

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

EXHIBIT TO
RETROLED COMPONENTS, LLC'S
INITIAL DISCLOSURES OF
INVALIDITY

Exhibit Withers II – 35 U.S.C. § 103

(“Exhibit Withers II”)

US9311835	Patent US 9,311,835 Claim Chart – Breihof ’835	EXHIBIT WITHERS II <u><i>Withers</i>, 35 U.S.C. § 103</u> US Patent No. 8,419,223 Priority Date: April 23, 2009 Issued: April 16, 2013
Assignee:	SignComp, LLC	
Title:	Lighting mount for interior-lighted signage and method of retrofitting a lighted sign	
Filing Date:	2011-11-22	
Publication Date:	2016-04-12	
Inventor:	Breihof, Thomas C.	
Earliest Priority:	2010-11-24 US 61417156	

United States Patent No. 8,419,223 (the “*Withers Patent*”) titled LED tube to replace fluorescent tube and issued to Billy V. Withers on April 16, 2013 is prior art to United States Patent No. 9,311,835 (the “*Breihof ’835 Patent*”) pursuant to 35 U.S.C. § 102(e) as the *Withers Patent* was filed on April 23, 2010 and claims priority to United States Provisional Application No. 61/172,049 (“*Withers Provisional*”) filed on April 23, 2009. This chart focuses only on the application filed on April 23, 2010 as the earliest priority date claimed by Principal LED for the Breihof ’835 Patent is November 24, 2010. Should Principal LED claim an earlier priority date, RetroLED reserves the right to amend this invalidity contention to rely on the *Withers Provisional*. Additionally, the *Withers Patent* Application was published on October 28, 2010 as United States Publication No. 2010/270,925 (“*Withers Publication*”) making the *Withers Publication* prior art to the Breihof ’835 Patent pursuant to 35 U.S.C. § 102(a). For the purposes of this invalidity chart, the term *Withers References* refers to the *Withers Patent* and *Withers Publication*, collectively.

Claims:

1	A lamp support assembly for interior lighting of a sign, said lamp support assembly comprising:	RetroLED contends that the preamble is not limiting. <i>See WITHERS I.</i>
	an elongate support member for supporting a plurality of electric lamp units, said elongate support member having opposite end portions;	<i>See WITHERS I.</i>

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<p>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;</p>	<p><i>See WITHERS I.</i></p>
<p>a mechanical coupling element at each of said outwardly-facing sides of said end caps, said mechanical coupling element configured to engage a single electro-mechanical mount for a gas-discharge lamp, wherein said mechanical coupling element comprises electrically insulative material and does not retain any electrical conductors along or through said mechanical coupling element for powering the plurality of electric lamp units; and</p>	<p><i>See WITHERS I.</i></p>
<p>wherein said elongate support member and said end caps are releasably supportable by and between two and only two of the mounts when the two mounts are aligned directly opposite one another and supported in spaced arrangement on respective frame portions of the sign.</p>	<p><i>See WITHERS I.</i></p>

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2	<p>The lamp support assembly of claim 1, 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.</p>	<p>Claim 2 of the Breihof '835 Patent is obvious in view of the <i>Withers References</i> in light of United States Patent No. 8,926,129 (the "<i>Socarras Patent</i>") issued to Socarras on January 6, 2015 and United States Provisional Application No. 61/322,080 (the <i>Socarras Provisional</i>) filed on April 8, 2010 (collectively, the "<i>Socarras References</i>").</p> <p>The <i>Socarras References</i> disclose an elongate support member comprising an I-beam cross section having a web portion and spaced-apart flange portions on opposite ends of the web portion. the <i>Socarras Patent</i> discloses an "I-beam" shaped cross-section that "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." (the <i>Socarras Patent</i> at col. 3, ll. 35-37; <i>see also id.</i> at Figs. 1, 2, 5 & 6.) Similarly, the <i>Socarras Provisional</i> discloses an "'I-beam' shaped cross-section [that] delimits a channel 13 along the length of divider 3 such that it is adapted to receive light strip 5 thereto." (the <i>Socarras Provisional</i> at ¶ 20; <i>see also</i> Figs. 1, 2, 6 & 7.) These I-beam structures disclosed in the <i>Socarras References</i> correspond to the I-beam structure of Figures 5 & 6 of the Breihof '835 Patent.</p>
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3	<p>The lamp support assembly of claim 2, wherein said web portion of said elongate support member comprises a pair of spaced plates joined together by said flange portions.</p>	<p>Claim 3 of the Breihof '835 Patent is obvious in view of the <i>Withers References</i> in light of United States Patent No. 8,926,129 (the "<i>Socarras Patent</i>") issued to Socarras on January 6, 2015 and United States Provisional Application No. 61/322,080 (the <i>Socarras Provisional</i>) filed on April 8, 2010 (collectively, the "<i>Socarras References</i>").</p> <p>The <i>Socarras References</i> disclose an elongate support member comprising an I-beam cross section having a web portion and spaced-apart flange portions on opposite ends of the web portion. the <i>Socarras Patent</i> discloses an "I-beam" shaped cross-section that "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." (the <i>Socarras Patent</i> at col. 3, ll. 35-37; <i>see also id.</i> at Figs. 1, 2, 5 & 6.) Similarly, the <i>Socarras Provisional</i> discloses an "'I-beam' shaped cross-section [that] delimits a channel 13 along the length of divider 3 such that it is adapted to receive light strip 5 thereto." (the <i>Socarras Provisional</i> at ¶ 20; <i>see also</i> Figs. 1, 2, 6 & 7.) These I-beam structures disclosed in the <i>Socarras References</i> correspond to the I-beam structure of Figures 5 & 6 of the Breihof '835 Patent.</p>
4	<p>The lamp support assembly of claim 2, 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.</p>	
5	<p>The lamp support assembly of claim 4, wherein said inwardly-facing sides of said end caps are configured to engage either of (i) a single-web I-beam cross section or (ii) a dual-web I-beam cross section of said elongate support member.</p>	

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6	The lamp support assembly of claim 2, wherein said elongate support member is configured to support the plurality of electric lamp units at said web portion.	<p>Claim 6 of the Breihof '835 Patent is obvious in view of the <i>Withers References</i> in light of United States Patent No. 8,926,129 (the "<i>Socarras Patent</i>") issued to Socarras on January 6, 2015 and United States Provisional Application No. 61/322,080 (the <i>Socarras Provisional</i>) filed on April 8, 2010 (collectively, the "<i>Socarras References</i>").</p> <p>As noted above for claim 2, The <i>Socarras References</i> disclose an elongate support member comprising an I-beam cross section having a web portion and spaced-apart flange portions on opposite ends of the web portion. the <i>Socarras Patent</i> discloses an "I-beam" shaped cross-section that "delimits channels 13 and 13' along the length of divider 3 such that <i>it is adapted to receive light strips 5 on either side thereof.</i>" (the <i>Socarras Patent</i> at col. 3, ll. 35-37 (emphasis added); see also <i>id.</i> at Figs. 1, 2, 5 & 6.) Similarly, the <i>Socarras Provisional</i> discloses an "I-beam" shaped cross-section [that] delimits a channel 13 along the length of divider 3 such that it is adapted to receive light strip 5 thereto." (the <i>Socarras Provisional</i> at ¶ 20; see also <i>id.</i> at Figs. 1, 2, 6 & 7.) Additionally, the <i>Socarras Provisional</i> provides that the light strips may be disposed on both sides of the divider. (<i>Id.</i> at ¶ 19 ("In 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.")) These I-beam structures disclosed in the <i>Socarras References</i> correspond to the I-beam structure of Figures 5 & 6 of the Breihof '835 Patent.</p>
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7	The lamp support assembly of claim 6, wherein said elongate support member is configured to support the electric lamp units along opposite sides of said web portion.	<p>Claim 7 of the Breihof '835 Patent is obvious in view of the <i>Withers References</i> in light of United States Patent No. 8,926,129 (the "<i>Socarras Patent</i>") issued to Socarras on January 6, 2015 and United States Provisional Application No. 61/322,080 (the <i>Socarras Provisional</i>) filed on April 8, 2010 (collectively, the "<i>Socarras References</i>").</p> <p>As noted above for claim 2, The <i>Socarras References</i> disclose an elongate support member comprising an I-beam cross section having a web portion and spaced-apart flange portions on opposite ends of the web portion. the <i>Socarras Patent</i> discloses an "I-beam" shaped cross-section that "delimits channels 13 and 13' along the length of divider 3 such that <i>it is adapted to receive light strips 5 on either side thereof.</i>" (the <i>Socarras Patent</i> at col. 3, ll. 35-37 (emphasis added); see also <i>id.</i> at Figs. 1, 2, 5 & 6.) Similarly, the <i>Socarras Provisional</i> discloses an "I-beam" shaped cross-section [that] delimits a channel 13 along the length of divider 3 such that it is adapted to receive light strip 5 thereto." (the <i>Socarras Provisional</i> at ¶ 20; see also <i>id.</i> at Figs. 1, 2, 6 & 7.) Additionally, the <i>Socarras Provisional</i> provides that the light strips may be disposed on both sides of the divider. (<i>Id.</i> at ¶ 19 ("In 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.")) These I-beam structures disclosed in the <i>Socarras References</i> correspond to the I-beam structure of Figures 5 & 6 of the Breihof '835 Patent.</p>
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8	<p>The lamp support assembly of claim 1, wherein said mechanical coupling elements are configured to engage a fixed-position mount and a spring-loaded mount, each of the mounts being configured for supporting a respective opposite end portion or coupler of a gas-discharge lamp and for supplying electricity to the gas-discharge lamp.</p>	<p><i>See WITHERS I.</i></p> <p>In the alternative, claim 8 of the Breihof '835 Patent is rendered obvious in light of the <i>Withers References</i> in light of United States Patent No. 5,122,074 issued to Maag, et al. on June 16, 1992 (the "<i>Maag Patent</i>") and/or United States Patent No. 3,116,098 issued to Kulka on December 31, 1963 (the "<i>Kulka Patent</i>"). Both the <i>Maag Patent</i> and the <i>Kulka Patent</i> disclose a tombstone type socket with a spring-loaded and fixed mount. A person of ordinary skill in the art, who is deemed aware of the prior art, would be motivated to combine the <i>Withers References</i> with either the <i>Maag Patent</i> and/or the <i>Kulka Patent</i> to meet the limitations of claim 8.</p> <p>As a further alternative, Claim 8 is dependent on Claim 1. The invalidity of Claim 1 is shown above. Dependent claim 8 is obvious in view of the <i>Withers References</i> in combination with U.S. Pat. No. 5,282,117, issued January 25, 1994 to Fritts ("<i>Fritts</i>") or U.S. Pat. No. 4,229,780, issued October 21, 1980 to Nelson ("<i>Nelson</i>").</p> <p>As noted previously, the <i>Withers References</i> disclose a LED light tube that includes "end caps" that "are not electrically active, but merely provide physical mounting structure to mount the LED light bulb in an existing fluorescent light fixture." (<i>Withers Patent</i> at Abs.; <i>see also Withers Publication</i> at Abs. (same).)</p> <p>The invention of <i>Fritts</i> 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." (<i>Fritts</i> at col. 1, ll. 23 – 29.) Thus, <i>Fritts</i> discloses a system to provide more even illumination from such "light boxes" (<i>i.e.</i>,</p>
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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; *see also id.* at col. 5, ll. 9-11 & Fig. 1, references 26 & 28.)

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 *Breihof* ’835 claim 8 invention would have been motivated to combine the teachings of the *Withers References* 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 *Withers References* in view of *Fritts*.

Similarly, *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

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		<p>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.” (<i>Nelson</i> at col. 3, l. 67 – Col. 4, l. 3.)</p> <p>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. <i>Nelson</i> discloses such a pair of mounts as recited in claim 8 and tellingly identifies them as “standard.”</p> <p>Thus, a person of ordinary skill in the art at the time of the purported <i>Breihof</i> ’835 claim 8 invention would have been motivated to combine the teachings of the <i>Withers References</i> and <i>Nelson</i> 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 the <i>Withers References</i> in view of <i>Nelson</i>.</p>
9	The lamp support assembly of claim 1, further in combination with a lighted sign and a plurality of the electric lamp units.	<i>See WITHERS I.</i>

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<i>10</i>	The lamp support assembly of claim 9, wherein said electric lamp units comprise LED lamps.	<i>See</i> WHITHERS I.
<i>11</i>	The lamp support assembly of claim 10, 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, and wherein said electric lamp units are coupled to said web portion and are positioned between said spaced-apart flange portions.	<p>Claim 11 of the Breihof '835 Patent is obvious in view of the <i>Withers References</i> in light of United States Patent No. 8,926,129 (the "<i>Socarras Patent</i>") issued to Socarras on January 6, 2015 and United States Provisional Application No. 61/322,080 (the <i>Socarras Provisional</i>) filed on April 8, 2010 (collectively, the "<i>Socarras References</i>").</p> <p>As noted above for claim 2, The <i>Socarras References</i> disclose an elongate support member comprising an I-beam cross section having a web portion and spaced-apart flange portions on opposite ends of the web portion. the <i>Socarras Patent</i> discloses an "I-beam" shaped cross-section that "delimits channels 13 and 13' along the length of divider 3 such that <i>it is adapted to receive light strips 5 on either side thereof.</i>" (the <i>Socarras Patent</i> at col. 3, ll. 35-37 (emphasis added); <i>see also id.</i> at Figs. 1, 2, 5 & 6.) Similarly, the <i>Socarras Provisional</i> discloses an "'I-beam' shaped cross-section [that] delimits a channel 13 along the length of divider 3 such that it is adapted to receive light strip 5 thereto." (the <i>Socarras Provisional</i> at ¶ 20; <i>see also id.</i> at Figs. 1, 2, 6 & 7.) Additionally, the <i>Socarras Provisional</i> provides that the light strips may be disposed on both sides of the divider. (<i>Id.</i> at ¶ 19 ("In 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.")) These I-beam structures disclosed in the <i>Socarras References</i> correspond to the I-beam structure of Figures 5 & 6 of the Breihof '835 Patent.</p>

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<p>12</p>	<p>The lamp support assembly of claim 1, wherein said elongate support member comprises a metal or a resinous plastic extrusion, and wherein said end caps comprise a non-metal material.</p>	<p><i>See WITHERS I.</i></p> <p>In the alternative, the second limitation, that the end caps are a non-metal material, is met by the <i>Withers References</i> in light of U.S. Pat. App. Pub. No. 2004/0062041 filed September 25, 2003 and published April 1, 2004 to Cross et al. (“<i>Cross</i>”). For example, <i>Cross</i> recites that an end cap “is preferably fabricated from non-conductive materials...” (<i>Cross</i> at ¶ 24.)</p> <p>Consequently, both limitations added by claim 12 are available in the prior art of which the person of ordinary skill 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 the <i>Withers References</i> and <i>Cross</i> thus rendering the purported invention of claim 12 obvious in light of those references.</p>
<p>13</p>	<p>A method of retrofitting an internally-lighted sign that is fitted with one or more gas-discharge lamps, said method comprising:</p> <p>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;</p> <p>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 and do not retain any electrical conductors along or through said end caps for powering said plurality of electric lamp units;</p>	<p><i>See WITHERS I.</i></p> <p><i>See WITHERS I.</i></p> <p><i>See WITHERS I.</i></p>

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	positioning one or more electric lamp units along the elongate support member; and	<i>See WITHERS I.</i>
	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.	<i>See WITHERS I.</i>
14	The method of claim 13, further comprising cutting the elongate support member to fit between the one or more respective pairs of the gas-discharge lamp couplings or the replacement couplings.	Dependent claim 14 of the <i>Breihof</i> '835 patent is invalid as being obvious under 35 USC § 103 over the <i>Withers References</i> 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 (" <i>Peddinghaus</i> "). As noted in <i>Peddinghaus</i> , "[t]he structural steel shapes can have H, U, I, or T cross § or an angular profile, i.e., a channel I-beam, H-beam, T-beam or angle iron." (Col. 3, ll. 31-34 of <i>Peddinghaus</i>). A person of skill in the art at the time the invention was made is deemed to be aware of the prior art. In considering the issue of fitting the elongate member in the space available 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. Thus, cutting the rectangular base plate described <i>Withers References</i> (as discussed with respect to claims 1 and 13), a method of cutting the elongate support member would have been known to the practitioner in the art and in particular, the method prescribed by <i>Peddinghaus</i> would have been one available method for such cutting. This is especially true as the <i>Withers References</i> contemplate LED lighting tubes of various lengths. (<i>See Withers Patent</i> at col. 3, ll. 34-39; <i>Withers Publication</i> at ¶ 23.)

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<p>15</p>	<p>The method of claim 13, further comprising disabling or removing an existing ballast in the internally-lighted sign so that the gas-discharge lamp couplings cannot readily be electrically energized.</p>	<p><i>See WITHERS I.</i></p> <p>In the alternative, dependent claim 15 of the <i>Breihof</i> '835 Patent is invalid as being obvious under 35 U.S.C. § 103 over the <i>Withers References</i> in view of German Patent DE 299 00 320 U 1 filed on April 1, 1999, published in the Patent Gazette on May 12, 1999 and issued to InfoSystems GmbH Visuelle und akustische ("<i>InfoSystems</i>"). <i>InfoSystems</i> provides disclosure of a method to disable the existing ballast in the internally lighted sign as follows:</p> <p>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.</p> <p><i>(InfoSystems at 3-4.)</i></p> <p>Further explication of how to disable the ballast is found on page 11 of <i>InfoSystems</i>,</p> <p>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.</p> <p><i>(InfoSystems at 11.)</i></p>
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		Thus, a person of skill in the art would find claim 15 of the <i>Breihof</i> '835 patent obvious, as a whole, over the <i>Withers References</i> in view of <i>InfoSystems</i> .
<i>16</i>	The method of claim 13, further comprising:	

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<p>providing a low-voltage power source for energizing the electric lamp units; and</p>	<p><i>See WITHERS I.</i></p> <p>In the alternative, dependent claim 16 is invalid as being obvious under 35 U.S.C. § 103 over the <i>Withers References</i> in view of U.S. Pat. No. 4,748,545 to Schmitt which issued May 31, 1988 and was filed Feb. 20, 1986 (“<i>Schmitt</i>”).</p> <p><i>Schmitt</i> 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...” (<i>Schmitt</i>, Col. 8, ll.10-13.) The systems disclosed in <i>Schmitt</i> include a plurality of low voltage lamps along a reflector system or in a housing for retro-fit. As <i>Schmitt</i> 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.” (<i>Schmitt</i>, Col. 8, ll. 54-60.) In one disclosed system in <i>Schmitt</i> details as to provision of low voltage power is provided.</p> <p>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.</p> <p>(<i>Schmitt</i>, Col. 6, ll. 29-33.)</p>
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electrically coupling the electric lamp units to the low-voltage power source.

See *WITHERS I*.

In the alternative, dependent claim 16 is invalid as being obvious under 35 U.S.C. § 103 over the *Withers References* in view of U.S. Pat. No. 4,748,545 to Schmitt which issued May 31, 1988 and was filed Feb. 20, 1986 (“*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, “[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

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		<p>extending conducting members 130,132 in combination with conductive members 158, for example, low voltage wires, within the housing 122.” (<i>Schmitt</i> 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. Thus, 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 the <i>Withers References</i> and <i>Schmitt</i>, 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.</p>
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<p>17</p>	<p>The method of claim 16, wherein said positioning one or more electric lamp units along the elongate support member further comprises routing low-voltage electrical wiring associated with the electric lamp units along at least a portion of the elongate support member and electrically connecting the electrical wiring to the low voltage power source.</p>	<p><i>See WITHERS I.</i></p> <p>In the alternative, dependent claim 17 is invalid as being obvious under 35 U.S.C. § 103 over the <i>Withers References</i> in view of U.S. Pat. No. 4,748,545 to Schmitt which issued May 31, 1988 and was filed Feb. 20, 1986 (“<i>Schmitt</i>”) and/or U.S. Pat. No. 4,376,966 to Tieszen issued March 15, 1983 from an application filed April 7, 1980 (“<i>Tieszen</i>”).</p> <p>Claim 17 depends from dependent claim 16 which in turn depends on independent claim 13. As shown above, that claim 1 is anticipated by the <i>Withers References</i> and claim 16 is invalid as obvious over the <i>Withers References</i> in view of <i>Schmitt</i>.</p> <p><i>Schmitt</i> 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 “<i>particularly advantageous in that it provides a direct replacement for existing fluorescent tubes within existing fluorescent fixtures....</i>” (<i>Schmitt</i> at col. 8, ll.10-13.)</p> <p>The systems disclosed in <i>Schmitt</i> include a plurality of low voltage lamps along a reflector system or in a housing for retro-fit. As <i>Schmitt</i> states,</p> <p style="padding-left: 40px;">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.</p>
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(*Schmitt*, 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.

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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

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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.

(Col. 4, ll. 1-55, *Tieszen*.)

Thus, a person of ordinary skill in the art would find claim 17 of the *Breihof* '835 patent obvious, as a whole, over the *Withers References* in view of *Schmitt* and/or *Tieszen*.

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18	The method of claim 13, further comprising replacing the gas-discharge lamp couplings with purely mechanical replacement couplings prior to said positioning the end caps, elongate support member, and electric lamp units.	
19	A retrofit kit for an internally-lit sign, the sign having a framework and at least one display sheet that is at least partially translucent, said kit comprising:	<i>See WITHERS I.</i>
	an elongate support member for supporting a plurality of electric lamp units, said elongate support member having opposite end portions;	<i>See WITHERS I.</i>
	a plurality of low-voltage lamp units for positioning along the elongate support member;	<i>See WITHERS I.</i>
	a pair of end caps configured to frictionally engage the opposite end portions of the elongate support member, each of the end caps having one and only one mechanical coupling element at an outwardly-facing side thereof, wherein the end caps are made of electrically insulative material and do not retain any electrical conductors along or through said mechanical coupling element for powering said plurality of electric lamp units; and	<i>See WITHERS I.</i>
	wherein respective mechanical coupling elements of the pair of end caps are configured to non-electrically engage respective individual standard mounts located directly opposite one another at the framework that are for supporting a single gas-discharge lamp at the framework.	<i>See WITHERS I.</i>

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20	The retrofit kit of claim 19, further comprising a pair of purely mechanical mounts for replacing the standard mounts in the sign.	
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