

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ROBE LIGHTING S.R.O.,
Petitioner,

v.

GUANGZHOU HAORYANG ELECTRONIC CO., LTD.,
Patent Owner.

Case IPR2025-01016
Patent 11,988,373 B1

Title: Light Fixture with Self-Test Ability of Sealing

**PETITION FOR INTER PARTES REVIEW OF
U.S. PATENT NO. 11,988,373**

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Patent Trial and Appeal Board
U.S. Patent and Trademark Office
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TABLE OF EXHIBITS

Exhibit	Description
1001	United States Patent No. 11,988,373 (“the ‘373 Patent”)
1002	Chart of Claim Limitations for the ‘373 Patent
1003	Prosecution File History of the ‘373 Patent
1004	Declaration of Mike Wood
1005	United States Patent No. 12,085,267 (“Jurik”)
1006	United States Patent Application Publication No. 2015/0103553 (“Jurik 2”)
1007	United States Patent Application Publication No. 2017/0184288 (“Owens”)
1008	United States Patent Application Publication No. 2014/0119019 (“Hsu”)
1009	United States Patent Application Publication No. 2019/0041291 (“Bialik”)
1010	United States Patent Application Publication No. 2021/0095834 (“Jiang 2”)
1011	United States Patent No. 11,060,713 (“Jiang 3”)
1012	United States Patent No. 11,143,392 (“Jiang 4”)
1013	United States Patent No. 9,777,917 (“Johansen”)
1014	Excerpt of USPTO Prosecution File History of Jurik, IDS filed Jan. 13, 2023, enclosing W.L. Gore Polyvent Product Brochure (printed June 22, 2022)

Exhibit	Description
1015	United States Patent Application Publ. No. 2015/0085487
1016	United States Patent No. 11,051,385
1017	United States Patent Application Publication No. 2013/0088869
1018	United States Patent No. at 9,212,808
1019	United States Patent No. 6,031,749
1020	Studio Spot 575 Manual (1996-2004)
1021	Merriam-Webster Dictionary definition of “synchronous” (available at http://www.merriam-webster.com/dictionary/synchronous)
1022	United States Patent No. 11,268,678
1023	United States Patent No. 11,060,713
1024	United States Patent No. 8,596,836

I. INTRODUCTION

ROBE lighting s.r.o. (“Petitioner”) respectfully petitions for *Inter Partes* Review (“IPR”) of all claims (1-13) of United States Patent No. 11,988,373 (“the ‘373 Patent”), which is assigned to Guangzhou Haoyang Electronic Co., Ltd. (“Patent Owner”).

II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

§ 42.8(b)(1): Real party-in-interest. Petitioner ROBE lighting s.r.o. is the real party-in-interest.

§ 42.8(b)(2) Related matters. There is no other judicial or administrative matter that would affect, or be affected by, a decision in this proceeding.

§ 42.8(b)(3) Lead and back-up counsel. Counsel for Petitioner are listed below:

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§ 42.8(b)(3) Service information. Please address all correspondence to the address shown above. Petitioner consents to electronic service by email at: HouPatMail@conleyrose.com and DallasPatents@dfw.conleyrose.com.

III. PAYMENT OF FEES UNDER 37 C.F.R. § 42.103

Petitioner authorizes the Office to charge Deposit Account No. 03-2769 for the petition fee set in 37 C.F.R. § 42.15(a) and for any other required fees.

IV. THE PETITION COMPLIES WITH THE REQUIREMENTS FOR INTER PARTES REVIEW PURSUANT TO 37 C.F.R. § 42.104

A. Grounds for Standing Under 37 C.F.R. § 42.104(a)

Petitioner certifies that the '373 Patent for which review is sought is available for IPR and that the petitioner is not barred or estopped from requesting an IPR challenging the patent claims on any of the grounds identified herein.

Petitioner is concurrently filing a power of attorney to the undersigned counsel and has included a certificate of service on the Patent Owner.

B. Identification of Challenge Under 37 C.F.R. § 42.104(b)

Petitioner requests institution of IPR and cancellation of all claims (1-13) of the '373 Patent on the grounds listed below, either under 35 U.S.C. § 102 or 35 U.S.C. § 103. In support, this Petition includes the declaration of entertainment lighting industry expert Mike Wood (EX1004).

Ground	Claim(s)	Basis for Cancellation
1	1-4, 6, 10, and 11	Anticipated (§ 102) by Jurik (United States Patent No. 12,085,267)
2	5, 12, and 13	Obvious (§ 103) over Jurik, or alternatively, obvious over Jurik in view of Johansen (United States Patent No. 9,777,917)
3	7 and 8	Obvious (§ 103) over Jurik
4	9	Anticipated (§ 102) by Jurik, or alternatively, obvious (§ 103) over Jurik in view of Jurik 2 (United States Patent Appl. Publ. No. 2015/0103553)

All of the references relied upon for invalidity are prior art, even assuming for the sake of argument that the ‘373 Patent is entitled to an effective filing date as of the March 30, 2023 date of the Chinese parent application. None of the references relied upon herein were cited during prosecution of the ‘373 Patent.

VI. SUMMARY OF THE ‘373 PATENT

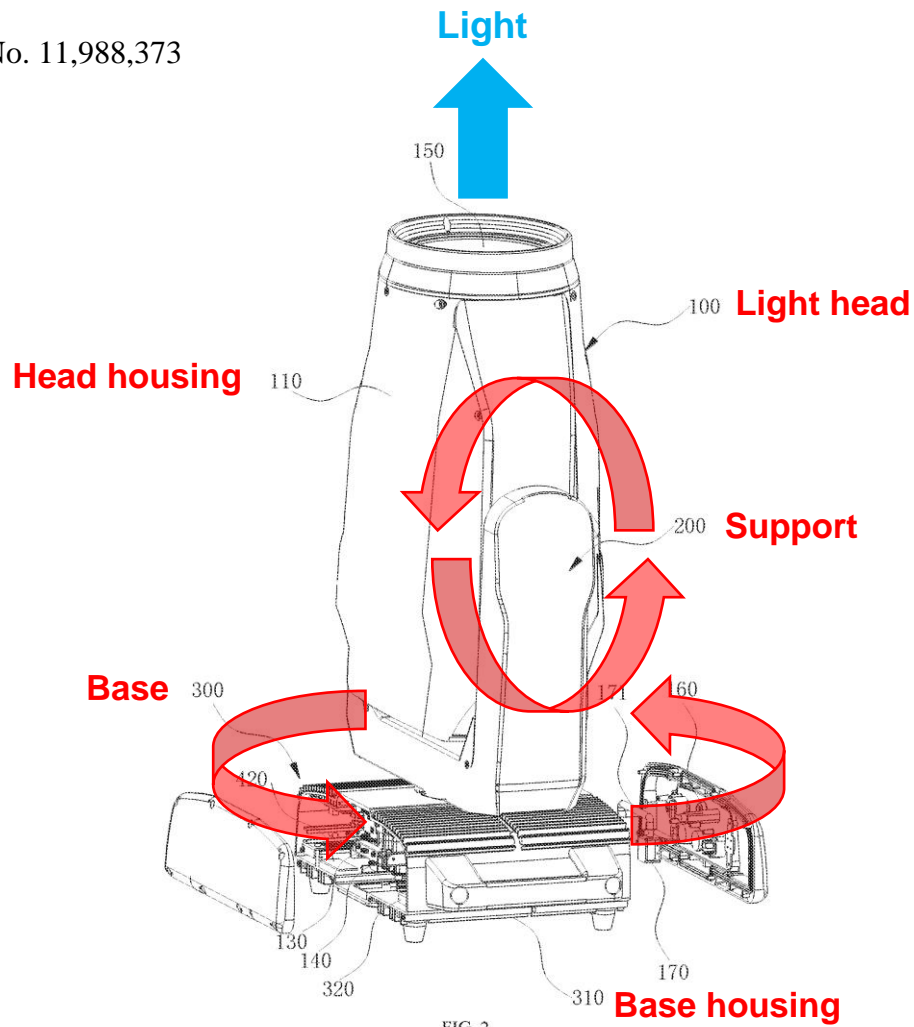
A. Background of the ‘373 Patent

The technology of the ‘373 Patent “relates to stage light fixtures, in particular to a light fixture with self-test ability of sealing.” (EX1001, Technical Field). In other words, the technology relates to stage lighting fixtures with the ability to self-test whether or not the fixture is sealed to external moisture, such as rain and high humidity. (EX1004 ¶ 34.) As explained in the Background,

Generally, in order to adapt to outdoor or specific environment, houses [sic, housings] of the light fixtures are designed into sealed structures, such as that the spliced positions of the houses [sic, housings] are sealed by waterproof strips or waterproof glue. Accordingly, [a] sealing performance test is required before the light fixture leave[s] the factory or after the house [sic, housing] of the light fixture has been maintained. Typically, the method for sealing performance test is to determine the sealing performance by observing the degree of gas leakage, with the house [sic, housing] filled a certain amount of gas. However, such method has disadvantages that it is required to conduct sealing performance test one by one before the light fixtures leaving the factory, which is considered as time-consuming and labor-intensive, and it is inconvenient for sealing performance test subsequent to the maintenance after the light fixtures leaving the factory, due to lack of professional test equipment. In addition, during the use of the light fixtures, the sealing performance of the houses [sic, housings] of the light fixture may be damaged due to the aging of the sealing strip or waterproof glue, or being hit. While such situation will not be known timely by the [sic].

(EX1001, Background, 1:20-44) (emphasis added). Thus, the ‘373 Patent is directed to a light fixture with the capability to self-test whether it is sealed, without using external professional test equipment. (EX1001, Summary, 1:48-51).

Aside from this self-test feature, the light fixture described in the ‘373 Patent is very typical of other controllable stage light fixtures from the 2022-2023 period. (EX1004 ¶ 35.) With reference to Figure 2 of the ‘373 Patent (reproduced below with annotations), the light fixture has a base 300 and support arm 200 which supports a panning and tilting light head 100 having a light source 120 (hidden inside) and a light outlet 150. (EX1001 at 1:14-16, 2:43-48, 6:20-28.)



To enable a self-test of sealing performance, the light fixture includes a temperature sensor 130 and a pressure sensor 140 located in the head housing 110. The light fixture also includes a controller 500 (Fig. 4) configured to receive the sensed temperature and pressure, and determine sealing performance. (EX1001 at 4:32-39.)

As shown below, the head housing 110 also includes a waterproof breathable valve 160 that permits air to escape and prevents water from entering the housing. A switch 170 is controlled by controller 500 to block the valve 160 during testing of

the seals and unblock the valve 160 during normal operation to allow pressure to escape the housing 110. (EX1001 at 4:41-50.)

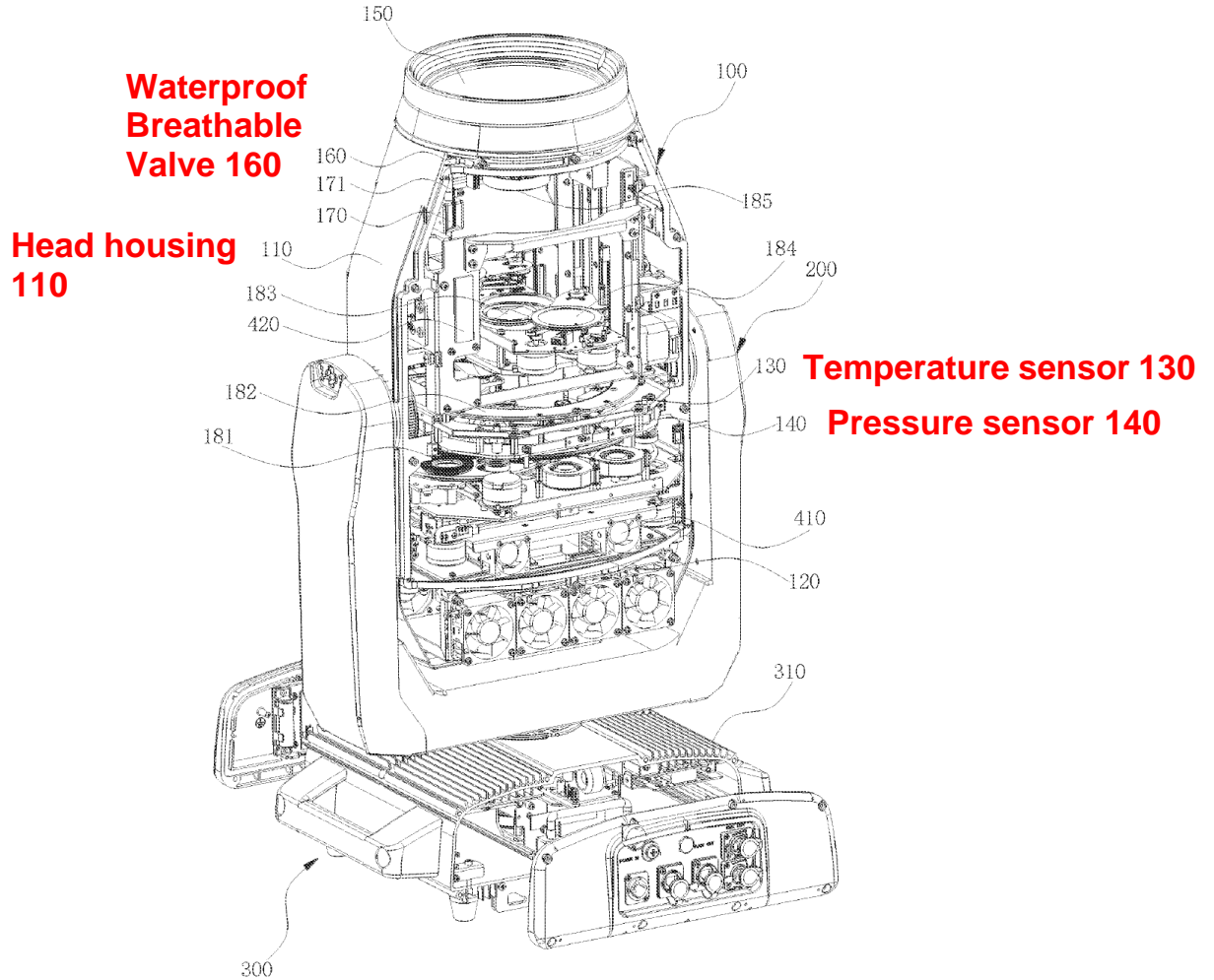


FIG. 1

During testing, when the valve 160 is blocked by switch 170, the light source 150 generates heat, which raises the temperature and internal pressure inside the housing 110. (EX1001 at 4:62-5:2.) Controller 500 can then determine the sealing performance by monitoring the data from the temperature sensor 130 and the pressure sensor 140. If the valve 160 is blocked and heat is applied in the housing

110 by light source 150, pressure should increase as the temperature rises. If it does not, this may indicate a leak or a faulty seal. (EX1001 at 5:19-30.)

B. Prosecution History of the ‘373 Patent

The ‘373 Patent claims priority from Chinese Patent Application Serial No. 202320673598.5, which was filed on March 30, 2023. The United States counterpart application was filed on May 23, 2023 and was assigned Serial No. 18/322,066 (“the ‘066 Application”). (EX1001 at 1.) The ‘373 Patent is therefore subject to the Leahy Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”).

The prosecution history of the ‘373 Patent is attached as Exhibit 1003.

The application for the ‘373 Patent (the ‘066 Application) was originally filed with 11 claims—1 independent claim and 10 dependent claims. (EX1003 at 179-80.)

On September 26, 2023, the USPTO Examiner rejected all 11 original claims. (EX1003 at 83-93.) Claims 1-9 were rejected based on prior art patent publications to Owens (US 2017/0184288) (EX1007) and Hsu (US 2014/0119019) (EX1008). Claim 10 was rejected over Owens in view of Hsu, and in further view of a prior art publication to Bialik (US 2019/0041291) (EX1009). Claim 11 was rejected over Owens in view of Hsu, and in further view of Jiang¹ (US 2021/0095834) (EX1010).

¹ Jiang is the same inventor as in the ‘373 Patent.

The Owens, Hsu, and Jiang references applied by the Examiner were all directed to stage lighting fixtures. The Bialik reference was more generally directed to systems and methods for testing sealing performance in portable electronics (such as weatherproof radios). In his search, the Examiner also found several other prior art references disclosing relevant stage lighting fixtures, such as U.S. Patent No. 11,060,713 (EX1011) (also to Jiang) and U.S. Patent No. 11,143,392 (EX1012) (also to Jiang).

Representative figures from several of the prior art references uncovered during prosecution are reproduced below:

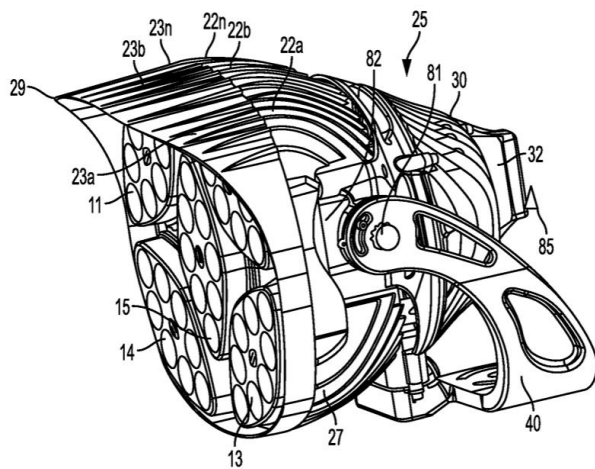


FIG. 2

Owens
US 2017/0184288 (EX1007)

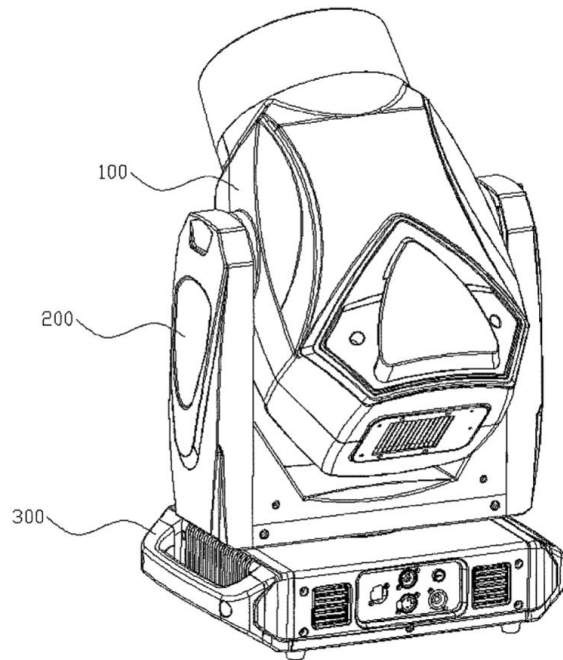


Fig. 1

Jiang
US 2021/0095834 (EX1010)

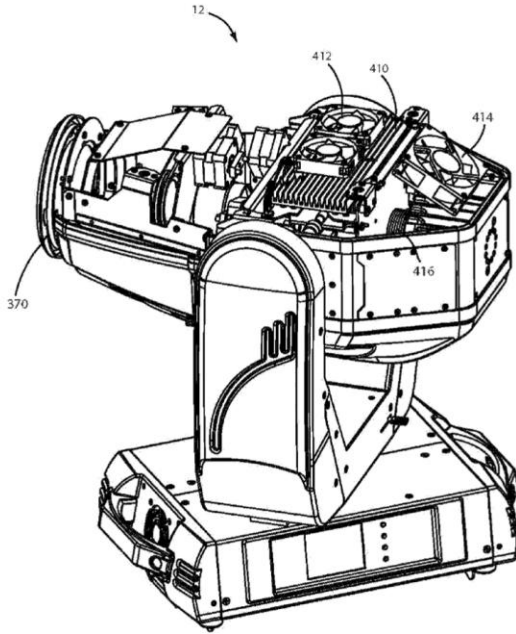


FIG 9

Jurik 2
US 2015/0103353 (EX1006)

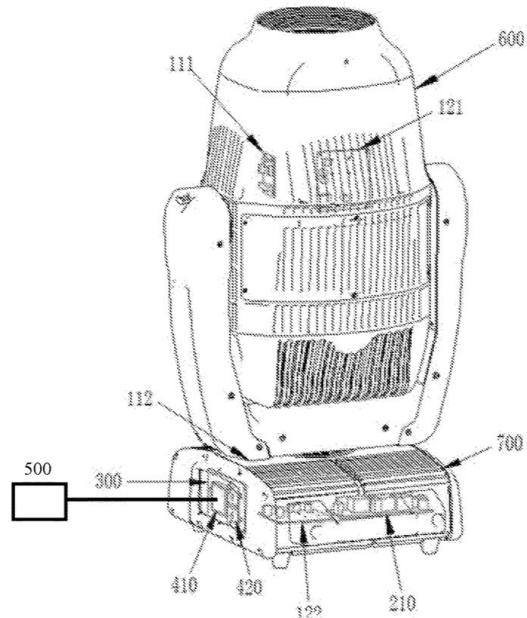


FIG. 4

Jiang
US Pat. 11,143,392 (EX1012)

On December 22, 2023, the Applicant responded to the USPTO’s Office Action. In its Response, the Applicant made significant amendments to independent claim 1, minor amendments to independent claims 9 and 10, and added new claims 12 and 13. (EX1003 at 69-74.)

In this Response, the Applicant amended the last “wherein” clause of independent claim 1 to more particularly specify the configuration of the waterproof breathable valve and the switch that controls the valve. (EX1003 at 72.)

The ‘066 Application was allowed on January 18, 2024. Here, the Examiner made a typographical correction and explained that the reasons for allowance were

primarily the “switch” configured to close the waterproof breathable valve during testing and open the waterproof breathable valve during normal operation. (EX1003 at 16-17 (emphasis added).)

The effective filing date of the ‘066 Application was never at issue during prosecution. The Applicant also did not file any Information Disclosure Statement, nor did the Applicant otherwise disclose any prior art. None of the prior art relied on herein was cited during prosecution.

C. Level of Ordinary Skill in the Art

A person of ordinary skill in the art (“POSITA”) at the time of the assumed effective filing date (March 30, 2023), would have had at least a B.S. degree in mechanical or electrical engineering and would have had at least two years of practical experience designing lighting systems. Alternatively, a POSITA would have at least two years of undergraduate training in a physical science (e.g., engineering or physics) and at least four years of practical experience designing lighting systems. (EX1004 ¶¶ 31-32.)

V. CLAIM CONSTRUCTIONS (37 C.F.R. § 42.104(B)(3))

The ’373 Patent has not yet expired, so the claims should be construed in the same manner as in a civil action, 37 C.F.R. § 42.100(b), where claims are presumptively construed with the ordinary and customary meaning. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). Petitioner does not assert any claim

construction issues because all claims of the ‘373 Patent are invalid under any reasonable construction. *See Nidec Motor Corporation v. Zhongshan Broad Ocean Motor Co. Ltd.*, 866 F.3d 1013, 1017 (Fed. Cir. 2017) (declining to render claim construction “because we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

VI. SUMMARY OF THE PRIOR ART JURIK REFERENCE

As explained in Part VII *Infra*, Claims 1-4, 6, 10, and 11 of the ‘373 Patent are invalid as anticipated by United States Patent No. 12,085,267, titled “System and Method for Controlling the Humidity and Pressure in a Luminaire,” to Pavel Jurik et al. (“Jurik”) (EX1005). All remaining claims of the ‘373 Patent are invalid as obvious over Jurik in view of other prior art. Parts VIII-X *infra*.

The Jurik Patent issued from United States Patent Application Serial No. 18/045,363 that was filed on October 10, 2022, claiming priority on two prior applications filed on June 18, 2022 and September 1, 2022. Jurik was published on December 28, 2023 as United States Patent Application Publication No. 2023/0417402. (EX1005 at 1.)

The Jurik Patent’s actual filing date of October 10, 2022 predates the earliest possible effective filing date of the ‘373 Patent. Accordingly, Jurik is prior art under at least 35 U.S.C. § 102(a)(2). Like the other prior art relied on herein, Jurik was

not disclosed by the Applicant or uncovered by the Examiner during prosecution of the '373 Patent.

In brief overview, Jurik discloses a controllable “luminaire” (or light fixture) that is used in the entertainment and architectural lighting industries (e.g., theatres, television studios, concerts, etc.). (EX1005 at 1:20-22, 1:26-35.) Like the '373 Patent, Jurik discloses a design with built-in features and capabilities to test the sealing performance of the seals on moisture proof housings of the light fixture. (EX1005 at 4:52-63, 6:59-7:911:60-12:28.) Jurik provides an excellent discussion why testing the seals is important to avoid water ingress and potential damage to the light fixture:

If a luminaire (or fixture) is used outdoors or in another area where it is subject to rain, weather, or high humidity it is important to protect any luminaire mechanisms and optical systems from the effects of moisture and humidity. Some fixtures may have sealed housings or semi-sealed housings with pressure equalization. Such fixtures may suffer from effects caused by the thermal operating cycle, as follows. When an automated luminaire is turned on, internal systems such as light sources, electronic circuits, power supplies, and motors generate heat and cause the temperature inside the fixture to rise. Such a rise in temperature produces a corresponding increase in the air pressure within the luminaire.

In some fixtures, this pressure is contained within the luminaire using hermetic seals. The load on such a hermetic seal from such a pressure increase within the luminaire can be significant and the repair and maintenance of the seals may be expensive and/or difficult. A failure in such seals may lead to water ingress into the luminaire, which may lead to damage or degradation of the luminaire mechanisms and/or optical systems.

In other fixtures, the fixture is sealed, but the pressure is allowed to escape through pressure relief valves. However, when such a fixture is powered off and cools down, its internal pressure drops relative to atmospheric pressure outside the fixture and external air (or outside air) and moisture may be drawn back into the luminaire through the seals, the pressure relief valve, or other paths. This too can lead to water ingress to the luminaire or condensation within the luminaire and damage or degradation of the luminaire mechanisms and/or optical systems.

(EX1004 ¶¶ 57-60 (quoting EX1005 at 2:51-3:13).)

Jurik discloses two related embodiments: the embodiment of Figures 1-6 and the embodiment of Figures 7-9, which simply adds a remotely operable air valve 719/819 to the other embodiment. (EX1005 at 9:44-51, 10:15-123, 11:4-7.)

Each of the embodiments disclose a luminaire (light fixture) 200 with a head enclosure 206 that is rotatably mounted on support arms above a motor enclosure 204, which is rotatably mounted on a base enclosure 202, such that the luminaire can pan (horizontally) and tilt (vertically). All three enclosures are sealed and connected together. (EX1005 at 4:4-63.) Annotated Figure 3 (below) depicts the assembled luminaire and annotated Figure 2 (below) depicts a partially disassembled luminaire.

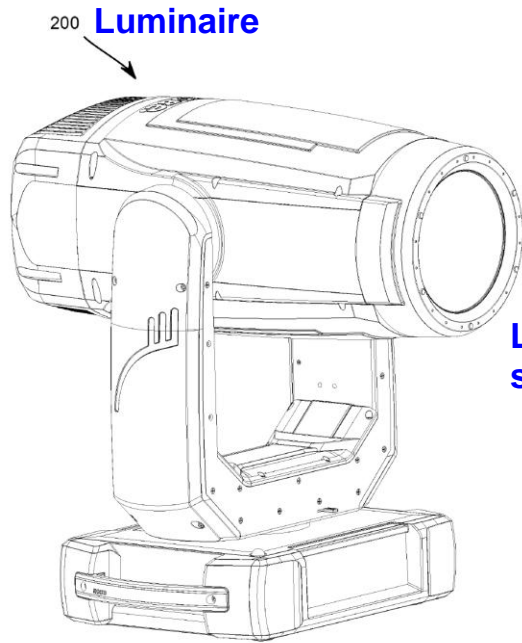


FIGURE 3

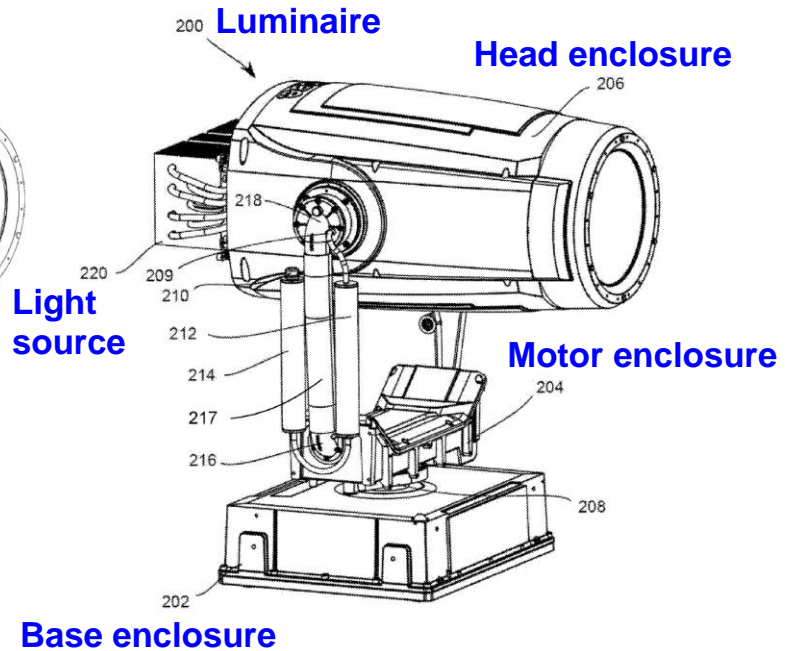


FIGURE 2

(EX1004 ¶ 62.)

The combined enclosure formed by base enclosure 202, motor enclosure 204, and head enclosure 206 is normally vented to atmosphere through vent pipe 209 and drying tubes 212 and 214 (which include a drying agent or desiccant), which exits through an opening covered by a hydrophobic membrane 210 (such as GORE-TEX®) to allow air to pass through, but which reduces or prevents the passage of water or moisture. (EX1005 at 5:24-43.) “Thus, the membrane 210 is configured to remove water droplets from incoming air and the drying agent of the drying tubes 212 and 214 is configured to remove water vapor (or humidity) from incoming air.” (*Id.* at 5:43-46.)

As discussed in connection with Figures 4 and 8, the light fixture control system 400 includes a sensor 424 which measures one or more parameters such as air pressure, air humidity, or air temperature. The sensor 424 (or multiple sensors) may be located in the base enclosure 402, the motor enclosure 404, and/or in the head enclosure 406. (*E.g.*, EX1005 at 7:41-47.)

As noted, Figures 7-9 depict a second embodiment, which simply adds a remotely operable air valve 719/819. The remotely operable air valve may be an electromagnetic valve that is electrically connected to the control system, is positioned between drying tubes 212 and 214, and is configured to pass air when opened (or to block the passage of air when closed). When the remotely operable air valve is closed, it blocks the passage of air between enclosures 202, 204, and 206, and blocks air from passing out to the atmosphere through the membrane 210. (EX1005 at 9:44-61.) When remotely operable air valve 719 is closed, the three enclosures are sealed, such that any air escaping may be assumed to result from faulty sealing of one or more of the enclosures. (EX1005 at 9:55-67.)

Figure 8 from Jurik (reproduced below) is a schematic view of the control system 800 of this second embodiment, including the remotely operable air valve 819. Figure 8 below is annotated to illustrate the light fixture with the valve 819 in the closed position using light blue to indicate the combined sealed enclosures 202, 204, and 206.

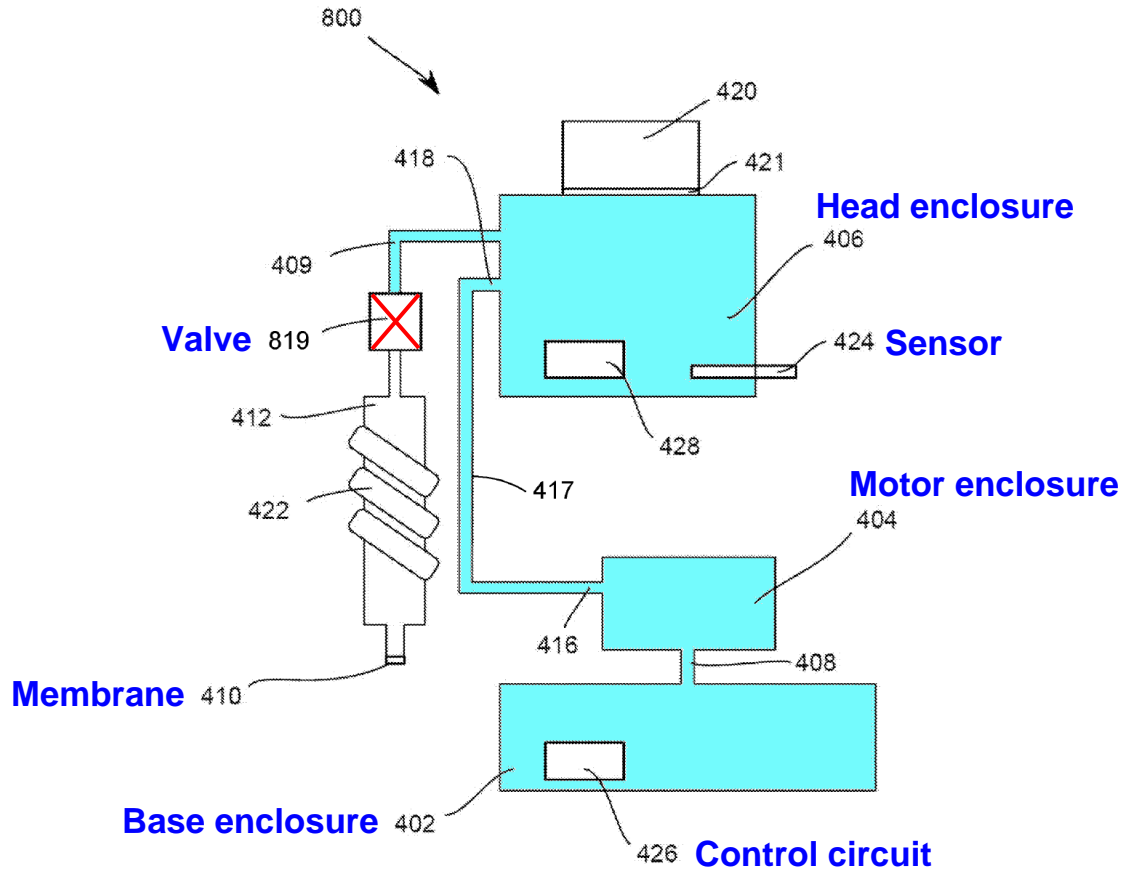


FIGURE 8

(EX1004 ¶ 66.)

Closing the remotely operated valve 719/819 creates a connected, sealed enclosure between enclosures 402, 404, and 406 (enclosures 202, 204, and 206 in the first embodiment). Measuring the pressure inside this connected enclosure while the valve is closed provides a means for the control system (400 or 800) to test whether the seals are adequately air-tight to minimize water ingress into the luminaire. (EX1005 at 10:43-53.) Such a test may be run when the unit is first built or after any maintenance that involves removal of one or more of the panels or covers

of the sealed enclosures. (*Id.* at 10:54-61.) For example, the test may be run upon a command that is entered on an input panel of the luminaire or run automatically each time the unit is powered up. (*Id.* at 10:62-11:3.)

VII. GROUND 1: CLAIMS 1-4, 6, 10, AND 11 ARE INVALID AS ANTICIPATED BY JURIK (US PATENT. NO. 12,085,267)

The prior art Jurik Patent discloses each of the limitations of claims 1-4, 6, 10, and 11 of the '373 Patent. Claims 1-4, 6, 10, and 11 are therefore all invalid as anticipated by Jurik. (EX1004 ¶¶ 68-113 (Wood Expert Decl.) (referring to EX1005).)

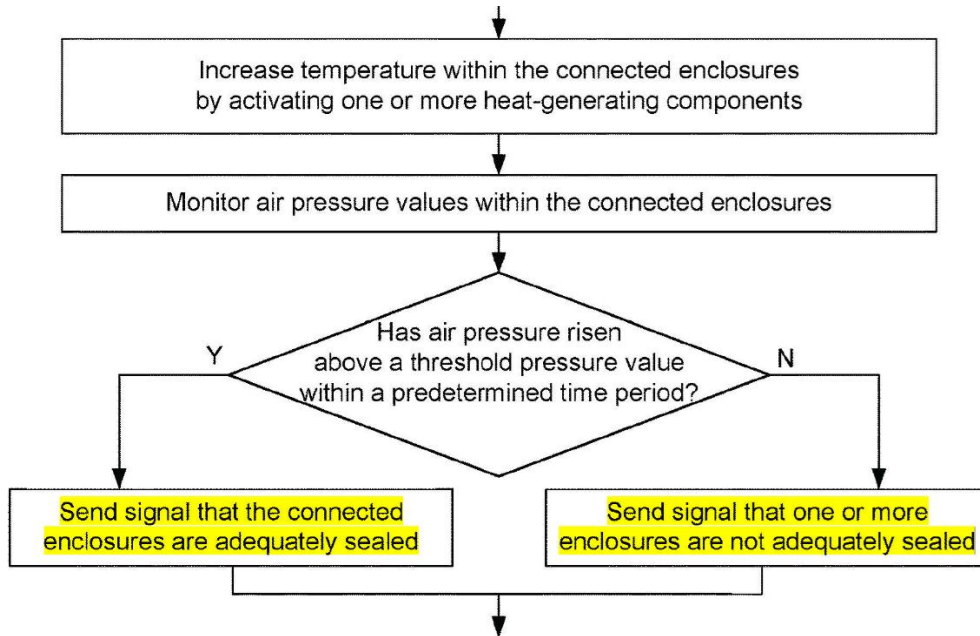
In order to demonstrate that a patent claim is invalid as anticipated, a Petitioner must show that a single prior art reference discloses each and every limitation of the challenged claim, as arranged in the claim. *Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987); *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008) (anticipation requires not only that each claimed element must be present in the asserted reference, but also that the reference teaches the claimed “arrangement or combination” of those elements).

The question whether a prior art reference anticipates is assessed from the perspective of one of ordinary skill in the art. *Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368–69 (Fed. Cir. 2003) (noting that question is whether one skilled in the art would reasonably understand or infer from the prior

art reference that every claim element was disclosed in that single reference). Additionally, “[i]t is well settled that a prior art reference may anticipate when the claim limitations not expressly found in that reference are nonetheless inherent in it.” *Brassica Prot. Prods. LLC v. Sunrise Farms (In re Cruciferous Sprout Litig.)*, 301 F.3d 1343, 1349 (Fed. Cir. 2002). ““Under the principles of inherency, if the prior art necessarily functions in accordance with, or includes, the claimed limitations, it anticipates.”” *Id.* (quoting *MEHL/Biophile Int’l Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999)).

Claim 1: A light fixture with self-test ability of sealing, comprising

Jurik discloses this claim limitation from the preamble to claim 1 of the ‘373 Patent. Jurik’s “luminaire” (luminaire 200/700 as depicted in Figures 2, 3, 5, and 7) is a “light fixture” as recited in claim 1 of the ‘373 Patent. (EX1005 at 1:26-41 (e.g., “light beam [is] emitted from the luminaire”), 4:19-28 (e.g., “light beam that is emitted from the head enclosure 206”).) In fact, Jurik appears to use the terms “luminaire” and “light fixture” interchangeably. (EX1004 ¶ 70 (citing EX1005 at 2:51-3:10).) As discussed throughout the Wood Declaration, Jurik’s luminaire is also configured to self-test its sealing capability. (EX1004 ¶ 70 (citing, e.g., EX1005 at 4:52-63, 5:24-46, 6:59-7:9, 10:43-12:60).) The below excerpt of Figure 10 provides an example:



1a: a light head having a head housing;

Jurik also discloses limitation 1a from claim 1 of the '373 Patent. The luminaire 200/700 from Jurik includes a head with a head housing (head enclosure 206/406). (EX1005 at 4:4-34, 7:10-29, 9:56-67.) The head housing (head enclosure 206/406) is highlighted blue in Figures 3 and 7 from Jurik:

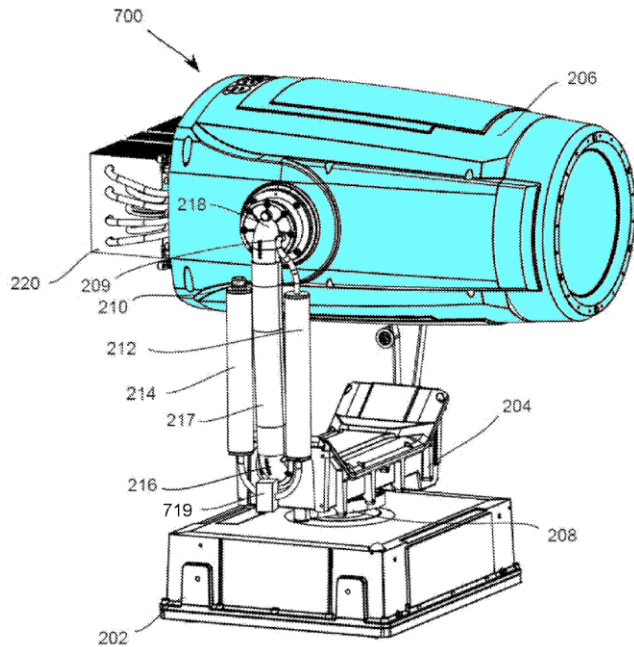


FIGURE 7

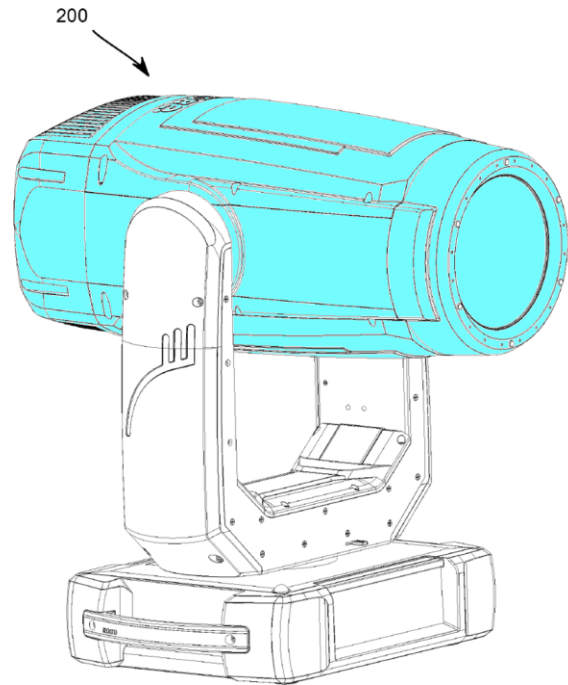


FIGURE 3

(EX1004 ¶ 71.)

1b: a light source for emitting light and generating heat, which is arranged in the head housing, the light emitted by the light source being projected through a light outlet of the head housing;

The luminaire described in Jurik also includes a light source as specified by limitation 1b. “Light source 220” is depicted at the back of head enclosure 206 in Figure 7 (reproduced above). (EX1004 ¶ 72 (citing EX1005 at 4:22-28 (“A light source 220 may be located within the head enclosure 206 or may be external to, but optically coupled with, the head enclosure 206 . . . The light source 220 and the luminaire components produce and modify a light beam that is emitted from the head enclosure 206.”))).)

1c: a temperature sensor and an air pressure sensor for respectively detecting temperature and air pressure inside the head housing, which are arranged in the head housing; and

Jurik further discloses the foregoing temperature sensor and air pressure sensor for respectively detecting temperature and air pressure inside the head housing (Jurik's "head enclosure" 206/406), and which are arranged in the head housing. (EX1004 ¶¶ 73-74.)

"In some embodiments, one or more of the enclosures 202, 204, and 206 may include one or more sensors that are configured to measure characteristics of the enclosure, where the characteristics are selected from, but not limited to, air pressure, air humidity, and/or air temperature." (EX1005 at 6:28-32 (emphasis added).) "The head enclosure 406 includes a sensor 424 that measures one or more parameters such as air pressure, air humidity, or air temperature. . . . In some embodiments, a plurality of such sensors 424 may be included in one or more of the enclosures 402, 404, and 406." (*Id.* at 7:40-47.) Sensor 424 is highlighted in Jurik's Figure 8 below.

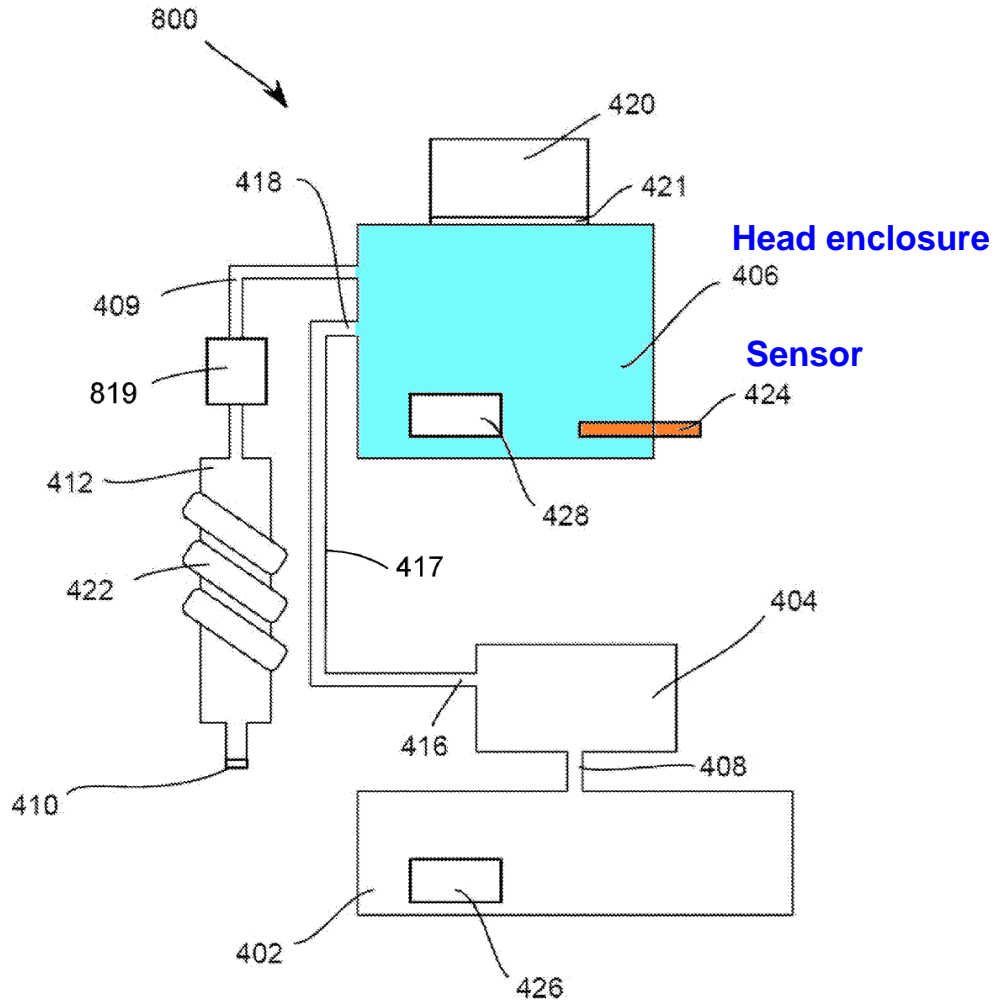


FIGURE 8

(EX1004 ¶ 74.)

1d: a controller configured to determine sealing performance of the head housing based on detection results of the temperature sensor and the air pressure sensor,

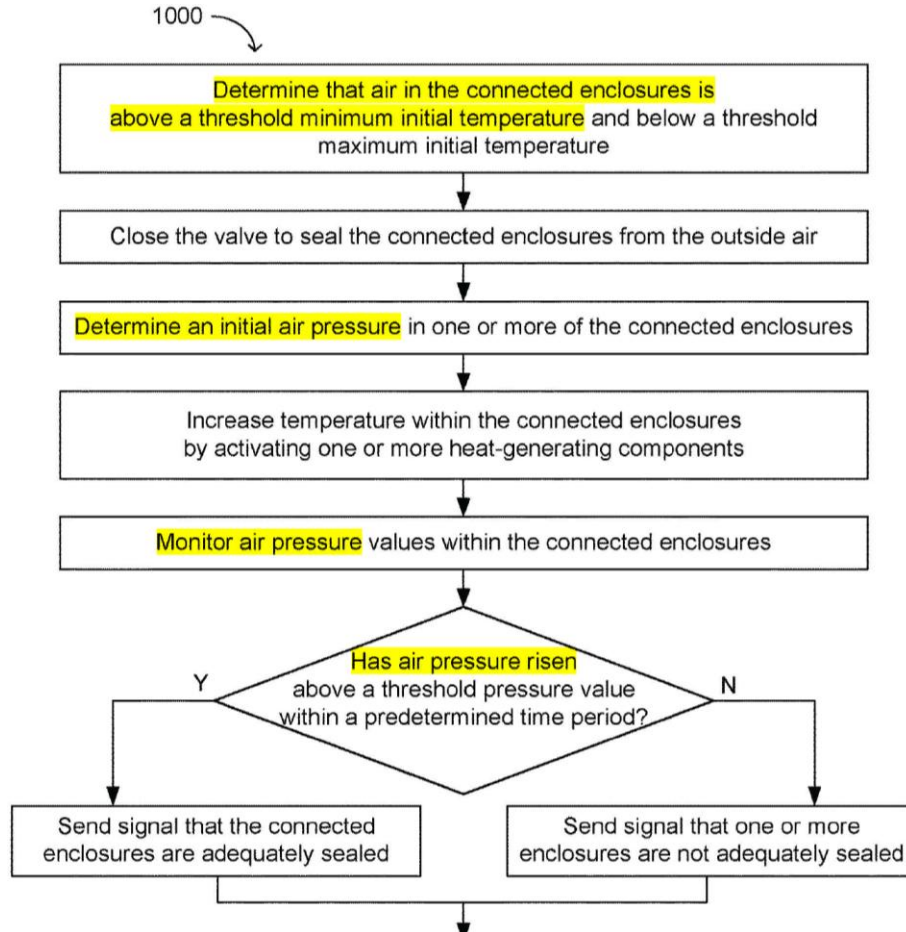
Jurik also discloses this controller limitation 1d from claim 1 of the '373 Patent. (EX1004 ¶¶ 75-77.) The '373 Patent describes a "controller 500, as shown in FIG. 4, . . . [that is] provided for determining the sealing performance of the head housing 110 based on the detection results of the temperature sensor 130 and the air

pressure sensor 140.” (EX1001 at 4:36-39.) However, the ‘373 Patent does not describe any particular structure, configuration, or programming of this “controller 500.” Nor does the file history of the ‘373 Patent clarify the structure of such a “controller.” Thus, the claimed “controller” should have its plain and ordinary meaning. (EX1004 ¶ 74.)

The “control system” from Jurik is a “controller” as recited by limitation 1d from the ‘373 Patent. (*Id.* ¶ 75.) Jurik notes that, “[a]dditionally, in some such embodiments, the control system of the luminaire 200 may determine, based on data from such sensors, whether the sealed enclosures have been effectively sealed (or re-sealed after maintenance).” (EX1005 at 6:59-62.) In fact, Jurik also refers to this “control system” as a “controller.” “FIG. 6 presents a block diagram of a control system (or controller) 600 according to the disclosure.” (*Id.* at 8:61-62 (emphasis added).)

The “control system” of Jurik includes a processor 602 that is coupled to a communications interface 606, which is coupled to one or more sensors 424 measuring temperature and air pressure, as well as coupled to electromagnetic valve 819. (*Id.* at 9:4-30, 10:24-26.) The control system is configured to automatically perform a test to determine the sealing performance of the head housing (enclosure) based on detection results of the temperature sensor and the air pressure sensor.

(EX1005 at 10:62-12:45 (referring to Figures 9 and 10, and discussing a testing algorithm based on data from the temperature sensor and pressure sensor.))



(EX1004 ¶ 77.)

1e: wherein the head housing is provided with a waterproof breathable valve allowing an internal space of the head housing in air communication with an external space of the light fixture; and

Jurik further discloses a waterproof breathable valve as recited by limitation

1e of the '373 Patent. (EX1004 ¶¶ 78-80.)

The '373 Patent describes very little structural detail about a “waterproof breathable valve.” The '373 Patent simply states that “head housing 110 is provided with a waterproof breathable valve 160 allowing the internal space of the head housing 110 in air communication with the external space of the light fixture.” (EX1001 at 4:42-45.) Similarly, the '373 Patent states that “[i]t should be further known that the waterproof breathable valve 160 can prevent water from entering the inside of the head housing 110, but does not affect air to get in or out of the head housing 110.” (EX1001 at 5:15-18.) Aside from listing these basic functions, the '373 Patent does not give any details about the structure of the “waterproof breathable valve.” This suggests that such waterproof breathable valves were well known in the art. (EX1004 ¶ 80.)

The corresponding waterproof breathable valve in Jurik is membrane 210, which is described in much more enabling detail than in the '373 Patent. (*Id.* ¶ 80.) As illustrated in Figure 8 from Jurik (annotated below), a pipe 409 exits the head enclosure 406 and thereby provides a path to vent the head enclosure 406 to the external space or atmosphere. The pipe 409 extends to a valve 819, which exits to a drying tube 412. The terminal end of the drying tube 412 is covered by membrane 410 which permits air to escape from the internal space of the head enclosure 406. However, the membrane 410 also reduces or prevents moisture from entering the drying tube 412, valve 819, pipe 409, and head enclosure 406. The membrane 410

may be made from a hydrophobic material such a GORE-TEX®. (EX1005 at 5:35-44, 7:25-32, 10:18-38.) In an IDS filed during prosecution, the Applicant even disclosed literature from W.L. Gore describing commercially available GORE-TEX valves specifically marketed for use in light fixtures. (EX1014.)

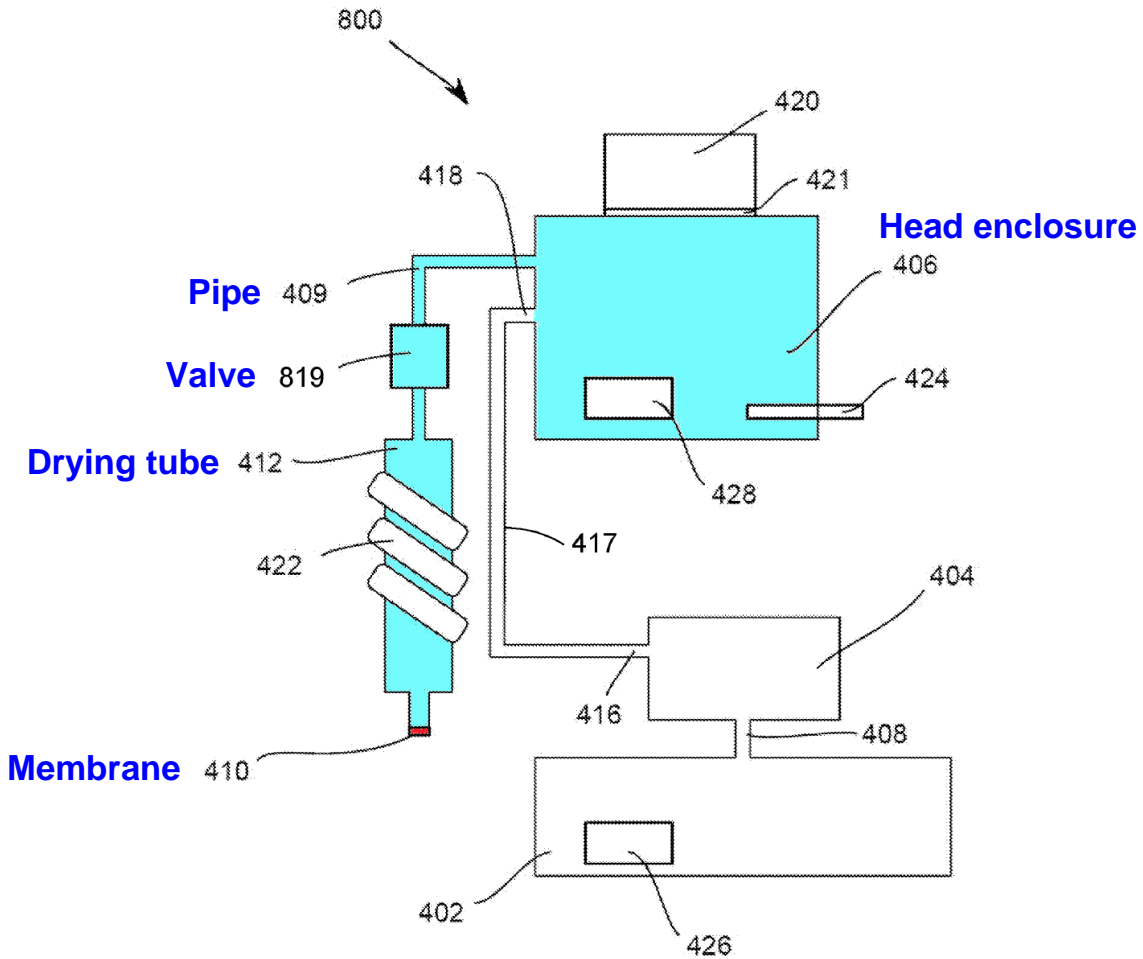


FIGURE 8

(EX1004 ¶ 80.)

1f: a switch is further provided, which is configured to make the internal space of the head housing in air communication with the external space of the light fixture by unblocking the waterproof breathable valve when the light fixture is in normal operation, so as to keep air pressure balance between inside and outside of the head housing, and

The claimed “switch” is described in the ‘373 Patent as “switch 170,” “which is capable of switching between two states by unblocking/blocking the waterproof breathable valve to make the internal space of the head housing 110 in air communicating with the external space of the light fixture or not.” (EX1001 at 4:45-50.) “The switch 170 is preferably in [the] form of an electromagnetic valve, which is connected with the waterproof breathable valve 160 via an air guide pipe 171.” (EX1001 at 8:36-38 (emphasis added).)

Jurik discloses this “switch” limitation as a valve 719/819, illustrated in Figure 8 reproduced above. (EX1004 ¶ 82.) Like the “switch 170” from the ‘373 Patent, the valve 719/819 in Jurik is also an electromagnetic valve. The valve 719/819 is open during normal operation to vent the head enclosure 406 and is closed during testing to seal enclosure 406. (EX1005 at 9:46-61 (e.g., “[T]he connected enclosures 202, 204, and 206 are vented to the outside air through the valve 719”), 10:24-33, 10:43-53, 11:4-12:23 (describing testing steps illustrated in Figs. 9, 10 and noting that the “valve 819 is an electromagnetic valve that is electrically coupled to the control system of the luminaire 700”).)

1g: configured to make the internal space of the head housing not in air communication with the external space of the light fixture by blocking the waterproof breathable valve when the light fixture is in testing of sealing performance.

Jurik also discloses the foregoing limitation 1g from claim 1 of the ‘373 Patent. In Jurik, “[a]ccess panels and covers of the connected enclosures 202, 204, and 206 are configured with seals and, when the seals are functioning as intended, air flows into and out of the connected enclosures 202, 204, and 206 only through the valve 719. Thus, when the valve 719 is closed, if air flows into or out of the connected enclosures 202, 204, and 206, it may be assumed that it is flowing through the seals.” (EX1005 at 9:61-67.) This enables self-testing the sealing performance. (EX 1004 ¶ 83.)

When the valve 719/819 from Jurik is closed for testing, in the same way as the switch 170 from the ‘373 Patent (also an electromagnetic valve), air is then prevented from escaping the head enclosure 406 through the membrane 410 to the external space of the light fixture. (EX1004 ¶ 84 (citing EX1005 at 10:43-53, 11:31-32, Fig. 9.) This step from the testing flowchart in Jurik is highlighted in Figure 9 below:

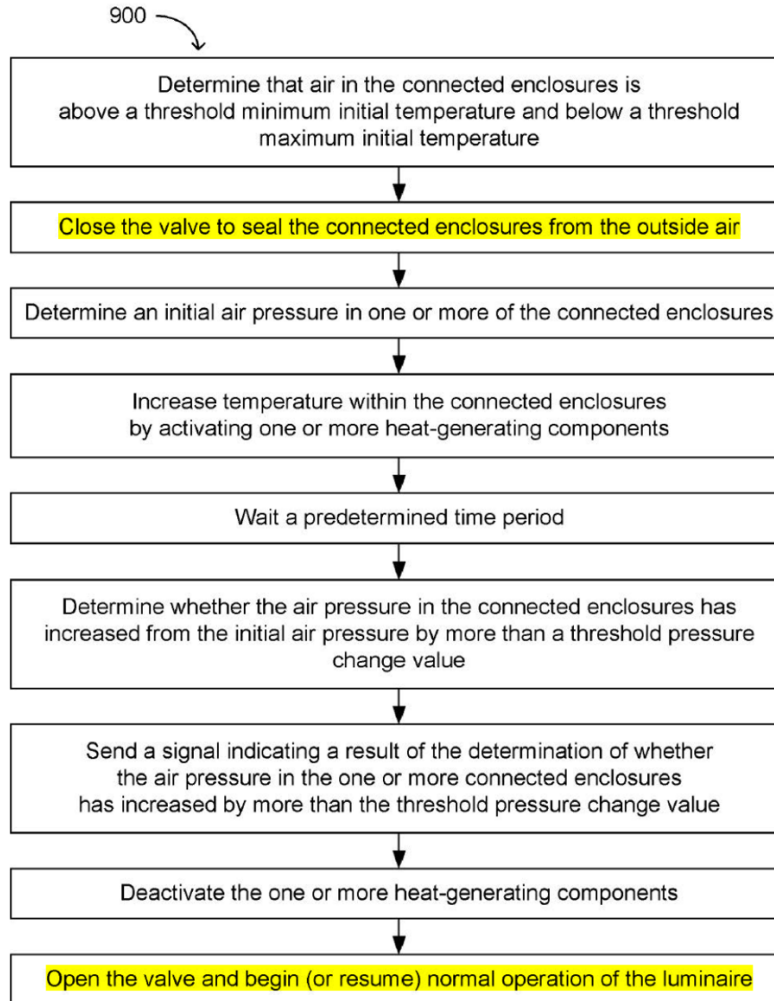


FIGURE 9

Accordingly, claim 1 of the '373 Patent should be cancelled as anticipated by Jurik under 35 U.S.C. § 102.

Claim 2: The light fixture according to claim 1, wherein an effect assembly is further provided inside the head housing, which is configured to receive the light emitted by the light source and generate a light effect.

Like claim 1, dependent claim 2 is also anticipated by Jurik. (EX1004 ¶¶ 86-89.)

“Effect assemblies” such as recited by claim 2 are described in the ‘373 Patent as “common components in the art and will not be described in detail in this disclosure.” (EX1001 at 5:35-49.) Petitioner’s expert Mike Wood agrees that “effect assemblies” were common components. (EX1004 ¶ 87.) Examples of these “effect assemblies” that are briefly mentioned in the ‘373 Patent include a blade module, a color filter module, a pattern sheet module 181, a color sheet module, a shading module 182, a focusing module, a prism module 183, a light homogenizing module 184, or an amplification module 185. (EX1001 at 6:1-10.)

The anticipating Jurik reference also discloses an “effect assembly” as recited by claim 2 of the ‘373 Patent. “The luminaire head of the luminaire 12 comprises an optical system comprising one or more luminaire mechanisms, each of which includes one or more optical devices such as gobo wheels, effects wheels, and color mixing (or other color changing) systems, as well as prism, iris, shutter, and lens movement systems.” (EX1005 at 3:60-65.) These effect assemblies are all well understood, even by persons of only basic skill in the art, to receive the light emitted by a light source and generate a light effect. (EX1004 ¶ 88.)

Accordingly, claim 2 should also be cancelled as anticipated by the prior art Jurik reference.

Claim 3: The light fixture according to claim 1, wherein a light shielding member for intercepting the light emitted by the light source is provided to improve efficiency of heating the inside of the head housing when the internal space of the head housing is isolated from the external space of the light fixture.

Jurik further discloses a “light shielding member” as specified by claim 3 of the ‘373 Patent.

The ‘373 Patent does not appear to require any particular structure for the “light shielding member” of claim 3. The “light shielding member” of claim 3 is discussed in the Detailed Description in connection with Figure 4:

According to a preferred embodiment of the present disclosure, in combination with FIG. 4 , in order to improve the efficiency of heating the inside of the head housing 110 during sealing performance test, a light shielding member 190 for intercepting the light emitted from the light source 120 is further provided inside the head housing 110.

(EX1001 at 5:50-55.) This “light shielding member 190” is only shown as a generic block in the block diagram of Figure 5 (annotated below).

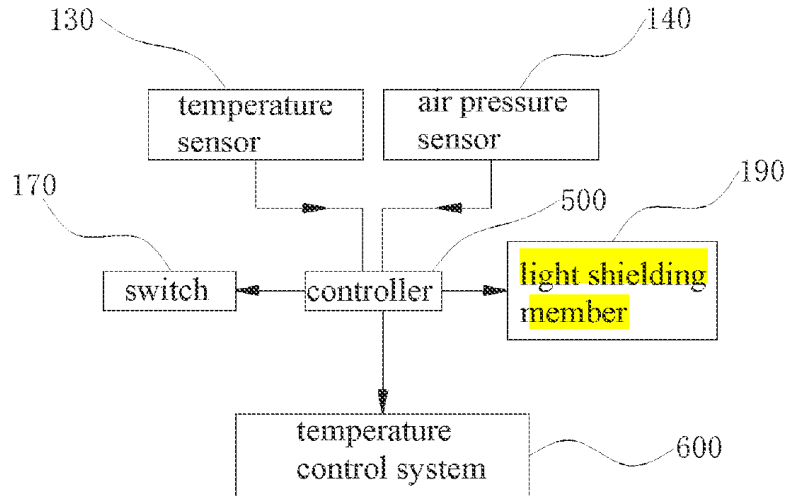


FIG 4

In addition, the ‘373 Patent notes that elements of the effect assembly may also function as a “light shielding member” to block or reduce the light emitted from the head housing.

It should be noted that the light shielding member 190 may be additionally provided, or may be the existing effect assembly, such as the blade module, the color filter module, the pattern sheet module 181, the color sheet module, the shading module 182, the focusing module, the prism module 183, the light homogenizing module 184 or the amplification module 185, as long as the light emitted from the light outlet 150 can be reduced to improve efficiency of heating the inside of the head housing 110 during sealing performance test.

(EX1001 at 6:1-10 (emphasis added).)

The prior art Jurik reference also discloses the “light shielding member” as recited by claim 3. The steps for testing the sealing integrity of Jurik’s luminaire 200 are outlined from column 10, line 43 to column 12, line 23 and the corresponding

flowcharts in Figures 9 and 10. Step 4 of the test in Jurik is to “[i]ncrease the temperature within the connected enclosures 202, 204, and 206 [head enclosure] by activating one or more heat-generating components of the luminaire 700.” (EX1005 at 11:35-37.) During this heating step of the process, “a framing shutter or other light-blocking optical device may be engaged to prevent the luminaire 700 from projecting a light beam.” (*Id.* at 11:45-48 (emphasis added).)

As discussed above in connection with claim 2, the Jurik reference also discloses an effect assembly in the luminaire head which functions to reduce the light emitted from the head. In fact, the “iris” and “shutter” components in the luminaire head of Jurik are stereotypical examples of structures that directly reduce or block the light emitted the luminaire head. (EX1004 ¶ 94 (citing EX1005 at 3:60-65 (“The luminaire head of the luminaire 12 comprises . . . one or more optical devices such as . . . effects wheels, and color mixing (or other color changing) systems, as well as prism, iris, shutter, and lens movement systems.”)).)

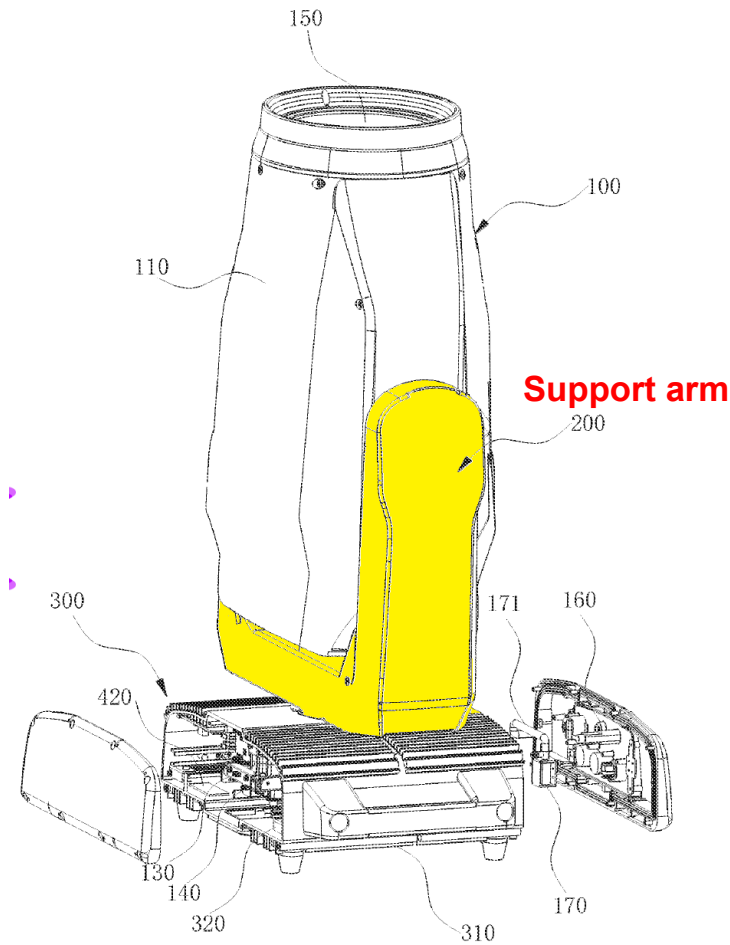
Accordingly, claim 3 should also be cancelled as anticipated by Jurik.

Claim 4: The light fixture according to claim 1, further comprising

The Jurik reference which anticipates independent claim 1 also discloses the limitations of dependent claim 4 of the ‘373 Patent.

4a: a support arm for supporting the light head to rotate, and

The Detailed Description in the '373 Patent describes this "support art" limitation as follows: "As shown in FIG. 1, a support arm 200 for supporting the light head 100 to rotate, and a base 300 for supporting the support arm 200 are further included." (EX1001 at 6-20-22.) The support arm 200 is best shown in Figure 2 from the '373 Patent.



(EX1004 ¶ 97.)

The prior art Jurik reference discloses a support arm for supporting the light head to rotate. (*Id.* ¶ 98.) As shown in Figures 2, 3, and 7, and described in the corresponding text, motor enclosure 204/404 with the attached pipe and tubes 212, 214, and 217 forms a support arm for supporting the head enclosure 206/406 to rotate.

The luminaire 200 includes a base enclosure 202, a motor enclosure 204, and a head enclosure 206. The base enclosure 202 is a portion of the luminaire that is typically fixedly attached to or rests on a supporting structure and remains stationary. . . The motor enclosure 204 may include the motors and associated electronic circuits that control pan and/or tilt motion of the luminaire head. . . The head enclosure 206 moves in a tilt direction relative to the motor enclosure 204, the motor enclosure 204 moves in a pan direction relative to the base enclosure 202.

(EX1005 at 4:11-33.) The “pan” direction discussed in Jurik is a “rotation” direction as recited by claim limitation 4a in the ‘373 Patent. The motor enclosure 204/404 and vertical pipe and tubes 212, 214, and 217 form the shape of a support arm for supporting the head enclosure 206/406 to rotate, as best shown by yellow highlighting in Figure 3 from Jurik below.

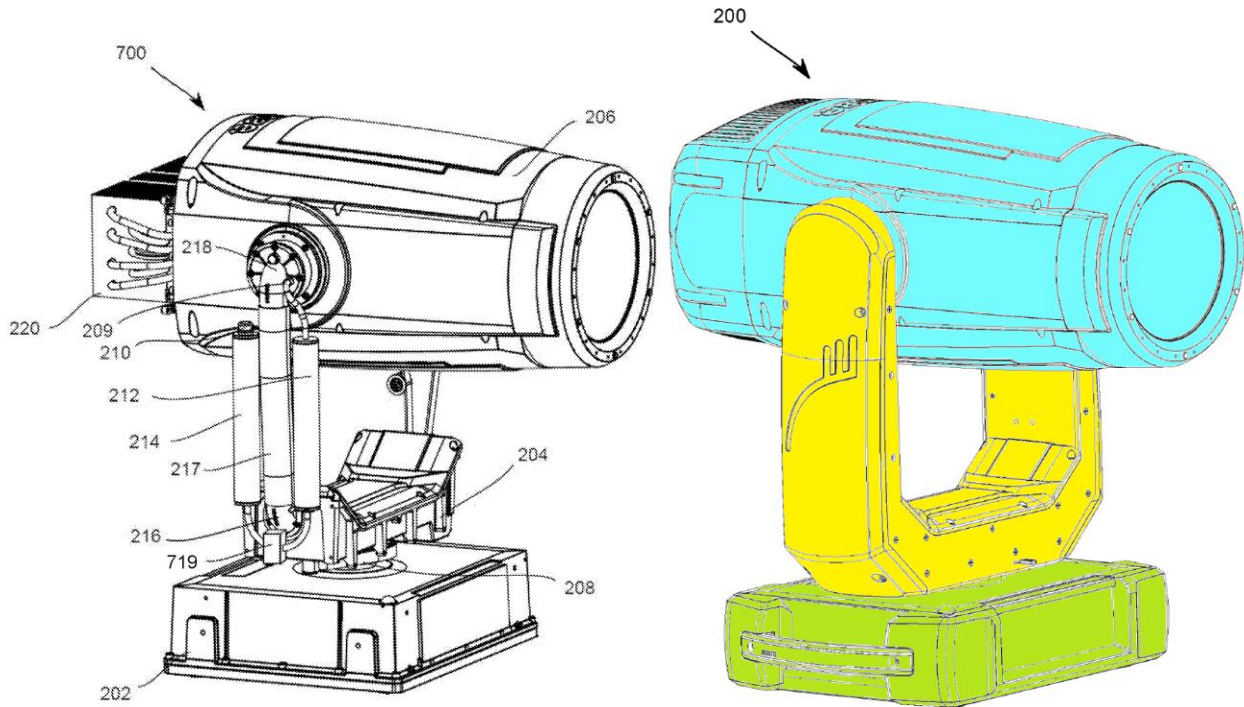


FIGURE 7

FIGURE 3

(EX1004 ¶ 98.)

4b: a base for supporting the support arm, the base having a base housing.

Jurik also discloses a base for supporting the support arm, the base having a base housing, as recited in limitation 4b of claim 4 of the '373 Patent. (EX1004 ¶¶ 99-102.)

In Jurik, the base enclosure 202/402 rests on a supporting structure (such as a stage) and remains stationary. The base enclosure 202/402 houses power supplies, interface electronic circuits, and other control equipment. (EX1005 at 4:11-17.)

The motor enclosure 204/404 in Jurik, with its attached pipe and tubes 212, 214, and 217, are rotatably mounted on the base enclosure 202/402 and form a support arm. (EX1005 at 4:17-19, 4:28-33.)

Accordingly, claim 4 of the '373 Patent should also be cancelled as anticipated by the prior art Jurik reference. (EX1004 ¶¶ 99-102.)

Claim 6: The light fixture according to claim 4, wherein a pipeline is configured to communicate the head housing with the base housing, with a joint therebetween sealed.

Jurik also anticipates the invention of dependent claim 6 of the '373 Patent, which depends from claim 4.

Pipes 208/408 and 217/417 in Jurik form a pipeline configured to communicate a head housing (head enclosure 206/406) with a base housing (base enclosure 202/402), with a joint therebetween sealed (“rotating sealed air coupling”).

In the luminaire 200, the base enclosure 202 is vented to the motor enclosure 204 through a pipe 208 that couples an opening in the base enclosure 202 to an opening in the motor enclosure 204.

The pipe 208 provides a rotatable sealed air coupling between the base enclosure 202 to the motor enclosure 204. . . .

In turn, the motor enclosure 204 is vented to the head enclosure 206 through a pipe 217. The pipe 217 comprises a sealed air coupling at a first end 216 to an opening in the motor enclosure 204 and a rotating sealed air coupling at a second end 218 to an opening in the head enclosure 206. The pipe 217 is configured to pass air from the motor enclosure 204 to the head enclosure 206 through the rotating tilt system on the side of the head enclosure 206.

(EX1005 at 4:60-5:23.) The pipeline is best visible in corresponding pipes 408 and 417 as shown in Figures 4 and 8:

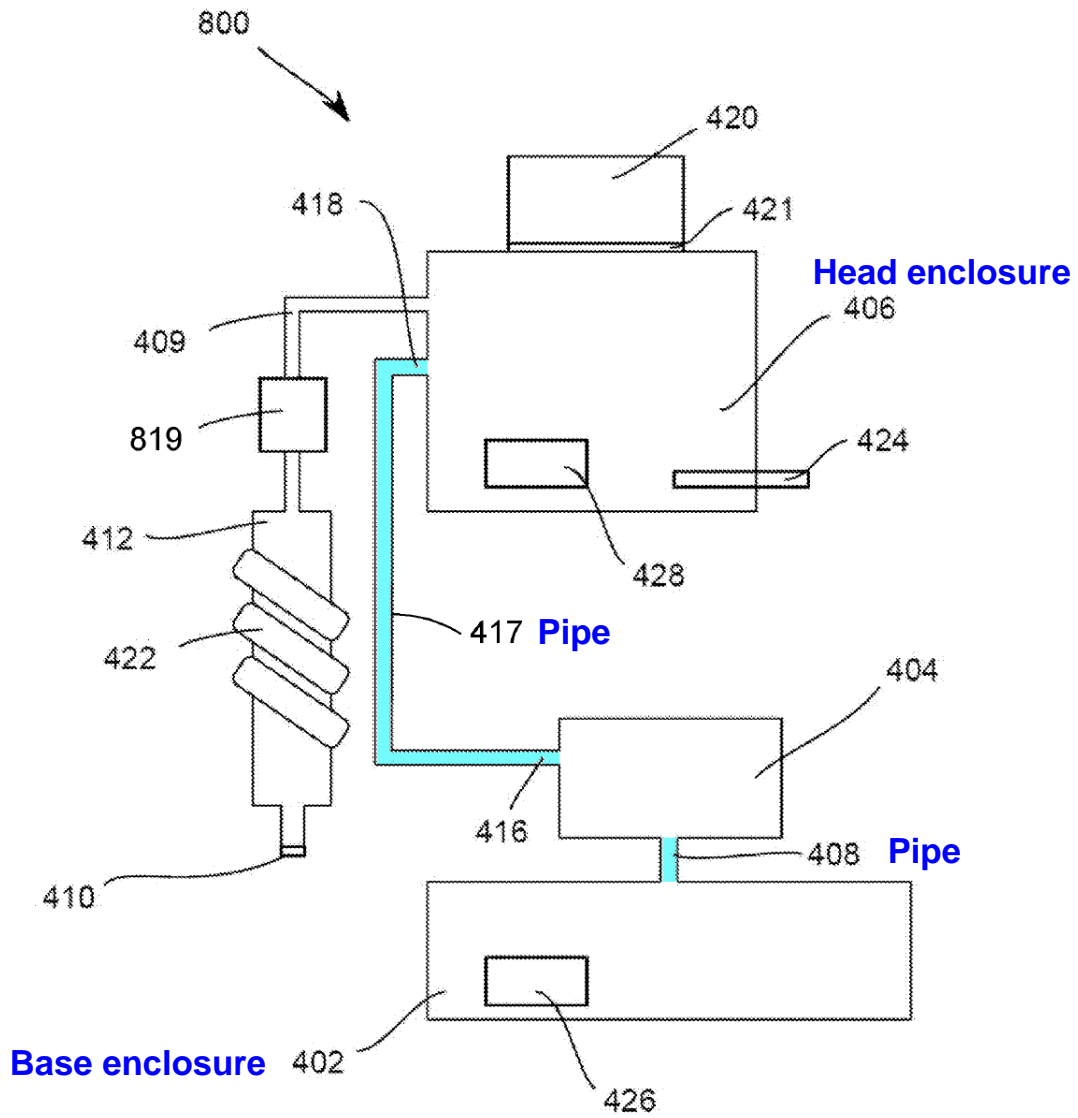


FIGURE 8

(EX1004 ¶ 104.)

Accordingly, claim 6 of the '373 Patent should also be cancelled as anticipated by the prior art Jurik reference.

Claim 10. The light fixture according to claim 1, wherein an auxiliary heating assembly is further provided in the head housing.

The prior art Jurik reference also discloses the invention of claim 10 of the '373 Patent.

The '373 Patent provides only a very sparse or cursory description of an “auxiliary heating assembly 420” and does not describe any particular structure, characteristics, or examples. (EX1004 ¶ 107.) The '373 Patent only mentions that it can be located in the head housing 110 or the base housing 310. (EX1001 at 8:27-35.)

The prior art Jurik reference discloses several heat-generating components that are used in the self-test procedure, including a light source 220 located in the head enclosure 206/406 and a standalone heating element located in any or all of the connected enclosures (including head enclosure 206/406), which clearly satisfies claim 10 of the '373 Patent. (EX1004 ¶ 108.)

4. Increase the temperature within the connected enclosures 202, 204, and 206 by activating one or more heat-generating components of the luminaire 700. The temperature may be increased by performing any or all of the following actions: activating the light source 220, applying a holding current to motors in the motor enclosure 204, activating electronic circuits on printed circuit boards in the connected enclosures, activating power supplies in the base enclosure 202, or activating a

standalone heating element located in any or all of the connected enclosures. In some embodiments, a framing 45 shutter or other light-blocking optical device may be engaged to prevent the luminaire 700 from projecting a light beam during this step of the process.

(EX1005 at 11:35-48 (emphasis added).)

Accordingly, claim 10 of the '373 Patent should also be cancelled as anticipated by the prior art Jurik reference.

Claim 11: The light fixture according to claim 1, wherein the switch is in form of an electromagnetic valve.

Jurik also discloses the invention of dependent claim 11 of the '373 Patent. (EX1004 ¶¶ 110-113.)

The Detailed Description of the '373 Patent discloses that the “switch” as recited in claim 11 is used to open the internal space of the head housing to air communication with the external space of the light fixture, by unblocking the waterproof breathable valve when the light fixture is in normal operation, and that this “switch” may be an “electromagnetic valve.” (EX1001 at 8:36-41.) However, the '373 Patent does not otherwise disclose any particular structure for the “electromagnetic valve.” (EX1004 ¶ 111.)

The Jurik reference clearly discloses this “electromagnetic valve” as recited in claim 11, for example:

The valve 719 may be an electromagnetic valve that is electrically coupled to the control system of the luminaire 200, which may be

configured to open and close the valve 719. Access panels and covers of the connected enclosures 202, 204, and 206 are configured with seals and, when the seals are functioning as intended, air flows into and out of the connected enclosures 202, 204, and 206 only through the valve 719. Thus, when the valve 719 is closed, if air flows into or out of the connected enclosures 202, 204, and 206, it may be assumed that it is flowing through the seals.

(EX 1005 at 9:58-67 (emphasis added).) The valve 719 is open for “normal operation.” (*Id.* at 11:63-64, 12: 22-23.)

Accordingly, claim 11 of the ‘373 Patent should also be cancelled as anticipated by the prior art Jurik reference.

VIII. GROUND 2: CLAIMS 5, 12, AND 13 ARE INVALID AS OBVIOUS OVER JURIK (US PATENT. NO. 12,085,267), OR ALTERNATIVELY, OBVIOUS OVER JURIK IN VIEW OF JOHANSEN (U.S. PATENT NO. 9,777,917)

Claims 5, 12, and 13 of the ‘373 Patent should be cancelled as obvious over Jurik, or alternatively, obvious over Jurik in view of United States Patent No. 9,777,917, titled *Lighting Fixture and a Method of De-Humidifying a Water-Proof LED Lighting Fixture* and naming Peter Johansen as inventor (“Johansen”) (EX1013).

A patent claim is invalid as obvious under 35 U.S.C. § 103 when “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject

matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). Where the elements of a claim are found in a combination of two or more prior art references, “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* at 416. Here, “a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.” *Id.* at 417.

A motivation to combine prior art elements “may be found explicitly or implicitly in market forces; design incentives; the interrelated teachings of multiple patents; any need or problem known in the field of endeavor at the time of invention and addressed by the patent; and the background knowledge, creativity, and common sense of the person of ordinary skill.” *Plantronics, Inc. v. Aliph, Inc.*, 724 F.3d 1343, 1354 (Fed. Cir. 2013) (internal quotations omitted). *See also B/E Aero., Inc. v. C&D Zodiac, Inc.*, 962 F.3d 1373, 1379 (Fed. Cir. 2020) (“[W]e affirm the Board’s conclusion that the challenged claims would have been obvious because modifying the Admitted Prior Art/Betts combination to include a second recess was nothing more than the predictable application of known technology [and] because ‘it would have been a matter of common sense’ to incorporate a second recess in the Admitted Prior Art/Betts combination.”) (quoting Board decision).

By way of example, it is ordinarily obvious to add a second or greater plurality of known component for their known purpose, unless a new and unexpected result

is produced. *In re Harza*, 47 C.C.P.A. 771, 774, 274 F.2d 669, 671 (C.C.P.A. 1960); *Optivus Tech., Inc. v. Ion Beam Applications S.A.*, No. CV 03-2052 SJO (VBKx), 2005 U.S. Dist. LEXIS 44535, at *26-27 (C.D. Cal. Mar. 13, 2005) (adding a known gantry at each treatment station held obvious); *Trans-World Display Corp. v. Mechtronics Corp.*, 437 F. Supp. 692, 698 n.6 (S.D.N.Y. 1977) (“mere adding of plurality of units to it is not a patentable improvement”); *Duke Mfg. Co. v. Low Temp Indus., Inc.*, IPR2021-00415, Paper 58 at 43, 2022 Pat. App. LEXIS 3657, *44 (PTAB Jul. 15, 2022) (finding obvious claim to food display system which simply adds further independently controlled food storage wells).

Claim 5: The light fixture according to claim 4, wherein the base further comprises

As discussed above, Jurik fully discloses the light fixture recited by claim 4 of the ‘373 Patent, including a base enclosure 202/402 (e.g., EX1005 at 4:11-23, 7:14-25, 7:48-50).

5a: a switching mode power supply arranged inside the base housing for supplying power and generating heat; and

The use of a switching mode power supply arranged in the base housing for supplying power and generating heat in stage lighting fixtures would have been obvious over the prior art Jurik reference in view of the knowledge of persons of ordinary skill in the art. (EX1004 ¶¶ 116-29.)

The Jurik reference discloses that the base enclosure 202/402 includes power supplies. (EX1005 at 4:15-16.) A person of even minimal skill in the art would recognize that a power supply as used in Jurik is a device for supplying power. (EX1004 ¶ 117.) The Jurik reference also explicitly discloses that the power supplies in the base enclosure 202/402 are used to generate heat as part of the sealing self-test procedure. (EX1005 at 11:35-43 (step 4: “Increase the temperature within the connected enclosures by . . . activating power supplies in the base enclosure 202”).

The Jurik reference does not explicitly disclose that the power supply is a “switching mode power supply.” However, at the time of the alleged invention, a person of ordinary skill in the art would have recognized that a switching mode power supply was the most common type of power supply used for many years in this type of application, and such a person would have considered it to be a very obvious or well-known implementation detail involving only minimal skill to implement with highly predictable results. (EX1004 ¶¶ 118-29.)

First, by way of background, the specification of the ‘373 Patent suggests that a “switching mode power supply” was a common component in light fixtures. The specification of ‘373 Patent only briefly mentions a “switching mode power supply,” and it does not disclose any particular model, type, structure, characteristics, or

configuration of such a device. In fact, the '373 Patent does not disclose any more detail about the "switching mode power supply" than in the claim language itself.

"FIG. 2 shows the base housing 310 is also provided with a sealing self-test system, similar to the head housing shown in FIG. 1. In this embodiment, the base 300 further includes a switching mode power supply 320 arranged inside the base housing 310 for supplying power and generating heat[.]"

(EX1001 at 4:29-33.) As shown below, reference numeral 320 in Figure 2 simply points to a non-descript portion of the base 300.

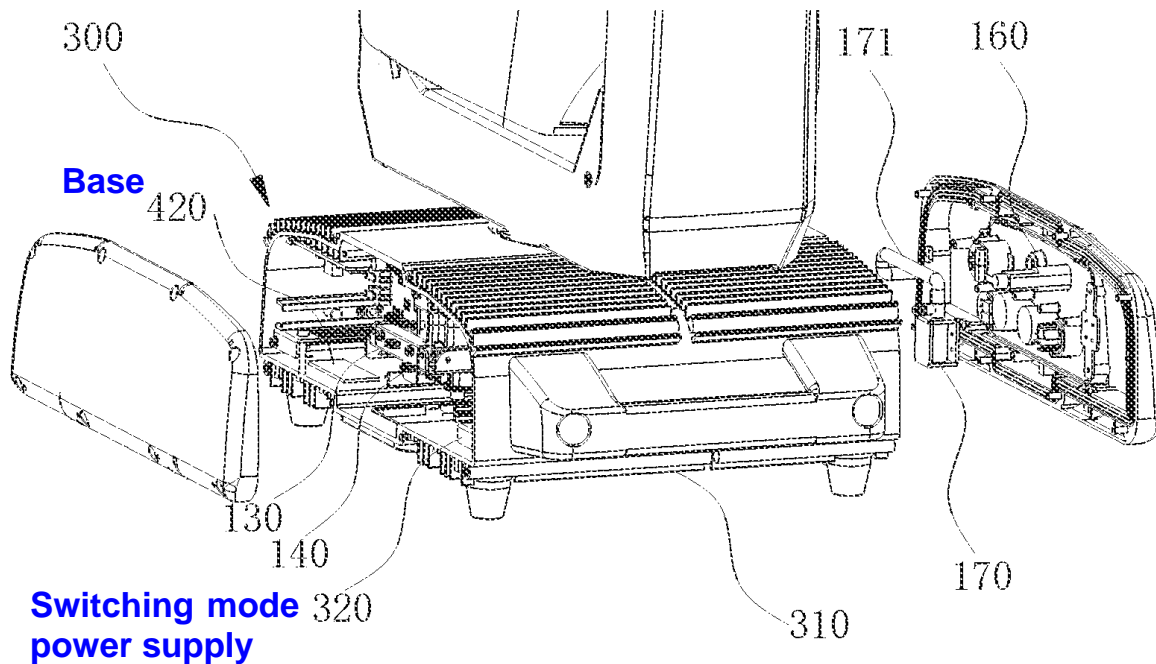


FIG. 2

This very sparse discussion in the '373 Patent correctly indicates that such a switching mode power supply was well known by those with ordinary skill in the relevant art. In fact, switching mode power supplies were well known in the art for

use in many different fields, including enclosed stage lighting fixtures like the fixture claimed by the '373 Patent. (EX1004 ¶¶ 119-20.)

As explained by Petitioner's expert Mike Wood, a power supply is an electronic device that converts the supplied AC power into DC power for use in the electronic components inside the light fixture, such as controllers, motors, effect assemblies, and lighting elements. (EX1004 ¶ 121.)

From at least the late 1990s until present, persons of ordinary skill in the art widely recognized that switching mode power supplies were the most appropriate power supply to use in sealed stage lighting fixtures, due to their smaller size, efficiency, and adaptability to different input voltages. (EX1004 ¶¶ 122-28 (discussing numerous prior art examples of stage lights using switching mode power supplies, and noting that switching mode power supplies are smaller, more efficient, and more easily adaptable to the different input voltages frequently encountered with stage lighting).)

Accordingly, a person of ordinary skill in the art as of March 30, 2023, would have considered it obvious to use a switching mode power supply in a sealed light fixture of the type disclosed in the '373 Patent. (EX1004 ¶ 129.)

5b: an additional temperature sensor and an additional air pressure sensor for respectively detecting the temperature and air pressure inside the base housing,

The prior art Jurik reference discloses an additional temperature sensor and an additional air pressure sensor located in the base housing, as recited by limitation 5b of claim 5. In particular, Jurik discloses that

The head enclosure 406 includes a sensor 424 that measures one or more parameters such as air pressure, air humidity, or air temperature. In other embodiments, one or more of such sensors 424 may be included in the enclosures 402 and/or 404. In some embodiments, a plurality of such sensors 424 may be included in one or more of the enclosures 402 [base enclosure], 404 [motor enclosure], and 406 [head enclosure].

(EX1005 at 7:41-47 (emphasis added).) Enclosure 402 in the prior art Jurik reference is the “base enclosure” corresponding to the “base housing” in the ‘373 Patent. (EX1005, 7:14-25, Fig. 4.)

5c: wherein the base housing is provided with an additional waterproof breathable valve allowing an internal space of the base housing in air communication with the external space of the light fixture; and

A person of ordinary skill in the art would have considered the addition of another waterproof breathable valve in the base housing, as in limitation 5c, to be obvious over Jurik alone, or alternatively, obvious over Jurik in view of Johansen (United States Patent No. 9,777,917) (EX1013).

As discussed in connection with limitation 1e above, Jurik discloses a waterproof breathable valve (membrane 210/410), which allows an internal space of the base housing (base enclosure 202/402) to be in air communication with the external space of the light fixture. However, the waterproof breathable valve disclosed by Jurik is only a single such valve, while limitation 5c above recites an “additional waterproof breathable valve allowing an internal space of the base housing in air communication with the external space of the light fixture.”

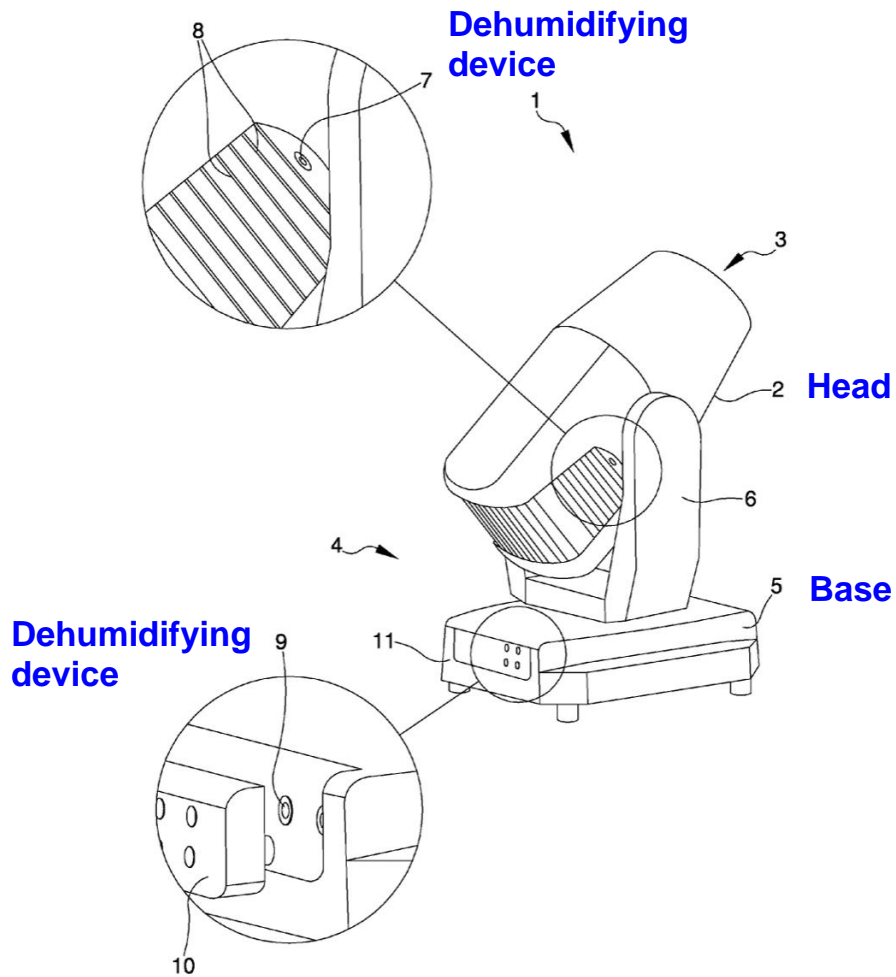
Petitioner’s industry expert Mike Wood testifies that, for two independent reasons, it would have been obvious to simply include a second waterproof breathable valve (like membrane 210/410) in the base enclosure 202/402 of Jurik. (EX1004 ¶¶ 133-38.)

134. First, very sound reasons existed for simply adding a second membrane 210/410 in Jurik, also connected to the base enclosure 202/402 to serve the same purpose as the first waterproof breathable valve. A person of ordinary skill would be motivated to make such a modification in order to allow for additional air outflow capacity, provide redundancy in the event of failure of one membrane, allow for situations where one breathable valve may be overloaded by pressure, and to provide redundancy in the event of a physical blockage of one membrane or in the event that the pipes connecting enclosures become blocked. This simple addition of another membrane at a separate location from the first (with its corresponding electromagnetic valve), duplicating the same structure and function as the first membrane, would not require any special skill or require reconfiguring any other parts of the light fixture. Rather, it would have been obvious to make that simple modification and thereby to expect that it would function successfully (i.e., just like the first membrane). . .

135. Second, a person of ordinary skill in the art of stage lighting would also have considered it obvious to include a second membrane on the base enclosure in situations where a separate humidity and pressure control system is connected to the base enclosure, either due to changes in the configuration of the enclosures, inability to connect all of the enclosures together, or in order to isolate the base enclosure or separately test the sealing ability of the base enclosure. Here, the Jurik reference not only discloses a single connected enclosure 202/402, 204/404, and 206/406, but it also discloses that there may be fewer or additional enclosures. (EX1005 at 4:34-51.) In the situations where such additional enclosures are included and the enclosures could not be connected together into one large connected enclosure, a person of ordinary skill would recognize that a duplicate humidity and pressure control system (including a second membrane) could be easily attached to one or more of the other enclosures, including the base enclosure. There would be no technical difficulty in so locating a second or duplicate membrane on the base enclosure, and a person of ordinary skill would have been confident that doing so would be effective.

Alternatively, it would have been obvious to include a second waterproof breathable valve in Jurik, as is shown by the two environmental control systems attached to both a base enclosure and a head enclosure in the Johansen reference (United States Patent No. 9,777,917) (EX1013). Johansen was issued on October 3, 2017 and is therefore prior art.

Johansen generally discloses a stage or entertainment light fixture that is very similar to the light fixtures disclosed in the '373 Patent and in the prior art Jurik reference. The light fixture includes a closed head 2 and a closed base 5, as shown in Figure 1 reproduced below:



In Johansen, each of closed head 2 and closed base 5 includes its own dehumidifying system. Closed head 2 and closed base 5 each include a separate dehumidifying device (devices 7 and 9), which are created from a polymeric ionic membrane 12 interposed between porous electrodes 13 and 14, and which operate as one-way valve to remove water vapor from ambient air entering the system (i.e., a waterproof breathable valve). (EX1004 ¶ 138 (citing EX1013 at 3:39-66).)

5d: a switch is further provided, which is capable of switching between two states by unblocking/blocking the additional waterproof breathable valve to make the internal space of the base housing in air communication with the external space of the light fixture or not.

As discussed above, it would have been obvious to modify Jurik to add a second waterproof breathable valve on Jurik's base enclosure 202/402. In making this modification, a person of ordinary skill would have recognized that the second waterproof breathable valve would need to be closed off in order to test the sealing performance, in the same way that the existing waterproof breathable valve is closed off. Such a modification would be very simple, requiring only a second electromagnetic valve like the existing valve 719/819. Duplicating these existing components on the base enclosure would involve no special skill and raise no technical issues, such that a person of ordinary skill would expect it to work successfully in precisely the same manner as the first set of components. (EX1004 ¶ 139.)

For all of these reasons, it would have been obvious to modify Jurik to include an additional humidity and pressure control system, including an additional membrane 210/410 on the base enclosure 202/402 and a corresponding valve 719/819, such as shown in Johansen's corresponding use of a separate dehumidifying system on each of the head 2 and base 5. (EX1004 ¶ 140.)

Accordingly, claim 5 of the '373 Patent is obvious over the prior art Jurik reference, or alternatively, obvious over the Jurik reference in view of the prior art Johansen reference. (*Id.* ¶ 141.)

Claim 12: The light fixture according to claim 5, wherein a heat homogenizing assembly is further provided in the base housing.

As discussed above, claim 5 of the '373 Patent is obvious over Jurik, or alternatively, obvious over Jurik in view of Johansen. The limitation added by dependent claim 12 is explicitly disclosed in Jurik by itself, such that claim 12 is also obvious for the same reasons.

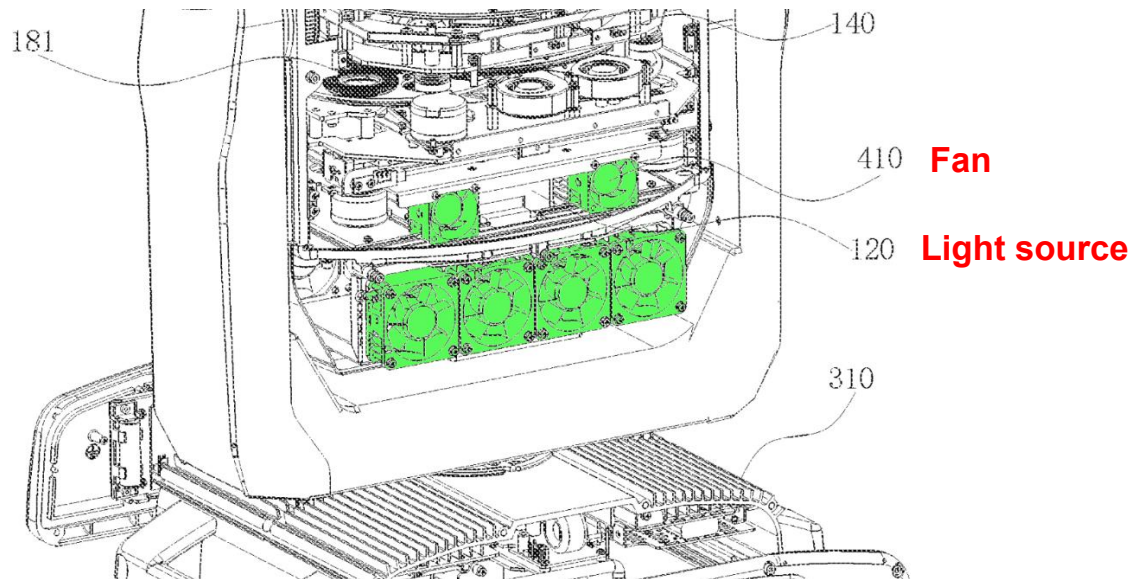
The '373 Patent describes a “heat homogenizing assembly” as recited in claim 12, but it does not describe any particular structure or configuration for the assembly other than summarily state that it could be a fan, cooling fins, or a heat transfer mesh.

Referring back to FIG. 1, according to a preferred embodiment of the present disclosure, a heat homogenizing assembly is further provided in the head housing 110 or the base housing 310. The heat homogenizing assembly can make the temperature inside the head housing 110 or the base housing 310 consistent in every position, as such situation is more conforming to an ideal gas state equation.

The heat homogenizing assembly may be a fan 410 or a heat conducting member, such as cooling fins or a heat transfer mesh.

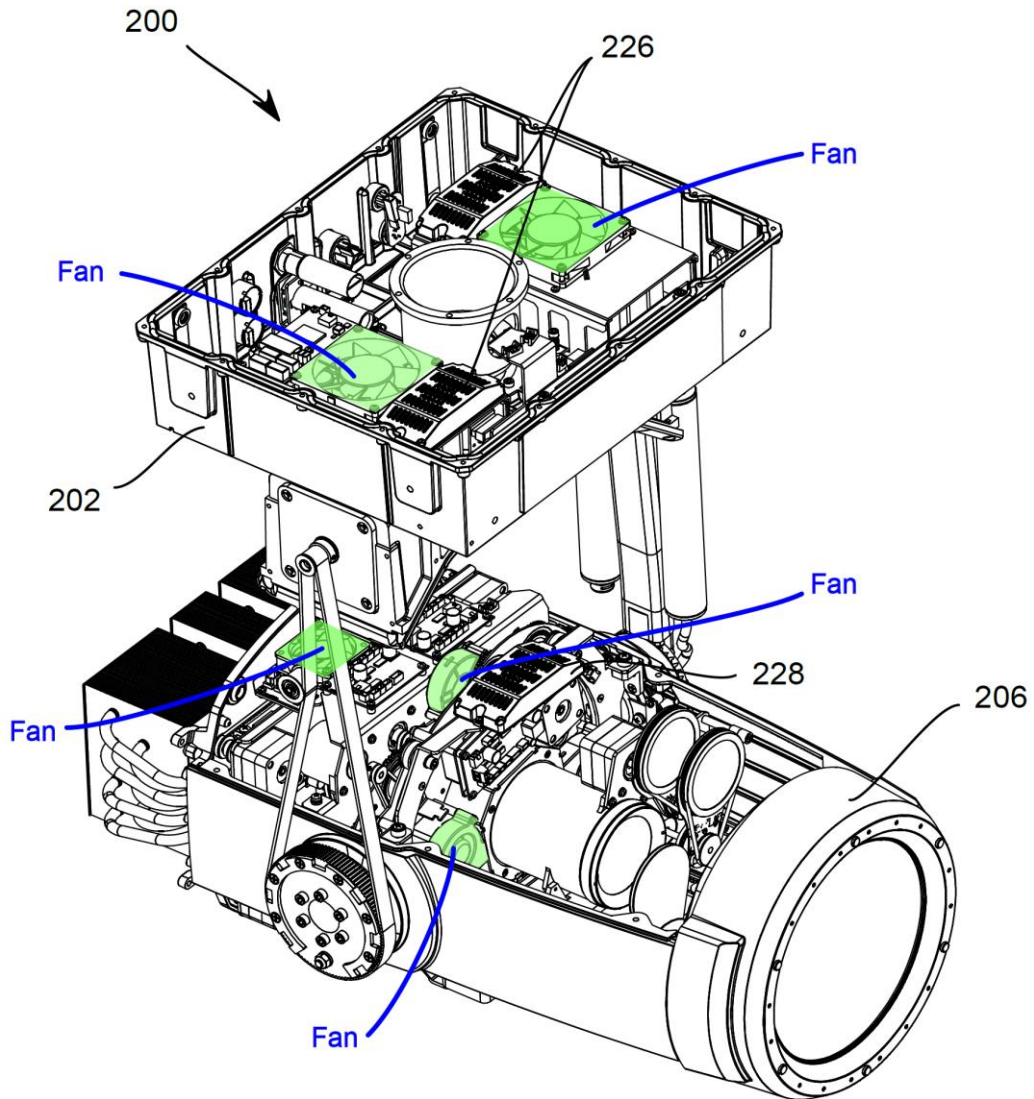
(EX1001 at 8:17-26 (emphasis added).)

For example, in the '373 Patent drawings, unnumbered fins are depicted on the top of the base housing 310. (EX1001 at Fig. 1.) These fins would be one example of a “heat homogenizing assembly” as recited by claim 12 of the '373 Patent. Similarly, a fan 410 is also depicted in the head housing 110 of Figure 1. Several such fans are depicted in Figure 1 and are highlighted in green below. A person of ordinary skill in the art would recognize that these the fins and the fans (depicted as very typical cooling fans) would circulate air inside the base housing 310 and head housing 110, and therefore tend to homogenize heat produced by the hotter components such as the light source 120. (EX1004 ¶ 144.)



The prior art Jurik reference discloses identical cooling fans positioned in the base enclosure 202 as recited in claim 12, as well as in the head enclosure 206. These fans are highlighted in green in Figure 5 from the Jurik reference (reproduced below). A person of ordinary skill in the art would recognize that these fans would

necessarily homogenize heat produced by the hotter components in the base enclosure 202 and head enclosure 206, such as power supplies, light sources, and interface electronic circuits. (EX1004 ¶ 145 (citing EX1005 at 2:58-61 (“When an automated luminaire is turned on, internal systems such as light sources, electronic circuits, power supplies, and motors generate heat and cause the temperature inside the fixture to rise.”), 4:15-17 (“The base enclosure 202 may include power supplies, interface electronic circuits, and other control equipment.”))).)



**Cooling Fans Depicted in the Jurik
Base Enclosure and Head Enclosure
(EX1004 ¶ 144)**

Accordingly, claim 12 should also be cancelled as obvious over Jurik, or alternatively, obvious over Jurik in view of Johansen.

Claim 13: The light fixture according to claim 5, wherein an auxiliary heating assembly is further provided in the base housing.

The limitation of an “auxiliary heating assembly” added by dependent claim 13 is also disclosed by the prior art Jurik reference. (EX1004 ¶¶ 147-50.)

As an example embodiment, the ‘373 Patent describes an auxiliary heating assembly 420 located in the head housing 110 or the base housing 310:

According to a preferred embodiment of the present disclosure, in order to increase the heating rate, an auxiliary heating assembly 420 is further provided in the head housing 110 or the base housing 310.

The auxiliary heating assembly 420 can arrange at the end of the head housing 110 away from the light source 120, or at the end of the base housing 310 away from the switching mode power supply 320. Such configuration facilitates heating more uniform.

(EX1001 at 8:27-35.)

Such an auxiliary heating assembly is also disclosed in the prior art Jurik reference in connection with step 4 of the seal testing procedure 900:

4. Increase the temperature within the connected enclosures 202, 204, and 206 by activating one or more heat-generating components of the luminaire 700. The temperature may be increased by performing any or all of the following actions: activating the light source 220, applying a holding current to motors in the motor enclosure 204, activating electronic circuits on printed circuit boards in the connected enclosures, activating power supplies in the base enclosure 202, or activating a standalone heating element located in any or all of the connected enclosures.

(EX1005 at 35-45 (emphasis added).) A person of ordinary skill would recognize these power supplies and the standalone heating element (both in the base enclosure

202/402) to be an auxiliary heating assembly as recited in claim 13 of the '373 Patent.

Accordingly, claim 13 should also be cancelled as obvious over Jurik, or alternatively, obvious over Jurik in view of Johansen.

IX. GROUND 3: CLAIMS 7 AND 8 ARE INVALID AS OBVIOUS OVER JURIK (US PATENT. NO. 12,085,267)

Claim 7: The light fixture according to claim 6, wherein the pipeline is provided with a blocking device for selectively blocking mutual air flow between the head housing and the base housing.

As discussed above, claim 6 of the '373 Patent is anticipated by the prior art Jurik reference. A “blocking device for selectively blocking mutual air flow between the head housing and the base housing” as recited by claim 7 is not expressly disclosed by Jurik, but would have been obvious over Jurik to a person of ordinary skill in the art. (EX1004 ¶¶ 151-54.)

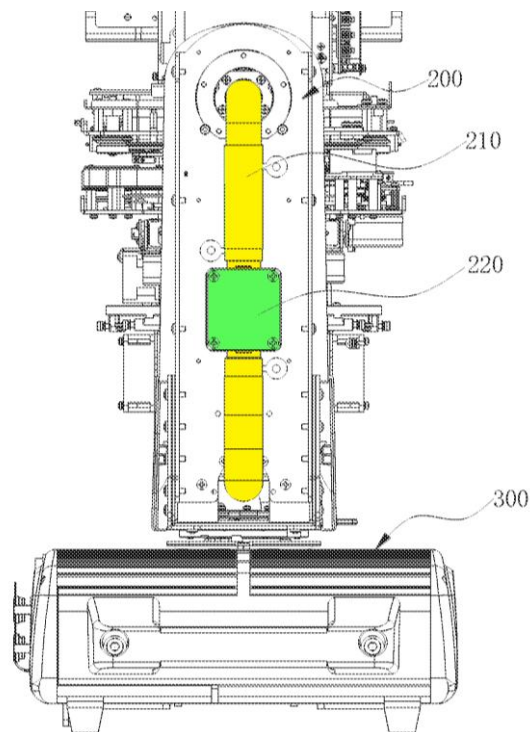
Adding such a blocking device to Jurik would have been a simple matter of adding a second electromagnetic valve (the same as the existing electromagnetic valve 719/819) between the head enclosure and the base enclosure. A person of ordinary skill would have been motivated to do so in order to separately test the head enclosure and the base enclosure in order to isolate the source of any leaks to one or the other of the enclosures, as discussed above. (EX1004 ¶ 151.)

An electromagnetic valve is an example of the “blocking device” recited by claim 7 of the ‘373 Patent:

Additionally, according to a preferred embodiment of the present disclosure, the pipeline 210 is provided with a blocking device 220 for selectively blocking the mutual air flow between the head housing 110 and the base housing 310. With the configuration of the blocking device 220, the mutual air flow between the head housing 110 and the base housing 310 can be blocked, so that the light head 100 and the base 300 can be independent of each other, making the temperature and air pressure therein not affect each other to avoid affecting the respective determination results of the sealing performance of the head housing 110 or the casing housing 310 in the sealing test.

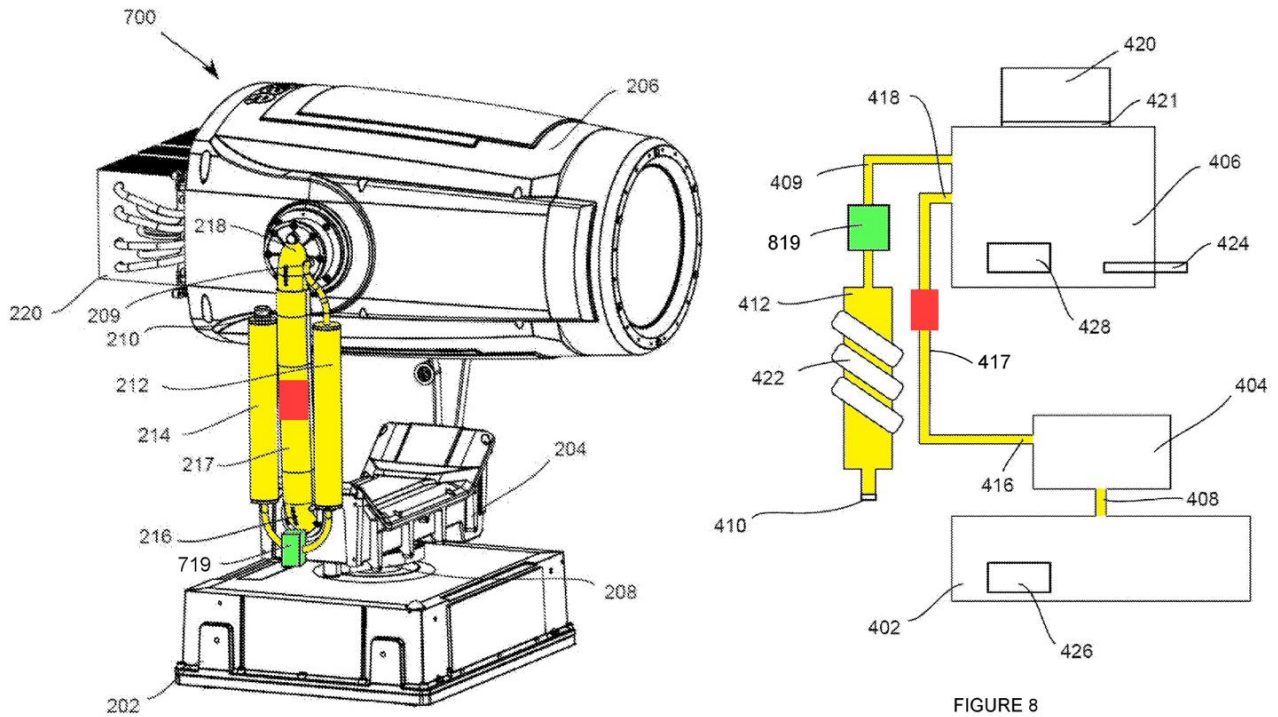
The blocking device 220 may be a sealing plug with a wire hole, or an electromagnetic valve.

(EX1001 at 7:28-42 (emphasis added).) The blocking device 220 and pipeline 210 are depicted in Figure 3 (highlighted in green and yellow, respectively):



(See EX1004 ¶ 152 (discussing annotated Fig. 3).)

Jurik discloses a very similar blocking device in electromagnetic valve 719/819. The electromagnetic valve 719/819 in Jurik selectively blocks air flow between all of the connected enclosures and the drying tube leading to the membrane 210, as shown in annotated Figures 7 and 8 below. A person of ordinary skill in the art would find it obvious to add another electromagnetic valve along pipe 217/417 so as to isolate and test the head enclosure 206/406 separately from the base enclosure 202/402, as indicated by the red highlighted area added to Figures 7 and 8 below from Jurik. (EX1004 ¶ 153.) A person of ordinary skill in the art would have been motivated to make this minor addition to Jurik in order to isolate the leaking enclosure and to save maintenance costs required to replace all of the seals when only one leaking seal needs replacement. (*Id.*)



Accordingly, claim 7 should also be cancelled as obvious over the prior art Jurik reference.

Claim 8: The light fixture according to claim 6, further comprising a temperature control system for synchronously increasing the temperature inside the head housing and the base housing

Claim 8 of the '373 Patent is also obvious over the prior art Jurik reference. As discussed above, Jurik discloses each of the limitations of parent claim 6 of the '373 Patent.

Dependent claim 6 adds the structural limitation of “a temperature control system for synchronously increasing the temperature inside the head housing and the base housing.” In the Detailed Description, the '373 Patent describes a temperature control system 600 simply as a microprocessor or controller connected

to the temperature sensor 130 and pressure sensor 140, as well as connected to the heating elements:

The temperature control system can coordinately control the temperature inside the head housing and the base housing to keep the temperature therein consistent, thus avoiding temperature asynchronous due to mutual influence of air pressure of the head housing and the base housing, such temperature asynchronous may result in inaccurate determination on the sealing performance of the whole system.

[T]he temperature control system 600 includes a microprocessor (which may be replaced by a controller) that coordinates the heating power of heating elements inside the head housing 110 and the base housing 310, and the temperature sensor 130. In such configuration, the temperature detected by the temperature sensor 130 can synchronously increase by controlling the heating power of the respective heating elements, thus achieving both synchronously change of the temperature and air pressure inside the head housing 110 and the base housing 310.

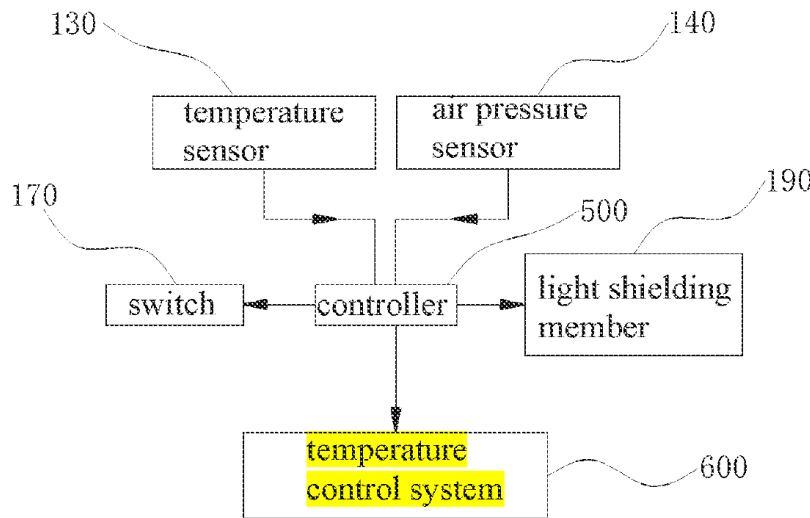


FIG. 4

(EX1001 at 3:49-56, 8:6-16, Fig. 4 (highlighting added).)

Claim 8 does not recite any particular steps, programming, or methodology that would “synchronously” increase the temperature. Likewise, the remainder of the specification of the ‘373 Patent does not describe or suggest any particular steps, programming, or methodology that would “synchronously” increase the temperature. Given this very scant discussion of “synchronously” in the ‘373 Patent, it appears that the claim term “synchronously” was intended to have its general or ordinary meaning, as increasing the temperature in the base housing and the head housing “at the same time.” (EX1004 ¶ 157 (citing Merriam-Webster Dictionary definition of “synchronous” (available at <http://www.merriam-webster.com/dictionary/synchronous>) (EX1021).)

If a more particular meaning of “synchronously” was intended, such as constantly maintaining equal temperature in the base housing and the head housing, then a person of ordinary skill in the art would expect the ‘373 Patent to disclose some type of programming steps, flowcharts, or particular controller feedback and sensor filtering routines, as would be necessary to control the temperature in some manner other than simply increasing the temperature in the head housing and the base housing “synchronously,” meaning “at the same time.” (EX1004 ¶ 157.)

The prior art Jurik reference discloses the “temperature control system” from claim 8 as control system 600, with a processor and control interface coupled to the sensors in order to control the seal testing process:

The control system 600 is suitable for use to control the systems of a luminaire comprising a luminaire humidity and pressure control system according to the disclosure. . . . The processor 602 is also coupled via a control interface 608 to one or more sensors 424, motors, actuators, controls, heater 422, and/or other devices. . . .

Via the control interface 608, the processor 602 is further electrically coupled to and in communication with temperature, humidity, and/or pressure sensors such as the sensor 424. . . .

The valve 819 is an electromagnetic valve that is electrically coupled to the control system of the luminaire 700, which is configured to open and close the valve 819. . . .

The control system 600 of the luminaire 700 may be configured to perform the test automatically when the luminaire 700 is initially powered up.

(EX1005 at 8:61-9:30, 10:66-11:1.)

Importantly, the seal testing process performed by the control system 600 includes a Step 4 that involves increasing the temperature in the sealed “enclosures” (plural), comprising:

4. Increase the temperature within the connected enclosures 202, 204, and 206 by activating one or more heat-generating components of the luminaire 700. The temperature may be increased by **performing any or all of the following actions**: activating the light source 220, applying a holding current to motors in the motor enclosure 204, activating electronic circuits on printed circuit boards in the connected enclosures, activating power supplies in the base enclosure 202, or activating a standalone heating element located in any or all of the connected enclosures. In some embodiments, a framing shutter or other light-blocking optical device may be engaged to prevent the luminaire 700 from projecting a light beam during this step of the process.

(EX1005 at 11:35-48 (emphasis added).) These heating elements are located in both the base enclosure and the head enclosure. By way of example, the light source is located in the head enclosure 206/406 and the power supplies are located in the base enclosure 202/402. (EX1004 ¶ 159.) Thus, activating all of the heating elements during the testing procedure would activate heating elements in both the base enclosure 202/402 and the head enclosure 206/406, thus increasing the temperature in both enclosures. (*Id.*)

The Jurik reference does not explicitly state that the control system 600 is configured to activate the heating elements in the base enclosure 202/402 and the head enclosure 206/406 “at the same time,” but a person of ordinary skill in the art would have considered it obvious to do. It would have obvious to activate the heating elements at the same time in order to more evenly heat all internal areas of the connected enclosures (and avoid a hot spot caused by using only one element). In addition, it would have been obvious to activate the heating elements at the same time so as to reduce the time required to sufficiently increase the temperature inside the connected enclosures so as to adequately test the sealing performance. (*Id.* ¶ 160.)

For all of these reasons, a person of ordinary skill would have considered it obvious configure the control system 600 of Jurik to synchronously increase the

temperature inside the head enclosure and the base enclosure, as specified by claim 8 of the '373 Patent. (EX1004 ¶ 161.)

X. GROUND 4: CLAIM 9 IS INVALID AS ANTICIPATED BY JURIK (US PATENT. NO. 12,085,267), OR ALTERNATIVELY, INVALID AS OBVIOUS OVER JURIK IN VIEW OF JURIK 2 (U.S. PATENT APPL. PUBL. NO. 2015/0103553)

Claim 9: The light fixture according to claim 1, wherein a heat homogenizing assembly is further provided in the head housing.

As discussed above, the prior art Jurik reference anticipates the invention of independent claim 1 of the '373 Patent. Claim 9 depends from claim 1 and adds the limitation “wherein a heat homogenizing assembly is further provided in the head housing.” As discussed above in connection with claim 12, the prior art Jurik reference discloses heat homogenizing assemblies (fans) in both the base enclosure 202, as well as in the head enclosure 206 as recited in claim 9. Part VIII, Claim 12 *supra*. Accordingly, claim 9 of the '373 Patent is invalid as anticipated by Jurik.

Alternatively, the invention of dependent claim 9 would also have been obvious to a person of ordinary skill over Jurik in view of United States Patent Application Publication No. 2015/0103553 A1 (“Jurik 2”) (EX1006).

As discussed above in connection with claim 12, the Jurik reference discloses a heat homogenizing assembly (several cooling fans) positioned in the base enclosure 202 and the head enclosure 206. (EX1005 at Fig. 5.)

In fact, using such cooling fans inside the enclosures of electronic devices, including head enclosures of stage lighting fixtures, was an exceedingly common practice in the 2022-2023 timeframe. It was so common that any person of ordinary skill who sought to make a sealed light fixture as described in the Jurik reference would very likely have included one or more such cooling fans in the head enclosure, even without any discussion in the Jurik reference. (EX1004 ¶ 165.) Thus, it is not unusual that the cooling fans in Jurik might appear in the drawings, but are not discussed in the Detailed Description.

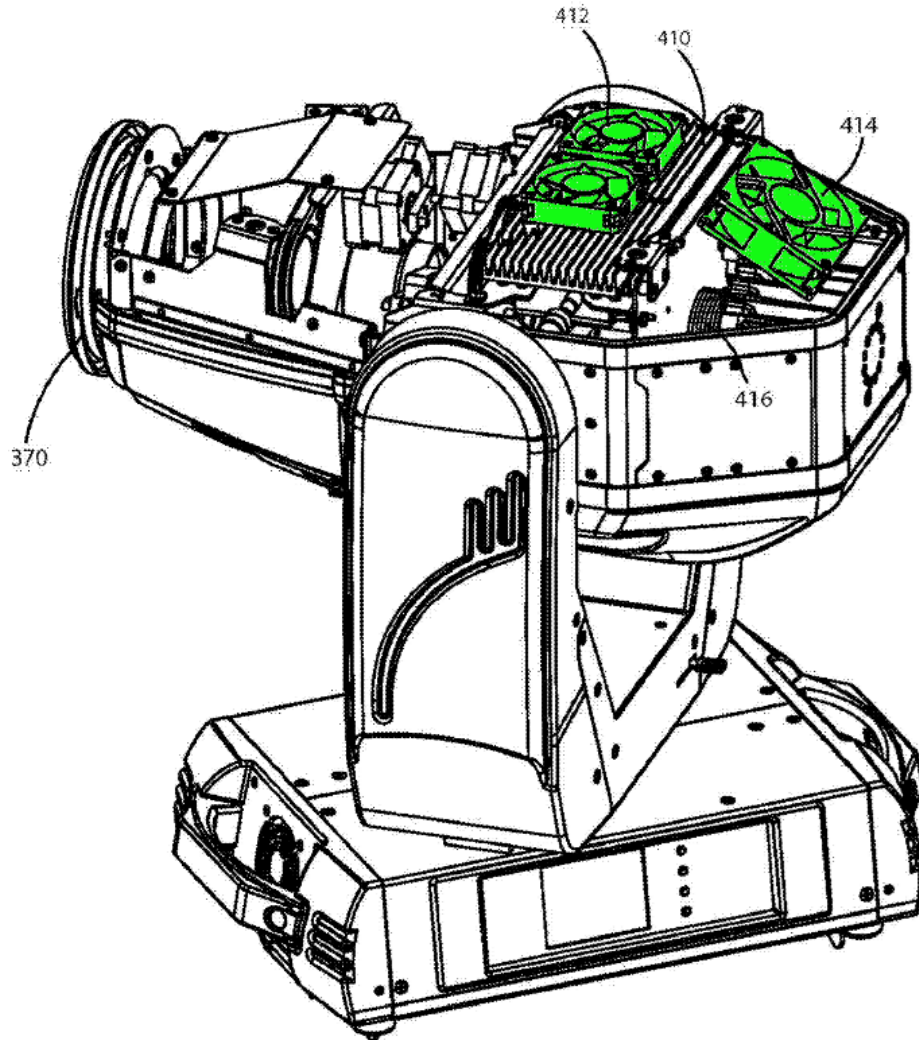
Such cooling fans are depicted in the drawings and discussed in the detailed description from a much earlier patent publication by the same inventor, Pavel Jurik. The Jurik 2 reference was published on April 16, 2015. (EX1006 at 1.) Accordingly, it is also prior art to the '373 Patent.

The Jurik 2 reference discloses another automated luminaire or light fixture typically used for stage lighting, much like the light fixtures described in the other Jurik reference and in the '373 Patent. (EX1004 ¶ 167.)

The original Jurik reference discloses that the light source 220 produces heat and even suggests activating the light source 220 in order to raise the temperature inside the head enclosure 206/406 during testing. (EX1005 at 11:35-40.) Thus, even during normal operation of the light fixture, a person of ordinary skill would

anticipate the need for a cooling fan in the head enclosure 206/406 of Jurik. (EX1004 ¶ 168.)

An example of such a cooling fan in the head enclosure is depicted in Figure 5 from Jurik, as well disclosed in both the drawings and detailed description of the Jurik 2 reference. Part VIII, Claim 12 *supra* (citing EX1004 ¶ 144). *See also* Jurik 2, EX1006 at Fig. 9, ¶ [0045] (describing fans 412/414).



(EX1006 at Fig. 9 (annotated in green).)

It is likely that the cooling fans depicted only in the drawings of Jurik were not also described further in the Detailed Description only because such cooling fans were a very common implementation detail that no reasonable inventor would expect to help show patentability. Rather, cooling fans were so routine that it would not be necessary or even helpful to describe them in a patent application. (EX1004 ¶ 170.)

Industry expert Mike Wood discusses several additional prior art examples of fans used to circulate air and homogenize heating in the head assembly of stage lighting fixtures. (EX1004 ¶ 171.) Mr. Wood testifies that the use of cooling fans to circulate air in a head assembly of a stage light fixture was very well known in art of stage lighting. Such fans were routine and widespread among most such fixtures. A person of ordinary skill in the art would thus have been motivated to include such a fan in the head enclosure of Jurik to use it for the same purpose as in the numerous other prior art examples of cooling fans.

Accordingly, claim 9 should be cancelled as anticipated by the Jurik reference. Alternatively, claim 9 should be cancelled as obvious over the Jurik reference in view of the Jurik 2 reference.

XI. CONCLUSION

For all of these reasons, Petitioner respectfully requests institution of *Inter Partes* Review and cancellation of all claims of the '373 Patent.

Respectfully submitted on this 13th day of June, 2025.

/Thomas L. Warden/
Thomas L. Warden
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Lead Counsel for Petitioner

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing *Petition for Inter Partes Review of U.S. Patent No. 11,988,373*, together with all referenced exhibits and a Power of Attorney, have been served in their entirety on June 13, 2025, in accordance with 37 C.F.R. § 42.205(a) and (b) using Priority Mail Express®.

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CERTIFICATE OF COMPLIANCE

I hereby certify that this Petition complies with the type-volume limitations of 37 CFR § 42.24(a)(1)(ii). Excluding portions as permitted under § 42.24(a)(1), this Petition contains 13,183 words (12,565 words as calculated by the “Word Count” feature of Microsoft Word 2019, and 618 additional words contained within the graphical matter which are not counted by such “Word Count” feature).

The undersigned further certifies that this brief complies with the typeface requirements of 37 CFR § 42.6(a)(2)(ii) and typestyle requirements of 37 CFR § 42.6(a)(2)(iii). This brief has been prepared in a proportionally spaced typeface using Microsoft Word 2019 in Times New Roman 14 point font.

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