

ANTHONY INC. (Petitioner)
v.
CONTROLTEC, LLC (Patent Owner)
PETITIONER'S DEMONSTRATIVES

Case No. IPR2025-00559
U.S. Patent No. 7,207,181
Before HUNG BUI, SCOTT A. DANIELS, AND BARRY L. GROSSMAN
Administrative Patent Judges

Exhibit 1063
Anthony v. ControlTec
IPR2025-00559

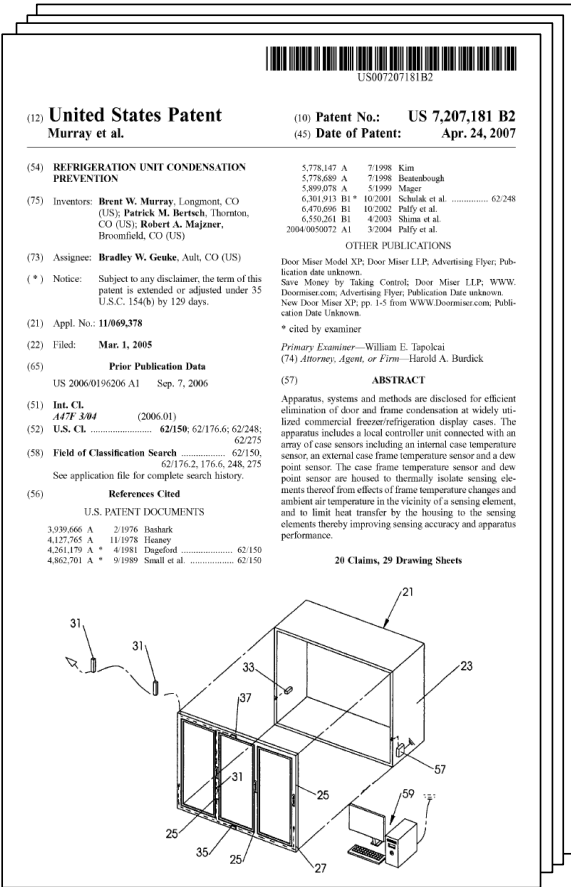
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Case Overview

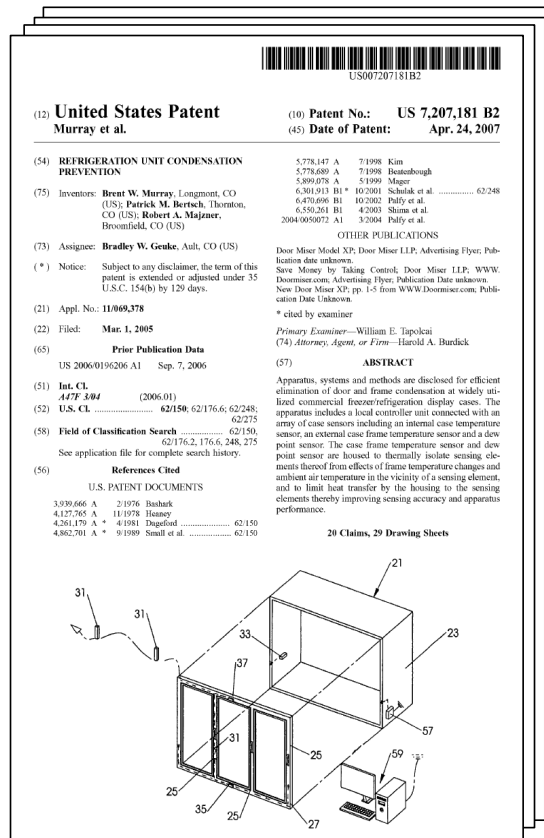
- Challenged Claims: 1-20
- Claims 1, 8, and 14 are independent



ID	Claims	Basis for Rejection
1A	1-2, 14-18	§ 103: Carter (US 7,137,262)
1B	1-7, 14-18	§ 103: Carter, Beatenbough (US 5,778,689), King (US 6,422,062)
1C	17-20	§ 103: Carter, Beatenbough, King, Gatling (US 6,502,409)
1D	1-6	§ 103: Carter, Beatenbough, Kotani (US 5,396,796)
1E	8-13	§ 103: Carter, Beatenbough, Gatling

Case Overview

The '181 Patent: An Obvious Collection of Known Elements



Other devices have suggested condensation control utilizing dew point calculation. Monitoring air temperature, relative humidity and surface temperatures to initiate condensation control events has been utilized in a variety of applications including refrigeration (see, for example, U.S. Patent Publication No. US 2004/0050072 A1 and U.S. Pat. Nos. 6,470,696, 5,778,689, 5,778,147, and 4,127,765). Some such devices or systems have utilized temperature sensing of both cold surfaces and the surrounding ambient air in condensation control response calculations. As is known, when a cold surface temperature is equal to or lower than the dew point of the ambient air, condensation forms on the cold surface.

EX1001, 1:41-53

sensor 35 and dew point sensor 37. The array of sensors may be hard wired (as shown herein) to unit 31 at each case 21 through frame members, or may be configured to function wirelessly utilizing known technologies. While separate

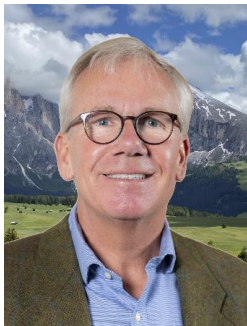
EX1001, 5:24-27

Controller unit 31 may utilize any known sensor(s) 37 for monitoring ambient air temperature (for example, thermistors may be utilized for the temperature sensors herein, including by sensors 33 and 35) and relative humidity (capacitive polymer or thin film type sensor, for example, may be utilized wherein capacitance is proportional to the relative humidity of surrounding air). Combination sensors providing relatively accurate dew point sensing are known and commercially available. Microprocessor 53 looks up the

EX1001, 8:55-63

Case Overview

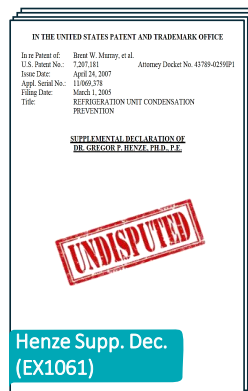
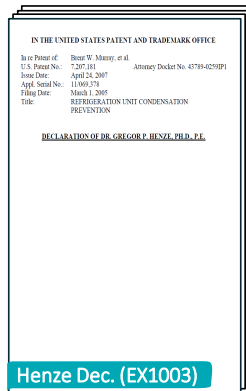
The '181 Patent: An Obvious Collection of Known Elements



Dr. Gregor Henze

Petitioner's Technical Expert

- Professor in the Building Systems Engineering Program at the University of Colorado, focusing on thermal engineering, mechanical systems design, and control of automated systems
- PhD in Civil Engineering (Building Systems),
- MS in Mechanical Engineering
- Member, award winner, and distinguished fellow of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)



B. A POSITA's Background Knowledge and Understanding of the Pertinent Technology

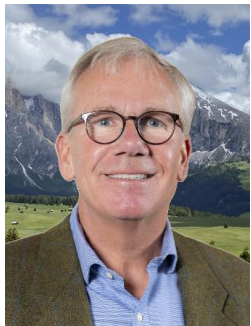
33. As I will show in the immediately following sections, condensation control for use in refrigeration systems was known long before the '181 patent, and those of skill in the art had already integrated various sensors, as well as control and monitoring systems, for use in anti-condensation devices for refrigeration systems.

I have cited numerous textbooks, papers, and patent documents that support my understanding, each of them either preceding the '181 patent or representing information that was known to a POSITA before the '181 patent in 2005. A POSITA would have known of these references and considered them representative examples regarding the state of the art.

Case Overview

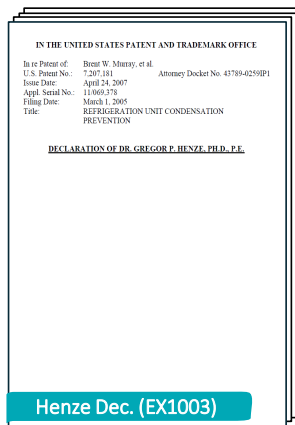
EX1003 Paras. 33-55

The '181 Patent: An Obvious Collection of Known Elements

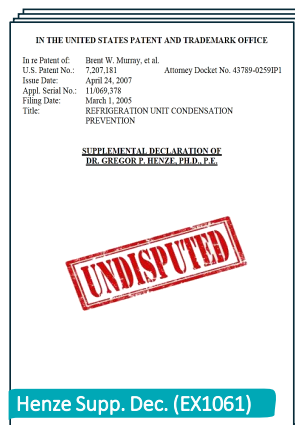


Dr. Gregor Henze

Petitioner's Technical Expert

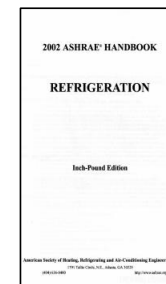


Henze Dec. (EX1003)

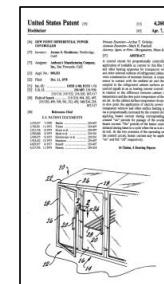


Henze Supp. Dec. (EX1061)

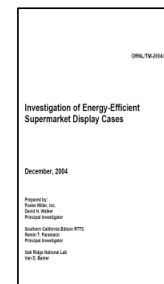
1. Condensation Control in Refrigeration Systems



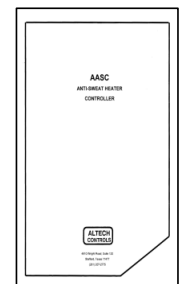
EX1039



EX1016

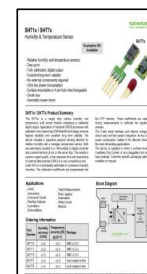


EX1024

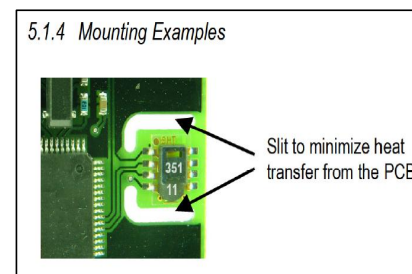


EX1021

2. Temperature and Humidity Sensor Packaging

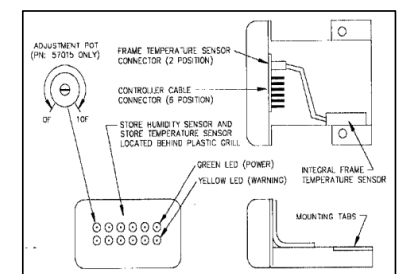


EX1020



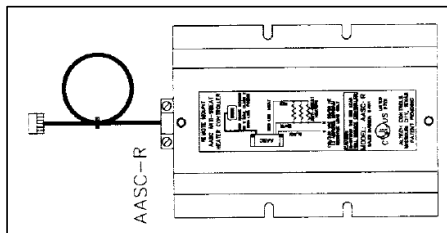
5.1.4 Mounting Examples

Slit to minimize heat transfer from the PCB

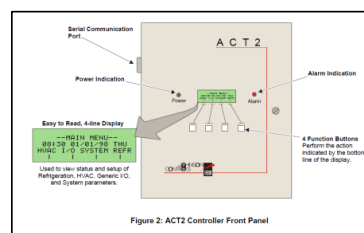


EX1021

3. Control and Monitoring in Refrigeration Systems



EX1021



EX1015

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Case Overview

Grounds 1A–1B & 1D

Grounds 1A–1B

Ground 1E

Claim 1	
[1.pre]	Condensation control apparatus for a refrigerated display case having at least one door, a frame and at least one frame/door heater, said apparatus comprising:
[1.a]	a frame temperature sensing unit adapted for monitoring temperature of one of the display case door or display case frame and including a carrier having a temperature sensor thereat;
[1.b]	a dew point sensing unit adapted for monitoring ambient air temperature and relative humidity outside of the display case and including a carrier having at least one dew point sensing component thereat;
[1.c]	a control unit communicating with said sensing units and including processing means connected for activating the display case frame/door heater when monitored display case door or frame temperature drops below a preselected set point above a dew point value derived from monitored ambient temperature and relative humidity; and
[1.d]	housing means for locating said sensing units including structure establishing thermal isolation of said sensing units by minimizing heat transfer contacts between said sensing units and said housing means and locating said temperature sensor and said at least one dew point sensing component amid insulated air pockets formed by said structure of said housing means.

Claim 14	
[14.pre]	A system for condensation control at a refrigerated display case having at least one door, a frame and at least one frame/door heater, said system comprising:
[14.a]	a temperature sensing unit in contact with the display case frame to monitor case frame temperature;
[14.b]	a dew point sensing unit on the display case to monitor ambient air temperature and relative humidity outside the display case; and
[14.c]	control means for receiving data from said sensing units and utilizing monitored case frame temperature, ambient air temperature and relative humidity to anticipate formation of condensation at the display case and activating and deactivating the frame/door heater responsive thereto.

Claim 8	
[8.pre]	A system for condensation control at an array of refrigerated display cases, the cases each having at least one door, a frame and at least one frame/door heater, said system comprising:
[8.a]	sensing and control apparatus configured for location at each display case in the array of display cases,
[8.b]	said apparatus including a frame temperature sensing unit adapted for mounting at the display case for monitoring temperature of one of the display case door or display case frame,
[8.c]	[said apparatus including...] a dew point sensing unit adapted for mounting at the display case for monitoring ambient air temperature and relative humidity outside of the display case,
[8.d]	[said apparatus including...] an internal case temperature sensing unit positionable inside the display case, and
[8.e.i]	[said apparatus including...] processing means mountable at the display case and connected for activating the display case frame/door heater when monitored display case door or frame temperature drops below a first preselected set point above a dew point value derived from monitored ambient temperature and relative humidity, for deactivating the frame/door heater when monitored display case door or frame temperature rises above a second preselected set point above said dew point value, and
[8.e.ii]	[processing means...connected...] for storing data related to readings at said sensing units and operation of the frame/door heater; and
[8.f]	a communication control unit associated with said processing means for coordinating programming and data download access to said processing means of said apparatus.

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Case Overview

Independent Claim Comparison

Feature Type	Claim 1	Claim 14	Claim 8
Heater Control	Activating Only	Activating/Deactivating	Activating/Deactivating
Frame Temp. and Dew Point Sensor-Related Structure	Housing Means & Carrier	No Housing Means or Carrier	No Housing Means or Carrier
Number of Display Cases	" <u>a</u> refrigerated display case"	" <u>a</u> refrigerated display case"	" <u>an array</u> of refrigerated display cases"
Data Storage	No	No	Yes
Internal Temp. Sensor	No	No	Yes
Comm. Control Unit	No	No	Yes

Grounds 1A–1B: Claim 1, Element [1.c] & Claim 14, Element [14.c]

Carter Renders Obvious the Claimed Heater Activating and Deactivating Features

Grounds 1A–1B: Claim 1, Element [1.c] & Claim 14, Element [14.c]

Pet. 10-11, 19-21, 29-32; Reply 6

***Carter and the '181 Patent Share the Same Objective:
Energy Efficient Condensation Prevention***

Accordingly, it is desirable to provide a method and apparatus that provides supplemental heat from a heat source based upon the operating environment of the freezer/refrigeration equipment. It is further desirable to provide automatic control of the supplemental heat provided to the freezer/refrigeration equipment. It is also desirable to automatically control the operation of providing supplemental heat such that it is only activated under conditions that would promote surface condensation on the sealing surface of freezer/refrigeration equipment.

EX1004, 1:22-31

and reading an ambient relative humidity. The method also provides measuring a calculated dew point reading and making a first determination of whether the cabinet surface temperature measurement is at a first acceptable level relative to the calculated dew point measurement. The method further provides for supplying supplemental heat if the first determination is not at the first acceptable level.

EX1004, 2:48-54

along the sealing surface 24. Thus, it may be most preferable to prevent and, if possible, concentrate efforts to eliminate the formation of condensation in this area. In a preferred

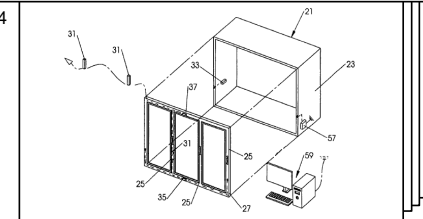
EX1004, 4:15-17

display cases. The invention is proactive in preventing condensation from forming by activating frame/door heaters before the dew point temperature at frame and door surfaces is reached. Power is then cycled off at a set point above dew point to save energy. This is accomplished by configuring

EX1001, 1:17-21

15a through 15q. Heaters are activated just above dew point and thus just before moisture appears on freezer surfaces.

EX1001, 8:53-54



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Grounds 1A–1B: Claim 1, Element [1.c] & Claim 14, Element [14.c]

Pet. 8-10, 23-25

Claim 1	
[1.c]	a control unit communicating with said sensing units and including processing means connected for <u>activating the display case frame/door heater</u> when monitored display case door or frame temperature drops below a preselected set point above a dew point value derived from monitored ambient temperature and relative humidity; and
Claim 14	
[14.c]	<u>control means for</u> receiving data from said sensing units and utilizing monitored case frame temperature, ambient air temperature and relative humidity to anticipate formation of condensation at the display case and <u>activating and deactivating the frame/door heater responsive thereto.</u>

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Grounds 1A–1B: Claim 1, Element [1.c] & Claim 14, Element [14.c]

Petitioner's Constructions

Pet. 4-10
EX1001, 5:34-50, 8:29-45,
8:63-9:5, Figures 13, 14b

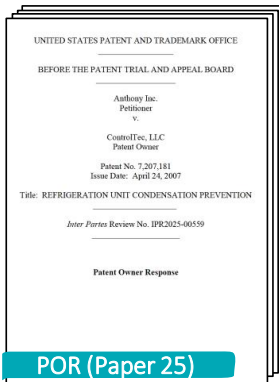
Function	Corresponding Structure	
	Element [1.c]	Element [14.c]
Heater Activating	A “microprocessor” executing the algorithm of: [1] Discounting frame temperature by a preselected set point; [2] Determining if the discounted frame temperature is <u>below</u> a dew point value derived from ambient temperature and relative humidity; and [3] Turning on a heater relay if the discounted frame temperature is <u>below</u> the dew point value.	Same as Element [1.c]
Heater Deactivating	N/A	A “microprocessor” executing the algorithm of: [1] Discounting frame temperature by a preselected set point; [2] Determining if the discounted frame temperature is <u>above</u> a dew point value derived from ambient temperature and relative humidity; and [3] Turning off a heater relay if the discounted frame temperature is <u>above</u> the dew point value.

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Grounds 1A–1B: Claim 1, Element [1.c] & Claim 14, Element [14.c]

POR 17-18

Patent Owner's Construction



A **processing means** / control means: A microprocessor executing a defined, **dual-setpoint algorithm** “for activating the display case frame/door heater when monitored display case door or frame temperature drops below a preselected set point above a dew point value derived from monitored ambient temperature and relative humidity. **The processor also deactivates** the frame/door heater when monitored display case door or frame temperature rises above a second preselected set point above the dew point value.” EX.1001, 2:47-54; EX.2014, ¶28.

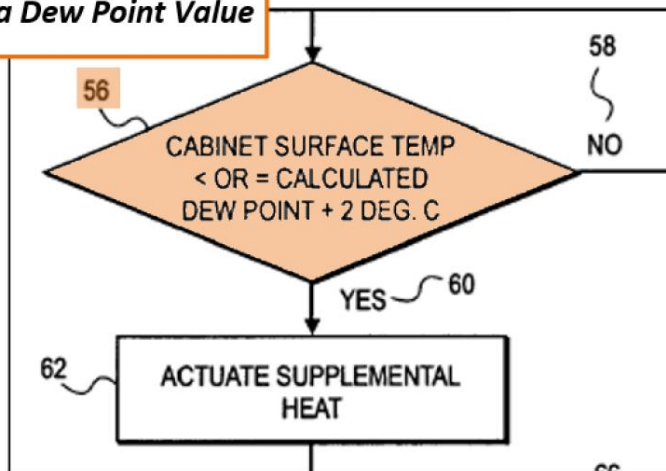
The Dispute: Patent Owner erroneously suggests the “processing means” of claim 1 requires a “**dual-setpoint algorithm**” despite lacking the “**deactivating**” requirement of claim 14.

Grounds 1A–1B: Claim 1, Element [1.c] & Claim 14, Element [14.c]

Pet. 16-21
POR 17, 34
Reply 2

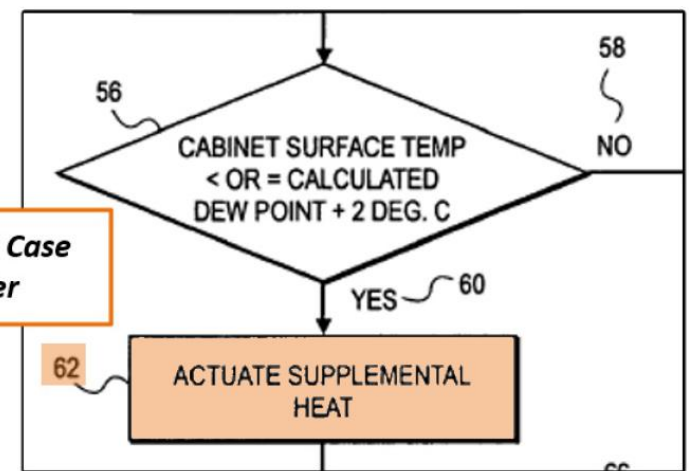
Carter Activates the Heater When Surface Temperature Drops Below a Set Point Above Dew Point

When Monitored Display Case Door or Frame Temperature Drops Below a Preselected Set Point Above a Dew Point Value



Undisputed: Carter renders obvious the heater-activation aspect of Element [1.c] and Element [14.c]

Activating the Display Case Frame/Door Heater

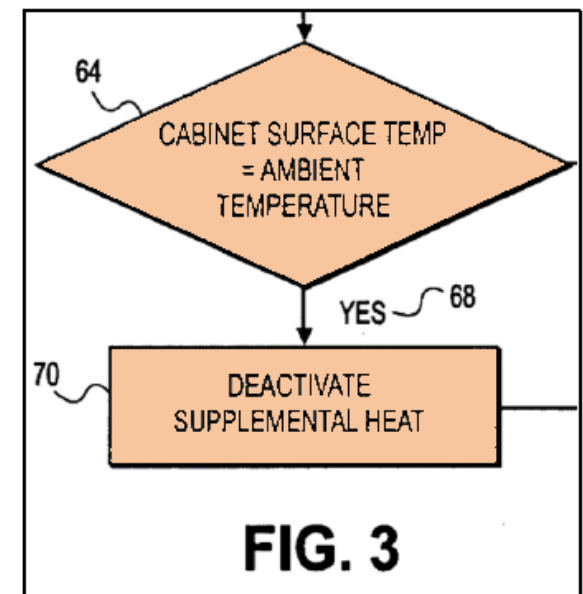


Grounds 1A–1B: Claim 14, Element [14.c]

Pet. 28-32

Carter Deactivates the Heater When Surface Temperature Reaches Ambient Temperature

If the cabinet surface temperature is equal to the ambient temperature 38 the control unit 28 will deactivate the supplemental heat 70 by deactivating the switching unit[] 30.



Grounds 1A–1B: Claim 14, Element [14.c]

Pet. 28-32
Reply 2-6

Carter Renders Obvious the '181 Patent's Deactivation Limitation Under Two Alternative Rationales

- **Obvious Modification:** A skilled artisan would have been motivated to modify Carter to use a second preselected setpoint for triggering heater deactivation, yielding an algorithm virtually identical to the '181 patent's.
- **Equivalent Disclosure:** Carter's express disclosure is equivalent and insubstantially different from the '181 patent's algorithm.

Grounds 1A–1B: Claim 14, Element [14.c]

Pet. 31-32; Reply 3-4

A POSITA Would Have Been Motivated to Modify Carter to Use a Preselected Setpoint For Heater Deactivation

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,207,181 Attorney Docket No. 43789-0259IP1
Issue Date: April 24, 2007
Appl. Serial No.: 11/069,378
Filing Date: March 1, 2005
Title: REFRIGERATION UNIT CONDENSATION PREVENTION

DECLARATION OF DR. GREGOR P. HENZE, PH.D., P.E.

Henze Dec. (EX1003)

UNDISPUTED

131. Accordingly, in humid indoor conditions, Carter's floating offset is smaller; and in dry conditions, the floating offset is larger. When conditions are very dry, the larger offset value would risk running the heaters longer than necessary, undermining efficiency. When indoor environmental conditions are very humid, the smaller offset would risk running the heater for too short an amount of time, potentially rendering the system less effective at preventing condensation or promoting repeated on/off switching of the heaters.

132. As the POSITA would have understood, because the offset is a function of ambient conditions, it cannot be selected, adjusted, or modified. Thus, the POSITA would have appreciated the efficiency and operational advantages of providing a control system that allows a manufacturer, technician, or operator to select the buffer value as a set point based on existing or expected conditions. One

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DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 14, Element [14.c]

Pet. 31-32; Reply 3-4

A POSITA Would Have Expected Success in Modifying Carter to Use a Preselected Setpoint For Heater Deactivation

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,207,181 Attorney Docket No. 43789-0259IP1
Issue Date: April 24, 2007
Appl. Serial No.: 11/069,378
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Title: REFRIGERATION UNIT CONDENSATION PREVENTION

DECLARATION OF DR. GREGOR P. HENZE, PH.D., P.E.

UNDISPUTED

select the buffer value as a set point based on existing or expected conditions. One

obvious and predictable approach for the POSITA would be to ¹replace Carter's

ambient temperature target for heater deactivation with a target temperature equal to

dew point plus a preselected set point. Another obvious and predictable approach

for the POSITA would be to ²introduce the set point feature as a user-selectable

alternative mode of operation for the control system.

EX1003 Para. 132

Henze Dec. (EX1003)

FISH

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 14, Element [14.c]

Rebuttal to: “Here, common sense is being used to fill in a missing limitation. That invocation fails...” *Sur-Reply at 14.*

Reply 4

The Definition of Obviousness: Applying Carter’s Setpoint Teaching for Both Heater Activation and Deactivation to Achieve Predictable Benefits

UNITED STATES PATENT AND TRADEMARK OFFICE

alternative mode of operation for the control system.” *Id.* Using a preselected setpoint to regulate Carter’s heater deactivation was not only advantageous, it was a highly predictable variation. After all, the setpoint technique is exactly what Carter used to turn the heater *on* in the first place. EX1004, 5:21–54. Using that same technique to turn the heater *off* is the very definition of obviousness. *Id.*

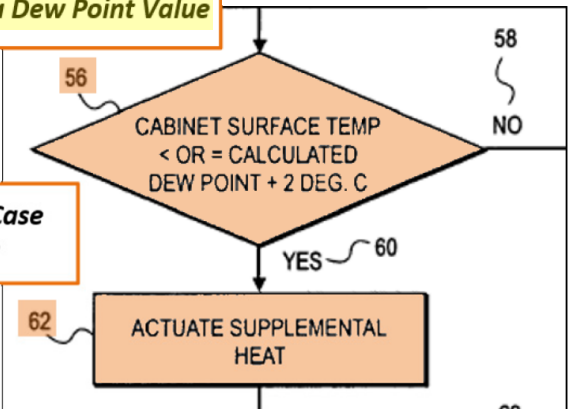
PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE

Pet. Reply (Paper 27)

Reply 4

**Activating the Display Case
Frame/Door Heater**

**When Monitored Display Case
Door or Frame Temperature
Drops Below a Preselected Set
Point Above a Dew Point Value**



EX1004, 5:21–54, Figure 3; see also 2:4–32, 3:40–53

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FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 14, Element [14.c]

Pet. 30-31
Reply 4-5

Carter's Equivalent Disclosure

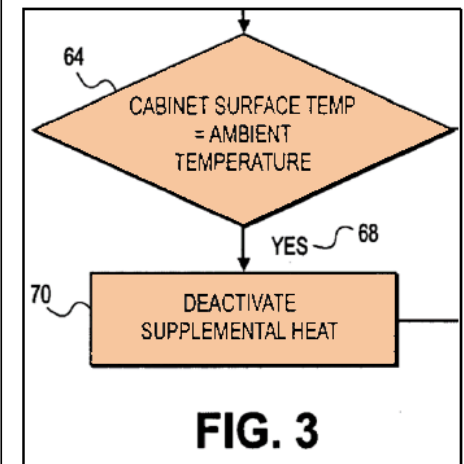
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,207,181 Attorney Docket No. 43789-0259IP1
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DECLARATION OF DR. GREGOR P. HENZE, PH.D., P.E.

Henze Dec. (EX1003)

123. A POSITA would have recognized that Carter's technique employs a floating offset responsive to ambient conditions. As was well known in the art, dew point is generally defined as the temperature at which air at a prevailing pressure becomes saturated and vapor begins to condense out of the air. EX1030, 1 (providing a definition of dew point). Accordingly, the POSITA would have known that ambient temperature is virtually always greater than dew point and that the difference between them depends on—floats according to—the relative humidity of the ambient environment. A psychrometric chart, which provides a graphical representation of the physical and thermal properties of moist air, confirms this point. EX1031. In other words, ambient temperature differs from the dew point by a floating offset. As a result, Carter's comparison expression shown in Figure 3



EX1004, 5:55–63, Figure 3;
see also 2:4-32, 3:42-53

Grounds 1A–1B: Claim 14, Element [14.c]

Pet. 30-31
Reply 4-5

Carter's Equivalent Disclosure

PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 7,207,181 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

Id. Thus, Carter's comparison expression shown in Figure 3 (Step 64):

$$\text{Cabinet Surface Temp} = \text{Ambient Temp}$$

is mathematically equivalent to:

$$\text{Cabinet Surface Temp} = \text{Dew Point} + \text{Floating Offset},$$

**Carter
Algorithm**

which parallels the '181 patent's expression from Figure 14b:

$$\text{Frame Temp} - \text{Set Point High} > \text{Dew Point}$$

and its mathematical equivalent:

$$\text{Frame Temp} > \text{Dew Point} + \text{Set Point High}.$$

**'181 Patent
Algorithm**

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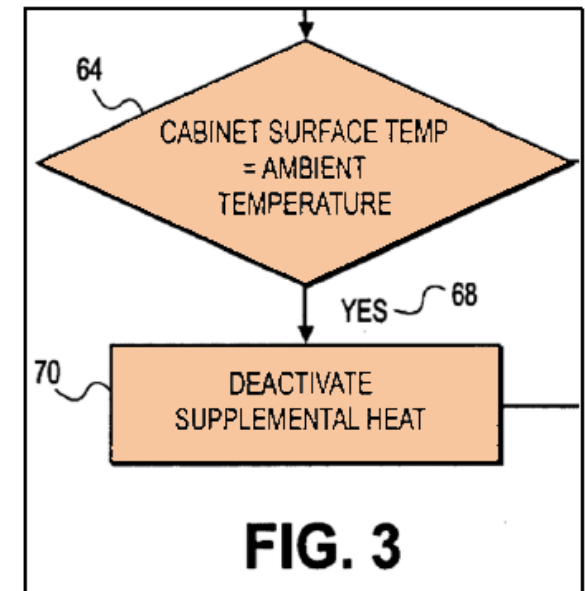
Grounds 1A–1B: Claim 14, Element [14.c]

Pet. 30-31
Reply 4-5

Carter's Equivalent Disclosure

PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT NO. 7,207,181 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

Third, that the '181 patent uses a preselected set point and Carter uses a floating offset is an insubstantial and obvious distinction to a POSITA. EX1003, ¶129. In each case, the set point/offset serves as a buffer value to ensure that the frame temperature of the display case is far enough away from the dew point value to prevent anticipated condensation without excessive on-off cycling of the heater.



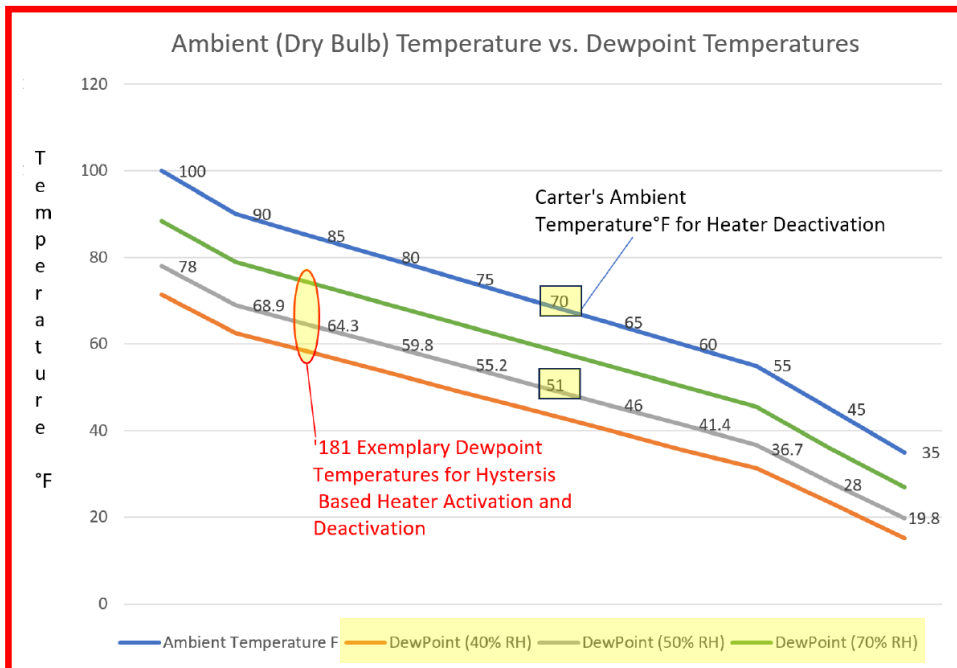
EX1004, 5:55–63, Figure 3;
see also 2:4-32, 3:42-53

Grounds 1A–1B: Claim 14, Element [14.c]

Rebuttal to: “Carter deactivates late[r] in lower humidity as compared to the ’181 Patent.” POR at 35-38.

Reply 5
EX1061, Paras. 40-43

The Illusion of a Distinction: Patent Owner’s Cherry-Picked Charts



Henze Supp. Dec. (EX1061)

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,207,181 Attorney Docket No. 43789-0259IP1
Issue Date: April 24, 2007
Appl. Serial No.: 11/069,378
Filing Date: March 1, 2005
Title: REFRIGERATION UNIT CONDENSATION PREVENTION

40. In his “Ambient Temperature vs. Dewpoint Temperature” chart, Mr. Pollock decided to chart certain “band[s] of dew point temperatures” at 40%, 50%, and 70% relative humidity. EX2014 ¶56. He also highlights certain dew point temperatures along these bands. Nowhere in his analysis does Mr. Pollock provide an objective basis for selecting these particular humidity and dew point values. Importantly, the chart has neither an abscissa label nor scale, rendering the chart largely unreadable and forcing the reviewer to guess.

FISH.

POR 36; EX2014, Para. 56

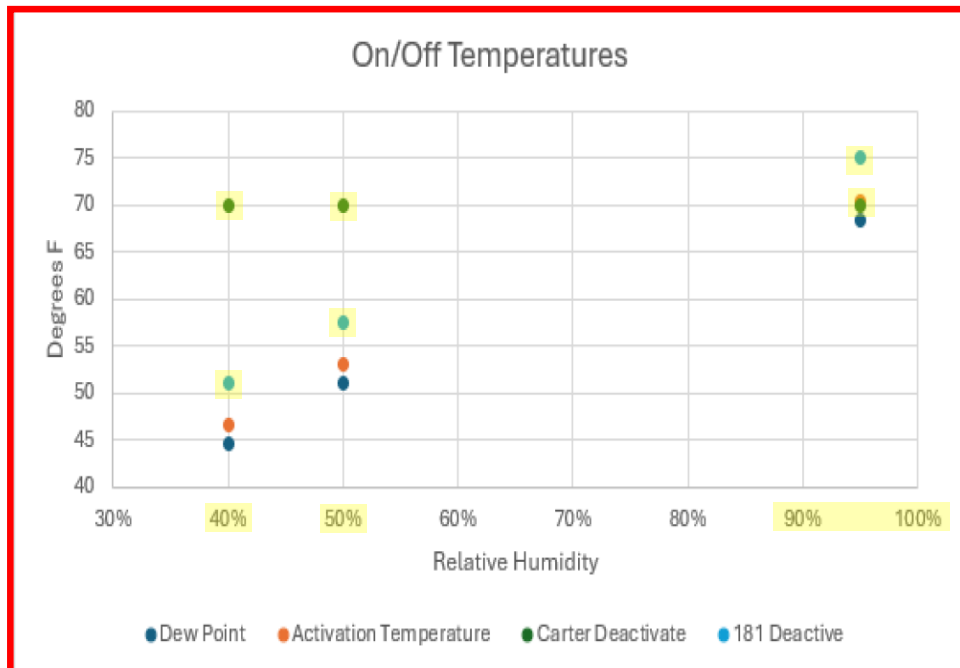
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 14, Element [14.c]

Rebuttal to: “Carter deactivates late[r] in lower humidity as compared to the ’181 Patent.” POR at 35-38.

Reply 5
EX1061, Paras. 40-43

The Illusion of a Distinction: Patent Owner’s Cherry-Picked Charts



Henze Supp. Dec. (EX1061)

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,207,181
Issue Date: April 24, 2007
Appl. Serial No.: 11/069,378
Filing Date: March 1, 2005
Title: REFRIGERATION UNIT CONDENSATION PREVENTION

SUPPLEMENTAL DECLARATION OF
DR. GREGOR P. HENZE, PH.D., P.E.

41. In his “On/Off Temperatures” chart, Mr. Pollock decided to chart deactivation surface temperatures at relative humidity values of 40%, 50%, and 95%. He also decided to use an ambient air temperature of “70°F” and a preselected setpoint of “dew point plus 6.5°F” for the ’181 patent’s deactivation algorithm. Nowhere in his analysis does Mr. Pollock provide an objective basis for selecting these particular humidity or setpoint values.

Grounds 1A–1B: Claim 14, Element [14.c]

Rebuttal to: “Carter deactivates late[r] in lower humidity as compared to the '181 Patent.” POR at 35-38.

Reply 5
EX1061, Paras. 40-43

The Illusion of a Distinction: Patent Owner's Cherry-Picked Charts

Q. The patent doesn't say what number to use, right?

MR. JONES: Objection, form, asked and answered.

A. No. The '181 patent uses preselected set points above the dew point on both activation and deactivation. Doesn't specifically call value out.

Q. The '847 also does not call out any specific values to use as a preselected set point above dew point for activation or deactivation, right?

A. Not that I see currently.

EX1062, 267:13-25

Q. Oh, let me reask. Thank you.

Your choice of the 2 degree Fahrenheit preselected set point relative to dew point for activation and the 6.5 degree Fahrenheit set point relative to dew point for deactivation are numbers that you picked on your own, right?

A. Yes.

MR. JONES: Objection, form.

A. For this --

MR. JONES: Go ahead.

A. Yes, for this example.

Q. When you say "this example," are you referring to the analysis that you did attempting to show a difference in performance and efficiency between the '181 and '847 patents and Carter, right?

A. Yes.

EX1062, 268:8-24

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Anthony Inc.

Petitioner

v.

ControlTec, LLC

Patent Owner

Patent No. 7,421,847

Inter Partes Review No. IPR2025-00636

Ref. 43789-0260IP1

VIDEO DEPOSITION of MICHAEL A. POLLOCK

Thursday, March 26, 2026

9:02 a.m. EDT

Boston, Massachusetts

Reported by: Dana Welch, CSR, RPR, CRR, CRC

Pollock Depo. (EX1062)

25

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 14, Element [14.c]

Rebuttal to: “Carter deactivates late[r] in lower humidity as compared to the '181 Patent.” POR at 35-38.

Reply 5
EX1061, Paras. 44-45

The Illusion of a Distinction: Patent Owner's Cherry-Picked Charts

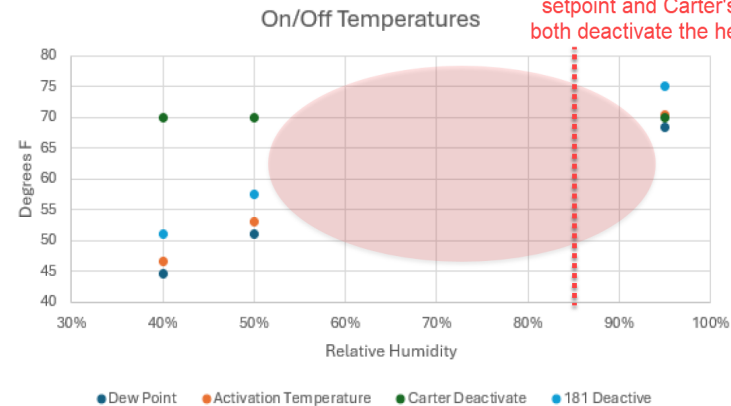
45. One can also disprove Mr. Pollock's biased conclusion without modifying his chosen setpoint value of dew point plus 4.5°F. Instead of changing the setpoint, one can modify his selected relative humidity value—e.g., from Mr. Pollock's value of 50% to a modified value of 85.7%. For example, at an ambient temperature of 70°F and 85.7% relative humidity, air has a dew point temperature of approximately 65.5°F.¹ That means dew point plus 4.5°F (Mr. Pollock's setpoint) is about the same as the ambient temperature of 70°F, meaning the two algorithms will deactivate the heater at about the same surface temperature. Mr. Pollock's “On/Off Temperatures” chart would have revealed this fact had he not left such a large gap between the relative humidity values he selectively chose to examine. Below, I have marked this unexplored area in Mr. Pollock's chart with a large red oval and added a red dotted line to illustrate where the two algorithms would simultaneously deactivate the heater using Mr. Pollock's 4.5°F setpoint.

Henze Supp. Dec. (EX1061)

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,207,181 Attorney Docket No. 43789-0259IP1
Issue Date: April 24, 2007
Appl. Serial No.: 11/069,378
Filing Date: March 1, 2005
Title: REFRIGERATION UNIT CONDENSATION PREVENTION

SUPPLEMENTAL DECLARATION OF
DR. GREGOR P. HENZE, PH.D., P.E.

UNDISPUTED



Grounds 1A–1B: Claim 14, Element [14.c]

Rebuttal to: “Carter deactivates late[r] in lower humidity as compared to the '181 Patent.” POR at 35-38.

Reply 5
EX1061, Paras. 44-45

The Illusion of a Distinction: Patent Owner's Cherry-Picked Charts

Q. Well, your Carter deactivate temperature is constant at 70 degrees, right?

A. Yes.

Q. And we've already established that there is a relative humidity at which your '181 deactivate under those same ambient conditions will be 70 degrees, right?

A. Yes, generally.

Q. And at that currently unknown but calculable relative humidity, the Carter deactivate and the '181 deactivate temperatures will be the same, right?

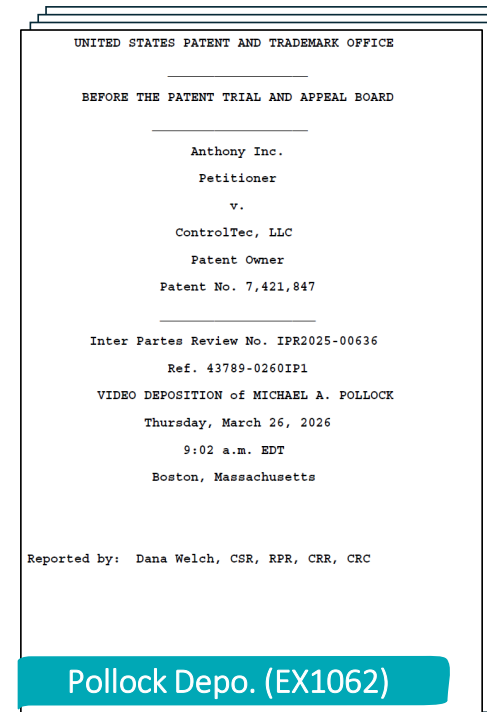
A. Yes, at that point, I think that's correct.

Q. And you have not shown that point in your analysis, right?

MR. JONES: Objection, form.

A. Not specifically.

EX1062, 250:8-22



27

Grounds 1A–1B: Claim 1, Element [1.pre] & Claim 14, Element [14.pre]

Carter Alone or With Beatenbough Renders
Obvious the Claimed Refrigerated Display Case

Grounds 1A–1B: Claim 1, Element [1.pre] & Claim 14, Element [14.pre]

Pet. 10-13, 28, 35, 43-44, 62

Claim 1

[1.pre]

Condensation control apparatus for a refrigerated display case having at least one door, a frame and at least one frame/door heater, said apparatus comprising:

Claim 14

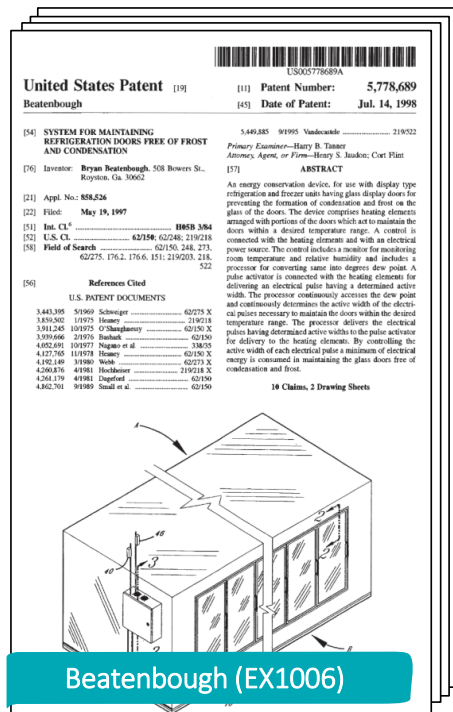
[14.pre]

A system for condensation control at a refrigerated display case having at least one door, a frame and at least one frame/door heater, said system comprising:

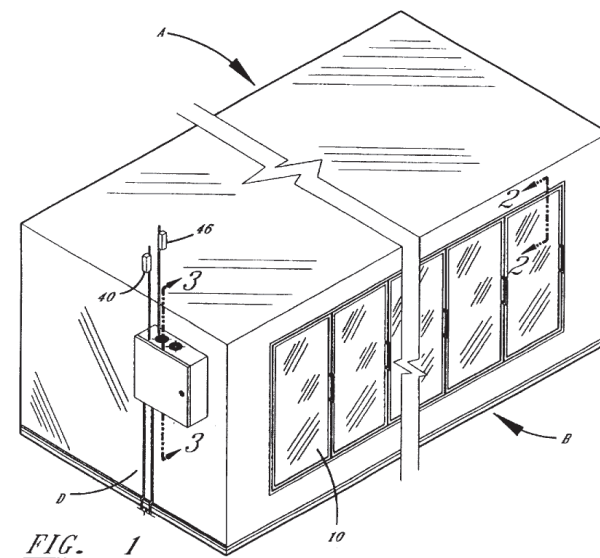
Grounds 1A–1B: Claim 1, Element [1.pre] & Claim 14, Element [14.pre]

Pet. 10-13, 28, 35, 43-44, 62

Like Carter and the '181 Patent, Beatenbough Teaches Energy Efficient Condensation Prevention



The above objectives are accomplished according to the present invention by providing a control device for use with display type refrigeration/freezer equipment having glass display doors and arranged within the room area of a store. The device operates to minimize the amount of electrical power used to prevent the formation of condensation and frost on the glass while the equipment is in use. The device includes heating elements arranged with portions of the doors which act to maintain the glass within a desired temperature range. The control device is connected with the heating elements and with an electrical power source. The control device includes monitors for continuously monitoring room temperature and relative humidity and a control panel having a processor for converting the temperature and humidity into degrees dew point. The control panel includes a pulse activator connected with the heating elements and which is operative to deliver electrical pulses of preset duration and a variable active width to the heating elements for maintaining the glass of the doors within a desired temperature range.



EX1006, 1:46-65

30

FISH.

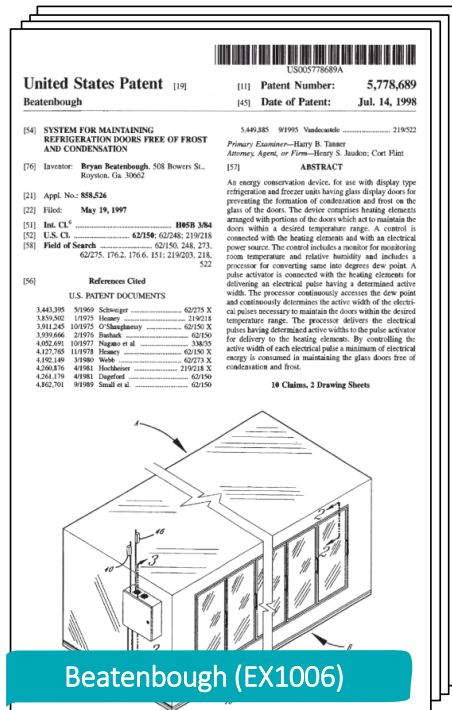
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.pre] & Claim 14, Element [14.pre]

Pet. 10-13, 28, 35, 43-44, 62

Reply 7-8

Beatenbough Applies Condensation Control Techniques to a Refrigerated Display Case

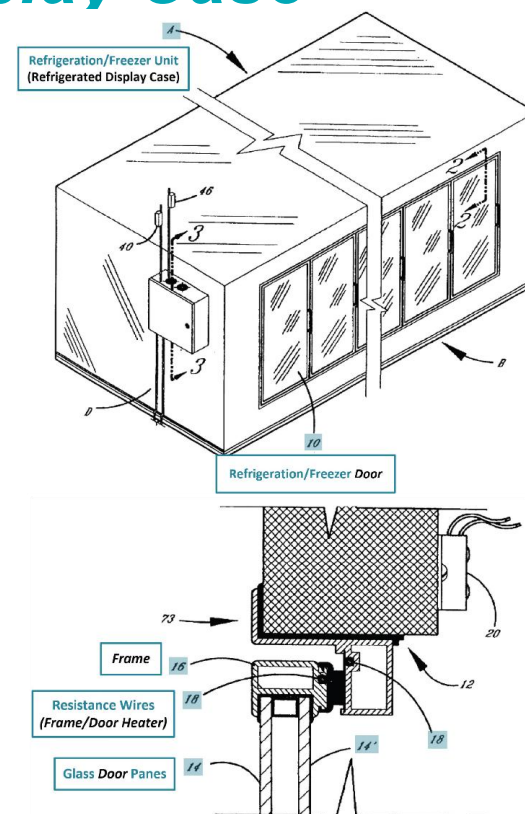


This invention relates to a system for maintaining glass doors of refrigeration/freezer units free of condensation and frost while maximizing the conservation of electrical energy.

EX1006, 1:6-9

Refrigeration/freezer door 10 is supported in metal door jam 12 and includes a glass area usually consisting of two glass panes 14, 14' mounted in metal frame 16. Door jam 12 and door frame 16 are provided with a plurality of resistance wires 18. One of the glass panes, preferably pane 14', is coated with a very thin transparent electrically conductive layer for heating the surface of the glass. Relay 20, which connects with control device C, provides electrical energy for heating resistant wires 18 and the coating at 14' which in turn heat the doors preventing the formation of condensation and frost. This type of heating arrangement is well known

EX1006, 2:63-3:6, Figures 1-2



Pet. 37-41

United States Patent

Breathroughs

Patent Number: 5,778,689

Date of Patent: Jul. 14, 1998

1520778A

5,648,985 (U.S.) Yokokawa 11/20/92

Primary Examiner—Gary J. Tupper
Attorney, Agent, or Firm—Walter J. Binkley, Orr, Wall

171

ABSTRACT

An emergency communication device, with self-display type operation and an infrared pass having glass display doors for preventing the intrusion of contaminants and for use on the glass of the doors. The device comprises heating elements adjacent with portions of the doors so as to maintain the doors within a desired temperature range. A control is connected with the heating elements and with the electrical power source. The control includes a module for monitoring room temperature and ambient humidity and includes a processor for controlling same and detecting door open. A pulse analyzer is connected with the heating elements for detecting an electrical pulse having a determined amplitude and duration and for controlling the heating elements and automatically determining the status of the electrical power source. The device also includes a control for room temperature and humidity. The processor activates the electrical pulse having threshold value and the pulse analyzer and the heating elements. By controlling the heating elements, the device maintains the doors at a temperature in maintaining the doors above their level of contamination.

18 Claims, 2 Drawing Sheets

SYSTEM FOR MAINTAINING REFRIGERATION DOORS FREE OF FROST AND CONDENSATION

Inventor: Bruce Breathrough, 555 Brown St.,
Riverton, Co. 80022

201 Sept. 10, 1998

202 Filed: May 19, 1997

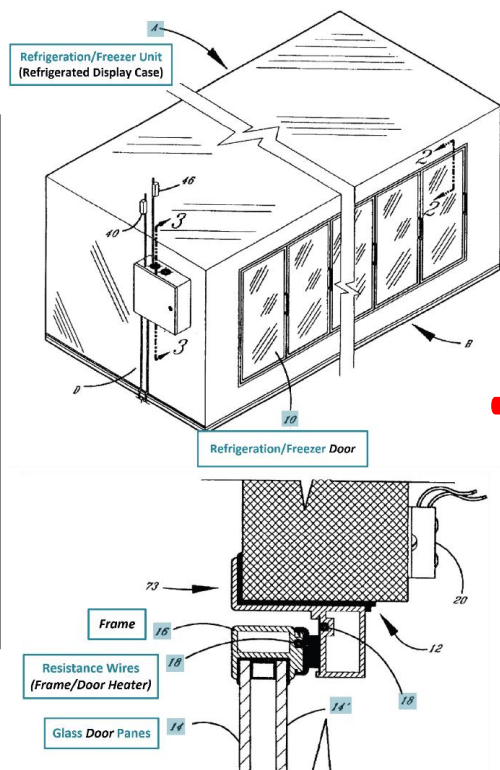
203 Int. Cl. 7: B65D 33/00

204 U.S. Cl.: 62306; 62308; 192001

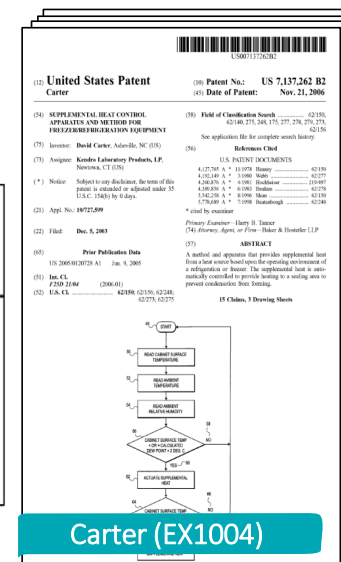
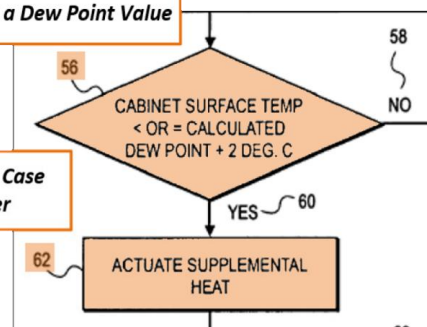
205 Field of Search: 62310, 288, 271,

62379, 6701, 6702, 6703, 6704, 192023, 281

6705, 6706, 6707, 6708, 6709, 6710, 6711, 6712, 6713, 6714, 6715, 6716, 6717, 6718, 6719, 6720, 6721, 6722, 6723, 6724, 6725, 6726, 6727, 6728, 6729, 6730, 6731, 6732, 6733, 6734, 6735, 6736, 6737, 6738, 6739, 6740, 6741, 6742, 6743, 6744, 6745, 6746, 6747, 6748, 6749, 6750, 6751, 6752, 6753, 6754, 6755, 6756, 6757, 6758, 6759, 6760, 6761, 6762, 6763, 6764, 6765, 6766, 6767, 6768, 6769, 6770, 6771, 6772, 6773, 6774, 6775, 6776, 6777, 6778, 6779, 6780, 6781, 6782, 6783, 6784, 6785, 6786, 6787, 6788, 6789, 6790, 6791, 6792, 6793, 6794, 6795, 6796, 6797, 6798, 6799, 6800, 6801, 6802, 6803, 6804, 6805, 6806, 6807, 6808, 6809, 6810, 6811, 6812, 6813, 6814, 6815, 6816, 6817, 6818, 6819, 6820, 6821, 6822, 6823, 6824, 6825, 6826, 6827, 6828, 6829, 6830, 6831, 6832, 6833, 6834, 6835, 6836, 6837, 6838, 6839, 6840, 6841, 6842, 6843, 6844, 6845, 6846, 6847, 6848, 6849, 6850, 6851, 6852, 6853, 6854, 6855, 6856, 6857, 6858, 6859, 6860, 6861, 6862, 6863, 6864, 6865, 6866, 6867, 6868, 6869, 6870, 6871, 6872, 6873, 6874, 6875, 6876, 6877, 6878, 6879, 6880, 6881, 6882, 6883, 6884, 6885, 6886, 6887, 6888, 6889, 6890, 6891, 6892, 6893, 6894, 6895, 6896, 6897, 6898, 6899, 6900, 6901, 6902, 6903, 6904, 6905, 6906, 6907, 6908, 6909, 6910, 6911, 6912, 6913, 6914, 6915, 6916, 6917, 6918, 6919, 6920, 6921, 6922, 6923, 6924, 6925, 6926, 6927, 6928, 6929, 6930, 6931, 6932, 6933, 6934, 6935, 6936, 6937, 6938, 6939, 6940, 6941, 6942, 6943, 6944, 6945, 6946, 6947, 6948, 6949, 6950, 6951, 6952, 6953, 6954, 6955, 6956, 6957, 6958, 6959, 6960, 6961, 6962, 6963, 6964, 6965, 6966, 6967, 6968, 6969, 6970, 6971, 6972, 6973, 6974, 6975, 6976, 6977, 6978, 6979, 6980, 6981, 6982, 6983, 6984, 6985, 6986, 6987, 6988, 6989, 6990, 6991, 6992, 6993, 6994, 6995, 6996, 6997, 6998, 6999, 7000, 7001, 7002, 7003, 7004, 7005, 7006, 7007, 7008, 7009, 7010, 7011, 7012, 7013, 7014, 7015, 7016, 7017, 7018, 7019, 7020, 7021, 7022, 7023, 7024, 7025, 7026, 7027, 7028, 7029, 7030, 7031, 7032, 7033, 7034, 7035, 7036, 7037, 7038, 7039, 7040, 7041, 7042, 7043, 7044, 7045, 7046, 7047, 7048, 7049, 7050, 7051, 7052, 7053, 7054, 7055, 7056, 7057, 7058, 7059, 7060, 7061, 7062, 7063, 7064, 7065, 7066, 7067, 7068, 7069, 7070, 7071, 7072, 7073, 7074, 7075, 7076, 7077, 7078, 7079, 7080, 7081, 7082, 7083, 7084, 7085, 7086, 7087, 7088, 7089, 7090, 7091, 7092, 7093, 7094, 7095, 7096, 7097, 7098, 7099, 7100, 7101, 7102, 7103, 7104, 7105, 7106, 7107, 7108, 7109, 7110, 7111, 7112, 7113, 7114, 7115, 7116, 7117, 7118, 7119, 7120, 7121, 7122, 7123, 7124, 7125, 7126, 7127, 7128, 7129, 7130, 7131, 7132, 7133, 7134, 7135, 7136, 7137, 7138, 7139, 7140, 7141, 7142, 7143, 7144, 7145, 7146, 7147, 7148, 7149, 7150, 7151, 7152, 7153, 7154, 7155, 7156, 7157, 7158, 7159, 7160, 7161, 7162, 7163, 7164, 7165, 7166, 7167, 7168, 7169, 7170, 7171, 7172, 7173, 7174, 7175, 7176, 7177, 7178, 7179, 7180, 7181, 7182, 7183,



Activating the Display Case Frame/Door Heater



Grounds 1A–1B: Claim 1, Element [1.pre] & Claim 14, Element [14.pre]

Pet. 37-41

Carter-Beatenbough: Multiple Motivation Rationales

PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT

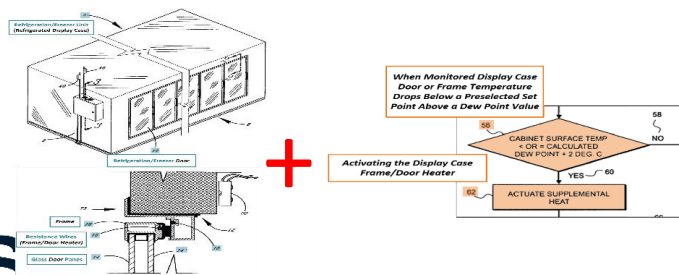
NO. 7,207,181 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

Beatenbough discloses that the doors of the display case should “be kept at no less than 2° above the dew point.” EX1006, 4:7–8. This teaching would have suggested to a POSITA that heater activation should occur when the sensed temperature at the door drops to or below the dew point temperature plus two degrees. EX1003, ¶153.

2° above the dew point.” EX1006, 4:7–8; EX1003, ¶154. While Beatenbough’s disclosure focuses on an improved variable pulse width technique for actuating the heater, it leaves other implementation details—such as determining when to actuate the heater—for the POSITA to fill in with common knowledge and/or supplemental disclosures like Carter. EX1003, ¶155 (discussing EX1006, 1:9–22), ¶¶34–41.

Third, a POSITA would have pursued the Carter-Beatenbough Combination based on the understanding that Carter’s heater activation technique and Beatenbough’s variable pulse width technique for heater operation rely on a shared operating variable—a dew point value derived from ambient temperature and relative humidity sensor readings. See EX1004, 5:31–54; EX1006, 3:51–4:34;

Where Beatenbough fulfills a need in the art for accurately “determining the percent of [heater] run time required” and avoiding wasted energy, (EX1006, 1:5–43), Carter similarly seeks to improve energy efficiency by remedying the fact that prior solutions were “typically configured to provide continuous heating,” an approach that “can waste unnecessary energy and drive up the operating/maintenance costs,” (EX1004, 1:15–2:32). Given their shared focus on energy efficiency and cost savings, a POSITA would have naturally sought to combine the teachings of Beatenbough and Carter to maximize these benefits. EX1003, ¶157, ¶¶40–41.



UNDISPUTED

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

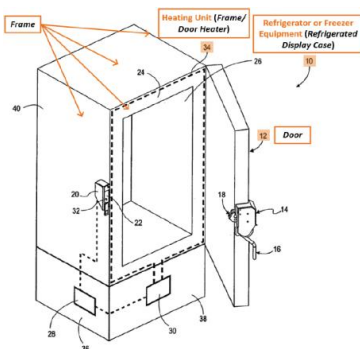
Grounds 1A–1B: Claim 1, Element [1.pre] & Claim 14, Element [14.pre]

Pet. 11-13

A POSITA Would Have Applied Carter's Teachings to a Refrigerated Display Case

PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 7,207,181 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

A POSITA would have been motivated to apply Carter's *apparatus* to the well-known use case of *refrigerated display cases* that store retail food items in an environment where “undesirable condensation can occur.” EX1003, ¶81 (quoting EX1004, 1:15–2:32), ¶¶34–41. Just as *condensation control apparatus* were desirable in the context of refrigerated cases for specimens, they were also sought by skilled artisans for refrigerated cases used to display food items. *Id.*



Pet. 13

DECLARATION OF DR. GREGOR P. HENZE, PH.D., P.E.

maintain perishables at a prescribed low temperature to prevent spoilage. For example, Carter explains that his refrigerated case can be used for “housing specimens requiring subjection to certain operating temperatures for one of a variety of reasons,” such as “to ensure that it doesn’t spoil.” EX1004 (Carter), 4:3–12. Carter further explains that allowing “condensation [to] develop and/or freeze along any freezer/refrigeration sealing areas such as a gasket” can cause “the gasket...los[ing] its ability to remain flexible in order to seal surfaces completely,” a result that increases the risk of multiple complications—e.g., “an inability of the freezer/refrigeration equipment to maintain a prescribed operating temperature” and “a loss of energy and time...in attempting to generate and maintain an operating temperature.” EX1004, 1:45–62. Preventing sealing failures caused by condensation, and the complications they cause, is as important in the retail food industry as any other. Accordingly, the POSITA would have recognized that

EX1003 Para. 81

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FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.pre] & Claim 14, Element [14.pre]

Pet. 11-13
Reply 8-9

The Only Difference Between Carter's Case and the Claimed "Display Case" Is a Glass Door

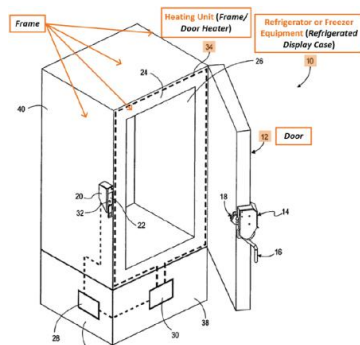
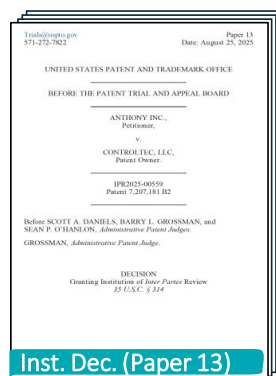


FIG. 1

freezer equipment in the form of a case with a door. Pet. 11–12. We recognize that Carter does not refer specifically to a “display” case. The record before us, however, does not support Patent Owner’s assertion that a refrigerated *display* case, as claimed in the ’181 patent, is substantively different from a refrigerated case, as disclosed in Carter. Indeed, based on Beatenbough, and the record before us, the only difference between a refrigerated *display* case and a refrigerated case is a glass door. See, e.g.,

Q. Would a laboratory refrigerator with a window display be considered a refrigerated display case?

A. I believe it could be considered a refrigerated display case.

Q. Could be, based on what?

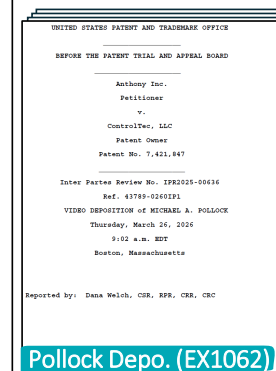
A. If you could view the inside portion through glass, I think it could be a display case.

Q. A refrigerated --

A. Refrigerated display case.

Q. In the meaning of the '181 and '847 patents?

A. Yes.



FISH.

Inst. Dec. at 20

EX1062, 195:21-196:12

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DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Carter Alone or With Beatenbough and King
Renders Obvious the Claimed “Housing Means”
and “Means for Thermally Isolating”

Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Claim Language & Claim Construction

Pet. 5-6, 9;
POR 18-19

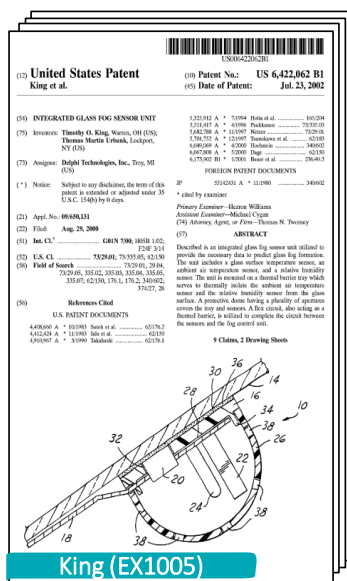
Claim Element	Petitioner	Patent Owner
Element [1.d]: housing means for locating said sensing units including structure establishing thermal isolation of said sensing units by minimizing heat transfer contacts between said sensing units and said housing means and locating said temperature sensor and said at least one dew point sensing component amid insulated air pockets formed by said structure of said housing means.	Recited “structure” is sufficient	Recited “structure” is sufficient
[15]: . . . means for thermally isolating said dew point sensing unit from variations in temperature of the display case frame or display case door.	A “housing” having a base and a cover that, when mated together, establish an air pocket around the dew point sensing unit.	(1) the housing assures the dew point sensor is held away from the frame; and (2) there is an air pocket behind the board/carrier of the sensor
[16]: . . . means for thermally isolating said temperature sensing unit from variations in temperature of ambient air.	A “housing” having a base and a cover that, when mated together, establish an air pocket around the temperature sensing unit.	N/A

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Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Pet. 36-37, 50-55, 63

Like Carter, Beatenbough, and the '181 Patent, King Teaches Sensors for Predicting Condensation



Referring now to FIG. 1 of the drawings, an integrated glass fog sensor unit 10 communicates with a fog control unit 12. Unit 12 can be an integral part of a heating, ventilation, and air conditioning control system, HVAC, of a vehicle, wherein the unit 10 is adhered to a glass surface 14 of a windshield.

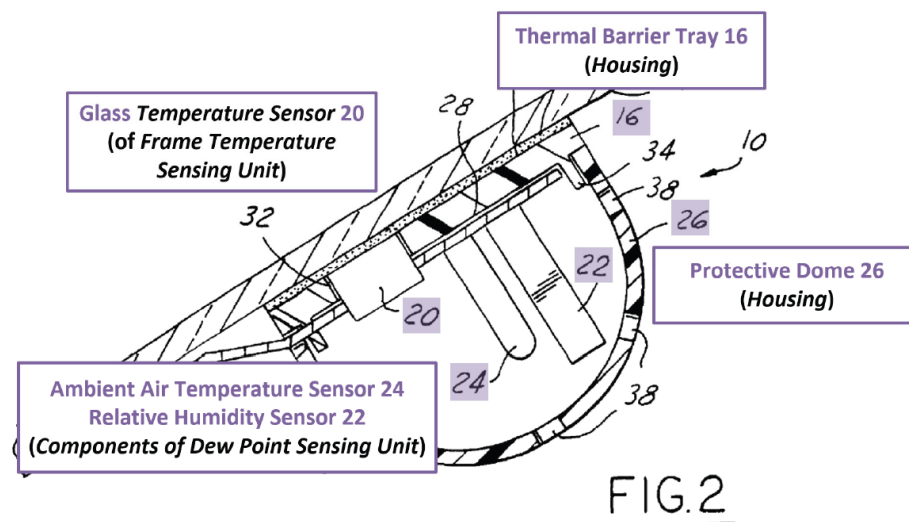
Referring to FIG. 2, the unit 10 has a thermal barrier tray 16, a multi-conductor member 18, a glass temperature sensor 20, an ambient air temperature sensor 22, a relative humidity sensor 24, and a protective dome 26. The tray 16 has a top surface 28, a bottom surface 30, a hole 32 spanning through the surfaces 28 and 30, and a perimeter wall 34 substantially defining the surfaces 28 and 30. Bottom surface 30 has an adhesive layer 36 for securing the sensor 10 to glass surface 14. The glass temperature sensor 20 is in thermal contact with the glass surface 14 in order to measure the temperature at surface 14. The same adhesive layer 36 which secures the tray 16 can be used to secure sensor 20 to the surface 14. Ambient air temperature sensor 22 is located adjacent to the relative humidity sensor 24 and both are separated from surface 14 by the thermal barrier tray 16 and multi-conductor member 18. Tray 16 assures that surface 14 temperature does not alter the ambient air temperature or relative humidity levels at the sensor 22 and sensor 24 locations. The close proximity of ambient air temperature sensor 22 and humidity sensor 24 is necessary in order to calculate accurate dew-point values.

EX1005, 2:34-60

(57)

ABSTRACT

Described is an integrated glass fog sensor unit utilized to provide the necessary data to predict glass fog formation.



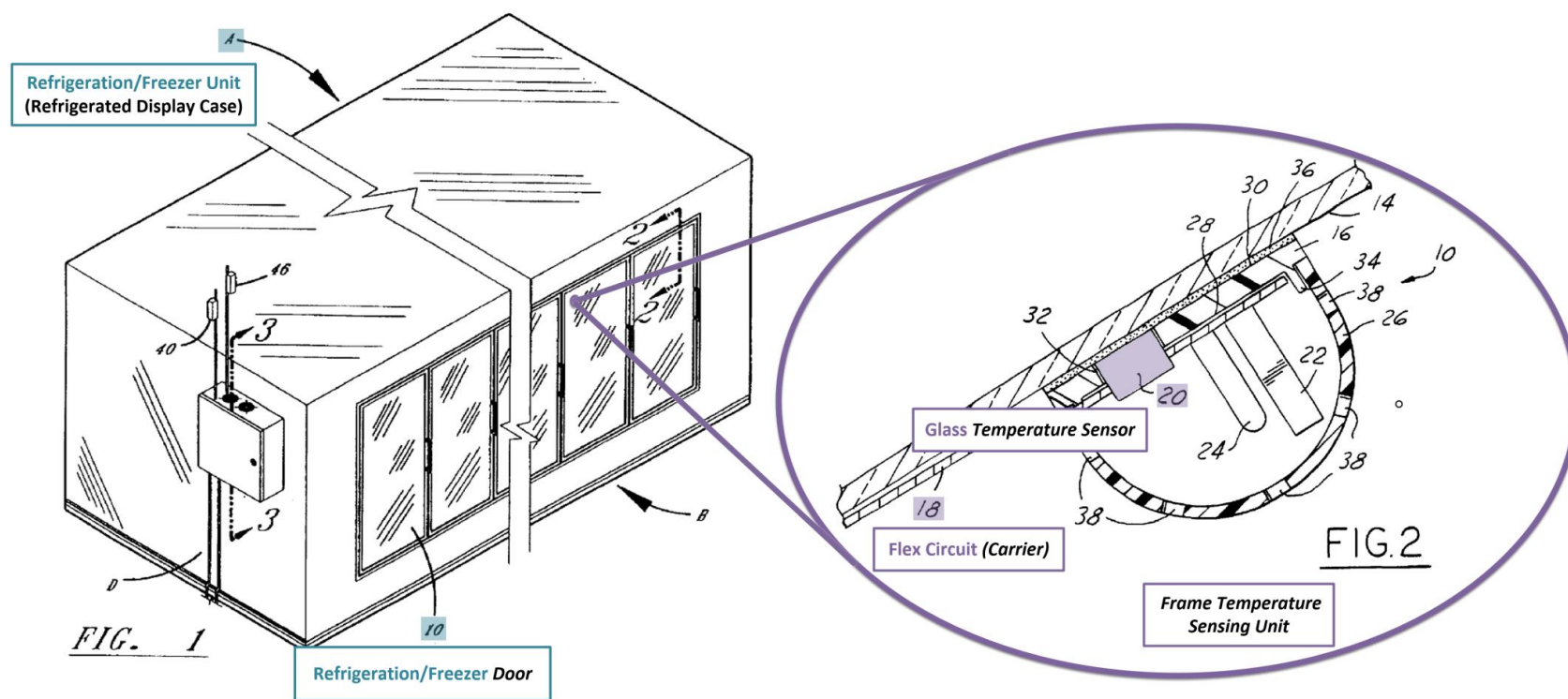
38

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Pet. 37-38, 41-42, 46

A POSITA Would Have Been Motivated to Use King's Integrated Sensor Package for the Carter-Beatenbough Condensation Control Scheme



Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Pet. 41-42

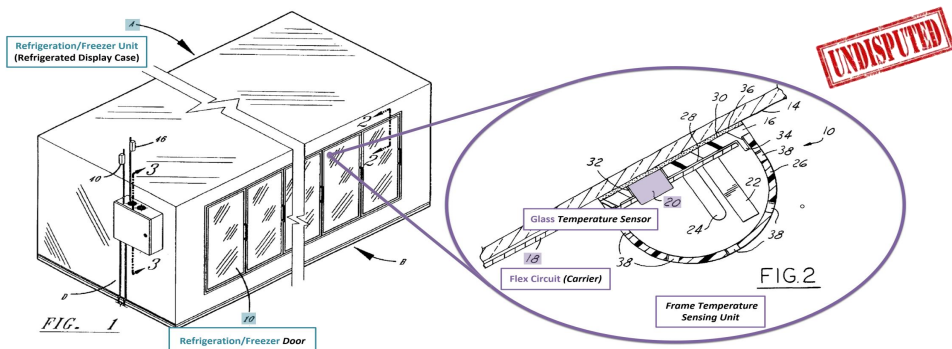
Carter-Beatenbough-King: Multiple Motivation Rationales

PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 7,207,181 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

EX1003, ¶160, ¶¶42–49. Thus, when tasked with implementing the Carter-Beatenbough condensation control scheme, the POSITA would have faced a routine sensor packaging problem. *Id.* Recognizing that King’s disclosure represents a known and suitable solution to this problem—one that specifically addresses the three types of sensors at issue—the POSITA would have been motivated to make the Carter-Beatenbough-King Combination. EX1003, ¶¶161–162.

Second, a POSITA would have been motivated to make the Carter-Beatenbough-King Combination because King’s teachings provide the advantage of a compact solution that mounts and houses all three of the requisite sensors in a single package. EX1003, ¶163. As the POSITA would have understood, King’s integrated sensor package would facilitate a more streamlined installation process compared to other designs that mount the sensors separately. EX1003, ¶163.

Third, a POSITA would have appreciated that King’s integrated sensor package provides the further advantage of lowering manufacturing, assembly, and installation costs by reducing the number of components compared to other designs that mount the sensors separately. EX1003, ¶164; EX1005, 1:36–45 (other designs

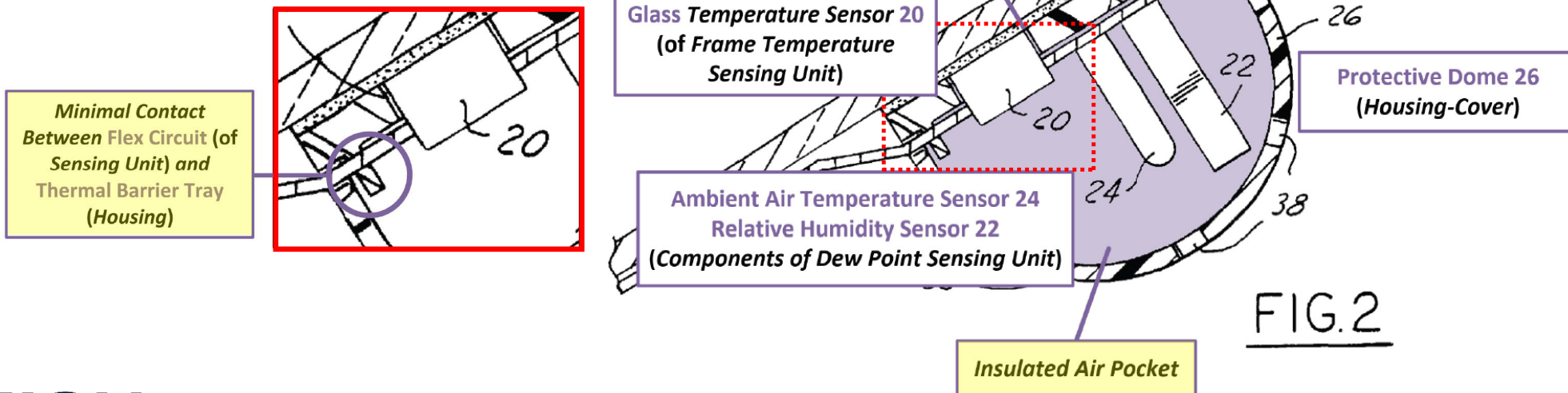


Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Pet. 50-55; EX1003 Paras. 176-184

King's Dome-and-Tray Assembly Has the Claimed Structure Establishing Thermal Isolation of the Sensing Units

Element [1.d]: establishing thermal isolation . . . by **minimizing heat transfer contacts** between said sensing units and said housing means and locating said [sensors] **amid insulated air pockets**

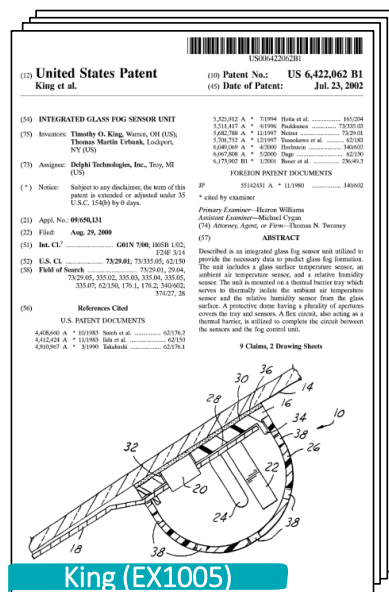


Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Rebuttal to: *“King likewise does not provide thermal isolation.”* POR at 55.

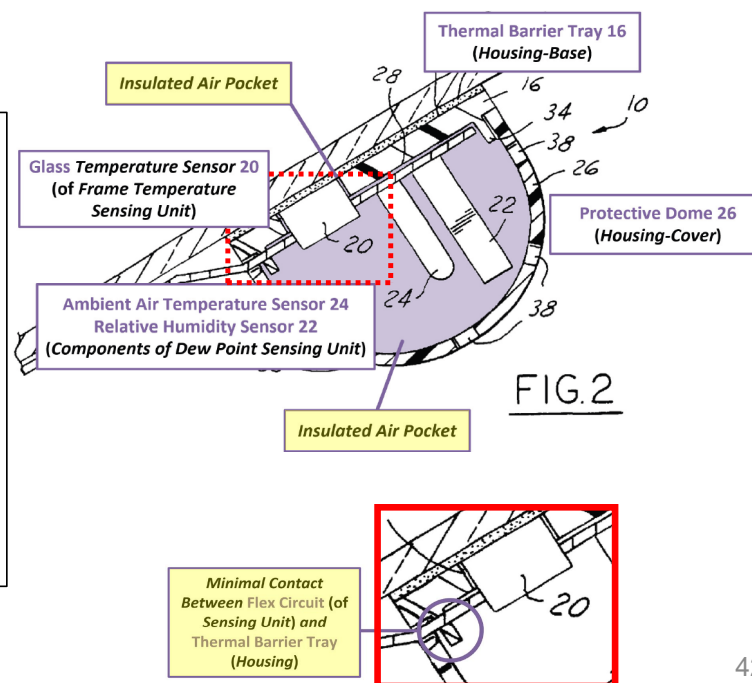
Pet. 50-55
Reply 11

King Expressly Teaches Thermal Isolation and Provides the Same Kind of Isolating Structures as the '181 Patent



Described is an integrated glass fog sensor unit utilized to provide the necessary data to predict glass fog formation. The unit includes a glass surface temperature sensor, an ambient air temperature sensor, and a relative humidity sensor. The unit is mounted on a thermal barrier tray which serves to thermally isolate the ambient air temperature sensor and the relative humidity sensor from the glass surface. A protective dome having a plurality of apertures covers the tray and sensors. A flex circuit, also acting as a thermal barrier, is utilized to complete the circuit between the sensors and the fog control unit.

EX1005. Abstract: see also 2:55-58



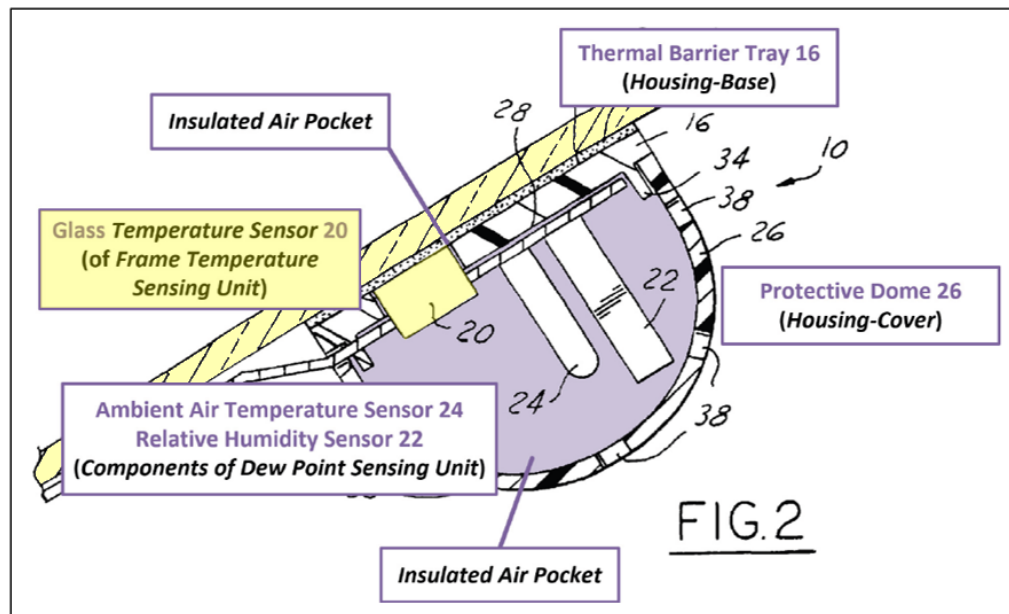
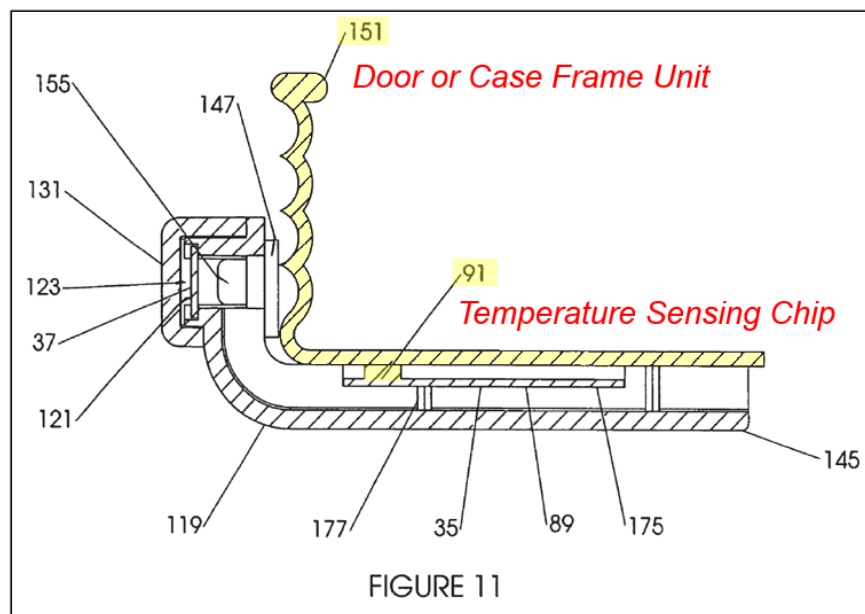
Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Rebuttal to:

“King’s ‘sensor unit’ would be located against the display case frame...That placement, however, concedes that the sensor unit sits on the frame without minimizing contact...” POR at 55.

Pet. 50-55
Reply 11

King Expressly Teaches Thermal Isolation and Provides the Same Kind of Isolating Structures as the '181 Patent



43

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Rebuttal to:

“The Petition further points to King’s flex circuit as a ‘thermal barrier,’ but that is not a housing means . . .” POR at 55.

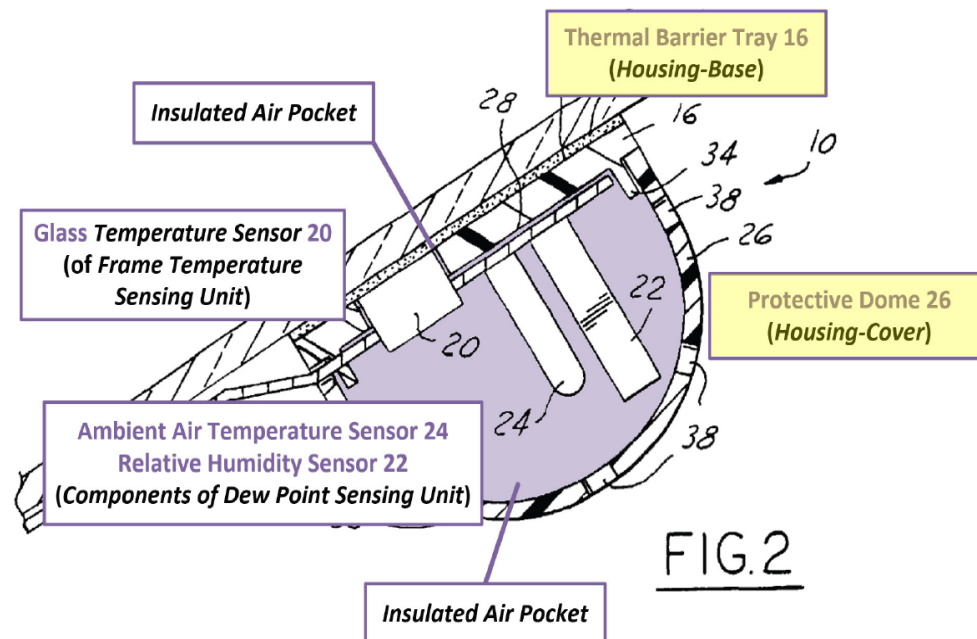
Pet. 50-55
Reply 11

The Petition Maps King’s Thermal Barrier Tray and Protective Dome to the Claimed “Housing Means,” Not the Flex Circuit

PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 7,207,181 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

EX1005, 1:48–65, Figure 2. The tray “assures that surface temperature does not alter the ambient air temperature or relative humidity levels,” and “the protective dome surrounds, and serves to protect, the sensors from any impacts.” EX1005, 2:55–63; *see also* 1:48–65 (“The tray and the flex circuit also serve as a thermal barrier isolating the ambient air sensor and humidity sensor from the potentially cold glass surface.”). In this way, the protective dome and the thermal barrier tray together form a housing for locating the sensing units. EX1003, ¶176.

Pet. 50-51



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Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Rebuttal to: “[King’s] sensor unit sits on the frame...without an air pocket behind the board or carrier.” POR at 55.
“King does not disclose locating both units amid insulated air pockets. . .” POR at 56.

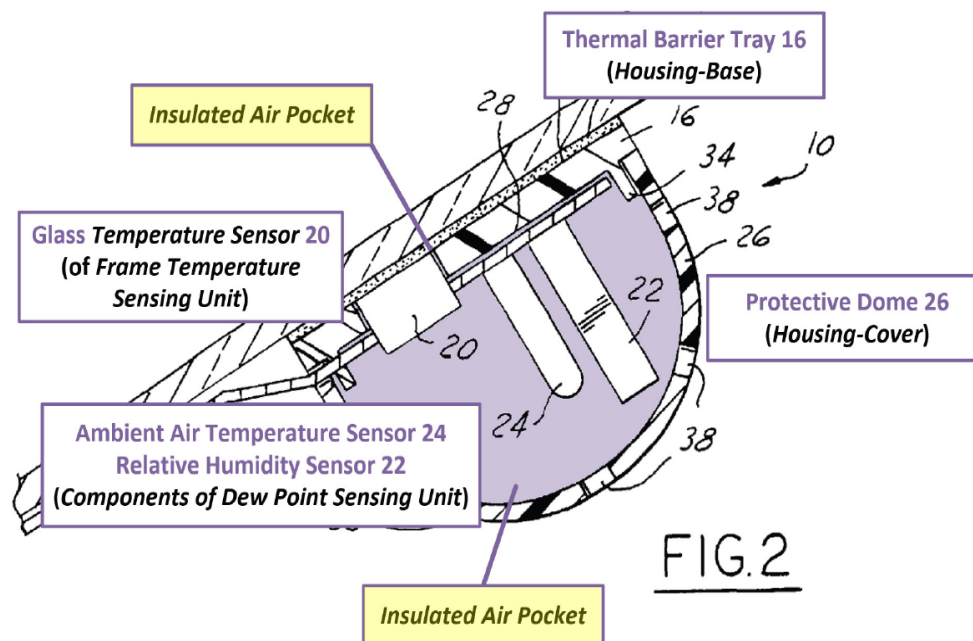
Pet. 50-55
Reply 12

Patent Owner Ignores the Petition’s Analysis of King’s Air Pockets

PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 7,207,181 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

Additionally, it would have been apparent or obvious that the *structure* of King’s dome *housing* (dome 26 and tray 16) *locates the temperature sensor* (glass temperature sensor 20) *and the at least one dew point sensing component* (ambient air temperature sensor 22 and/or relative humidity sensor 24) *amid insulated air pockets formed by the structure of the housing*. EX1003, ¶182. For example, King’s figures show that these sensing components are received *amid insulated air pockets formed by the structure of the housing*. EX1005, 1:48–65 (“The glass temperature sensor sits within a hole, penetrating the tray and the flex circuit...[and a]ll three sensors are located beneath a protective dome which is secured to a perimeter wall of the tray.”), 2:40–3:2, Figures 1–2; EX1003, ¶182 (air is a thermal insulator); EX1001, 7:25–28 (“insulating air gap”).

Pet. 53



45

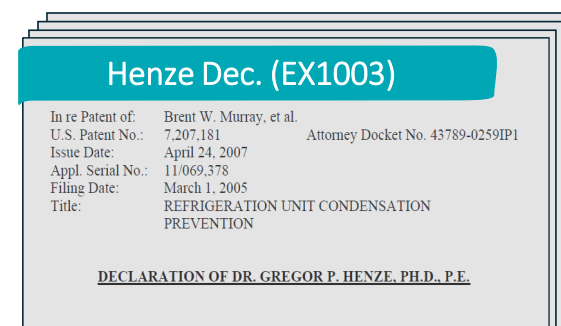
Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Rebuttal to: *“The ’181 Patent addresses a specific, practical problem unique to refrigerated display cases[.]” POR at 58.*

Pet. 36-37
Reply 14-16

King’s Sensor Unit Teachings Are Reasonably Pertinent to the ’181 Patent’s Sensor Packaging Problem

148. Second, King is reasonably pertinent to the problem(s) addressed by the ’181 patent. King and the ’181 patent similarly address the design problem of provisioning a housing for a sensor package including a surface temperature sensor, an ambient air temperature sensor, and a relative humidity temperature sensor. Compare §V (summarizing the ’181 patent), with §X.B.1 (summarizing King). In both King and the ’181 patent, the design problem involves mechanically supporting, electrically connecting, and thermally isolating the sensors. King is therefore reasonably pertinent to at least one of the problems that the ’181 patent’s inventors were trying to solve.



149. Indeed, someone faced with the kind of sensor packaging problem addressed by the ’181 patent would have thought to pursue references like King that propose viable solutions, regardless of their technical field. Because automated control systems are used in so many kinds of electrical devices/systems, sensors are likewise deployed in a wide variety of different fields. Accordingly, a person looking to design, improve, and/or procure a sensor package would not have confined themselves to prior art references from any particular field.

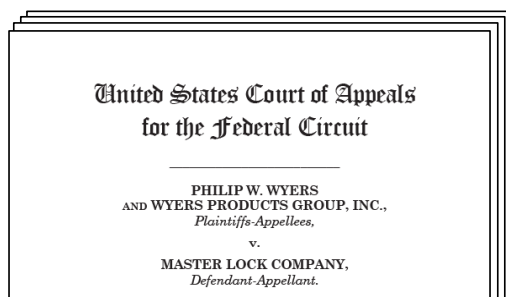
Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Rebuttal to:

“The ’181 Patent addresses a specific, practical problem unique to refrigerated display cases[.]” POR at 58.

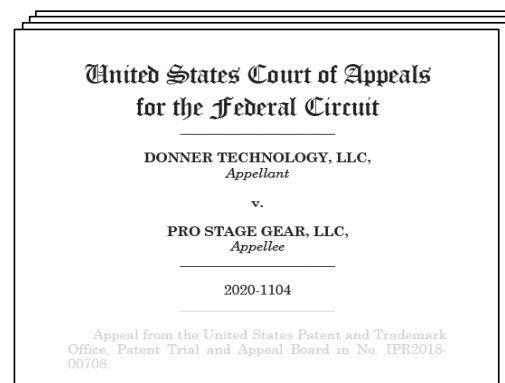
Pet. 36-37
Reply 14-16

Patent Owner’s Overly Narrow Problem Statement Collapses the Field-of-Endeavor and Reasonable-Pertinence Inquiries



Wyers v. Master Lock Co.,
616 F.3d 1231, 1238 (Fed. Cir. 2010)

Even if the prior art padlocks were not within the same field of endeavor, they are nonetheless clearly “reasonably pertinent” to the problem that the inventor was trying to solve. See *In re Clay*, 966 F.2d at 659. The Supreme Court’s decision in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007), directs us to construe the scope of analogous art broadly, stating that “familiar items may have obvious uses beyond their primary purposes, and a person of ordinary skill often will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *Id.* at 402 (emphasis added). Here, the prior



Donner Tech., LLC v. Pro Stage Gear, LLC,
979 F.3d 1353, 1360 (Fed. Cir. 2020)

rowly so as to rule out all such art.¹ The Board’s characterization of the problem to which the claimed invention relates effectively collapses the field-of-endeavor and reasonable-pertinence inquiries and ignores that the reasonable-pertinence analysis must be carried out through the lens of a PHOSITA who is considering turning to art outside her field of endeavor.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

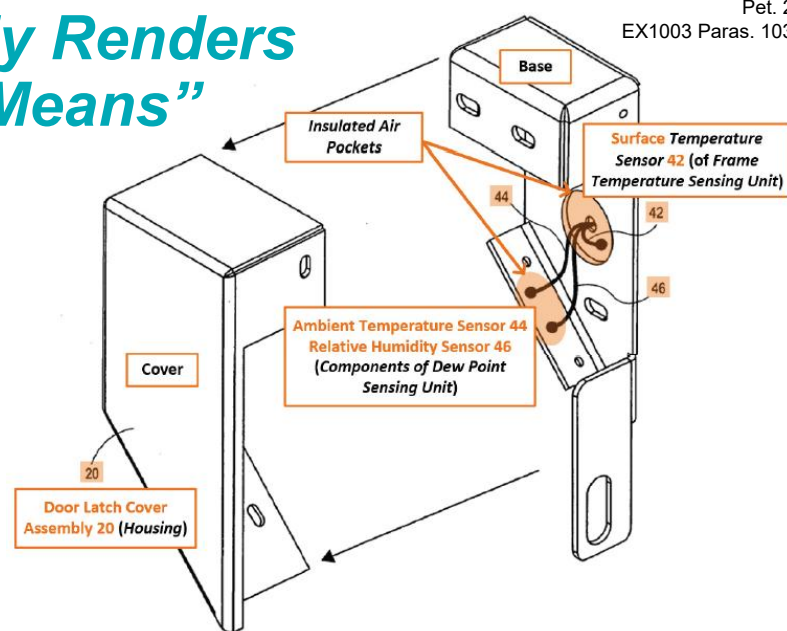
Carter's Door Latch Cover Assembly Renders Obvious the Claimed Housing "Means"

PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 7,207,181 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

To start, and for at least the following **three reasons** (taken individually or collectively), it would have been apparent or obvious to a POSITA reading Carter's disclosure that **the structure of the door latch cover assembly (housing) has minimized heat transfer contacts with the sensing units.** EX1003, ¶¶105–108.

1 refrigerated case and the ambient air, achieving Carter's goal of **"more accurate" sensor readings** would naturally entail **minimizing heat transfer contacts between the sensing units and** other heat sources/sinks, including the door latch cover assembly (*housing*). *Id.*

2 ¶¶42–49. **Motivated by the benefit of promoting sensor accuracy**, the POSITA would have employed the **known technique** of **minimizing heat transfer contacts between the sensing units and their housing enclosure.** *Id.*



3 supports this understanding of Figures 1–2. *Id.* Notably, Carter only states that the components of “the sensor assembly unit 32 [are] integrated within the interior portion 22 of the door latch cover assembly 20” (*housing*) and **never says or implies that these components contact the housing.** EX1004, 5:1–20.

Pet. 21-26, 32-33
EX1003 Paras. 103-113, 42-49

Pet. 23-24

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FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

Pet. 21-26, 32-33
EX1003 Paras. 103-113, 42-49

Carter's Door Latch Cover Assembly Renders Obvious the Claimed Housing "Means"

DECLARATION OF DR. GREGOR P. HENZE, PH.D., P.E.

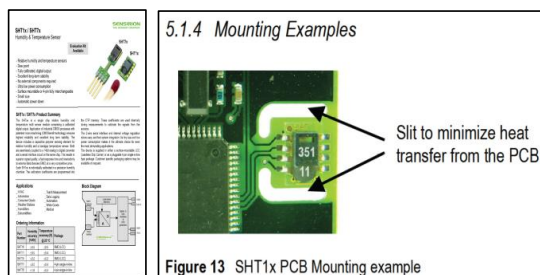


Figure 13 SHT1x PCB Mounting example

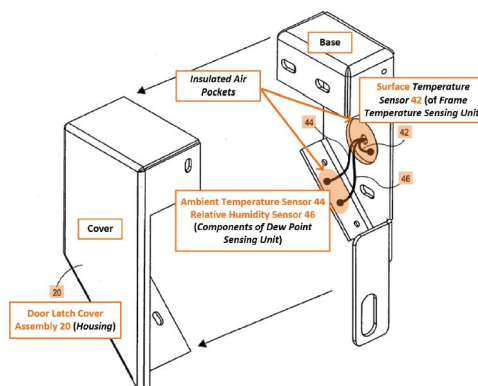
4.4 Temperature Effects

The relative humidity of a gas strongly depends on its temperature. It is therefore essential to keep humidity sensors at the same temperature as the air of which the relative humidity is to be measured. If the SHTxx shares a PCB with electronic components that give off heat it should be mounted far away and below the heat source and the housing must remain well ventilated. To reduce heat conduction copper layers between the SHT1x and the rest of the PCB should be minimized and a slit may be milled in between (see figure 13).

EX1020 at 6-7

Accordingly, temperature and humidity sensors are typically held in housings designed to support the sensing elements, protect the sensing elements, and isolate the sensing elements from outside factors (things not being sensed) that would otherwise bias the measurements or damage the sensors. Common sources of measurement bias for both air temperature and humidity sensors include radiation heat transfer with nearby surfaces. See also EX1020, 6 ("The relative humidity of a

EX1003 Para. 43



readings to operate heating elements in a manner that prevents condensation. As the POSITA would have known, the effectiveness of a "control unit [that] operates automatically," (EX1004 (Carter) 6:57–58), is affected by the accuracy of the sensor measurements on which it depends. EX1027, 2 ("The point here is that you cannot control a variable more accurately than you can measure it. Therefore, measurement is fundamental to control."). When considering Carter's automated system—a system designed to prevent condensation effectively and efficiently by activating electrical heaters only when sensed conditions are ripe—the POSITA would have appreciated the importance of sensor accuracy. Inaccurate sensor readings would cause the control unit to activate the heaters prematurely, which would waste energy, or belatedly, which would allow condensation to form. Neither result would be satisfactory to the POSITA. As a result, motivated by the benefit of promoting sensor accuracy, the POSITA would have employed the known technique of minimizing heat transfer contacts between the sensing units and their housing

EX1003 Para. 107
49

Grounds 1A–1B: Claim 1, Element [1.d] & Claims 15-16

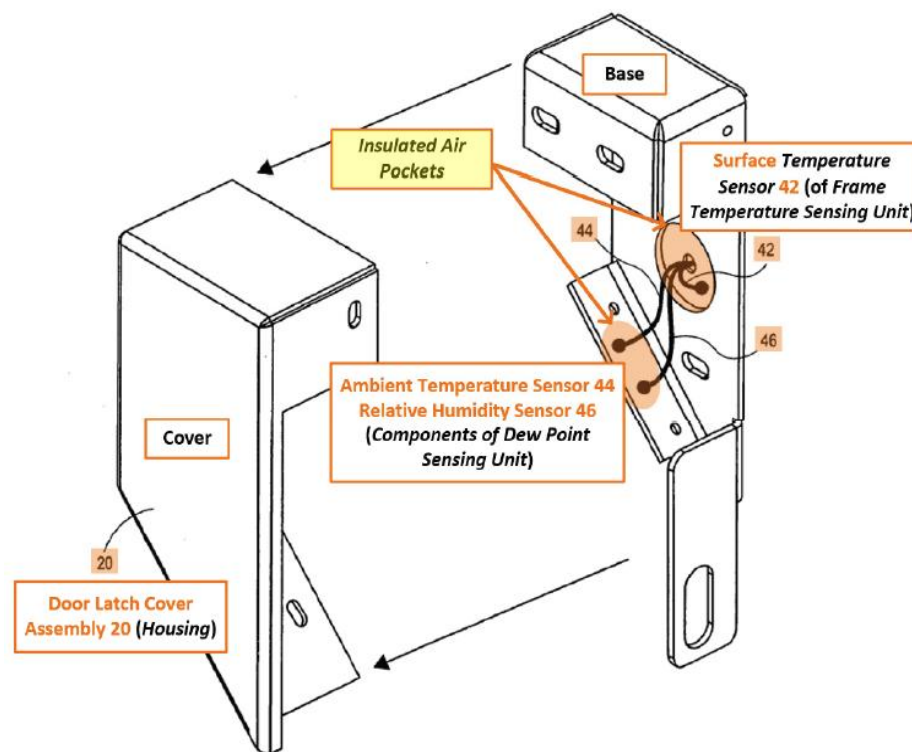
Carter's Door Latch Cover Assembly Renders Obvious the Claimed Housing "Means"

Pet. 21-26, 32-33
EX1003 Paras. 103-113, 42-49

PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 7,207,181 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

Additionally, it would have been apparent or obvious that the *structure* of Carter's *housing* (door latch cover assembly 20) *locates the temperature sensor* (surface temperature sensor 42) *and the at least one dew point sensing component* (including ambient temperature sensor 44 and/or ambient relative humidity sensor 46) *amid insulated air pockets formed by the structure of the housing*. EX1003, ¶¶109–111. To wit, Carter explains that these components of "the sensor assembly unit 32 [are] integrated within the interior portion 22 of the door latch cover assembly 20" (*housing*), and Carter's figures show that this interior portion receives the sensing components *amid insulated air pockets formed by the structure of the housing*. EX1004, 5:1–20, 6:50–56, Figures 1–2; EX1003, ¶110 (air is a thermal insulator); EX1001, 7:25–28 ("insulating air gap").

Pet. 24



50

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Elements [1.a]-[1.b]

Carter Alone or With Beatenbough and King
Renders Obvious the Claimed Sensors “Adapted
for Monitoring” Frame/Door Temperature, Ambient
Air Temperature, and Relative Humidity

Grounds 1A–1B: Claim 1, Elements [1.a]-[1.b]

Pet. 45-49

Claim 1

[1.a]

a frame temperature sensing unit adapted for monitoring temperature of one of the display case door or display case frame and including a carrier having a temperature sensor thereat;

[1.b]

a dew point sensing unit adapted for monitoring ambient air temperature and relative humidity outside of the display case and including a carrier having at least one dew point sensing component thereat;

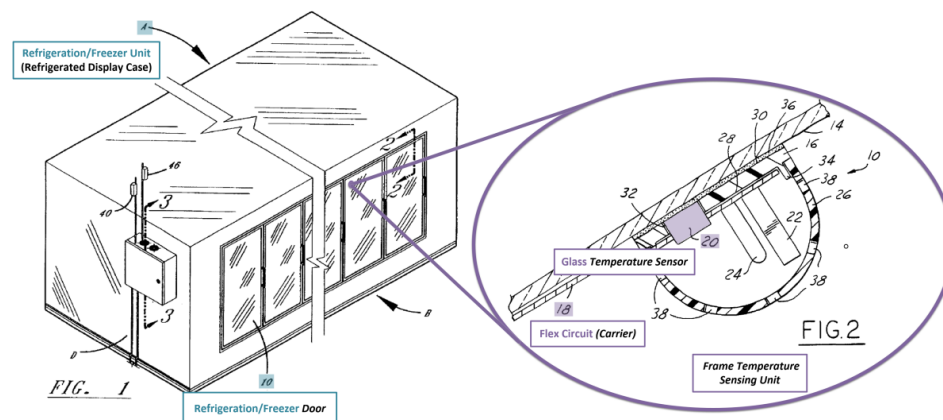
Grounds 1A–1B: Claim 1, Elements [1.a]-[1.b]

Pet. 45-49

King's Sensors Are “Adapted for Monitoring” the Frame or Door and Ambient Environment of Beatenbough's Display Case

In pursuing the Carter-Beatenbough-King Combination, a POSITA would have contemplated locating a “*sensor unit*” according to King's teachings such that the above-discussed glass *temperature sensor* is placed against—and, thus, *monitors the temperature of*—the outer glass pane supported by the *frame of* Beatenbough's display case door. EX1003, ¶167.

See EX1003, ¶168 (discussing visual aid). It would have been an obvious alternative solution to locate a “*sensor unit*” like the one King teaches against the display case frame to monitor frame temperature, as was well known in the art and even taught by Carter (see Element[1.a], Ground 1A). EX1003, ¶169. As a POSITA would have appreciated, a frame-mounted deployment would position the sensor unit more discreetly without sacrificing its functional capabilities. *Id.*



Pet. 46

53

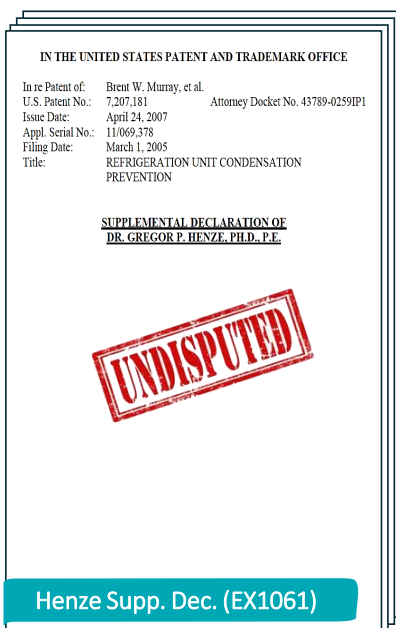
Grounds 1A–1B: Claim 1, Elements [1.a]-[1.b]

Pet. 45-49
Reply 12-14

Rebuttal to: “[T]he Petition provides no explanation regarding how the sensor unit would be adapted for ‘monitoring temperature of one of the display case door or display case frame.’” POR at 34

A POSITA Would Have Known: Merely Changing the Location of King’s Sensor Unit Would Not Render Its Sensors Inoperable

EX1061 Para. 59



59. Mr. Pollock seems to improperly assume that merely changing the location of King’s sensor unit—i.e., from a car windshield to a different surface like a glass door or a door frame of a refrigerated case—would somehow change the designed functionality of the sensors. But that assumption is unfounded. So long as the surface temperature sensor is placed adjacent to the door or frame of the display case and the air temperature and humidity sensors face the ambient environment (e.g., as I explained and illustrated above), they will fulfill their designed monitoring functionality in precisely the manner King described. This would have been clear to a POSITA from reading King, as well as from prior experience and knowledge.

54

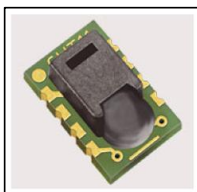
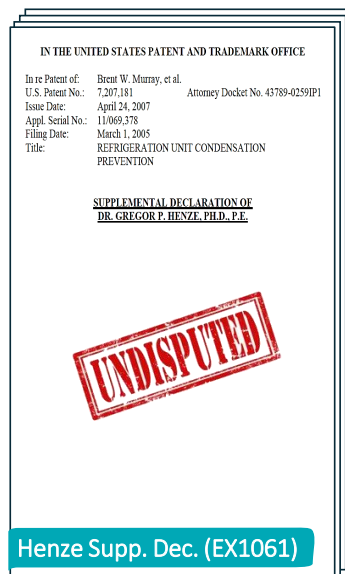
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Elements [1.a]-[1.b]

Pet. 45-49
Reply 12-14

Rebuttal to: “[T]he Petition provides no explanation regarding how the sensor unit would be adapted for ‘monitoring temperature of one of the display case door or display case frame.’” POR at 34

A POSITA Would Have Known: Merely Changing the Location of King’s Sensor Unit Would Not Render Its Sensors Inoperable



Two in one!
Two sensors (rh/temp.)
on one single chip, fully
calibrated and ready to
use

EX1032 at 1

Applications

- High volume consumer products
- White goods
- Automotive
- Building control & HVAC

For example, the POSITA would have recognized that sensor packages like King’s were known to be adaptable to a variety of different applications. For example, the Sensirion sensor package that I discussed in my Prior Declaration (EX1003 ¶¶45–47 (citing EX1020)), which included both relative humidity and air temperature sensors in a shared housing, was marketed as suitable for using in “High volume consumer products,” “White goods,” “Automotive,” and “Building control & HVAC”). See EX1032.

EX1061 Para. 59

Recall that the '181 patent concedes known sensors are suitable

(12) **United States Patent**
Murray et al.

(10) Patent No.: US 7,207,181 B2
(45) Date of Patent: Apr. 24, 2007

Controller unit 31 may utilize any known sensor(s) 37 for monitoring ambient air temperature (for example, thermistors may be utilized for the temperature sensors herein, including by sensors 33 and 35) and relative humidity (capacitive polymer or thin film type sensor, for example, may be utilized wherein capacitance is proportional to the relative humidity of surrounding air). Combination sensors providing relatively accurate dew point sensing are known and commercially available. Microprocessor 53 looks up the

EX1001, 8:55-63

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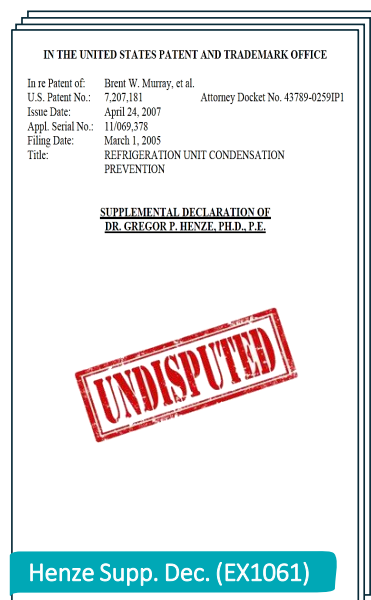
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Elements [1.a]-[1.b]

Pet. 45-49
Reply 12-14

Rebuttal to: *“The Petition does not explain how Carter would be reconfigured to monitor the display case door or frame in this different platform...” POR at 32-33.*

A POSITA Would Have Known: Carter’s Sensors Would Not Perform Differently on a Refrigerated Display Case



63. My discussion above with respect to King’s sensor unit on this point is similarly applicable to Carter’s sensor assembly unit, which I addressed in Ground 1A of my Prior Declaration regarding the “adapted for” language.⁴ See EX1003 ¶¶82–83, ¶¶85–86. A POSITA would have well understood that the designed functionality of the sensors in Carter’s assembly would not change merely because the refrigerated case is used for purpose of displaying its contents. I detailed

Level of Ordinary Skill in the Art

Patent Owner's Overly Narrow Skill Level Definition Is Ends-Oriented and Unjustifiable

Level of Ordinary Skill in the Art

Pet. 4; POR 23

The Parties' Respective Skill Level Definitions

Petitioner	Patent Owner
The qualifications for a POSITA would have included a bachelor's degree in mechanical engineering, electrical engineering, or a comparable field and at least three to five years of experience related to heating, ventilating, air conditioning, and refrigeration (HVAC&R) systems. EX1003, ¶¶31–32.	A POSITA would have a bachelor's degree in mechanical engineering, electrical engineering, or a related field, and at least two years' professional experience working with refrigerated display cases. EX.2014, ¶11.

Level of Ordinary Skill in the Art

Pet. 4, 37; Reply 20
EX1003 Paras. 26-30, 145-146; EX1061 Paras. 16-24

The Petition Correctly Identifies the “Art” as HVAC&R

Henze Dec. (EX1003)

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,207,181 Attorney Docket No. 43789-0259IP1
Issue Date: April 24, 2007
Appl. Serial No.: 11/069,378
Filing Date: March 1, 2005
Title: REFRIGERATION UNIT CONDENSATION PREVENTION

DECLARATION OF DR. GREGOR P. HENZE, PH.D., P.E.

145. First, King is within the same field of endeavor as the '181 patent. The '181 patent pertains to the field of “remediat[ing] condensation build up” in Heating, Ventilating, Air Conditioning, and Refrigerating (HVAC&R) systems. EX1001 ('181 patent), 1:5–10. Although its preferred embodiments and claims involve refrigeration systems, a POSITA would have understood that the '181 patent's focus on condensation control invokes the broader context of HVAC&R.

EX1003 Para. 145

A So the way I would like to answer this question is, the '181 and the '847 are trying to solve condensation problems. That is squarely in the HVAC&R field. As a person of ordinary skill in the art, I would have looked to solutions that are solving this condensation problem.

EX2019 at 155:2-4

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Henze Depo. (EX2019)

59

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Level of Ordinary Skill in the Art

Pet. 4, 37; Reply 20; EX1003 Paras. 26-30, 145-146; EX1061 Paras. 16-24

The Petition Correctly Identifies the “Art” as HVAC&R

DECLARATION OF DR. GREGOR P. HENZE, PH.D., P.E.

EX1003 Para. 146

146. Tellingly, the '181 patent expressly confirms that the kind of “condensation control” techniques it describes are not limited to refrigeration and are instead “utilized in a variety of applications.” EX1001 ('181 patent) 1:41–47. For example, at Column 1, Line 46, the '181 patent cites US2004/0050072, a published patent application from 2004 directed to “sensing or predicting when condensation having a given physical state is present or imminent and for suppressing such condensation from a surface, such as a vehicle windscreen, eyewear, goggles, helmet visor, computer monitor screen, window, electronic equipment, etc.,” (EX1029 at Abstract). Then again, at Column 1, Line 47, the '181 patent cites US5,778,147, an issued patent from 1998 describing “[a] dew preventing mechanism [that] prevents the formation of dew on the grilles of an air discharge port of a room air conditioner,” (EX1040 at Abstract). Clearly, the inventors of the '181 patent appreciated that condensation control is a broad technical field, one not limited to refrigeration.

(12) United States Patent
Murray et al.

(10) Patent No.: US 7,207,181 B2
(45) Date of Patent: Apr. 24, 2007

Other devices have suggested condensation control utilizing dew point calculation. Monitoring air temperature, relative humidity and surface temperatures to initiate condensation control events has been utilized in a variety of applications including refrigeration (see, for example, U.S. Patent Publication No. US 2004/0050072 A1 and U.S. Pat. Nos. 6,470,696, 5,778,689, 5,778,147, and 4,127,765). Some such devices or systems have utilized temperature sensing of both cold surfaces and the surrounding ambient air in condensation control response calculations. As is known, when a cold surface temperature is equal to or lower than the dew point of the ambient air, condensation forms on the cold surface.

Such devices and systems have not proven altogether successful, however, due to inaccuracy of temperature readings, particularly where both cold and warm environments are adjacent one another such as is found at commercial freezer/refrigeration display cases. Failure to configure such systems to enhance accuracy of readings has resulted in erratic condensation control, on some occasions wasting energy unduly heating frames/doors, on other occasions responding late or otherwise inadequately to condensation formation, and/or on still other occasions failing to control appropriate heater cycling (i.e., shut-off) with consequent loss of efficiencies. Some such systems, utilized in fields not

EX1001, 1:41-65

60

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Level of Ordinary Skill in the Art

Pet. 4, 37; Reply 20
EX1003 Paras. 26-30, 145-146; EX1061 Paras. 16-24

The Petition Correctly Identifies the “Art” as HVAC&R

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,207,181 Attorney Docket No. 43789-0259IP1
Issue Date: April 24, 2007
Appl. Serial No.: 11/069,378
Filing Date: March 1, 2005
Title: REFRIGERATION UNIT CONDENSATION
PREVENTION

SUPPLEMENTAL DECLARATION OF DR. GREGOR P. HENZE, PH.D., P.E.

Henze Supp. Dec. (EX1061)

18. The problems presented in the '181 patent are archetypal HVAC&R

considerations that are not unique to refrigerated display cases. It is my opinion that

the technical challenges associated with mitigating condensation on refrigerated display cases are applications of classical engineering principles, for which a bachelor's degree in mechanical engineering, electrical engineering, or a closely related field, supplemented by three to five years of professional experience in heating, ventilating, air conditioning, and refrigeration (HVAC&R) systems, constitutes a sufficient qualification. Refrigerated display cases do not operate under

a unique set of physical laws. Rather, they are governed by the universal principles of thermodynamics, psychrometrics, and heat transfer that form the bedrock of a

standard engineering curriculum and broader HVAC&R practice that I have been

educating for more than 25 years.

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DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Level of Ordinary Skill in the Art

Reply 21-24

No Credible Evidence Supports Confining the “Art” to Display Cases

- **Title** is not specific to display cases
- **Field of invention** identifies “remediat[ing] condensation build-up” as the problem, and “refrigerated display cases” as merely the application environment
- **Claims** focus on “condensation control apparatus,” with basic display case components to show an intended use

REFRIGERATION UNIT CONDENSATION PREVENTION

FIELD OF THE INVENTION

This invention relates to frame and/or door heating to **remediate condensation build-up** in refrigerated display cases, and, more particularly, relates to sensing and operating devices and methods for activation and deactivation of such heating.

EX1001, 1:1-10

What is claimed is:

1. **Condensation control apparatus for** a refrigerated display case having at least one door, a frame and at least one frame/door heater, said apparatus comprising:

EX1001, 9:29-31

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FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Level of Ordinary Skill in the Art

Pet. 4; Reply 24-25

Dr. Henze Has Ample Refrigeration & Display Case Experience

DECLARATION OF DR. GREGOR P. HENZE, PH.D., P.E.

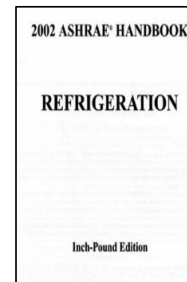
operations focusing on novel sensing, control, and fault detection approaches. I am certified by the American Society of Heating, Refrigerating, and Air Conditioning Engineers as a High-Performance Building Design Professional.¹ I am also a licensed professional mechanical engineer (P.E.) in Nebraska.

¹ The American Society of Heating, Refrigerating and Air-Conditioning Engineers is a recognized organization in the HVAC industry and has published many handbooks and other documents that are used in the industry.

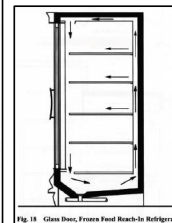
EX1003 Para. 12

14. I have researched and conducted projects involving a variety of different building control systems, including those employing control strategies for operating vapor compression refrigeration cycles in chillers, heat pumps, air-cooled condensers, and thermal energy storage systems. Moreover, at the National Renewable Energy Laboratory I have investigated waste heat recovery opportunities for commercial refrigeration systems. As such, I am well-versed in the system requirements, performance, and components used to design such systems.

EX1003 Para. 14



Display Refrigerators 47.1



Additional savings can be achieved by controlling antisweat heaters and reducing defrost frequency at ambient relative humidities below 55%. Energy savings credit for reduced use of display case antisweat heaters can only be taken if the display cases are equipped with humidity-sensing controls that reduce the amount of power supplied to the heaters as the store dew point decreases. Also,

EX1039, 1, 4, 31, 34, 38

SUPPLEMENTAL DECLARATION OF DR. GREGOR P. HENZE, PH.D., P.E.

30. Regardless, I do have professional experience with refrigerated display cases. For example, I have analyzed the thermodynamic performance of these cases. As one example, I led a grant application that analyzed and enhanced commercial refrigeration systems in retail settings. In this, I proposed energy-cascading refrigeration architectures, which involve integration of low- and medium-temperature refrigeration racks with building-wide HVAC and water heating systems. This experience is not limited to existing hardware but extends to the redesign of thermal exchange processes such as the implementation of indirect

EX1061 Para. 30

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DEMONSTRATIVE EXHIBIT – NOT EVIDENCE