and the screwed tip becomes the socket pin and is mounted on the socket of the fluorescent lamp.

(*Royal Lighting Translation #2* at ¶ 10.)

Further, the use of a socket pins (53) that comprise electrically insulative material, such as plastic, is a choice for the practitioner who would not place a metal screw in a fluorescent socket or mount.

As shown in Fig. 6 of *Royal Lighting*, in the “line lamp” of *Royal Lighting*, the mechanical coupling element (*i.e.*, 53) is isolated from the elongate support member and power is applied separately through electrical supply 2 as shown in Fig. 2 and as socketed line 3 as shown in Fig. 3. If a reference discloses applying power to the electric lamps in ways other than the end caps, such a reference necessarily meets the limitation of claims 1, 13 and 19 that recites that the “*mechanical coupling element does not retain any electrical conductors along or through said mechanical coupling element for powering the plurality of electric lamp units...*” Thus, the mechanical coupling elements (pins 53) of *Royal Lighting* do not “*retain any electrical conductors along or through said mechanical coupling element for powering the plurality of electric lamp units*” as recited in the limitations of claims 1, 13, and 19. The end caps 5 are attached to the elongate support member with set screws 8 that are used to change the angle of illumination as shown in Fig. 6. Claim 1 of *Breihof* recites “frictional” engagement of the inner side of the recited “end caps” with the elongate support member and RetroLED contends that limitation to be present in *Royal Lighting* by the use of set screws 8 emergent from the inner side of end caps 5 to apply frictional engagement with the elongate support member 1.

Royal Lighting is appended as Exhibits: Royal Lighting Japanese as *Royal Lighting* and Translation #1 as *Royal Lighting Translation #1* and Translation #2 as *Royal Lighting Translation #2*.

D. Independent claims 1, 13 and 19 of the *Breihof* '835 patent are invalid under

35 U.S.C. § 103 as being obvious over *Royal Lighting* in view of *Huang* and German utility patent DE 299 00 320 U 1 which was filed April 4, 1999 and published in the Patent Gazette on May 12, 1999 for InfoSystems GmbH Visuelle und akustische (“*InfoSystems*”). The *Royal Lighting* priority date of November 17, 2008, as well as the publication date of June 3, 2010 are both prior to the earliest claimed priority date of November 24, 2010 of the *Breihof* Patent. Further, the priority date and publication date of *Huang* are prior to November 24, 2010. A person of ordinary skill in the art would therefore be deemed to have known the contents of *Royal Lighting*, *Huang*, and *InfoSystems* before the time of filing of the purported *Breihof* invention which, as at its earliest, is November 24, 2010. “*The issue of obviousness is determined entirely with reference to a hypothetical ‘person having ordinary skill in the art.’ It is only that hypothetical person who is presumed to be aware of all the pertinent prior art.*” *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 454 (Fed. Cir. 1985). *Royal Lighting* is described above in Narrative Contention C and the *Royal Lighting* Exhibits.

As to the “mechanical coupling element” being “comprised of electrically insulative material” as recited of claims 1, 13 and 19, the use of socket pins (53) that comprise electrically insulative material, such as plastic, would be chosen by the practitioner and would be advised given use of existing fluorescent sockets.

In *Huang*, however, the “mechanical coupling elements” (*i.e.*, the “mounting pins 111”) are devised to be breakable by the user as discussed in Paragraph 24 of *Huang*, or as said in claim 5 of *Huang*, “selectively breakable.” Therefore, *Huang*

provides the person of ordinary skill a teaching of a mechanical coupling element that would have been deemed by a person of ordinary skill in the art (sometimes referred to as “POSA”) to comprise electrically insulative material as a breakable pin 111 would be most likely to be plastic or a non-metal which is nonconductive. Further, the LEDs of *Huang* are powered by an electrical cord separate and apart from the mechanical coupling elements of the end caps and separate and apart from the end caps themselves as disclosed in Figs. 2, 3, 6, and 7 and as described in paragraphs 8 and 19 of *Huang*. The mechanical coupling elements “pins 111” on the end caps of *Huang* therefore do “*not retain any electrical conductors along or through said mechanical coupling element for powering the plurality of electric lamp units*” as recited in claims 1, 13, and 19 of the *Breihof*’835 patent. Further, as shown in Fig. 6 of *Royal Lighting*, the mechanical coupling elements (*i.e.*, pins 53) are electrically isolated from the elongate support member and power is applied separately through electrical supply 2 as shown in Fig. 2 or socketed line 3 as shown in Fig. 3. Thus, the mechanical coupling elements (pins 53) of *Royal Lighting* do not “*retain any electrical conductors along or through said mechanical coupling element for powering the plurality of electric lamp units*” as recited in claims 1, 13, and 19. If a reference discloses applying power to the electric lamps in ways other than the end caps, such a reference necessarily meets the limitation of claims 1, 13 and 19 that recites that the “*mechanical coupling element does not retain any electrical conductors along or through said mechanical coupling element for powering the plurality of electric lamp units....*”

The end caps 5 of *Royal Lighting* are attached to the elongate support member with set screws 8 that are used to change the angle of illumination as shown in Fig. 6. Claim 1 of *Breihof* recites “frictional” engagement of the inner side of the recited “end caps” with the elongate support member and RetroLED contends that limitation to be present in *Royal Lighting* by the use of set screws 8 emergent from the inner side of end caps 5 to apply frictional engagement with the elongate support member.

1. Even so, the inwardly facing sides of end caps 11 of *Huang* frictionally engage its elongate support member as explained and supported in Narrative Contention A and the Exhibits cited therein.

As to claim 9, *InfoSystems* discloses a replacement kit that is an LED lamp designed as a plug in device for replacing existing fluorescent lamps... (*InfoSystems* at page 3 (last paragraph of Translation).) The *InfoSystems* replacement kit uses plural LEDs supported on an elongate support member for use in signs (*i.e.*, said to be “information displays” in *InfoSystems* at 2) in transit systems. (*See also InfoSystems* at Fig. 7.). *Royal Lighting* as well as *Huang* and *InfoSystems* each employ a plurality of electric lamp units as recited in claim 9 and as further recited in claim 10, the plural electric lamp units are LEDs in each of these cited references as shown by the following exemplar cites:

Royal Lighting Translation #1 at 1 (PROBLEM TO BE SOLVED and SOLUTION).

Huang: “It is the main object of the present invention to provide an LED lamp tube, which is directly connectable to a conventional

fluorescent bulb holder to substitute for a fluorescent bulb.”

(*Huang* at ¶ 7)

InfoSystems: “According to the invention, the replacement kit comprises an LED lamp designed as a plug-in device and for replacing existing fluorescent lamps...” (*InfoSystems Translation* at 3, last Paragraph.)

Consequently, a person of ordinary skill in the art considering the problems of replacing fluorescent lighting with a more energy efficient and safer approach and cognizant of the teachings of *Royal Lighting* and *Huang* and *InfoSystems* would be motivated to combine the teachings of *Royal Lighting* with those of *Huang* and *InfoSystems* thus rendering the purported inventions of claims 1, 13 and 19 as well as 9 and 10, as a whole, invalid under 35 U.S.C. § 103. *InfoSystems* is appended as Exhibits: InfoSystems German (“*InfoSystems*”) and InfoSystems Translation (“*InfoSystems Translation*”).

E. Independent claims 1, 13 and 19 and dependent claims 9 and 10 are invalid as being obvious under 35 U.S.C. § 103 over *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting*.

InfoSystems was filed on January 4, 1999 and published May 12, 1999. A person of ordinary skill in the art would be deemed to have known the contents of *InfoSystems* (as well as *Huang*, *Withers*, and *Royal Lighting*) at the time of filing of the purported *Breihof* invention which, as at its earliest, is November 24, 2010.

InfoSystems discloses a “replacement kit” illumination system to replace fluorescent bulbs with LEDs preferably in signs in transit systems. *InfoSystems* discloses a plurality of LEDs disposed along an elongated circuit board held by an “illumination carrier” which in turn, along with the circuit board, is held by end pieces (*i.e.*, “end caps”) comprised of insulating material to create a unit which is plugged into existing fluorescent mounts in signs such as those found in public transit systems. For example, *Infosystems* recites

On the basis of the deficiencies of the prior art, the invention is based on solving the problem of providing a replacement kit for an illumination device of the kind mentioned above, which can be installed as a replacement for an existing fluorescent lamp without any great expenditure in terms of installation work.

(*InfoSystems Translation* at 3, 2d paragraph).

Infosystems further recites

According to the invention, the replacement kit comprises an LED lamp designed as a plug-in device and for replacing existing fluorescent lamps, as well as a set of cables or another device for bridging or bypassing the pre-existing ballast, so that the plug-in socket may be immediately connected to the on-board DC voltage.

(*InfoSystems Translation* at 3, last paragraph, to 4, first partial paragraph.)

InfoSystems discloses the limitation of claims 1 and 19 of the *Breihof*’835 Patent which recites,

an elongate support member for supporting a plurality of electric lamp units, said elongate support member having opposite end portions.” For example, *InfoSystems* recites “In the lamp 2 that may be plugged into the fluorescent lamp mounting, sixteen light-emitting diodes 6 are provided as sources of light. The light-emitting diodes 6 are arranged in rows on a circuit board 7, which is arranged

in a reflector 8 made of sheet metal, which has a U-shaped cross-sectional profile.

(*InfoSystems Translation* at 8, last paragraph; *see also InfoSystems Translation* at Figs. 1, 2 & 3)

InfoSystems further recites

The use of light-emitting diodes also has the advantage that due to their relatively low space requirement as well as their low electric power consumption, ... the desired illumination may be adjusted simply by varying the number and/or layout type of the light-emitting diodes on the board.

(*InfoSystems Translation* at 4.)

These recitations from *Infosystems* demonstrate that the claim 19 limitation that recites “*a plurality of low-voltage lamp units for positioning along the elongate support member*” and the claim 13 limitation that recites, “*positioning one or more electric lamp units along the elongate support member*” is disclosed by *InfoSystems*. A POSA at the time of the invention would know that low power consumption and LED technology would mean low voltage. A POSA would, particularly in light of the of *InfoSystems*’s teaching of “by-passing the pre-existing” high voltage ballast in a fluorescent fixture, learn that the ubiquitous low voltage used by LEDs could well be used to advantage in the system.

InfoSystems teaches the limitation of claim 1 that recites “*one and only one end cap at each of said opposite end portions of said elongate support member, each of said end caps having an inwardly-facing side and an outwardly-facing side, said inwardly-facing sides configured to frictionally engage and be supported at a respective one of said opposite end portions of said elongate support member*” and the

similar limitation of claim 19 which recites, “*a pair of end caps configured to frictionally engage the opposite end portions of the elongate support member*” and the similar limitation of claim 13 in which there is “*positioning and frictionally engaging respective end caps at opposite end portions of an elongate support member, wherein the end caps are made of electrically insulative material.*”

InfoSystems discloses that,

[t]he end pieces 14 have a circular-cylindrical core 15 made from an insulating material, the lateral surface of which carries a metal jacket 16. In the core 14[sic] of the end pieces 14, a slot-shaped recess 17 of a low depth is respectively machined in the side facing the reflector 8. This recess extends respectively along the radius of which the contact pins 9, 10 (or the unused contacts 9', 10') are arranged. The recess 8.1 accommodates the edges on the narrow side of the circuit board 7 and secures in this way their stable position within the space volume surrounded by reflector 8.

(*InfoSystems Translation* at 10, first paragraph).

As to the first limitation of claim 13, “*removing the one or more gas-discharge lamps from between one or more respective pairs of gas-discharge lamp couplings positioned directly opposite from one another along an interior of the sign*” a POSA replacing fluorescent bulbs with more energy efficient systems such as those disclosed in *InfoSystems*, *Huang*, *Royal Lighting*, or *Withers* would not try to force the lamp assembly into sockets already occupied by the fluorescent tubes. In fact it would be necessary to remove the gas-discharge lamps from between the employed couplings in the sign because otherwise, it would be impossible to replace the fluorescents with the lower power LED light assembly. But even so, *InfoSystems* describes installation of the lamp, specifically, “installing it as a replacement for a fluorescent lamp, be

plugged into the pre-existing mountings in the same way as the fluorescent lamp and may be locked therein by rotating it by 90 degrees.” (*InfoSystems Translation* at 6-7.)

Further, *Huang* and *Withers* and *Royal Lighting* all disclose lighting systems in which power for the disclosed lighting systems is provided in ways other than through the end caps and, therefore, meet the limitation of the independent claims of the *Breihof*’835 patent that require that the mechanical coupling element “does not retain any electric conductors along or through said mechanical coupling element for powering the plurality of electric lamp units.” If a reference discloses applying power to the electric lamps in ways other than the end caps, such a reference necessarily meets the limitation of claims 1, 13 and 19 that recites that the “*mechanical coupling element does not retain any electrical conductors along or through said mechanical coupling element for powering the plurality of electric lamp units...*” (*Breihof*’835 at cls. 1, 13 & 19.)

For example, the system in *Huang* is powered by an electrical cord separate and apart from the mounting pins and end caps as disclosed in Figures 2, 3, 6 and 7 and as described in paragraphs 8 and 19 of *Huang*.

Figures 1 and 2 of *Royal Lighting* show an electrical supply cord separate and apart from the mechanical coupling element while Figure 3 of *Royal Lighting* shows an electrical supply cord that is separate and apart from the mechanical coupling element of the lighting assembly and which is terminated with a plug for the power supply to supply power separate from the fluorescent mount by which the lighting

assembly is supported.

Similarly, Figures 2, 3, and 4 of *Withers* show power application to the LED light tube through a path other than the “mechanical coupling elements” of the end caps and Fig. 5 of the *Withers References* explicitly shows a power strategy in which the power application and path is distant from the end caps themselves. Further, the Abstract of the *Withers References* states,

Presented is an LED light tube in the general configuration of a prior art fluorescent tube. The LED light tube includes end caps with electrodes at each end, with the electrodes providing physical mounting structure to mount the LED light tube in an existing LED light fixture. The end caps of the LED light tube are not electrically active, but merely provide physical mounting structure to mount the LED light bulb in an existing fluorescent light fixture. This allows existing LED light fixtures to be utilized without replacement, by merely replacing the tubes and ballast with LED based equipment.”

(*Withers Patent* at Abs.; *Withers Publication* at Abs. (same).)

As to the last limitation of claim 13,

engaging each of the end caps in a non-conductive manner with a respective one and only one of the gas discharge couplings or with a respective one and only one replacement coupling to thereby position the end caps, the elongate support member, and the electric lamp units between the gas-discharge lamp couplings or replacement couplings that are positioned directly opposite from one another,

once the POSA has devised a lamp assembly in which power is provided in paths other than through the end caps such as taught in *Withers*, *Huang* or *Royal Lighting*, for example, installing the replacement kit lamp assembly would necessarily meet this limitation. A POSA would not create such a lamp and then not

install that light. Similar arguments apply to the last clauses of claims 1 and 19.

Consequently, a POSA considering the problems of replacing fluorescent lighting with a more energy efficient and safer approach would be motivated to combine the teachings of *InfoSystems* with those of *Huang* and/or *Withers* and/or *Royal Lighting* thus rendering the purported inventions of claims 1, 13 and 19, as a whole, obvious under 35 U.S.C. § 103.

F. Independent claims 1, 13 and 19 and dependent claims 9 and 10 are invalid as being obvious under 35 U.S.C. § 103 over U.S. Pat. No. 7,049,761 B2 to Timmermans et al. issued May 23, 2006 and filed February 12, 2001 with claimed priority to Provisional 60/181,744 filed Feb. 11, 2000 (“*Timmermans*”) in view of *Huang* and *Withers* and/or *Royal Lighting*. Based on the dates of *Timmermans*, a person of ordinary skill in the art would therefore be deemed to have known the contents of *Timmermans* at the time of the earliest claimed priority date of the purported *Breihof* invention which is November 24, 2010.

Timmermans discloses a “light tube” (20) within which is disposed a circuit board (30) along which are mounted LEDs (22):

In a preferred embodiment of the present invention, the light tube 20 has the same dimensions and end caps 26 and 28 (e.g., electrical male bi-pin connectors, type G13) as a conventional fluorescent light tube. As such, the present invention can be mounted in a conventional fluorescent light tube socket (not shown).

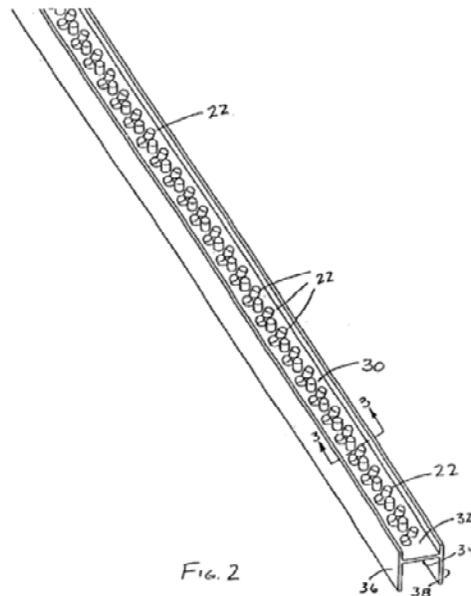
(*Timmermans* at col. 2, ll. 24-29.)

And, further, *Timmermans* discloses,

To provide structural strength along the length of light tube 20, the circuit board 30 is designed with a H-shaped cross-section.

(*Timmermans* at col. ll. 55-57.)

Note that an “H” tipped on its side becomes an “I” with long flanges. For example, *Timmermans* discloses Figure 2 which “is a perspective view of the LEDs mounted on a circuit board.” (*Timmermans* at col. 1, ll. 56-57; *see also* Fig. 2.) Figure 2 is reproduced below.



Similarly, Figure 4 of *Timmermans* is described as “a fragmentary, perspective view of one embodiment of the present invention showing one end of the light tube disconnected from one end of a light tube socket.” (*Timmermans* at col. 1, ll. 61-63 & Fig. 4.).

Further, *Timmermans* employs various strategies to power the light tube but it appears that all of them provide power through the end caps. As noted above, in

both *Huang* and *Withers* as well as *Royal Lighting* systems are disclosed in which power for the disclosed lighting systems is provided in ways other than through the end caps. As is mentioned elsewhere in these contentions, if a reference discloses applying power to the electric lamps in ways other than the end caps, such a reference necessarily meets the limitation of claims 1, 13 and 19 that recites that the “mechanical coupling element does not retain any electrical conductors along or through said mechanical coupling element for powering the plurality of electric lamp units....”

For example, the system in *Huang* is powered by an electrical cord separate and apart from the mounting pins and end caps as disclosed in Figures. 2, 3, 6 and 7 and as described in paragraphs 8 and 19 of *Huang*.

Figures 1 and 2 of *Royal Lighting* similarly show an electrical supply cord for the constituent LEDs separate and apart from the mechanical coupling element of caps 5 while Figure 3 of *Royal Lighting* shows an electrical supply cord that is separate and apart from the mechanical coupling element of the lighting assembly and which is terminated with a plug for the power supply to supply power separate from the fluorescent mount by which the lamp is supported with pins 53.

Additionally, Figures 2, 3 and 4 of the *Withers References* show power application to the LED light tube through a path other than the “mechanical coupling elements” of the end caps and Figure 5 of the *Withers References* explicitly shows a power strategy in which the power application and path is notably distant from the end caps themselves. Further, the Abstract of *Withers* states,

Presented is an LED light tube in the general configuration of a prior art fluorescent tube. The LED light tube includes end caps with electrodes at each end, with the electrodes providing physical mounting structure to mount the LED light tube in an existing LED light fixture. The end caps of the LED light tube are not electrically active, but merely provide physical mounting structure to mount the LED light bulb in an existing fluorescent light fixture. This allows existing LED light fixtures to be utilized without replacement, by merely replacing the tubes and ballast with LED based equipment.

(*Withers Patent* at Abs.; *Withers Publication* at Abs. (same).)

Consequently, a person of ordinary skill in the art considering the problems of replacing fluorescent lighting with a more energy efficient approach would be motivated to combine the teachings of *Timmerman* with those of *Huang* and/or *Withers* and/or *Royal Lighting* thus rendering the purported invention of claim 1, as a whole, invalid under 35 U.S.C. Section 103.

Timmermans is appended as Exhibit “*Timmermans*.”

G. Dependent claim 2 of the *Breihof* '835 patent is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of U.S. Pat. No. 8,926,129 B2 to Socarras issued January 6, 2015 (“*Socarras Patent*”) from an application filed on April 7, 2011 which claims priority back to Provisional Application No. 61/322,080 filed April 8, 2010 (“*Socarras Provisional*”) (together the “*Socarras References*”). Claim 2 depends from claim 1.

Narrative Contention A and its exhibits shows that claim 1 is anticipated by *Huang*.

Claim 2 adds to claim 1 the limitation “*wherein said elongate support member comprises an I-beam cross-section having a web portion and spaced apart flange portions on opposite ends of said web portion.*” (*Breihof*’835 patent at cl. 2.)

Each of the *Socarras References* discloses a system in which an elongate support member (identified as a divider in the *Socarras References*) supports plural LEDs in a lighting system devised to be a replacement for fluorescent bulbs. For example, the *Socarras Patent* recites that

[t]he present invention relates generally to lighting systems and more specifically to various embodiments of a light-emitting diode (hereinafter referred to as "LED") lighting system including a lamp, end caps, and power supply. The present invention comprises an improved LED lighting system designed to be used in connection with a wide variety of applications, including custom signs and to retrofit existing signs. The present invention offers high efficiency, low heat-emission lighting that is 100% recyclable, features that are not possible with common high output fluorescent light systems.

(*Socarras Patent* at col. 1, ll. 26-36.)

The *Socarras Provisional* similarly recites that

[t]he present invention relates generally to lighting systems and more specifically to a light emitting diode (hereafter referred to as “LED” lighting system including a light bulb arrangement, end caps, and power supply.

(*Socarras Provisional* at ¶ 3.)

As to the I-beam cross-section of the “elongate support member” in particular as recited in claim 2 of the *Breihof*’835 patent, the *Socarras References* satisfy this limitation. For example, the *Socarras Provisional* recites

[a]s shown in figure 2, in some embodiments of the present invention, divider 3 may be made of translucent acrylic and

have an 'I-beam' shaped cross-section wherein the thickness of divider 3 is slightly narrower at the center of the cross-section. The I-beam shaped cross section delimits a channel 13 along the length of divider 3 such that it is adapted to receive light strips 5 thereto.

(Socarras Provisional at ¶20.)

In the *Socarras Patent* it is stated that

[a]s shown in FIG. 2, in some embodiments of the present invention, divider 3 may be made of translucent acrylic and may have an “I-beam” shaped cross-section wherein the thickness of divider 3 is slightly narrowed at the center of the cross-section. The “I-beam” shaped cross-section delimits channels 13 and 13' along the length of divider 3 such that it is adapted to receive light strips 5 on either side thereof.” (Col. 3, ll. 31-37 of *Socarras Patent*.) Further, the divider “may include one or more fins longitudinally disposed along a length thereof.

(Socarras Patent at col. 1, ll. 58-60.)

In describing how the LED strip 5 may be secured to the channel of the I-beam configured elongate support member, the *Socarras Provisional* states,

In some embodiments, strip 5 may be secured to channel 13 (and therefore divider 3) by compression fit or by an adhesive material. If a compression fit is used, it may be preferable that the cross section of the divider at channel 13 is notched or lipped such that the sides of channel 13 are capable of receiving the edges of ribbon 9 thus securing the ribbon to the channel. The use of this type of lipped channel allows for strip 5 to be interchanged, replaced, and/or repaired as desired without damaging divider 3.

(Socarras Provisional at ¶21.)

Further, Claim 5 of filed *Socarras Provisional* recites,

5. The lighting system of claim 1, wherein said cross-section is I-beam shaped such that a channel is formed along each of said first side and second side of said divider.

The *Socarras References* are directed to fluorescent to LED replacements and systems and, therefore, a POSA at the time of the invention would have been motivated to combine various elements and structures from the *Socarras References* including the recited disclosed *Socarras References* I-beam configuration for the elongate support member with those of *Huang* thus, rendering as a whole, the claimed invention of claim 2 of the *Breihof* '835 patent obvious to a person of ordinary skill in the art at the time.

Narrative Contention G is charted under claim 2 in *Exhibit Huang 1 – Section 35 U.S.C. § 102 (b) and 35 U.S.C. § 103* and the *Socarras Provisional* is appended as Exhibit “*Socarras Provisional*” and the *Socarras Patent* as Exhibit “*Socarras Patent*.”

H. Dependent claim 2 of the *Breihof* '835 patent is invalid as being obvious under 35 U.S.C. § 103 over *Withers* in view of the *Socarras References*.

Narrative Contention B and its Exhibits shows that claim 1 is anticipated by *Withers*. Claim 2 depends from claim 1. Claim 2 adds to claim 1 the limitation “wherein said elongate support member comprises an I-beam cross-section having a web portion and spaced apart flange portions on opposite ends of said web portion.” (*Breihof* '835 patent at cl. 2.)

Each of the *Socarras References* discloses a system in which an elongate support member (identified as a divider in the *Socarras References*) supports plural LEDs in a lighting system devised to be a replacement for fluorescent bulbs having an I-beam cross section for LEDs as used in a lamp assembly devised to replace

fluorescent bulbs. For example, the *Socarras Patent* recites

The present invention relates generally to lighting systems and more specifically to various embodiments of a light-emitting diode (hereinafter referred to as "LED") lighting system including a lamp, end caps, and power supply. The present invention comprises an improved LED lighting system designed to be used in connection with a wide variety of applications, including custom signs and to retrofit existing signs. The present invention offers high efficiency, low heat-emission lighting that is 100% recyclable, features that are not possible with common high output fluorescent light systems.

(*Socarras Patent* at col. 1, ll. 26-36.)

The *Socarras Provisional* is similar:

The present invention relates generally to lighting systems and more specifically to a light emitting diode (hereafter referred to as "LED" lighting system including a light bulb arrangement, end caps, and power supply.

(*Socarras Provisional* at ¶ 3.)

As to the I-beam cross-section of the "elongate support member" in particular as recited in claim 2 of the *Breihof* 835 patent, the *Socarras Provisional* provides that

[a]s shown in figure 2, in some embodiments of the present invention, divider 3 may be made of translucent acrylic and have an 'I-beam' shaped cross-section wherein the thickness of divider 3 is slightly narrower at the center of the cross-section. The I-beam shaped cross section delimits a channel 13 along the length of divider 3 such that it is adapted to receive light strips 5 thereto.

(*Socarras Provisional* at ¶ 20.)

Similarly, in the *Socarras Patent* it is stated that,

[a]s shown in FIG. 2, in some embodiments of the present invention, divider 3 may be made of translucent acrylic and may have an "I-beam" shaped cross-section wherein the thickness of divider 3 is slightly narrowed at the center of

the cross-section. The “I-beam” shaped cross-section delimits channels 13 and 13’ along the length of divider 3 such that it is adapted to receive light strips 5 on either side thereof.

(Socarras Patent at col. 3, ll. 31-37.)

Further, the divider “may include one or more fins longitudinally disposed along a length thereof.” *(Socarras Patent at col. 1, ll. 58-60.)* In describing how the LED strip 5 may be secured to the channel of the I-beam configured elongate support member, the *Socarras Provisional* states,

In some embodiments, strip 5 may be secured to channel 13 (and therefore divider 3) by compression fit or by an adhesive material. If a compression fit is used, it may be preferable that the cross section of the divider at channel 13 is notched or lipped such that the sides of channel 13 are capable of receiving the edges of ribbon 9 thus securing the ribbon to the channel. The use of this type of lipped channel allows for strip 5 to be interchanged, replaced, and/or repaired as desired without damaging divider 3.

(Socarras Provisional at ¶ 21.)

Claim 5 of filed *Socarras Provisional* recites,

5. The lighting system of claim 1, wherein said cross-section is I-beam shaped such that a channel is formed along each of said first side and second side of said divider.

The *Socarras References* are directed to fluorescent to LED replacements and systems and, therefore, a person of ordinary skill in the art at the time of the invention would have been motivated to combine various elements and structures from the *Socarras References* including the recited disclosed *Socarras* I-beam configuration for the elongate support member with those of *Withers* thus, rendering as a whole, the claimed invention of claim 2 of the *Breihof*’835 patent obvious to a

person of ordinary skill in the art at the time.

Narrative Contention H is charted in *Exhibit Withers II – 35 U.S.C. § 103 (“Exhibit Withers II”)*.

I. Dependent claim 2 of the *Breihof*’835 patent is invalid as being obvious under 35 U.S.C. § 103 over *Royal Lighting* in view of *Huang* and further in view of the *Socarras References*. Claim 2 is dependent on independent claim 1.

Narrative Contention D and any associated Exhibits shows that claim 1 is obvious over *Royal Lighting* in view of *Huang*. Claim 2 adds to claim 1 the limitation “*wherein said elongate support member comprises an I-beam cross-section having a web portion and spaced apart flange portions on opposite ends of said web portion.*” (the *Breihof* ’835 patent at cl. 2.)

Each of the *Socarras References* discloses a system in which an elongate support member (identified as a divider in the *Socarras References*) supports plural LEDs in a lighting system devised to be a replacement for fluorescent bulbs having an I-beam cross section for LEDs as used in a lamp assembly devised to replace fluorescent bulbs. For example, the *Socarras Patent* provides that

The present invention relates generally to lighting systems and more specifically to various embodiments of a light-emitting diode (hereinafter referred to as "LED") lighting system including a lamp, end caps, and power supply. The present invention comprises an improved LED lighting system designed to be used in connection with a wide variety of applications, including custom signs and to retrofit existing signs. The present invention offers high efficiency, low heat-emission lighting that is 100% recyclable, features that are not possible with common high

output fluorescent light systems.

(*Socarras Patent* at col. 1, ll. 26-36.)

The *Socarras Provisional* is similar:

The present invention relates generally to lighting systems and more specifically to a light emitting diode (hereafter referred to as “LED” lighting system including a light bulb arrangement, end caps, and power supply.

(*Socarras Provisional* at ¶ 3.)

As to the I-beam cross-section of the “elongate support member” in particular as recited in claim 2 of the *Breihof*’835 patent, the *Socarras Provisional* recites

[a]s shown in figure 2, in some embodiments of the present invention, divider 3 may be made of translucent acrylic and have an ‘I-beam’ shaped cross-section wherein the thickness of divider 3 is slightly narrower at the center of the cross-section. The I-beam shaped cross section delimits a channel 13 along the length of divider 3 such that it is adapted to receive light strips 5 thereto.

(*Socarras Provisional* at ¶ 20.)

In the *Socarras Patent* it is stated that,

[a]s shown in FIG. 2, in some embodiments of the present invention, divider 3 may be made of translucent acrylic and may have an “I-beam” shaped cross-section wherein the thickness of divider 3 is slightly narrowed at the center of the cross-section. The “I-beam” shaped cross-section delimits channels 13 and 13’ along the length of divider 3 such that it is adapted to receive light strips 5 on either side thereof.

(*Socarras Patent* at col. 3, ll. 31-37.)

Further, the divider “may include one or more fins longitudinally disposed along a length thereof.” (*Socarras Patent* at col. 1, ll. 58-60.) In describing how the LED strip 5 may be secured to the channel of the I-beam configured elongate support

member, the *Socarras Provisional* states,

In some embodiments, strip 5 may be secured to channel 13 (and therefore divider 3) by compression fit or by an adhesive material. If a compression fit is used, it may be preferable that the cross section of the divider at channel 13 is notched or lipped such that the sides of channel 13 are capable of receiving the edges of ribbon 9 thus securing the ribbon to the channel. The use of this type of lipped channel allows for strip 5 to be interchanged, replaced, and/or repaired as desired without damaging divider 3.

(*Socarras Provisional* at ¶ 21.)

Claim 5 of filed *Socarras Provisional* recites,

5. The lighting system of claim 1, wherein said cross-section is I-beam shaped such that a channel is formed along each of said first side and second side of said divider.

(*Socarras Provisional* at cl. 5.)

The *Socarras References* are directed to fluorescent to LED replacements and systems and, therefore, a POSA at the time of the invention would have been motivated to combine various elements and structures from the *Socarras References* including the recited disclosed *Socarras* I-beam configuration for the elongate support member with those of *Royal Lighting* and *Huang* thus, rendering as a whole, the claimed invention of claim 2 of the *Breihof*'835 patent obvious to a person of ordinary skill in the art at the time. See Exhibit *Royal Lighting* in view of *Huang* and in further view of the *Socarras References*.

J. Dependent claim 2 of the *Breihof*'835 patent is invalid as being obvious under 35 U.S.C. § 103 over *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting* and the *Socarras References*.

Claim 2 is dependent on independent claim 1. Narrative Contention E and its Exhibits demonstrate that the purported invention of claim 1 is obvious.

InfoSystems discloses a “replacement kit” illumination system in which a plurality of LEDs are disposed along an elongated circuit board held by an “illumination carrier” which in turn, along with the circuit board, is held by end pieces (*i.e.*, “end caps”) made of insulating material to create a unit that is a replacement kit for fluorescent bulbs and which is plugged into existing fluorescent sockets for use in signs such as those found in public transit systems. In particular, *InfoSystems* teaches that,

[t]he end pieces 14 have a circular-cylindrical core 15 made from an insulating material, the lateral surface of which carries a metal jacket 16. In the core 14[sic] of the end pieces 14, a slot-shaped recess 17 of a low depth is respectively machined in the side facing the reflector 8. This recess extends respectively along the radius of which the contact pins 9, 10 (or the unused contacts 9', 10') are arranged. The recess 8.1 accommodates the edges on the narrow side of the circuit board 7 and secures in this way their stable position within the space volume surrounded by reflector 8.

(*InfoSystems Translation* at 10, first paragraph).

Each of the *Socarras References* discloses a system in which an elongate support member (identified as a “divider” in the *Socarras References*) supports plural LEDs in a lighting system devised to be a replacement for fluorescent bulbs. For example, the *Socarras Patent* provides that

The present invention relates generally to lighting systems and more specifically to various embodiments of a light-emitting diode (hereinafter referred to as "LED") lighting system including a lamp, end caps, and power supply. The

present invention comprises an improved LED lighting system designed to be used in connection with a wide variety of applications, including custom signs and to retrofit existing signs. The present invention offers high efficiency, low heat-emission lighting that is 100% recyclable, features that are not possible with common high output fluorescent light systems.

(*Socarras Patent* at col. 1, ll. 26-36.)

The *Socarras Provisional* is similar:

The present invention relates generally to lighting systems and more specifically to a light emitting diode (hereafter referred to as “LED” lighting system including a light bulb arrangement, end caps, and power supply.

(*Socarras Provisional* at ¶ 3.)

As to the I-beam cross-section of the “elongate support member” in particular as recited in claim 2 of the *Breihof* '835 patent,

[a]s shown in figure 2, in some embodiments of the present invention, divider 3 may be made of translucent acrylic and have an ‘I-beam’ shaped cross-section wherein the thickness of divider 3 is slightly narrower at the center of the cross-section. The I-beam shaped cross section delimits a channel 13 along the length of divider 3 such that it is adapted to receive light strips 5 thereto.

(*Socarras Provisional* at ¶20.)

In the *Socarras Patent* it is stated that,

[a]s shown in FIG. 2, in some embodiments of the present invention, divider 3 may be made of translucent acrylic and may have an “I-beam” shaped cross-section wherein the thickness of divider 3 is slightly narrowed at the center of the cross-section. The “I-beam” shaped cross-section delimits channels 13 and 13’ along the length of divider 3 such that it is adapted to receive light strips 5 on either side thereof.

(*Socarras Patent* at col. 3, ll. 31-37.)

Further, the divider “may include one or more fins longitudinally disposed along a length thereof.” (*Socarras Patent*, Col. 1, ll. 58-60.) In describing how the LED strip 5 may be secured to the channel of the I-beam configured elongate support member, the *Socarras Provisional* states,

In some embodiments, strip 5 may be secured to channel 13 (and therefore divider 3) by compression fit or by an adhesive material. If a compression fit is used, it may be preferable that the cross section of the divider at channel 13 is notched or lipped such that the sides of channel 13 are capable of receiving the edges of ribbon 9 thus securing the ribbon to the channel. The use of this type of lipped channel allows for strip 5 to be interchanged, replaced, and/or repaired as desired without damaging divider 3.

(*Socarras Provisional* at ¶ 21.)

Claim 5 of filed *Socarras Provisional* recites,

5. The lighting system of claim 1, wherein said cross-section is I-beam shaped such that a channel is formed along each of said first side and second side of said divider.

(*Socarras Provisional* at cl. 5.)

The *Socarras References* are directed to fluorescent to LED replacements and systems and, therefore, a person of ordinary skill in the art at the time of the invention would have been motivated to combine various elements and structures from the *Socarras References* including the recited disclosed *Socarras* I-beam configuration for the elongate support member with those of *InfoSystems* and *Royal Lighting, Huang* and *Withers* thus, rendering as a whole, the claimed invention of claim 2 of the *Breihof*’835 patent obvious to a person of ordinary skill in the art at the time. See Exhibit *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting* and the *Socarras References* – Claim 2.

K. Dependent claims 4 and 5 of the *Breihof* '835 patent are invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of the *Socarras References* and *InfoSystems*.

Claim 4 is dependent on claim 2 which is dependent on claim 1. Claim 5 is dependent on claim 4. Narrative Contention G above and its exhibits shows that claim 2 is invalid as being obvious over *Huang* in view of the *Socarras References*. Narrative Contention A and its exhibits show that claim 1 is anticipated by *Huang* under 35 U.S.C. Section 102(b).

InfoSystems discloses a “replacement kit” illumination system in which a plurality of LEDs are disposed along an elongated circuit board held by an “illumination carrier” which in turn, along with the circuit board, is held by end pieces (*i.e.*, “end caps”) made of insulating material to create a unit that is a replacement kit for fluorescent bulbs and which is plugged into existing fluorescent sockets for use in signs such as those found in public transit systems. In particular, *InfoSystems* teaches that,

[t]he end pieces 14 have a circular-cylindrical core 15 made from an insulating material, the lateral surface of which carries a metal jacket 16. In the core 14[sic] of the end pieces 14, a slot-shaped recess 17 of a low depth is respectively machined in the side facing the reflector 8. This recess extends respectively along the radius of which the contact pins 9, 10 (or the unused contacts 9', 10') are arranged. The recess 8.1 accommodates the edges on the narrow side of the circuit board 7 and secures in this way their stable position within the space volume surrounded by reflector 8.

(*InfoSystems Translation* at 10, first paragraph.)

Consequently, the recited limitation of claim 4 of the *Breihof*'835 patent in which the end caps “*comprise a plurality of projections for engaging said I-beam cross section of said elongate support member*” would have been, prior to the invention date of the *Breihof*'835 patent, made obvious to the POSA by the reference in *InfoSystems* of engaging the end caps with the elongate support member for the LEDs (which in *InfoSystems* is a circuit board) because once an I-beam was considered for the elongate support structure as disclosed in the *Socarras References*, the configuration of projections to mate with that particular design of elongate support member would have been obvious as it is merely a design choice as to the particular enhancing mode of engagement between the end cap and the corresponding configuration of the elongate support member which in claim 4 is an I-beam as taught by the *Socarras References* as further explained above in, for example, Narrative Contention G and any related exhibits.

A person of ordinary skill in the art at the time of the purported the *Breihof*'835 patent inventions would, therefore, have been motivated to combine the teachings of *Huang* with *Socarras References* and *InfoSystems* which are directed to fluorescent to LED replacements and systems thus rendering, as a whole, the purported invention of claim 4 of the *Breihof*'835 patent obvious. Further, as to claim 5, the particular cross section of I-beam recited in claim 5 as either having “a single-web” or “dual-web” would have been obvious to a person of ordinary skill in the art through that practitioner’s knowledge of the *Socarras References* which disclose

an I-beam elongate support member and various iterations of the I-beam configuration are merely a design choice available to the person of ordinary skill in the art.

Thus, both claims 4 and 5 of the *Breihof*'835 patent are invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of the *Socarras References* and *InfoSystems*. See Exhibit *Huang* in view of the *Socarras References* in further view of *InfoSystems* – Claims 4 & 5.

L. Dependent claims 4 and 5 of the *Breihof*'835 patent are invalid as being obvious under 35 U.S.C. § 103 over *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting* further in view of the *Socarras References*.

Claim 5 is dependent on claim 4 which is dependent on claim 2 which is dependent on claim 1. Narrative Contention E and its exhibits show that claim 1 is invalid as being obvious over *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting*. Narrative Contention J above and its exhibits shows that claim 2 is obvious over *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting* and further in view of the *Socarras References*.

Claim 4 of the *Breihof*'835 patent adds to claim 2 the limitation “wherein said inwardly-facing sides of said end caps comprise a plurality of projections for engaging said I-beam cross section of said elongate support member at said opposite ends thereof.”

InfoSystems discloses a “replacement kit” illumination system in which a

plurality of LEDs are disposed along an elongated circuit board held by an “illumination carrier” which in turn, along with the circuit board, is held by end pieces (*i.e.*, “end caps”) made of insulating material to create a unit that is a replacement kit for fluorescent bulbs and which is plugged into existing fluorescent sockets for use in signs such as those found in public transit systems. In particular, *InfoSystems* teaches that,

[t]he end pieces 14 have a circular-cylindrical core 15 made from an insulating material, the lateral surface of which carries a metal jacket 16. In the core 14[sic] of the end pieces 14, a slot-shaped recess 17 of a low depth is respectively machined in the side facing the reflector 8. This recess extends respectively along the radius of which the contact pins 9, 10 (or the unused contacts 9', 10') are arranged. The recess 8.1 accommodates the edges on the narrow side of the circuit board 7 and secures in this way their stable position within the space volume surrounded by reflector 8.

(*InfoSystems Translation* at 10, first paragraph.)

Consequently, the recited feature of claim 4 of the *Breihof*'835 patent in which the end caps comprise a plurality of projections for engaging the edge of the elongate support member—which in claim 4 is in the shape of an I-beam cross section—would have been obvious to the POSA prior to the filing of the *Breihof*'835 patent by the reference in *InfoSystems* of engaging the end caps with the elongate support member for the LEDs—which in *InfoSystems* is a circuit board—because once an I-beam was considered for the elongate support structure as disclosed in the *Socarras References*, the configuration of projections to mate with that particular design of elongate support member would have been obvious as it is merely a design choice as to the

particular enhancing mode of engagement between the end cap and the corresponding configuration of the elongate support member as an I-beam as taught by the *Socarras References* and recited by claim 4.

A person of ordinary skill in the art at the time of the purported invention of the *Breihof*'835 patent inventions would have been therefore motivated to combine the teachings of *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting* further in view of the *Socarras References* which are directed to fluorescent to LED replacements and systems and, therefore, such a person would have been motivated to combine various elements and structures from those references thus rendering as a whole the claimed invention of claim 4 of the *Breihof*'835 patent obvious.

Further, as to claim 5, the particular cross section of I-beam recited in claim 5 as either having "a single-web" or "dual-web" would have been obvious to a person of ordinary skill in the art through that practitioner's knowledge of the *Socarras References* which disclose an I-beam elongate support member and various iterations of the basic I-beam configuration are merely a design choice available to the person of ordinary skill in the art. Thus, both claims 4 and 5 of the *Breihof*'835 patent are invalid as being obvious under 35 U.S.C. § 103 over *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting* further in view of the *Socarras References*.

See Exhibit *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting* and in view of the *Socarras References – Claims 4 & 5*.

M. Dependent claim 6 of the *Breihof*'835 patent is invalid as being obvious under

35 U.S.C. § 103 over *Huang* in view of the *Socarras References*.

Claim 6 is dependent on claim 2. Narrative Contention G and its Exhibits demonstrates how claim 2 is obvious under 35 U.S.C. § 103 over *Huang* in view of the *Socarras References*. Claim 6 merely adds to claim 2 the limitation “wherein said elongate support member is configured to support the plurality of electric lamp units at said web portion.”

The *Socarras References* disclose the limitations of claim 6. For example, the *Socarras Provisional* discloses that “[t]he ‘I-beam’ shaped cross-section delimits a channel 13 along the length of divider 3 such that it is adapted to receive a light strip 5 thereto.” (*Socarras Provisional* at ¶ 20 and Figs. 1 & 2). The *Socarras Patent* further discloses that “[i]n some embodiments, the divider has an I-beam shaped cross-section, defining a channel along each side of the divider, wherein the LED strips may be disposed in the channels.” (*Socarras Patent* at col. 1, ll. 54-58.)

Consequently, a person of ordinary skill at the time of the invention of the *Breihof* ’835 patent, being aware of the disclosures of *Huang* and the *Socarras References* would be motivated to combine the teachings and disclosures of these references given their common application to the problems of replacing fluorescents with LEDs, thus therefore rendering claim 6 obvious.

Narrative Contention M is charted in *Exhibit Huang 1 – Section 35 U.S.C. § 102(b) and 35 U.S.C. § 103* and Exhibit *Huang* in view of *Socarras References*.

N. Dependent claim 6 of the *Breihof* ’835 patent is invalid as being obvious under 35 U.S.C. § 103 over *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal*

Lighting and further in view of the *Socarras References*.

Claim 6 depends from claim 2 which is dependent on claim 1. The combination of *InfoSystems* with *Huang* and/or *Withers* and/or *Royal Lighting* rendering as a whole the invention of claim 1 obvious is recited above with respect to that claim. Claim 2 from which claim 6 depends, is shown in Narrative Contention G above and its exhibits to be obvious.

As to the further limitation of claim 6 from claim 2 which requires that the “elongate support member is configured to support the plurality of electric lamp units at said web portion,” (claim 2) the *Socarras Provisional* states that, “[t]he ‘I-beam’ shaped cross-section delimits a channel 13 along the length of divider 3 such that it is adapted to receive a light strip 5 thereto.” (*Socarras Provisional* at ¶ 20 and Figs. 1 & 2.) The *Socarras Patent* further recites that “[i]n some embodiments, the divider has an I-beam shaped cross-section, defining a channel along each side of the divider, wherein the LED strips may be disposed in the channels.” (*Socarras Patent* at col. 1, ll. 54-58.)

Consequently, a person of ordinary skill at the time of the invention of *Breihof* ’835 patent, being aware of the disclosures of *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting* and further in view of the *Socarras References* would be motivated to combine the teachings and disclosures of these references given their common application to the problems of replacing fluorescents with LEDs thus therefore rendering claim 6 obvious.

See Exhibit *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal*

Lighting in view of *Socarras References* –35 U.S.C. § 103 – Claim 6.

O. Dependent claim 7 of the *Breihof*'835 patent is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of the *Socarras References*.

Claim 7 is dependent upon claim 6 which is dependent upon claim 2 which is dependent upon claim 1. The demonstrations of the invalidity of the claims from which claim 7 depends were earlier made by selected prior narrative contentions along with their corresponding exhibits.

As to the added limitation recited by claim 7 of the *Breihof*'835 patent of there being “electric lamp units along opposite sides of said web portion,” the *Socarras Patent* states in referring to the divider that corresponds to the “elongate support member” of the *Breihof* '835 claims, “[i]n some embodiments, the divider has an I-beam cross section defining a channel along each side of the divider, wherein the LED strips may be disposed in the channels.” (*Socarras Patent* at col. 1, ll. 55-58.) The *Socarras Patent* goes on to say,

the use of a transparent or translucent divider 3 provides substantial advantages over the prior art in that, where the strip is disposed on both sides thereof, the present invention provides for substantially omni-directional light emission. That being said, divider 3 may optionally be comprised of an opaque material which provides for more directional lighting.

(*Socarras Patent* at col. 2, ll. 56-62.) The referred to “strip” comprises a ribbon of plural LEDs and resistor. The *Socarras Provisional* goes on to state, “[i]n some embodiments, LED light strip 5 is disposed on both sides of the divider, thus

increasing the number and LEDs and, in turn, the resultant light emission.”
(*Socarras Provisional* at ¶ 19.)

Consequently, a POSA at the time of the invention of the *Breihof*’835 patent, knowing the disclosures of the *Socarras References* and *Huang*, would be motivated to combine the teachings of those references to use an elongate support member for plural LEDs to increase the stability and capacity of the assembly devised to replace fluorescents with LEDs while increasing the light emission by placing LEDs on both sides of the I-beam configuration. Thus, a person of ordinary skill in the art would find that the purported invention of claim 7 as a whole to be obvious and, therefore, claim 7 is invalid under 35 U.S.C. § 103 as being obvious over *Huang* in view of the *Socarras References*.

Narrative Contention O is charted in *Exhibit Huang 1 – Section 35 U.S.C. § 102(b) and 35 U.S.C. § 103*.

P. Dependent claim 7 of the *Breihof*’835 patent is invalid as being obvious under 35 U.S.C. § 103 over *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting* and further in view of the *Socarras References*.

The combination of *InfoSystems* with *Huang* and/or *Withers* and/or *Royal Lighting* to render obvious the invention of claim 1 when taken as a whole is recited above with respect to that claim. Claim 7 is dependent upon claim 6 which is dependent upon claim 2 which is dependent upon claim 1. The demonstrations of the invalidity of the claims from which claim 7 depends were earlier made by selected

prior contentions along with their corresponding exhibits.

As to the added limitation recited by claim 7 of the *Breihof*'835 patent of there being "electric lamp units along opposite sides of said web portion," the *Socarras Patent* states in referring to the divider that corresponds to the "elongate support member" of the *Breihof*'835 claims, "[i]n some embodiments, the divider has an I-beam cross section defining a channel along each side of the divider, wherein the LED strips may be disposed in the channels." (*Socarras Patent* at col. 1, ll. 55-58.) The *Socarras Patent* goes on to say,

the use of a transparent or translucent divider 3 provides substantial advantages over the prior art in that, where the strip is disposed on both sides thereof, the present invention provides for substantially omni-directional light emission. That being said, divider 3 may optionally be comprised of an opaque material which provides for more directional lighting. (*Socarras Patent* at col. 2, ll. 56-62.)

The referred to "strip" comprises a ribbon of plural LEDs and resistor. The *Socarras Provisional* goes on to state, "[i]n some embodiments, LED light strip 5 is disposed on both sides of the divider, thus increasing the number and LEDs and, in turn, the resultant light emission." (*Socarras Provisional* at ¶ 19.)

Consequently, a person of ordinary skill at the time of the invention of the *Breihof*'835 patent, knowing the disclosures of the *Socarras References* and *Huang*, would be motivated to combine the teachings of those references to use an elongate support member for plural LEDs to increase the stability and capacity of the assembly devised to replace fluorescents with LEDs while increasing the light emission by placing LEDs on both sides of the I-beam configuration. Thus, a person of ordinary

skill in the art would find that the purported invention of claim 7 as a whole to be obvious and, therefore, claim 7 is invalid under 35 U.S.C. § 103 as being obvious over *InfoSystems* in view of *Huang* and/or *Withers* and/or *Royal Lighting* and further in view of the *Socarras References*.

Q. Dependent claim 8 of the *Breihof*'835 patent is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of US Pat. No. 4,229,780, issued October 21, 1980 to Nelson ("*Nelson*").

The anticipation of the purported invention of claim 1 by *Huang* is demonstrated above in Narrative Contention A and its exhibits.

Nelson discloses a fluorescent lighting assembly for use in explosive atmospheres such as mines by adding a guard to a fluorescent light assembly. In describing the disclosed lighting assembly, *Nelson* discloses that,

[a] standard stationary socket 36 is mounted by screws 38, 38 on the end portion 34 of the head end of the lamp, and a standard spring-loaded socket 40 is mounted by screws 42 on the end portion 34 at the tail end of the lamp.

(*Nelson* at col. 3, l. 67 – Col. 4, l. 3.)

In devising systems to replace fluorescent bulbs with LED based systems, a POSA would have been aware of various sockets and mounts by which fluorescents are mounted and the use of a standard spring loaded socket or mounts situated to accept one end of an applied fluorescent bulb and a standard stationary socket or mount disposed to accept the other end of the fluorescent bulbs to be replaced would be within the field of art of the practitioner seeking to replace fluorescents with LEDs

while using much of the fluorescent infrastructure. *Nelson* discloses such a pair of mounts as recited in claim 8 and tellingly identifies them as “standard.” Thus, a POSA at the time of the purported invention of the *Breihof*’835 patent claim 8 invention would have been motivated to combine the teachings of *Huang* and *Nelson* in devising a system in which standard spring and stationary fluorescent mount pairs were used with systems to replace fluorescent bulbs with LEDs thus rendering the purported invention of claim 8, as a whole, obvious under 35 U.S.C. § 103 over *Huang* in view of *Nelson*.

Narrative Contention Q is charted in *Exhibit Huang 1 – Section 35 U.S.C. § 102(b) and 35 U.S.C. § 103* and *Exhibit Huang* in view of *Nelson* - 35 U.S.C. § 103 – Claim 8. *Nelson* is provided as Exhibit “*Nelson*.”

R. Dependent claim 8 of the *Breihof*’835 patent is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of U.S. Pat. No. 5,282,117, issued January 25, 1994 to Fritts (“*Fritts*”) (*e.g.*, Col. 5, ll. 9-11 and Fig. 1 references 26 and 28).

The anticipation of the purported invention of claim 1 by *Huang* is recited above in Narrative Contention A and its exhibits.

The disclosure of *Fritts* is concerned with

internally illuminated displays of the type” that “commonly utilize a light box incorporating therein an array of equally spaced parallel rectilinear fluorescent lamps behind a diffusely light transmissive white display panel adapted to bear a light transmissive image to be illuminated.

(*Fritts* at col. 1, ll. 23 – 29.)

Fritts discloses a system to provide more even illumination from such “light boxes” (*i.e.*, signs). In disclosing the inventive system, *Fritts* describes the receptacles used in conjunction with the disclosed light box:

Mounted on a spacer plate 25 suitably fixed to and overlying the bottom wall 15 adjacent the rear wall 17 is a static receptacle 26 for each of the lamps 24 and into which the respective lower ends of said lamps are received. Running along and secured to the inner surface of the upper wall 14 adjacent the rear wall 17 is a receptacle mounting member 27 which is aperatured to receive a spring loaded upper receptacle 28 for each of the lamps 24.

(*Fritts* at col 5, ll. 10-19.)

In devising systems to replace fluorescent bulbs with LED based systems, a person of ordinary skill in the art would have been aware of various sockets and mounts by which fluorescents are mounted and the use of a standard spring loaded socket or mounts situated to accept one end of an applied fluorescent bulb and a standard stationary socket or mount disposed to accept the other end of the fluorescent bulbs to be replaced would be within the field of art of the practitioner seeking to replace fluorescents with LEDs while using much of the fluorescent infrastructure. Thus, a person of ordinary skill in the art at the time of the purported invention of the *Breihof* '835 patent claim 8 invention would have been motivated to combine the teachings of *Huang* and *Fritts* in devising a system in which standard spring and stationary fluorescent mount pairs were used with systems to replace fluorescent bulbs with LEDs thus rendering the purported invention of claim 8, as a whole, obvious under 35 U.S.C. § 103 over *Huang* in view of *Fritts*.

Narrative Contention R is charted more fully in *Exhibit Huang 1 – Section 35*

U.S.C. § 102(b) and 35 U.S.C. § 103 and Exhibit Huang in view of *Fritts* - 35 U.S.C. § 103 – Claim 8 combines only *Huang* and *Fritts*. *Fritts* is provided as Exhibit “*Fritts*.”

S. Dependent claim 11 of the *Breihof*’835 patent is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of the *Socarras References*.

Claim 11 is dependent on claim 10 which is dependent on claim 9 which is dependent on claim 1. The demonstration of the invalidity of the claims from which claim 11 depends was earlier made by selected ones of the above narrative contentions along with their corresponding exhibits.

Claim 11 adds the “I-beam” cross sectional aspect to the “elongate support member” and recites “wherein said electric lamp units are coupled to said web portion and are positioned between said spaced-apart flange portions.” (the *Breihof*’835 patent at cl. 11.)

Each of the *Socarras References* discloses a system in which an elongate support member (identified as a divider in the *Socarras References*) supports plural LEDs in a lighting system devised to be a replacement for fluorescent bulbs. For example, the *Socarras Patent* provides

The present invention relates generally to lighting systems and more specifically to various embodiments of a light-emitting diode (hereinafter referred to as "LED") lighting system including a lamp, end caps, and power supply. The present invention comprises an improved LED lighting system designed to be used in connection with a wide variety of applications, including custom signs and to retrofit existing signs. The present invention offers high

efficiency, low heat-emission lighting that is 100% recyclable, features that are not possible with common high output fluorescent light systems.

(*Socarras Patent* at col. 1, ll. 26-36.).

The *Socarras Provisional* is similar:

The present invention relates generally to lighting systems and more specifically to a light emitting diode (hereafter referred to as “LED” lighting system including a light bulb arrangement, end caps, and power supply.

(*Socarras Provisional* at ¶ 3.)

As to the I-beam cross-section of the “elongate support member” of as recited in claim 11 of the *Breihof*’835 patent, the *Socarras Provisional* recites

[a]s shown in figure 2, in some embodiments of the present invention, divider 3 may be made of translucent acrylic and have an ‘I-beam’ shaped cross-section wherein the thickness of divider 3 is slightly narrower at the center of the cross-section. The I-beam shaped cross section delimits a channel 13 along the length of divider 3 such that it is adapted to receive light strips 5 thereto.

(*Socarras Provisional* at ¶ 20.)

In the *Socarras Patent* it is stated that,

[a]s shown in FIG. 2, in some embodiments of the present invention, divider 3 may be made of translucent acrylic and may have an “I-beam” shaped cross-section wherein the thickness of divider 3 is slightly narrowed at the center of the cross-section. The “I-beam” shaped cross-section delimits channels 13 and 13’ along the length of divider 3 such that it is adapted to receive light strips 5 on either side thereof.

(*Socarras Patent* at col. 3, ll. 31-37.)

Further, the divider “may include one or more fins longitudinally disposed along a length thereof.” (*Socarras Patent* at col. 1, ll. 58-60.)

In describing how the LED strip 5 may be secured to the channel of the I-beam configured elongate support member, the *Socarras Provisional* states

In some embodiments, strip 5 may be secured to channel 13 (and therefore divider 3) by compression fit or by an adhesive material. If a compression fit is used, it may be preferable that the cross section of the divider at channel 13 is notched or lipped such that the sides of channel 13 are capable of receiving the edges of ribbon 9 thus securing the ribbon to the channel. The use of this type of lipped channel allows for strip 5 to be interchanged, replaced, and/or repaired as desired without damaging divider 3.

(*Socarras Provisional*, ¶ 21.)

Further, claim 5 of filed *Socarras Provisional* recites,

5. The lighting system of claim 1, wherein said cross-section is I-beam shaped such that a channel is formed along each of said first side and second side of said divider.

(*Socarras Provisional* at cl. 5.)

The *Socarras References* are directed to fluorescent to LED replacements and systems and, therefore, a POSA at the time of the invention would have been motivated to combine the teachings of those references in devising a system to replace fluorescents with LEDs and therefore the purported invention of claim 11 would, therefore, be invalid under 35 U.S.C. § 103 as being obvious over those references. Narrative Contention S is charted in *Exhibit Huang 1 – Section 35 U.S.C. § 102(b) and 35 U.S.C. § 103*.

T. Dependent claim 12 is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of U.S. Pat. App. Pub. No. 2004/0062041 filed September 25, 2003 and published April 1, 2004 to Cross et al. (“*Cross*”).

Claim 12 is dependent on claim 1 which was earlier shown to be anticipated by *Huang* by Narrative Contention A and its exhibits.

Cross recites that an end cap “is preferably fabricated from non-conductive materials...” (*Cross* at ¶ 24.) As previously demonstrated, *Huang* employs a circuit board as the elongate support member. Circuit boards comprise metal for electrical conduction purposes and therefore, use of a circuit board as the elongate support member inherently also discloses a system in which the “elongate support member comprises a metal or resinous plastic extrusion” as recited by claim 12 of the *Breihof* '835 patent.

Consequently, both limitations added by claim 12 are found in *Huang* and *Cross* of which a POSA is deemed to have knowledge and, therefore, such a person in working to devise systems to replace fluorescent bulbs with lower power lighting assemblies would be motivated to combine the teachings of *Huang* and *Cross* thus rendering the purported invention of claim 12 obvious in light of those references.

See Exhibit *Huang* in view of *Cross*; 35 U.S.C. § 103 – Claim 12. *Cross* is provided as Exhibit “*Cross*.”

U. Dependent claim 12 is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of *Cross* and U.S. Pat. No. 5,780,143 issued July 14, 1998 to Shimamoto et al. (“*Shimamoto*”).

Claim 12 depends from claim 1. The anticipation of claim 1 by *Huang* is demonstrated above in Narrative Contention A and its exhibits.

Cross discloses that an end cap “is preferably fabricated from non-conductive materials....” (*Cross* at ¶ 24.)

Shimamoto discloses various modes of thru-hole technologies in circuit boards and in so doing, introduces the basic technology of circuit boards as follows,

[R]eferring to FIG. 1, a circuit board generally designated at 2 includes a board body 4 constituted by an insulating substrate 6. The insulating substrate 6 may be in any form such as paper based-phenolic resin laminated substrate, paper base-epoxy resin laminated substrate, paper base-polyester resin laminated substrate, glass base-epoxy resin laminated substrate, paper base-teflon resin laminated substrate, glass base-polyimide resin laminated substrate, glass base-BT (bismaleimide-triazine) resin laminated substrate, or a synthetic resin substrate such as composite resin board, or a flexible substrate such as of polyimide resin or polyester resin, or a metallic insulating substrate of aluminum, steel, stainless steel and the like coated with an epoxy resin to have electrically insulating property or a ceramic substrate.

(*Shimamoto* at col. 4, l. 59 – Col. 5, l. 5.)

Thus, *Shimamoto* discloses that a circuit board, which is used in *Huang* as the elongate support member for the array of LEDs (*i.e.*, the recited “electric lamps”), comprises a metal or resinous plastic extrusion and *Cross* discloses an end cap comprised of non-metal material (*i.e.*, non-conductive) as shown in Narrative Contention T above and as recited in claim 12. Consequently, a POSA at the time of the invention, being deemed to know the contents of *Huang*, *Cross* and *Shimamoto* would find the purported invention of claim 12 obvious, as a whole in light of those references.

See Exhibit *Huang* in view of *Cross* and *Shimamoto* – Claim 12. *Shimamoto*

is provided as Exhibit “*Shimamoto*.”

V. Dependent claim 12 is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of *InfoSystems*.

Claim 12 depends from claim 1. *Huang* discloses each and every limitation of claim 1 as stated above in Narrative Contention A and its exhibits.

In the retro-fit kit of *InfoSystems* devised for replacement of fluorescent tubes with low voltage based lamps, *InfoSystems* discloses that the “end pieces” (i.e., the end caps) are “made from an insulating material...” (*InfoSystems Translation* at 7, second paragraph.)

As previously demonstrated, *Huang* employs a circuit board as the elongate support member. Circuit boards comprise metal for electrical conduction purposes and therefore, use of a circuit board as the elongate support member inherently also discloses a system in which the “elongate support member comprises a metal or resinous plastic extrusion” as recited by claim 12 of the *Breihof*’835 patent.

Even so, *Shimamoto* discloses various modes of thru-hole technologies in circuit boards and in so doing, introduces the basic technology of circuit boards as follows and thereby shows that the circuit board of *Huang* which is the elongate support member recited in claims 1 and 12 of the *Breihof* ’835 patent inherently discloses a metal or resinous plastic extrusion. Further, *Shimamoto* is offered to demonstrate that inherency and which reference states,

[R]eferring to FIG. 1, a circuit board generally designated at 2 includes a board body 4 constituted by an insulating

substrate 6. The insulating substrate 6 may be in any form such as paper based-phenolic resin laminated substrate, paper base-epoxy resin laminated substrate, paper base-polyester resin laminated substrate, glass base-epoxy resin laminated substrate, paper base-teflon resin laminated substrate, glass base-polyimide resin laminated substrate, glass base-BT (bismaleimide-triazine) resin laminated substrate, or a synthetic resin substrate such as composite resin board, or a flexible substrate such as of polyimide resin or polyester resin, or a metallic insulating substrate of aluminum, steel, stainless steel and the like coated with an epoxy resin to have electrically insulating property or a ceramic substrate.

(*Shimamoto* at col. 4, l. 59 – Col. 5, l. 5.)

Thus, *Shimamoto* discloses that a circuit board, which is used in *Huang* and the elongate support member for the electric lamps, comprises a metal or resinous plastic extrusion. The recited feature in which the end caps “comprise” a non-metal material is disclosed by *InfoSystems* such that a person of ordinary skill in the art, being deemed to know the contents of *Huang* and *InfoSystems* would be motivated to combine the teachings of those references in devising a system that replaces fluorescent bulbs with lower powered lamps such as LEDs thus rendering as a whole the purported invention of claim 12 obvious. See Exhibit *Huang* in view of *InfoSystems* – Claim 12.

W. Dependent claim 12 is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of *InfoSystems* and further in view of *Shimamoto*.

Claim 12 depends from claim 1. Narrative Contention A and its exhibits demonstrates the anticipation of claim 1 by *Huang*.

In the retro-fit kit of *InfoSystems* devised for replacement of fluorescent tubes with low voltage based lamps, *InfoSystems* discloses that the “end pieces” (i.e., the end caps) are “made from an insulating material...” (*InfoSystems Translation* at 7, second paragraph.)

Therefore, the recited limitation of claim 12 in which the end caps “comprise” a non-metal material is disclosed by *InfoSystems* while *Shimamoto*, whose teachings are discussed above in detail with reference to Narrative Contention U shows that a circuit board is comprised of a metal or a resinous plastic extrusion such that a person of ordinary skill in the art, being deemed to know the contents of *Huang* and *InfoSystems* and *Shimamoto* would find the purported invention of claim 12 obvious, as a whole, in light of those references.

X. Claim 12 is anticipated by *Huang* and is therefore invalid under 35 U.S.C. § 102(b). Narrative Contention X is charted in *Exhibit Huang 1 – Section 35 U.S.C. § 102(b) and 35 U.S.C. § 103*.

Y. Dependent claim 14 of the *Breihof*’835 patent is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of US Pat. No. 4,691,601 entitled “Method of Sawing a Steel Structural Shape Having at least One Flange” issued September 8, 1987 to Peddinghaus (“*Peddinghaus*”).

A person of ordinary skill in the art at the time the invention was made is deemed to be aware of the prior art.

In considering the claim 14 limitation, “further comprising cutting the elongate

support member to fit” in the space between the pairs of “gas discharge couplings,” the process of cutting the elongate support member to so fit in the available space between the lamp couplings would have been a gating step. An elongate support member having the configuration of an I-beam is disclosed and discussed in substantial detail in the *Breihof*’835 patent. It would have been known to the practitioner in the art that the elongate support member supporting the lamps would need to fit between the gas discharge lamp couplings in a system in which fluorescents were to be replaced by low voltage and/or LED lamps if the system were to be convenient in application. *Peddinghaus* discloses a method of cutting an I-beam. “The structural steel shapes can have H, U, I, or T cross section or an angular profile, i.e., a channel I-beam, H-beam, T-beam or angle iron.” (*Peddinghaus* at col. 3, ll. 31-34.) As to the cross-sectional shape of the elongate support member as disclosed in the *Breihof*’835 patent, the method prescribed by *Peddinghaus* would have been an available method for such cutting of an elongate support member to fit between the fluorescent lamp couplings.

Consequently, a person of ordinary skill in the art, knowing the teachings of *Huang* and *Peddinghaus* would have been motivated to combine those teachings in cutting an elongate support member to fit in the available space between two fluorescent mounts thereby rendering as a whole the purported invention of claim 14 obvious.

Narrative Contention Y is charted in *Exhibit Huang 1 – Section 35 U.S.C. § 102(b) and 35 U.S.C. § 103*. See also *Exhibit Huang* in view of *Peddinghaus 35*

U.S.C. § 103 – Claim 14.

Peddinghaus is provided as Exhibit “*Peddinghaus*.”

Z. Dependent claim 14 of the *Breihof*’835 patent is invalid as being obvious under 35 U.S.C. § 103 over *Royal Lighting* in view of *Huang* and *InfoSystems* and *Peddinghaus*.

Claim 14 depends from claim 13 and Narrative Contention D sets out the demonstration of the obviousness of claim 13 in light of *Royal Lighting* in view of *Huang*. See also Narrative Contention C.

As to claim 14, “[t]he structural steel shapes can have H, U, I, or T cross section or an angular profile, i.e., a channel I-beam, H-beam, T-beam or angle iron.” (*Peddinghaus* at col. 3, ll. 31-34.) In considering the claim 14 limitation “further comprising cutting the elongate support member to fit” in the space between the pairs of “gas discharge couplings” the process of cutting the elongate support member to so fit in the available space between the lamp couplings would have been a gating step. *Peddinghaus* discloses a method of cutting an I-beam. An elongate support member having the configuration of an I-beam is disclosed and discussed in substantial detail in the *Breihof*’835 patent. It would have been known to the POSA at the time of the invention that the elongate support member supporting the lamps would need to fit between the gas discharge lamp couplings in a system in which fluorescents were to be replaced by LED lamps if the system were to be convenient in application and provide replacement of fluorescents with lower powered lighting while using much of

the infrastructure. As to the cross-sectional shape of the elongate support member as disclosed in the *Breihof*'835 patent, the method prescribed by *Peddinghaus* would have been one available method for such cutting of an elongate support member to fit between the fluorescent lamp couplings.

Consequently, a person of ordinary skill in the art, knowing the teachings of *Royal Lighting*, *Huang*, *InfoSystems* and *Peddinghaus* would have been motivated to combine those teachings in cutting an elongate support member to fit in the available space between two fluorescent mounts thereby rendering, as a whole, the purported invention of claim 14 obvious.

AA. Dependent claim 14 of the *Breihof*'835 patent is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of the *Socarras References* and further in view of *Peddinghaus*.

Claim 14 is dependent upon claim 13. Narrative Contention A and its exhibits demonstrates that claim 13 is anticipated by *Huang*.

In considering the claim 14 limitation, “further comprising cutting the elongate support member to fit” in the space between the pairs of “gas discharge couplings” the process of cutting the elongate support member to so fit in the available space between the lamp couplings would have been a gating step. *Peddinghaus* discloses a method of cutting an I-beam. An elongate support member having the configuration of an I-beam is disclosed and discussed in substantial detail in the *Breihof*'835 patent. The *Socarras References* disclose the use of elongate support members having

a cross-sectional profile of an “I-beam” as recited in claim 14. In using such a structure as disclosed by the *Socarras References*, the person of ordinary skill in the art would be motivated to determine a method of cutting such a structure so as to fit between the fluorescent sockets to be used by the system in its replacement of fluorescent tubes with a lower energy consuming system such as that comprised of LEDs mounted along an elongate support member and in particular such a member in the shape of an “I-beam.”

Peddinghaus offers the solution to that cutting to fit. “The structural steel shapes can have H, U, I, or T cross section or an angular profile, i.e., a channel I-beam, H-beam, T-beam or angle iron.” (*Peddinghaus* at col. 3, ll. 31-34). It would have been known to the practitioner in the art that the elongate support member supporting the lamps would need to fit between the gas discharge lamp couplings in a system in which fluorescents were to be replaced by LED lamps if the system were to be convenient in application use much of the existing infrastructure. As to the cross-sectional shape of the elongate support member as disclosed in the *Breihof*’835 patent, the method prescribed by *Peddinghaus* would have been one available method for such cutting of an elongate support member to fit between the fluorescent lamp couplings.

Consequently, a POSA at the time of the invention, knowing the teachings of *Huang* and the *Socarras References* and *Peddinghaus* would have been motivated to combine those teachings in cutting an elongate support member to fit in the available space between two fluorescent mounts thereby rendering, as a whole the purported

invention of claim 14 obvious. *See Exhibit Huang* in view of the *Socarras References* and further in view of *Peddinghaus*.

BB. Dependent claim 15 is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of *InfoSystems*.

Claim 15 depends from independent claim 13. Narrative Contention A and its exhibits above demonstrate that claim 13 is anticipated by *Huang*.

InfoSystems, which is described in more detail above, provides disclosure of a method to disable the existing ballast in the internally lighted sign:

According to the invention, the replacement kit comprises an LED lamp designed as a plug-in device and for replacing existing fluorescent lamps, as well as a set of cables or another device for bridging or bypassing the pre-existing ballast, so that the plug-in socket may be immediately connected to the on-board DC voltage.

(*InfoSystems Translation* at 3, last paragraph, to 4, first paragraph.)

Further explication of how to disable the ballast is found on page 11 of *InfoSystems*:

The flexible cables 4 and 5 of the cable set are respectively connected to plug-in blocks 19.1 and 19.2 of the fluorescent lamp mounting 19 in sockets receiving the contact pins and are connected – whilst electrically bridging the ballasts of the replaced fluorescent lamp – with their free ends to the poles of the vehicle battery.

(*InfoSystems Translation* at 11, second paragraph.)

Thus, a person of ordinary skill in the art, aware of the prior art and motivated to devise a system to replace fluorescent bulbs with lower powered lamps would be motivated to combine the teachings of *Huang* with *InfoSystems* and therefore

rendering claim 15, as a whole, obvious.

Narrative Contention B is charted in *Exhibit Huang 1 – Section 35 U.S.C. § 102(b) and 35 U.S.C. § 103*.

CC. Dependent claim 16 is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of U.S. Pat. No. 4,748,545 to Schmitt which issued May 31, 1988 and was filed Feb. 20, 1986 (“*Schmitt*”).

Claim 16 depends from independent claim 13. Narrative Contention A above and its exhibits demonstrates that claim 13 is anticipated by *Huang*.

Schmitt discloses various low voltage illumination systems for use in display cases and in some embodiments replace fluorescent bulbs, some of which system are said to be “particularly advantageous in that it provides a direct replacement for existing fluorescent tubes within existing fluorescent fixtures....” (*Schmitt* at col. 8, ll.10-13.) The systems disclosed in *Schmitt* include a plurality of low voltage lamps along a reflector system or in a housing for retro-fit. As *Schmitt* states,

[t]he housing 202 in combination with the end caps and axially extending conductors, is selected to be of the same length and diameter as a fluorescent tube of a given wattage. Thus, the modular illumination system 200 is intended as a direct replacement for a correspondingly, physically-sized, fluorescent tube, such as where its use as a retrofit system is desired.

(*Schmitt* at col. 8, ll. 54-60.)

In one disclosed system in *Schmitt* details as to provision of low voltage power is provided:

Electrical energy can be supplied to the illumination system 60 via a low-voltage wiring system 110. The wiring system 110 can be coupled to a transformer, corresponding to the transformer 54, which can be located in the ballast compartment of the cabinet C4.

(*Schmitt* at col. 6, ll. 29-33.)

Schmitt goes on to disclose how the low voltage is conveyed, “Low-voltage electrical energy can be supplied to the light sources 152 via the axially extending conducting members 130,132 in combination with conductive members 158, for example, low voltage wires, within the housing 122.” (*Schmitt* at col. 7, ll. 48-51.)

Thus, *Schmitt* discloses “*providing a low-voltage power source for energizing the electric lamp units and electrically coupling the electric lamp units to the low voltage power source*” as recited in claim 16. A person of ordinary skill in the art, devising methods and systems to replace fluorescents with lower powered electric lamps and knowing the disclosures of *Huang* and *Schmitt*, would be motivated to combine the teachings of those references in connecting the low voltage lamp units to the low voltage power source thus rendering claim 16, as a whole, obvious.

Schmitt is provided as Exhibit “*Schmitt*.”

Contention CC is charted in the *Exhibit Huang 1 – Section 35 U.S.C. § 102(b) and 35 U.S.C. § 103*.

DD. Dependent claim 16 is invalid as being obvious under 35 U.S.C. § 103 over *Withers* in view of *Schmitt*. Narrative Contention DD is charted in *Exhibit Withers II – 35 U.S.C. § 103*. See also Exhibit *Withers in view of Schmitt; 35 U.S.C. § 103 –*

Claim 16.

EE. Dependent claim 17 is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of *Schmitt* and/or U.S. Pat. No. 4,376,966 to Tieszen issued March 15, 1983 from an application filed April 7, 1980 (“*Tieszen*”).

Claim 17 depends from dependent claim 16 which in turn depends on independent claim 13. Narrative Contention A and its exhibits demonstrates that claim 1 is anticipated by *Huang*. The narrative contention above demonstrates that claim 16 is invalid as obvious over *Huang* in view of *Schmitt*.

Schmitt discloses various low voltage illumination systems for use in display cases and in some embodiments replace fluorescent bulbs, some of which system are said to be “particularly advantageous in that it provides a direct replacement for existing fluorescent tubes within existing fluorescent fixtures....” (*Schmitt* at col. 8, ll.10-13.) The systems disclosed in *Schmitt* include a plurality of low voltage lamps along a reflector system or in a housing for retro-fit. As *Schmitt* states,

The housing 202 in combination with the end caps and axially extending conductors, is selected to be of the same length and diameter as a fluorescent tube of a given wattage. Thus, the modular illumination system 200 is intended as a direct replacement for a correspondingly, physically-sized, fluorescent tube, such as where its use as a retrofit system is desired.

(*Schmitt* at col. 8, ll. 54-60.)

In one disclosed system in *Schmitt* details as to provision of low voltage power is provided:

Electrical energy can be supplied to the illumination system 60 via a low-voltage wiring system 110. The wiring system 110 can be coupled to a transformer, corresponding to the transformer 54, which can be located in the ballast compartment of the cabinet C4.

(*Schmitt* at col. 6, ll. 29-33.)

Schmitt goes on to disclose how the low voltage is conveyed, “Low-voltage electrical energy can be supplied to the light sources 152 via the axially extending conducting members 130,132 in combination with conductive members 158, for example, low voltage wires, within the housing 122.” (*Schmitt* at col. 7, ll. 48-51.)

The limitations added to claim 16 by claim 17 as to routing low voltage electric wiring associated with the electric lamp units along at least a portion of the elongate support member and electrically connecting the electric wiring to the low voltage power source is disclosed by *Schmitt* and *Tieszen*, which is entitled, “Strip Lights and Method of Making the Same,” and discloses in detail various aspects of routing low voltage wiring in a strip light in which the low voltage lamps are supported by an elongate tubular member or channel. For example, as to the detail of wiring, *Tieszen* states,

For a purpose to be presently explained, the tubular member is preferably not circular in transverse cross section, but rather of a "D" or symmetrical trapezoid configuration as may be seen on inspection of FIG. 5. The external dimensions of the tubular member 16 can, by way of example only, be such that the spacing of its parallel sides is 0.277 inch with such sides having widths of 0.165 inch and 0.389 inch. The wall thickness is about 0.040 inch. Such size is well suited for use with size T-1 lamps hereinafter mentioned. The lamp assembly 12 includes a lamp and electric harness designated generally at 18 that is constituted of a plurality of electric lamps 20 that are

connected in electrical parallel between a pair of electric conductors 22 and 24 which can be of copper and size No. 28. The lamps 20 are conventional incandescent lamps in that they include a glass envelope surrounding a filament (not shown) that is energized by a pair of flexible electric leads 26 and 28 extending from the envelope. The lamps 20 are preferably at least as small as lamps known in the art and obtainable from many hobby shops as "wheat" lamps. Still smaller lamps are especially preferred such as size T-1 that draw 30 ma from a 12 volt power source. Such lamps consume only about 0.36 watt and result in only a slight temperature rise in their surroundings. The small amount of heat generated appears to be readily conducted away by the leads and otherwise dissipated even when very little, if any, free ambient air movement can occur. Indeed, it appears that very little temperature rise can be caused by the small lamps even when affirmative steps are taken to minimize the dissipation of heat. In the assembly 18 as shown in FIG. 8, it will be seen that the flexible conductors 22 and 24 are in closely spaced and in substantial parallelism, with the leads 26 and 28 of the lamps being mechanically and electrically connected respectively to the conductors 24 and 22. Each of such connections preferably involving a lead being twisted about and soldered to its respective conductor, such as, for example, the connection of the lead 26 to the conductor 24 indicated at 30, and the connection of the lamp lead 28 to the conductor 22 indicated at 32. Alternatively, the connections 30 and 32 can simply be spot welded connections. It will be noted that the leads 26 and 28 of each lamp 20 extend in opposite directions from each other and in approximate parallelism with the conductors 22 and 24. All the leads 26 extend in the same direction, with the length of the connected leads 26 and 28 and the spacing of the lamps 20 being such that the connections 30 and 32 occur alternately and in spaced relation to each other. In other words the overall longitudinal extent of the leads of each lamp is longitudinally spaced from the leads of adjacent lamps. In particular, no lead 26 contacts any other lead 28.

(*Tieszen* at col. 4, ll. 1-55.)

Thus, a person of ordinary skill in the art would find claim 17 of the *Breihof*

'835 patent obvious, as a whole, over *Huang* in view of *Schmitt* and/or *Tieszen*.

Tiezen is provided as Exhibit "*Tiezen*."

FF. Independent claim 19 is invalid as being obvious under 35 U.S.C. § 103 over *Huang* in view of *Schmitt*.

Narrative Contention A and its exhibits demonstrates that *Huang* discloses all the limitations of claim 19 and that, therefore, claim 19 is invalid under 35 U.S.C. § 102(b).

It is inconceivable that a POSA would not know that LEDs were low voltage and therefore prior art that discloses use of LEDs in systems to replace fluorescents with LED based systems in which plural LEDs are supported on an elongate support member inherently discloses the use of "low voltage lamp units" positioned along the elongate support member as recited in claim 19.

Even so, *Schmitt* discloses in detail the literal implementation of low voltage lamps along an elongate support member as described in detail in above narrative contention DD and Exhibit "*Schmitt*." Consequently, a POSA having the benefit of the disclosures of *Huang* and *Schmitt* would find the purported invention of claim 19 obvious in light of those disclosures to systems devised to replace fluorescent bulbs with a plurality of low voltage electric lamp units.

GG. Claims 1, 13 and 19 are invalid under 35 U.S.C. § 103 over *Huang* in view of U.S. Pat. No. 5,122,074 to Maag et al., issued June 16, 1992 ("*Maag*") and/or Part Nos. 582GDF and/or 583 GDF from Voltarc Technologies of Waterbury, Conn and/or

United States Patent No. 3,116,098 issued to Kulka on December 31, 1963 (the “*Kulka*”).

The *Breihof* '835 patent states that,

Mechanical coupling element 18, which is disposed along outwardly-facing side 16b of end cap 16 (FIGS. 4, 7, 10, 11, 13-15, 17 and 18), substantially replicates the structure of the conventional electro-mechanical end coupler 21a of a “high output” fluorescent tube lamp 21, and is shaped to engage or be received in the conventional or standard electro-mechanical sockets or mounts 20a, 20b. Standard electro-mechanical sockets or mounts 20a, 20b may be of the type commonly referred to as a “Kulka socket”, such as that shown and described in U.S. Pat. No. 5,122,074, the disclosure of which is hereby incorporated by reference, and as such may be available at Part Nos. 582GDF and/or 583GDF from Voltarc Technologies, Inc. of Waterbury, Conn.

(the *Breihof* '835 patent at col. 5, ll. 19-31.).

Thus, given that *Maag* and the part numbers from Voltarc referred to in the *Breihof* '835 patent specification as cited above are prior art to the *Breihof* '835 patent, a POSA would be deemed to be aware of those references and in developing systems to replace fluorescents with LED based lighting systems, such a POSA would find it obvious to employ a “mechanical coupling element” that is shaped to substantially replicate the structure of the conventional electro-mechanical end coupler 21a of a “high output” fluorescent tube lamp 21 so as to engage or be received in (as stated in the *Breihof* '835 patent) the conventional electro-mechanical end coupler disclosed in that prior art cited in the *Breihof* '835 patent itself.

HH. Claim 8 is invalid under 35 U.S.C. § 103 over *Withers* combined with *Maag* and/or *Kulka*. Narrative Contention HH is charted in *Exhibit Withers II – 35 U.S.C. § 103*.

II. Claim 12 is invalid under 35 U.S.C. § 103 over *Withers* combined with *Cross*. Narrative Contention II is charted in *Exhibit Withers II – 35 U.S.C. § 103*.

JJ. Claim 14 is invalid under 35 U.S.C. § 103 over *Withers* combined with *Peddinghaus*. Narrative Contention JJ is charted in *Exhibit Withers II – 35 U.S.C. § 103*.

KK. Claim 16 is invalid under 35 U.S.C. § 103 over *Withers* combined with *Schmitt*. Narrative Contention KK is charted in *Exhibit Withers II – 35 U.S.C. § 103*.

LL. Claim 17 is invalid under 35 U.S.C. § 103 over *Withers* combined with *Schmitt* and *Tiezen*. Narrative Contention LL is charted in *Exhibit Withers II – 35 U.S.C. § 103*.

MM. Claim 6 is invalid under 35 U.S.C. § 103 over *Withers* combined with the *Socarras References*. Narrative Contention MM is charted in *Exhibit Withers II – 35 U.S.C. § 103*.

NN. Claim 7 is invalid under 35 U.S.C. § 103 over *Withers* combined with the *Socarras References*. Narrative Contention OO is charted in *Exhibit Withers II – 35 U.S.C. § 103*.

OO. Claim 11 is invalid under 35 U.S.C. § 103 over *Withers* in view of the *Socarras References*. Narrative Contention MM is charted in *Exhibit Withers II – 35 U.S.C. § 103*.

PP. Claim 15 is invalid under 35 U.S.C. § 103 over *Withers* in view of *InfoSystems*. Narrative Contention PP is charted in *Exhibit Withers II – 35 U.S.C. § 103*.

QQ. Claims 1, 2, 3, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, and 19 are invalid under 35 U.S.C. § 103 over the *Socarras References* in view of a variety of earlier identified prior art as combined in *Exhibit AA – Claim Chart Socarras 35 U.S.C. § 103*.

II. TERMS GOVERNED BY PRE-AIA 112, ¶ 6

In determining, invalidity it is necessary to properly construe the terms at issue. *See Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1351 (Fed. Cir. 2001) (“A claim must be construed before determining its validity just as it is first construed before deciding infringement.”) (quoting *Markman v. Westview Instrs., Inc.*, 52 F.3d 967, 996 n.7 (Fed. Cir. 1995) (Mayer, J., concurring), *aff’d*, 517 U.S. 370 (1996)). This includes the application of pre-AIA 35 U.S.C. § 112, ¶ 6. *See Univ. of Minn. v. AGA Med. Corp.*, 717 F.3d 929, 940 (Fed. Cir. 2013) (“A patented invention is anticipated

by a prior art reference if that reference discloses all elements of the claimed invention, including means-plus-function structures or their equivalents.”). Thus, it will be necessary to identify claim terms subject to interpretation under pre-AIA § 112, ¶ 6.

Two terms in the ’835 Patent are subject to interpretation under § 112, ¶ 6: “elongate support member,” found in claims 1 through 20, and “mechanical coupling element,” found in claims 1 through 12, 19 and 20.

A. Elongate Support Member – Summary of 35 U.S.C. § 112, ¶ 6 Interpretation more fully explained in Exhibit AAA

With respect to “elongate support member,” this term is limited to two structures: an I-beam structure and a modified I-beam structure with flanges on the end. These two structures are exemplified in Figures 5 & 6 for the I-beam structure and Figures 8 & 9 for the modified I-beam structure.

Pursuant to § 112, ¶ 6, RetroLED contends that function and structure of the means-plus-function term, “elongate support member” are as follows:

The function of the “elongate support member” is, as follows: to support a plurality of electrical lamps. The corresponding structure for this function is found in at least the following portions of the specification: Figs. 4-6; Figs. 8-9; Figs. 21A & 21B; a portion of Fig. 24; col. 3, ll. 60-63; and col. 4, 35-60.

B. Mechanical Coupling Element – Summary of 35 U.S.C. § 112, ¶ 6 Interpretation more fully explained in Exhibit AAA

With respect to “mechanical coupling element,” the term is limited to a structure including a base plate or flange and a male prong or projection extending outwardly from base plate, which in turn has a pair of opposite side walls spaced from

each other and joined at their ends by rounded end walls to define an interior cavity, which includes a pair of recessed shoulders inside the cavity that project outwardly from base plate but not as far as do side walls and which form the outward extent of rounded end walls so that a gap is formed between end portions of the opposite side walls. A graphical representation of the structure is found, for example, in Figure 20. The function of the “mechanical coupling element” is, as follows: to mechanically engage or be received in a single electro-mechanical mount for a gas-discharge lamp. The corresponding structure for this function is found in at least the following portions of the specification: Fig. 20; col. 3, l. 66 – col. 4, l. 6; col. 2, ll. 29-32; col. 5, ll. 19-31; col. 5, ll. 32-55.

C. Narrative Contention AAA

Claims 1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 19 are invalid under 35 U.S.C. § 103 over the *Socarras References* combined with a variety of earlier identified prior art as combined in *Exhibit AAA – Claim Chart Socarras 35 U.S.C. § 103 using 35 U.S.C. §112, ¶6*.

III. SUMMARY, ANNUAL SALES INFORMATION.

Attached as the exhibit titled, “RetroLED Sales by Item,” is the summary of annual sales information for the years 2017, 2018 and 2019 (through March 19, 2019) pursuant to the Case Schedule entered in this case. The attached exhibit is marked and should be treated as Attorneys’ Eyes Only subject to the Protective Order in this case.

Respectfully submitted,

Dated: April 3, 2019

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true and correct copy of the above and foregoing document was served on April 3, 2019 upon:

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