

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,421,847 Attorney Docket No. 43789-0260IP1
Issue Date: September 9, 2008
Appl. Serial No.: 11/788,453
Filing Date: April 20, 2007
Title: REFRIGERATION UNIT CONDENSATION
PREVENTION

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**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 7,421,847 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

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LIST OF EXHIBITS

EX1001	U.S. Patent No. 7,421,847
EX1002	U.S. Patent No. 7,421,847 File History
EX1003	Declaration of Dr. Gregor P. Henze
EX1004	U.S. Patent No. 7,137,262 (Carter)
EX1005	U.S. Patent No. 6,422,062 (King)
EX1006	U.S. Patent No. 7,240,501 (Bunch)
EX1007	U.S. Patent No. 6,502,409 (Gatling)
EX1008	U.S. Patent No. 5,396,796
EX1009	U.S. Patent No. 5,778,689
EX1010	U.S. Prov. Appl. No. 60/569,581
EX1011	U.S. Prov. Appl. No. 60/559,113
EX1012	U.S. Patent No. 3,939,666
EX1013	U.S. Patent No. 3,696,360
EX1014	U.S. Publication No. 2005/0007136
EX1015	ACT2-CS Convenience Store Controller, Johnson Controls (1999)
EX1016	U.S. Patent No. 4,260,876
EX1017	RESERVED
EX1018	Altech Controls XPRT Eagle Controls Manual (Section A-B)

EX1019	Altech Controls XPRT Eagle Controls Manual (Section C)
EX1020	Sensirion, SHT1x/SHT7x Humidity & Temperature Sensor (revised May 2005)
EX1021	Altech Controls AASC Anti-Sweat Heater Controller
EX1022	Anthony Engineering Change Notice—Engineering Drawings for Altech Controls AASC Control Assembly and Altech Controls Sensors
EX1023	Steven J. Slayzak & Joseph P. Ryan, Instrument Uncertainty Effect on Calculation of Absolute Humidity Using Dewpoint, Wet-Bulb, and Relative Humidity Sensors (National Renewable Energy Laboratory) 1998
EX1024	David H. Walker et al., Investigation of Energy-Efficient Supermarket Display Cases, Oak Ridge National Laboratory (Dec. 2004)
EX1025	RESERVED
EX1026	RESERVED
EX1027	Contemporary Control Systems Inc., Introduction to Control, Vol. 2. Issue 2 (2001)
EX1028	Shivakumar Raman & Paul H. Cohen, <i>Remote sensing for on-line temperature estimation in machining: A basic framework</i> , 38 J. of Materials Processing Tech. 613 (1993)
EX1029	U.S. Publication No. 2004/0050072
EX1030	Sensirion, SHTxx Humidity & Temperature Sensmitter, Application Note Dew-point Calculation (revised January 2005)
EX1031	ASHRAE Psychometric Chart No. 1 (1992)

- EX1032 Low Cost Humidity Sensor SHT10, Sensirion (Mar. 12, 2006),
https://web.archive.org/web/20060312033617/http://www.sensirion.com/en/02_sensors/00_products.htm?cat=3&category=&art=11&product=humidity%20sensor%20SHT10
- EX1033 Larry D. Wittie, Microprocessors and Microcomputers (Encyclopedia of Computer Science) (2003)
- EX1034 Ramin Faramarzi, P.E. et al., Anti-Sweat Heaters in Refrigerated Display Cases, ASHRAE J. 64 (2001)
- EX1035 U.S. Publication No. 2007/0130968
- EX1036 U.S. Patent No. 5,369,753
- EX1037 Complaint (Document 1), *ControlTec, LLC v. Anthony, Inc. et al.* 1:24-cv-00883 (DDE)
- EX1038 Stipulation and [Proposed] Order to Stay Proceedings (Document 20), *ControlTec, LLC v. Anthony, Inc. et al.* 1:24-cv-00883 (DDE)
- EX1039 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 2002 ASHRAE Handbook: Refrigeration (excerpt)
- EX1040 U.S. Patent No. 5,778,147
- EX1041 RESERVED
- EX1042 RESERVED
- EX1043 Refrigeration Monitor and Case Control Installation and Operation Manual (Rev 4 08-12-99)
- EX1044 UltraSite 32 User's Guide (Rev 3 9-28-99)

LISTING OF CHALLENGED CLAIMS

Claim 1	
[1.pre]	A method for condensation control at a refrigerated display case having at least one door, a frame and at least one frame/door heater, said method comprising the steps of:
[1.a]	monitoring case frame temperature and providing first output data related thereto;
[1.b]	monitoring ambient air temperature and relative humidity outside the display case and providing second output data related thereto;
[1.c]	processing said first and second output data at said display case to anticipate formation of condensation at the display case and activating and deactivating the frame/door heater responsive thereto; and
[1.d]	communicating said first and second output data related to monitored case frame temperature, ambient air temperature and relative humidity and a record of display case frame/door heater activation and deactivation to a remote centralized processing location.

Claim 2	
[2]	The method of claim 1 wherein said communicating step includes wirelessly receiving said first and second output data and said record from a selected one of a plurality of refrigerated display cases and wirelessly communicating with said processing location.

Claim 3	
[3]	The method of claim 1 wherein said monitoring steps include reducing data inaccuracy by thermally isolating units utilized for monitoring.

Claim 4	
[4]	The method of claim 1 further comprising accumulating said data and said record at said processing location to provide at least one of selective data/record viewing and data/record reporting.

Claim 5	
[5]	The method of claim 1 further comprising accumulating a history of said record of display case frame/door heater activation and deactivation and selectively compiling efficiency reports related thereto at said processing location.

Claim 6	
[6]	The method of claim 1 further comprising remotely recalibrating frame/door heater activation or deactivation based on data acquisition.

Claim 7	
[7]	The method of claim 1 further comprising establishing constantly updatable on-site automated control parameters for the step of processing said first and second output data to anticipate formation of condensation at the display case and activating and deactivating the frame/door heater.

Claim 8	
[8.pre]	A method for condensation control at a refrigerated display case having at least one door, a frame and at least one frame/door heater, said method comprising the steps of:

[8.a]	placing a temperature sensing unit in contact with the display case frame to monitor case frame temperature;
[8.b]	mounting a dew point sensing unit on the display case to monitor ambient air temperature and relative humidity outside the display case; and
[8.c]	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 9

[9]	The method of claim 8 further comprising thermally isolating said dew point sensing unit from variations in temperature of the display case frame or display case door.
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Claim 10

[10]	The method of claim 8 further comprising thermally isolating said temperature sensing unit from variations in temperature of ambient air.
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Claim 11

[11]	The method of claim 8 further comprising mounting an internal case temperature sensing unit inside the display case and monitoring internal case temperature.
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Claim 12

[12]	The method of claim 11 further comprising storing data related to readings at said sensing units and operation of the frame/door heater.
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Claim 13	
[13]	The method of claim 12 further comprising wirelessly accessing said stored data.

Claim 14	
[14.pre]	A method for condensation control at any of a plurality of refrigerated display cases, each of the display cases having at least one door, a frame and at least one frame/door heater, said method comprising the steps of:
[14.a]	monitoring selected parameters related to each of the display cases in the plurality of display cases and providing output data related thereto;
[14.b]	collecting said output data;
[14.c]	anticipating from said collected output data condensation formation status at any of the display cases and establishing an output indicative thereof;
[14.d]	establishing measures to address said condensation formation status at any of the display cases responsive to said output indicative of condensation formation status; and
[14.e]	compiling a record of said data and said measures.

Claim 15	
[15.pre]	The method of claim 14
[15.a]	wherein said monitoring step includes monitoring temperature of display case doors or display case frames of each of the display cases and monitoring dew point at each of the display cases by monitoring ambient air temperature and relative humidity outside of each of the display cases, and

[15.b]	wherein said step of establishing measures to address said condensation formation status includes the step of activating a selected 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.
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Claim 16	
[16.pre]	The method of claim 14
[16.a]	wherein said monitoring step includes monitoring temperature of display case doors or display case frames of each of the display cases and monitoring dew point at each of the display cases by monitoring ambient air temperature and relative humidity outside of each of the display cases, and
[16.b]	wherein said step of establishing measures to address said condensation formation status includes the step of deactivating a selected display case frame/door heater when monitored display case door or frame temperature rises above a preselected set point above a dew point value derived from monitored ambient temperature and relative humidity.

Claim 17	
[17]	The method of claim 14 further comprising the steps of monitoring internal case temperatures of said plurality of display cases and compiling a record thereof.

Claim 18	
[18]	The method of claim 14 further comprising the step of communicating said record to a remote processing location.

Claim 19	
[19]	The method of claim 14 further comprising the step of reducing output data inaccuracy by thermally isolating units utilized for monitoring.

Claim 20	
[20]	The method of claim 14 further comprising the step of establishing constantly updatable automated control parameters for the steps of anticipating condensation formation status and establishing measures to address said condensation formation status at any of the display cases.

CONVENTIONS OF THE PETITION

- All emphasis is added unless noted otherwise;
- Bold-italic emphasis correlates to claim language;
- Quotations are generally from exhibits, not claim language; and
- The phrase “as discussed” and equivalent phrases incorporate fully the analysis of the cross-cited portion of the Petition.

Anthony Inc. (“Petitioner”) petitions for IPR of Claims 1–20 (“Challenged Claims”) of U.S. Patent No. 7,421,847 (“the ’847 patent”) based on the compelling evidence of obviousness presented throughout this Petition.

I. REQUIREMENTS FOR IPR—37 C.F.R. §42.104

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

The ’847 patent is available for IPR, and Petitioner is not barred or estopped.

B. Challenge and Relief Requested—37 C.F.R. §42.104(b)

Petitioner requests IPR of the Challenged Claims on the grounds below. Dr. Henze provides supporting explanations and detailed corroborating evidence in an expert declaration cited throughout this Petition. *See generally* EX1003.

ID	Claims	Basis for Rejection
1A	8–12	§103: Carter (US7,137,262)
1B	1–20	§103: Carter, Bunch (US7,240,501)
1C	3, 9–10, 19	§103: Carter, Bunch, King (US6,422,062)
1D	2, 11–13, 17	§103: Carter, Bunch, Gatling (US6,502,409)

Each of these references pre-dates the ’847 patent’s priority date of March 1, 2005.

Reference	Prior Art Date	Status
Carter [EX1004]	Filed December 5, 2003	§102(e)
King [EX1005]	Issued July 23, 2002	§102(b)
Bunch [EX1006]	Filed February 11, 2004	§102(e)
Gatling [EX1007]	Issued January 7, 2003	§102(b)

II. THE '847 PATENT

A. Pertinent Disclosure

The '847 patent aims to use “frame and/or door heating” for “remediat[ing] condensation build-up in refrigerated display cases” and, to that end, “relates to...devices and methods for activation and deactivation of such heating.” EX1001, 1:14–18; EX1003, ¶¶26–30. Figure 1 (below) illustrates “a common commercial freezer/cooler display unit 21 including a display container 23 having a frame [27]...and doors 25.” EX1001, 5:16–22. The display unit 21 further includes “a local controller unit 31” connected to an array of sensors—e.g., “external case frame temperature sensor 35 and dew point sensor 37.” EX1001, 5:16–29.

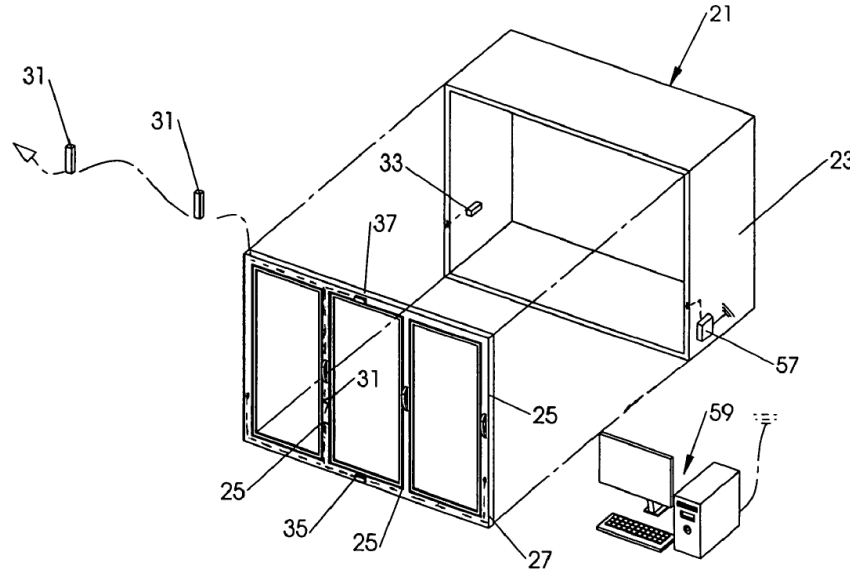


FIGURE 1

EX1001, Figure 1.

The local controller unit 31 utilizes inputs from sensors 35, 37 to derive a dew point value and activate door/frame heaters using a relay 43 when “the frame temperature approaches the dew point.” EX1001, 8:27–43, 8:51–67.

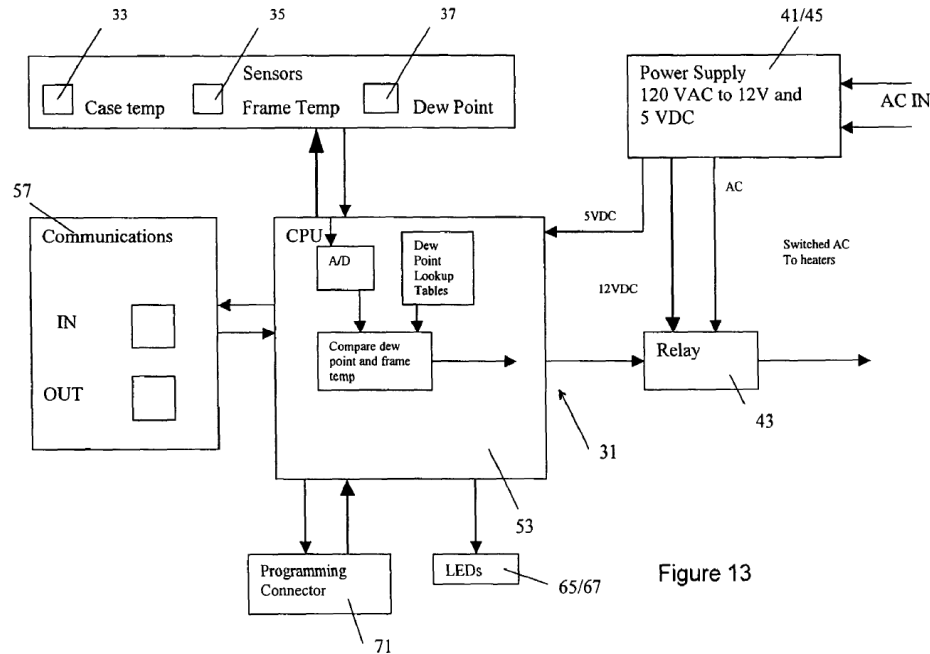


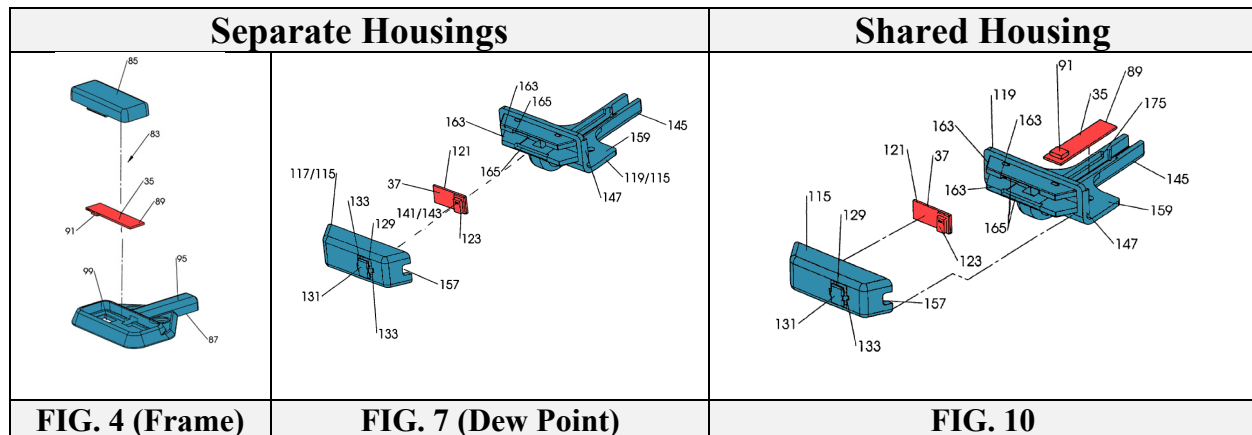
Figure 13

EX1001, Figure 13.

The '847 patent concedes that the above-discussed concept of “[m]onitoring air, relative humidity and surface temperatures to initiate condensation control events has been utilized in a variety of applications including refrigeration.” EX1001, 1:47–60. Purportedly, though, such prior art systems “have not proven altogether successful...due to inaccuracy of temperature readings,” which “has resulted in erratic condensation control.” EX1001, 1:61–2:16.

The '847 patent solves this sensor accuracy problem with housing structures that locate the sensors amid air pockets and, thus, thermally isolated from heat

sources/sinks that might otherwise bias the readings. *E.g.*, EX1001, 2:27–32, 3:25–31, 6:51–8:8. In the embodiments of Figures 3–9 (below, left), the frame surface temperature sensor and dew point sensor components (red) are housed in separate structures (blue). *See* EX1001, 6:32–7:60. In the embodiments of Figures 10–12 (below, right), these same sensors (red) are housed in a single, shared structure (blue). *See* EX1001, 8:9–26.



B. Prosecution History

On April 20, 2007, the Applicant filed the '847 patent as U.S. Appl. No. 11/788,453. EX1002, pp.29–101. On May 1, 2008, the Examiner issued a Notice of Allowance, offering only conclusory statements that the prior art failed to teach the claimed system. *Id.*, pp.5–10. As a result, the '847 patent issued with the presently Challenged Claims having never received even a single prior art rejection.

III. LEVEL OF ORDINARY SKILL

The range of 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. Additional experience could substitute for a formal degree or training (and vice versa). *Id.*

As Dr. Henze explains, a POSITA would have possessed pertinent background knowledge of the technologies employed by the '847 patent, including condensation control in refrigeration systems (EX1003, ¶¶34–41), temperature and humidity sensor packaging (*id.*, ¶¶42–51), and control and monitoring in refrigeration systems (*id.*, ¶¶52–60). These technologies were developed and commercially adopted before 2005. The '847 patent's claims would have been obvious given the mature state of the art and the POSITA's advanced abilities.

IV. CLAIM CONSTRUCTION—37 C.F.R. §42.104(b)(3)

The analysis below in Section V proves the Challenged Claims obvious under any reasonable interpretation according to *Phillips*. Accordingly, the Board need not resolve any express constructions. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011). Should any subsequent claim interpretation arise here or in the parallel district court proceeding, Petitioner reserves the right to address it.

V. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. GROUND 1A: Claims 8–12 Are Obvious Over Carter

1. Carter (EX1004)

Like the '847 patent, Carter relates to the “control of heating functions” in refrigeration or freezer equipment for the purpose of “prevent[ing] condensation from forming.” EX1004, 1:7–11, Abstract; EX1003, ¶¶62–64.¹ As shown in Figure 1 (below), Carter’s refrigeration equipment 10 includes “a door having an installed door latch assembly 14” in addition to “a control unit 28, a switching unit 30, a sensor assembly unit 32, and a heating unit 34.” EX1004, 3:54–67, 4:36–43.

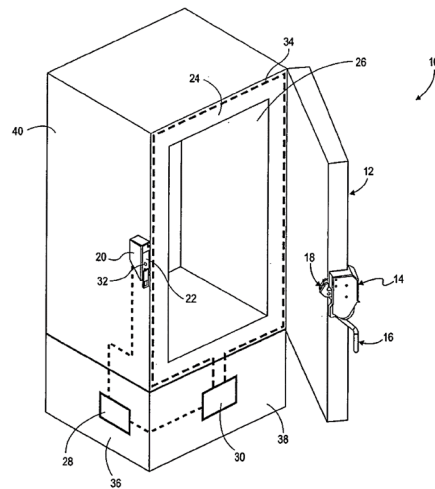


FIG. 1

EX1004, Figure 1. As the '847 patent concedes was known, Carter teaches that readings from the sensor assembly unit are used to compare a surface temperature

¹ General descriptions of asserted references and combinations are incorporated into each claim element analysis that includes citations to these references/combinations.

of the refrigeration equipment to a dew point value and “determine whether it is necessary to supply supplemental heat” to prevent condensation. EX1004, 5:15–20, 7:7–9; *see also* 4:44–61, 5:21–63, Figure 3.

As shown below in Figure 2, Carter’s “sensor assembly unit 32 includes a surface temperature sensor, an ambient temperature sensor, and an ambient relative humidity sensor.” EX1004, 5:1–20. “[T]he sensor assembly unit 32 is integrated within the interior portion 22 of the door latch cover assembly 20,” which adds “protection from outside elements” and, like the ’847 patent, helps “localize the measurements of the sensor assembly unit 32 to generally produce more accurate temperature readings.” EX1004, 5:1–20; *see supra* §II.A (discussing the ’847 patent’s aim to increase sensor accuracy).

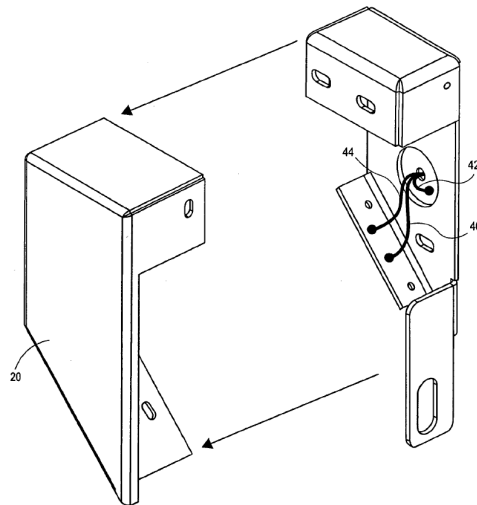


FIG. 2

EX1004, Figure 2.

2. Claim Element Analysis

(a) Claim 8

Element[8.pre]: A method for condensation control at a refrigerated display case having at least one door, a frame and at least one frame/door heater, said method comprising the steps of:

Carter renders obvious Element[8.pre]. EX1003, ¶¶65–67. For example, Carter describes “[a] ***method***...that provides supplemental heat from a heat source based upon the operating environment of a ***refrigerat[or]*** or freezer,” where “[t]he supplemental heat is automatically ***controlled*** to provide heating to a sealing area to prevent ***condensation*** from forming.” EX1004, Abstract; *see also* 1:1–11, 2:22–31, 2:35–43, 3:40–53, 4:44–55, 6:30–49.

Carter’s Figure 1 (below) illustrates exemplary “***refrigerator*** or freezer equipment 10” in the form of a ***case*** with “a ***door*** 12 having an installed door latch assembly 14 attached thereto” and “a sealing surface 24...[that] serve[s] to retain and maintain an operating temperature within a compartment chamber 26.” EX1004, 3:54–4:2; EX1003, ¶66.

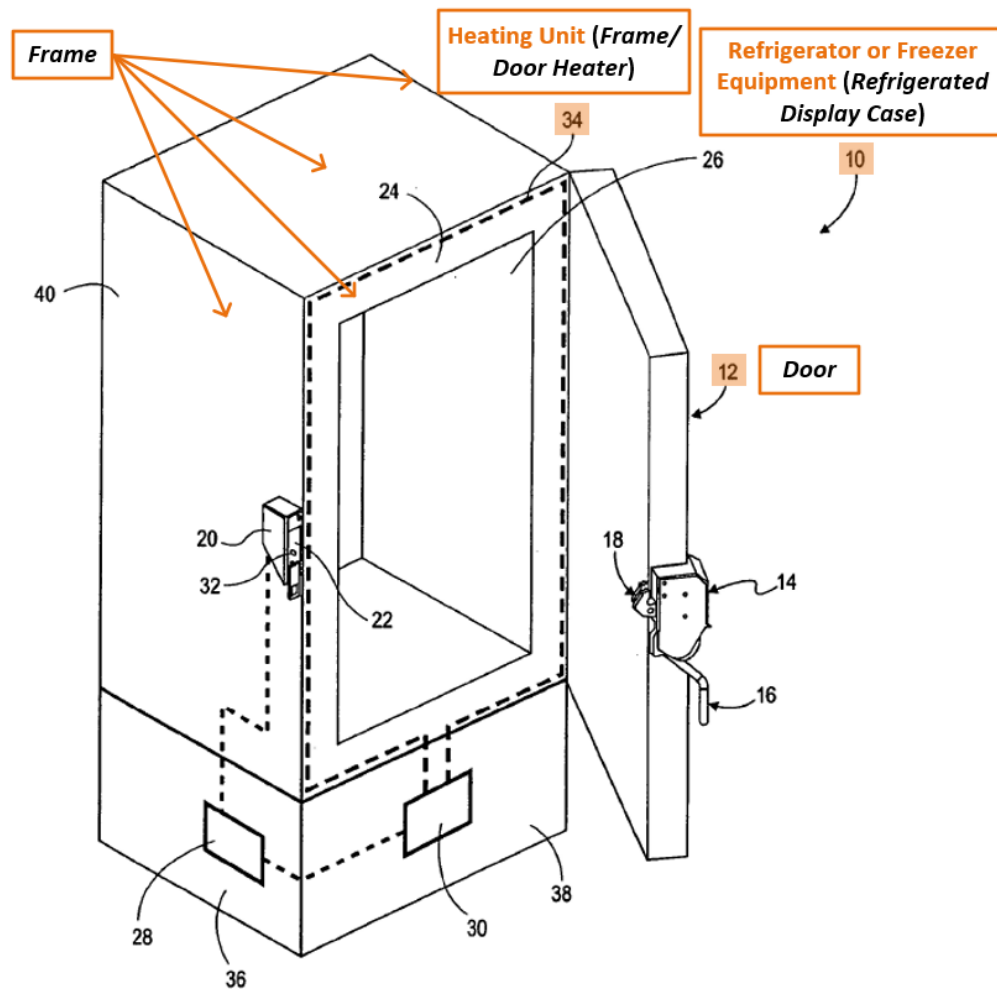


FIG. 1

EX1004, Figure 1 (annotated).

The sealing surface 24 is part of a **frame** against which the door 12 seals when held shut by the door latch assembly 14. EX1004, 3:54–4:2; EX1003, ¶66. A “**heating** unit 34” “traverses” this portion of the frame, “providing supplement[al] heat generally to the sealing surface area” of both the **frame** and **door**, such that “the effects of condensation can be...prevented.” EX1004, 4:36–67.

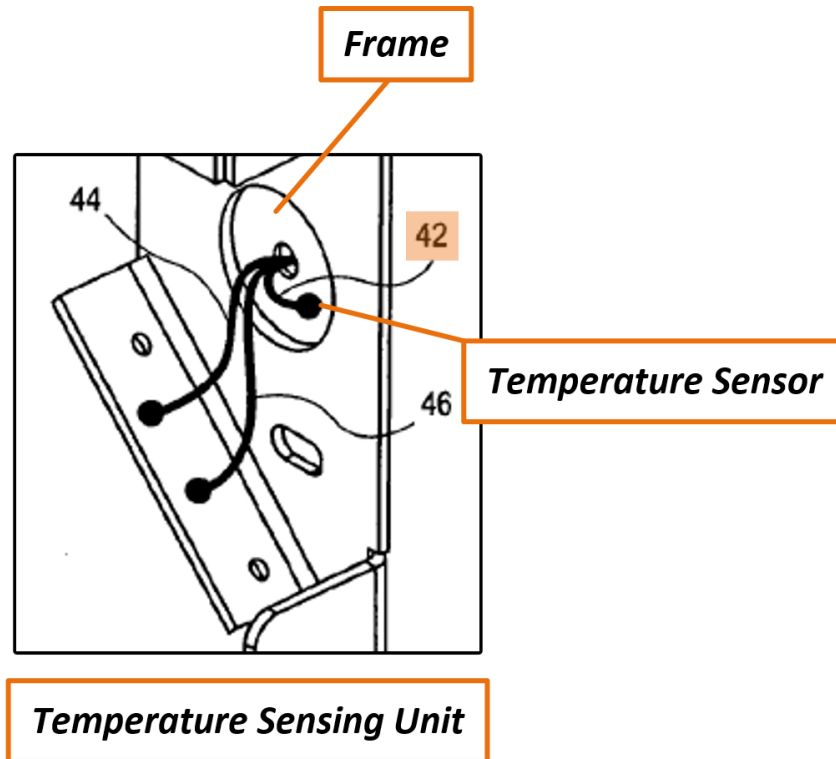
Carter explains that the above-discussed *refrigerated case* can be used for “housing specimens requiring subjection to certain operating temperatures for one of a variety of reasons,” such as “to ensure that it doesn’t spoil.” EX1004, 4:3–12. A POSITA would have been motivated to apply Carter’s *apparatus* to the well-known use-case of *refrigerated display cases* that store retail food items in an environment where “undesirable condensation can occur.” EX1003, ¶67 (quoting EX1004, 1:15–2:32), 34–41. Just as *condensation control methods* were desirable in the context of refrigerated cases for specimens, they were likewise sought by those of skill in the art for refrigerated cases used to display food items. *Id.*

Element[8.a]: placing a temperature sensing unit in contact with the display case frame to monitor case frame temperature;

Carter renders obvious Element[8.a]. EX1003, ¶¶68–69. For example, Carter describes a “sensor assembly *unit 32* [that] is composed of a surface *temperature sensor 42*, an ambient temperature sensor 44, and an ambient relative humidity sensor 46.” EX1004, 5:1–20; *see also* 4:36–43. Using surface *temperature sensor 42*, sensor assembly *unit 32 monitors* a “surface *temperature* of the refrigerator or freezer equipment 10” (*display case*). EX1004, 5:31–40, Figure 3; *see also* 3:42–46 (“mo[nitor]ing external surface temperature”), 4:17–22 (similar). As shown below in Figure 2, Carter’s illustrated embodiment portrays surface *temperature sensor 42*

placed against—and, thus, *monitoring the temperature of*—the display case *frame*.

EX1003, ¶69.

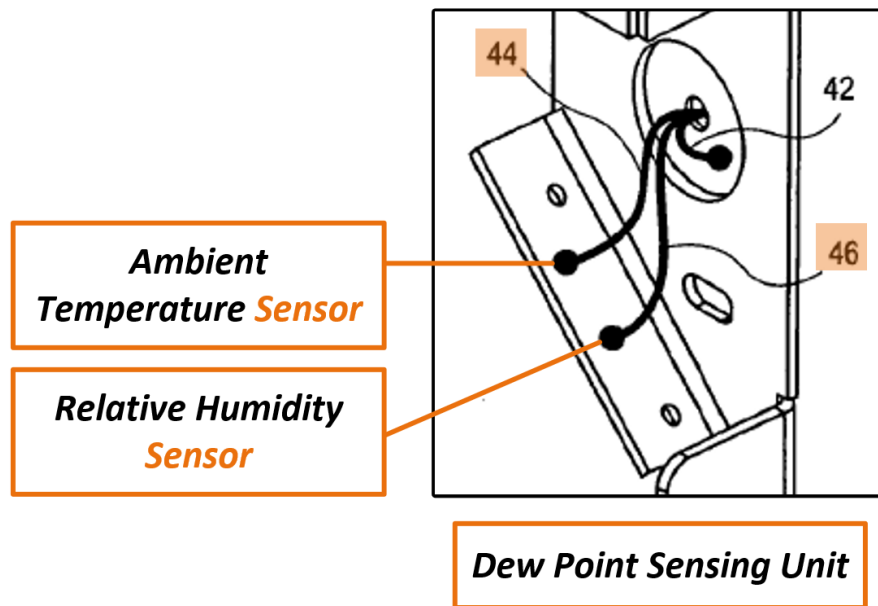


EX1004, Figure 2 (excerpted-annotated).

Element[8.b]: mounting a dew point sensing unit on the display case to monitor ambient air temperature and relative humidity outside the display case; and

Carter renders obvious Element[8.b]. EX1003, ¶¶70–71. As discussed at Element[8.a], Carter describes a “sensor assembly *unit* 32 [that] is composed of a surface temperature sensor 42, an *ambient [air] temperature* sensor 44, and an ambient *relative humidity* sensor 46.” EX1004, 5:1–20; *see also* 4:36–43 (explaining that “sensor assembly *unit* 32” is shown “*mounted* in a preferred location” *on the case*). Using sensors 44 and 46, sensor assembly *unit* 32 *monitors*

“the *ambient [air] temperature* and...the ambient *relative humidity*” *outside of the display case*. EX1004, 5:31–40; *see also* 1:5–11 (providing supplemental heat “based upon the operating environment of refrigeration or freezer equipment”), 1:15–28, 2:22–32. These ambient temperature and relative humidity readings from sensors 44 and 46 are used to “calculate[] *dew point*.” EX1004, 2:44–67, 5:31–40, 6:30–40, 7:1–9 (“calculating a dew point from the first ambient temperature measurement and the ambient relative humidity”), Figure 3.



EX1004, Figure 2 (excerpted-annotated).

Element[8.c]: 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.

Carter renders obvious Element[8.c]. EX1003, ¶¶72–94. For example, Carter discloses “a control unit 28, a switching unit 30, [and] a sensor assembly unit 32.”

EX1004, 4:36–55. “The control unit 28 is generally responsible for receiving information from the sensor assembly unit 32, which, as discussed above at Elements[8.a]–[8.b], includes sensors 42, 44, 46 for *monitoring case frame temperature, ambient air temperature and relative humidity*. EX1004, 4:36–55, 5:1–20, 5:31–40, Figures 1–3; *see also* 3:42–46, 4:17–22. The control unit 28 is also “responsible...for [determining] whether a set condition exists that would promote surface condensation...based upon”—and, thus, *utilizing*—“[the] information supplied from the sensor assembly unit.” EX1004, 4:36–55; EX1003, ¶72.

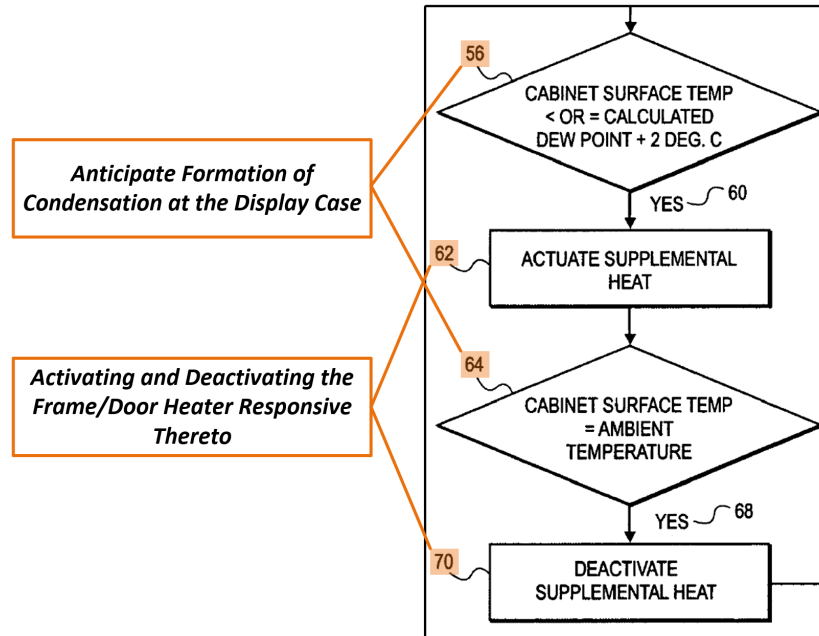
It would have been apparent or obvious to a POSITA that Carter’s teaching to identify a “set condition...that would promote surface condensation” connotes *anticipat[ing] formation of condensation at the display case*. EX1003, ¶¶73–80; EX1004, 4:36–55. This is so for at least the following four reasons.

First, the POSITA would have appreciated that identifying the known conditions that promote a certain phenomenon is a logical and effective way to *anticipate* the occurrence of such a phenomenon. EX1003, ¶73. Second, as Carter teaches and the ’847 patent concedes, the POSITA would have understood that condensation is a predictable phenomenon that occurs under known measurable conditions. EX1004, 1:15–28; EX1001, 1:48–60 (“As is known, when a cold surface is equal to or lower than the dew point of ambient air, condensation forms on the cold surface.”); EX1003, ¶¶73–74.

Third, as Carter explains, the goal is to “prevent the formation of condensation” before it starts, and doing so requires “additional heat...under certain prescribed conditions”; the conditions “that would promote surface condensation.” EX1004, 2:4–32. Appreciating Carter’s aim to prevent condensation with selective, preemptive heating, the POSITA would have gleaned that Carter’s control unit *anticipates formation of condensation* by identifying a prescribed “set condition.” EX1003, ¶75; EX1004, 4:36–55. Fourth, a comparison between the ’847 patent’s specification confirms this mapping to Carter because, as Petitioner’s Dr. Henze explains, both documents describe substantially similar algorithms for determining when to preemptively activate heaters to prevent condensation. EX1003, ¶¶76–80 (*comparing* EX1001, 8:27–9:2, Figures 13, 14b, *with* EX1004, 5:21–54, Figure 3).

Carter further teaches that *responsive to* identifying the “set condition” (*anticipating formation of condensation*), the control unit 28 “w[ill] enact the switching unit 30 to [*activate*] supplemental heat via the heating unit 34” (*frame/door heater*). EX1004, 4:36–55; *see also* 2:22–32 (“supplemental heat...is only *activated* under conditions that would promote surface condensation”), 3:42–53. Next, when *condensation* is no longer *anticipated*—e.g., “[i]f the cabinet surface temperature is equal to the ambient temperature”—“the control unit will *deactivate* the supplemental *heat*.” EX1004, 5:55–63, Figure 3. Thus, both

activating and *deactivating* of the *frame/door heater* occur *responsive to anticipating formation of condensation*. EX1003, ¶¶81–82.



EX1004, Figure 3 (annotated).

Lastly, Element[8.c] (and Claim 8 as a whole) would still be obvious even if Patent Owner were to assert an erroneous, narrower interpretation that *deactivating the frame/door heater responsive thereto* is limited to the '847 patent's preferred embodiment, where frame temperature is compared to a dew point value derived from ambient air temperature and relative humidity. See EX1003, ¶¶83–92; EX1001, 8:59–9:2, Figure 14b. As Petitioner's Dr. Henze explains, a POSITA would have recognized that Carter's heater deactivation technique accounts for dew point by employing a floating offset responsive to ambient conditions. EX1003, ¶¶84–85 (citing EX1004, 5:58–63, Figure 3). That is, the POSITA would have

known that ambient temperature is virtually always greater than dew point and the difference between them depends on—floats according to—the relative humidity of the ambient environment. *Id.* Thus, Carter’s comparison expression shown in Figure 3 (step 64):

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

is mathematically equivalent to:

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

which parallels the ’847 patent’s expression from Figure 14b:

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

and its mathematical equivalent:

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

From the perspective of a POSITA, Carter’s heater deactivation algorithm and the ’847 patent’s algorithm for heater deactivation are substantially similar. EX1003, ¶¶86–91. First, it has already been established above at Element[8.a] that Carter’s cabinet surface temperature provides the surface temperature of the display case frame—i.e., frame temperature. Second, it would have been apparent or obvious to the POSITA that Carter’s teaching to determine when the cabinet/frame temperature reaches ambient temperature is not limited to a strict equal-to (“=”) operator but would also include a greater-than (“>”) operator, as in the ’847 patent.

EX1003, ¶88. Otherwise, the heater would remain running unless/until there was an exact match in temperature, which would undermine Carter’s goal of avoiding wasted energy and increased operating/maintenance costs associated with running the heater continuously. EX1003, ¶¶89–90 (citing EX1004, 2:4–32), ¶¶40–41.

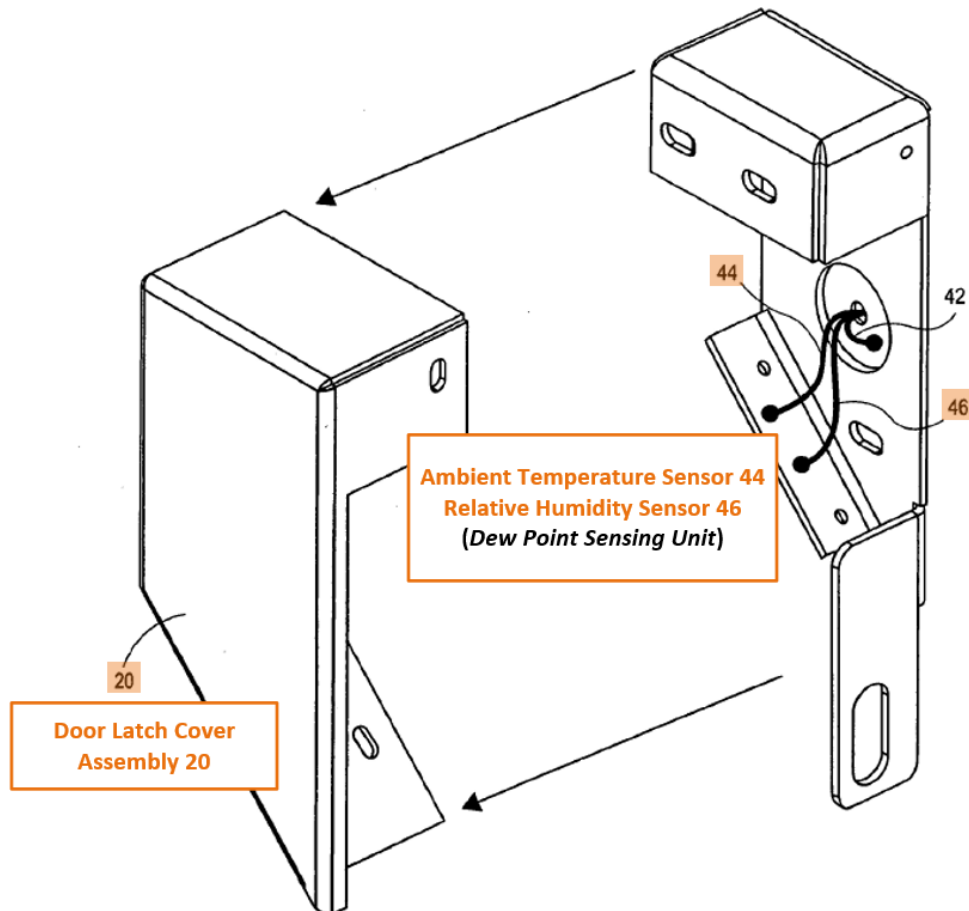
Third, that the ’847 patent uses a preselected set point (“Set Point Hight”) and Carter uses a floating offset is an insubstantial and obvious distinction to a POSITA. EX1003, ¶91. In each case, the set point/offset serves as a buffer value to ensure that the frame temperature of the display case is far enough away from the dew point value to prevent anticipated condensation without excessive on-off cycling of the heater. *Id.* More, a POSITA looking to improve Carter would have been motivated to employ a preselected set point for the purpose of achieving a more flexible control system, e.g., one more adaptable to different climates and conditions. EX1003, ¶¶92–94 (explaining the efficiency and operational advantages of selecting set points based on climates/conditions).

(b) Claim 9

Element[9]: The method of claim 8 further comprising thermally isolating said dew point sensing unit from variations in temperature of the display case frame or display case door.

Carter renders obvious Element[9]. EX1003, ¶¶95–100. For example, Carter explains that “the sensor assembly *unit* 32”—including ambient temperature sensor 44, and relative humidity sensor 46 (*dew point sensing unit*, per Element[8.b])—“is

integrated within the interior portion 22 of the door latch cover assembly 20.”
EX1004, 5:1–20 (the door latch cover assembly “add[s] protection from outside elements” and “localize[s] the measurements...to generally produce more accurate temperature readings”), Figures 1–2; *see also* 6:50–56.



EX1004, Figure 2 (annotated).

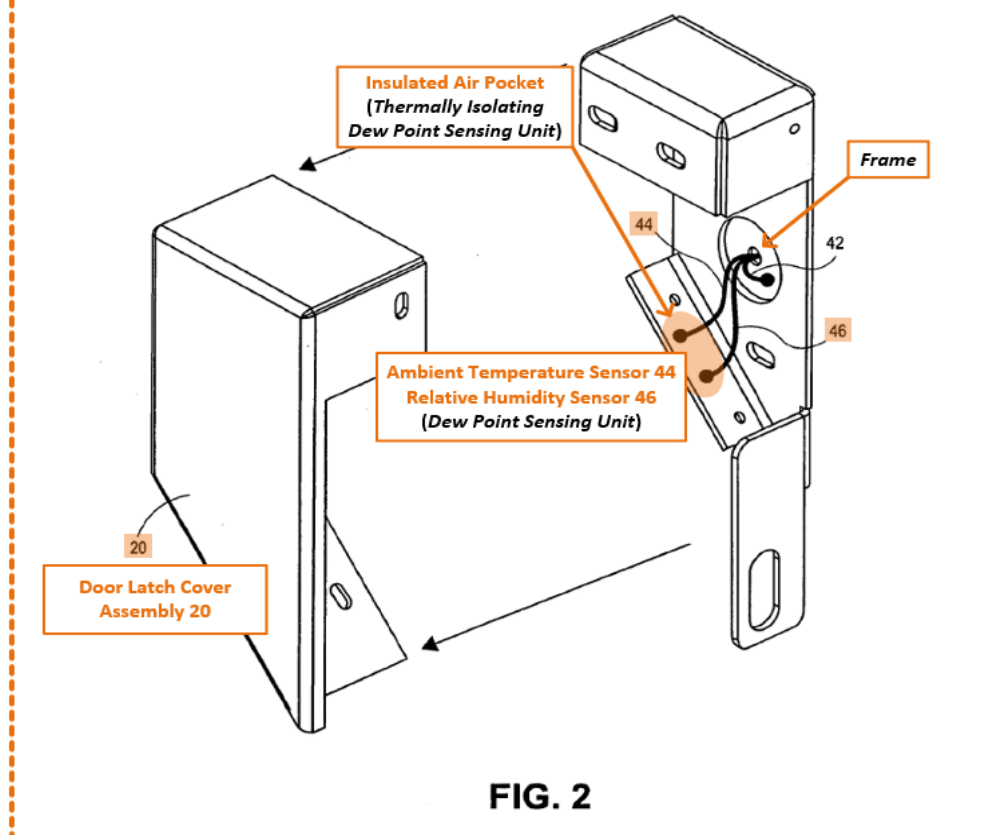
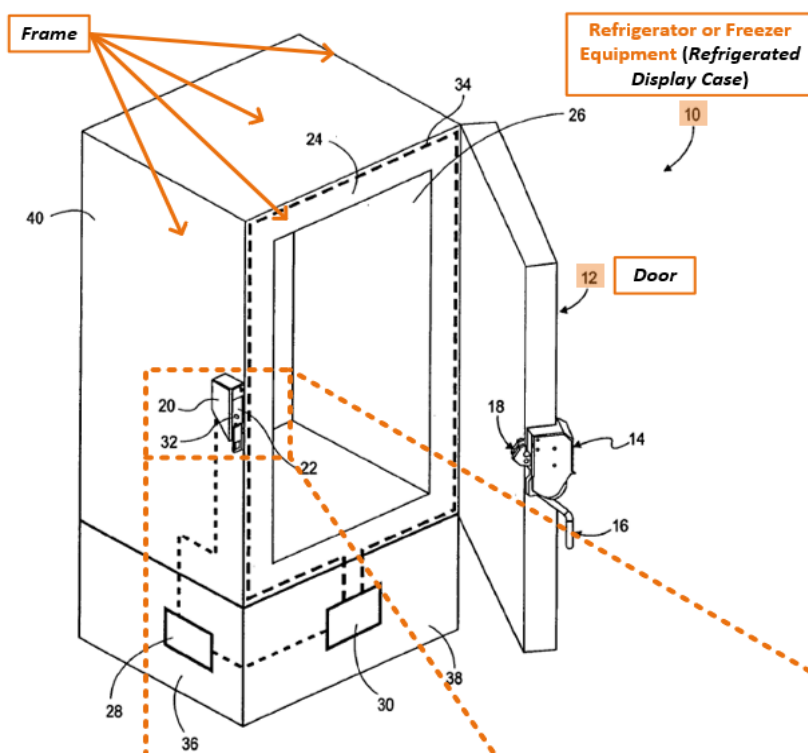
For at least the following three reasons (taken individually or collectively), it would have been further apparent or obvious to a POSITA that Carter’s door latch cover assembly *thermally isolates the dew point sensing unit from variations in temperature of the display case frame or display case door*. EX1003, ¶¶96–100.

First, Carter suggests as much by emphasizing that the design of the door latch assembly makes the sensor readings “more accurate.” EX1004, 5:12–15. As a POSITA would have known, the accuracy of humidity and ambient temperature readings, and consequent dew point readings, is diminished by inadvertent heat transfer—i.e., heat transfer between the sensing elements and a heat source/sink other than the subject of the measurement. EX1003, ¶97, ¶¶42–49. Here, where the subject of the measurement is the ambient air, achieving Carter’s goal of “more accurate” sensor readings would naturally entail *thermally isolating the dew point sensing unit from variations in temperature of other heat sources/sinks, including the display case frame or display case door. Id.*

Second, even without Carter’s teaching to promote sensor accuracy, doing so was a known design goal that a POSITA would have sought to achieve in the normal course of pursuing a control system like Carter’s that relies on sensor readings to operate heating elements in a manner that prevents condensation. EX1003, ¶98, ¶¶42–49. More, because Carter’s condensation control scheme involves a quantitative comparison between surface temperature and dew point, the POSITA would have appreciated that the respective measurements by the surface temperature sensor 42 and the ambient temperature/relative humidity sensors 44/46 (*dew point sensing unit*) should be independent from one another. *See* EX1004, 2:44–67, 5:1–20, 5:31–40, 6:30–40, 7:1–9, Figure 3; EX1003, ¶98. Motivated by both [1] the

general benefit of promoting sensor accuracy; and [2] the particularized benefit in Carter's system of sequestering surface temperature and ambient air sensor readings, the POSITA would have employed the known technique of *thermally isolating the dew point sensing unit from variations in temperature of the display case frame or display case door*. EX1003, ¶98; EX1004, 5:12–15.

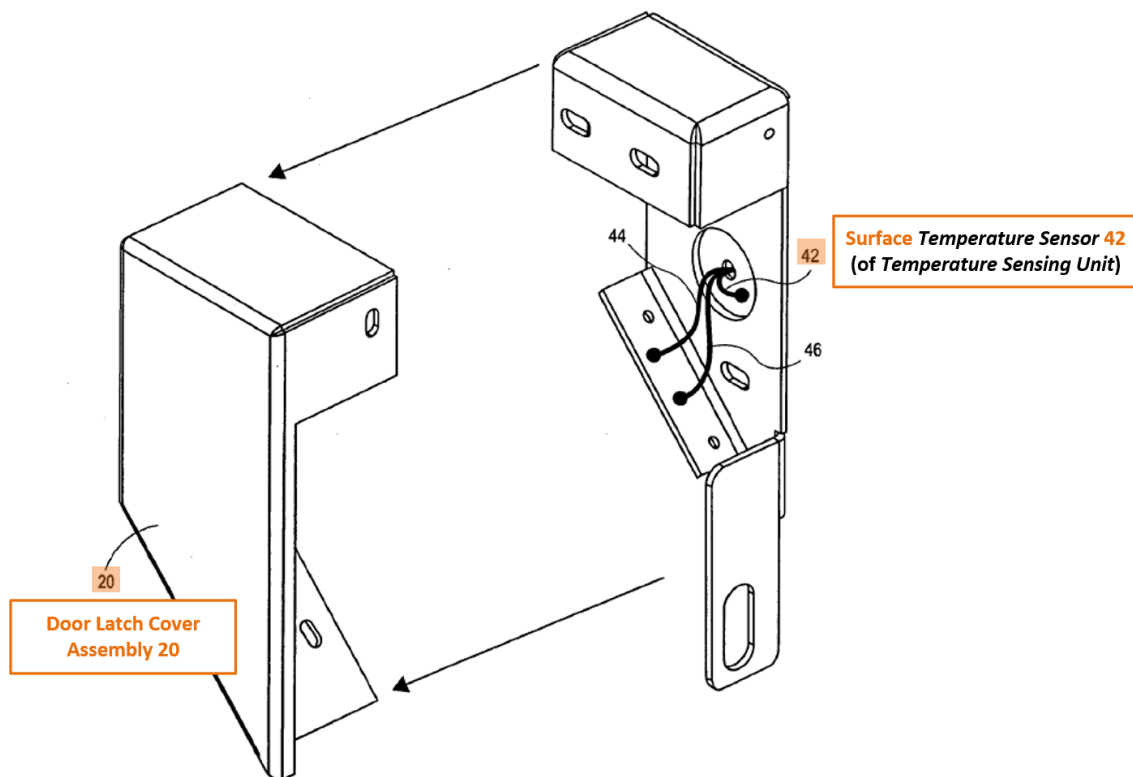
Third, Carter's Figures 1–2 (above and below) illustrate an arrangement that mitigates or prevents heat transfer between *the dew point sensing unit* (ambient temperature sensor 44 and ambient relative humidity sensor 46) and any surface of the display case, including *the display case frame or door*. EX1003, ¶99, ¶¶42–49. Additionally, it would have been apparent or obvious that the structure of Carter's door latch cover assembly 20 locates *the dew point sensing unit* (including ambient temperature sensor 44 and ambient relative humidity sensor 46) amid an insulated air pocket. EX1003, ¶100. 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.” EX1004, 5:1–20, 6:50–56. Carter's Figures 1–2 show that this “interior portion” spaces the components of *the dew point sensing unit* apart from *the display case frame* and *door* amid the insulated air pocket, which *thermally isolates* them. EX1004, 5:1–20, 6:50–56, Figures 1–2; EX1003, ¶100 (air is a thermal insulator); EX1001, 7:25–28 (“insulating air gap”).



(c) Claim 10

Element[10]: The method of claim 8 further comprising thermally isolating said temperature sensing unit from variations in temperature of ambient air.

Carter renders obvious Element[10]. EX1003, ¶¶101–105. Carter explains that “the sensor assembly *unit* 32”—including surface *temperature sensor* 42 (of the *temperature sensing unit*, per Element[8.a])—“is integrated within the interior portion 22 of the door latch cover assembly 20.” EX1004, 5:1–20, Figures 1–2; *see also* 6:50–56. Carter’s door latch cover assembly “add[s] protection from outside elements” and “localize[s] the measurements...to generally produce more accurate temperature readings.” *Id.*



EX1004, Figure 2 (annotated).

For at least the following three reasons (taken individually or collectively), it would have been further apparent or obvious to a POSITA that Carter's door latch cover assembly *thermally isolates the temperature sensing unit from variations in temperature of ambient air*. EX1003, ¶¶102–105.

First, Carter suggests as much by emphasizing that the design of the door latch assembly makes the sensor readings “more accurate.” EX1004, 5:12–15. As a POSITA would have known, the accuracy of temperature readings is diminished by inadvertent heat transfer—i.e., heat transfer between the sensing elements and a source other than the subject of the measurement. EX1003, ¶103, ¶¶42–49. Here, where the subject of the measurement is the surface of the refrigerated case, achieving Carter's goal of “more accurate” sensor readings would naturally entail *thermally isolating the temperature sensing unit from variations in temperature of ambient air* (and any other heat sources/sinks, including the door latch cover assembly). *Id.*

Second, even without Carter's teaching to promote sensor accuracy, doing so was a known design goal that a POSITA would have sought to achieve in the normal course of pursuing a control system like Carter's that relies on sensor readings to operate heating elements in a manner that prevents condensation. EX1003, ¶104, ¶¶42–49. Motivated by both the general benefit of promoting sensor accuracy; and [2] the particularized benefit in Carter's system of sequestering surface temperature

and ambient air sensor readings (as explained above at Element[9] and incorporated here), the POSITA would have employed the known technique of *thermally isolating the temperature sensing unit from variations in temperature of ambient air*. *Id.*

Third, Carter’s Figure 2 (above) illustrates an arrangement where the *temperature sensing unit* (sensor 42) is tucked within a cut-out section of the door latch cover assembly, which is outside the path of any airflow that might pass through when the door is opened. EX1003, ¶105. Carter’s corresponding description supports this understanding of Figure 2. *Id.* As mentioned above, Carter teaches that the components of “the sensor assembly unit 32 [are] integrated within the interior portion 22 of the door latch cover assembly 20,” which provides “added protection from outside elements.” EX1004, 5:1–20.

(d) Claim 11

Element[11]: The method of claim 8 further comprising mounting an internal case temperature sensing unit inside the display case and monitoring internal case temperature.

Carter renders obvious Element[11]. EX1003, ¶106. Carter repeatedly emphasizes the importance of “maintain[ing] a prescribed operating temperature” within the freezer/refrigeration equipment (*refrigerated display case*, per Element[8.pre]) to ensure its contents do not “spoil.” EX1004, 1:45–62, 1:34–44. Temperature-controlled refrigeration systems were ubiquitous in the art at the time

of the '847 patent, and they were known to include *an internal case temperature sensing unit mounted inside the display case and monitoring internal case temperature* for the purpose of facilitating closed control loops and product quality monitoring. EX1003, ¶106. A POSITA would have expected a feature-rich system like Carter's—one featuring a supplemental closed control loop for preventing condensation—to include basic closed-loop refrigeration control for maintaining a prescribed internal operating temperature. EX1003, ¶106.

(e) Claim 12

Element[12]: The method of claim 11 further comprising storing data related to readings at said sensing units and operation of the frame/door heater.

Carter renders obvious Element[12]. EX1003, ¶¶107–108. For example, Carter discloses “a control unit 28, a switching unit 30, [and] a sensor assembly unit 32.” EX1004, 4:36–55. “The control unit 28 is generally responsible for receiving information from the sensor assembly unit 32,” which includes sensors 42, 44, 46 (*sensing units*, per Elements[8.a]–[8.b]). EX1004, 4:44–55, 5:1–20, 5:31–40, Figures 1–3; *see also* 3:42–46, 4:17–22. As discussed at Element[8.c], it would have been apparent or obvious to a POSITA that Carter's control unit 28 utilizes *data related to readings at the sensing units* to facilitate *operation of the frame/door heater* (e.g., temperature readings, operational parameters such as set points, and algorithmic program instructions). *See id.* It would have been further apparent or

obvious to a POSITA that provisioning a control unit like Carter’s to access and utilize such *data* would naturally involve *storing* the *data*—for at least a short period of time—using well-known computer memory structures, such as a cache, register, or active memory module associated with the microprocessor. EX1003, ¶107.

Additionally, the POSITA would have appreciated that the concept of data logging in the context of refrigeration systems with condensation control/anti-sweat capabilities was well known by the time of the ’847 patent in 2005 (e.g., to monitor system operations and aid in troubleshooting). EX1003, ¶108, ¶¶52–60 (describing commercial refrigeration systems with anti-sweat capabilities and data logging functionality)). From the POSITA’s perspective, integrating such rudimentary data logging technology with Carter’s teachings would have been nothing more than the addition of a well-known technique (storing operational data of a control system) to solve a self-evident design problem (maintaining data records to aid in system monitoring and troubleshooting). *Id.*

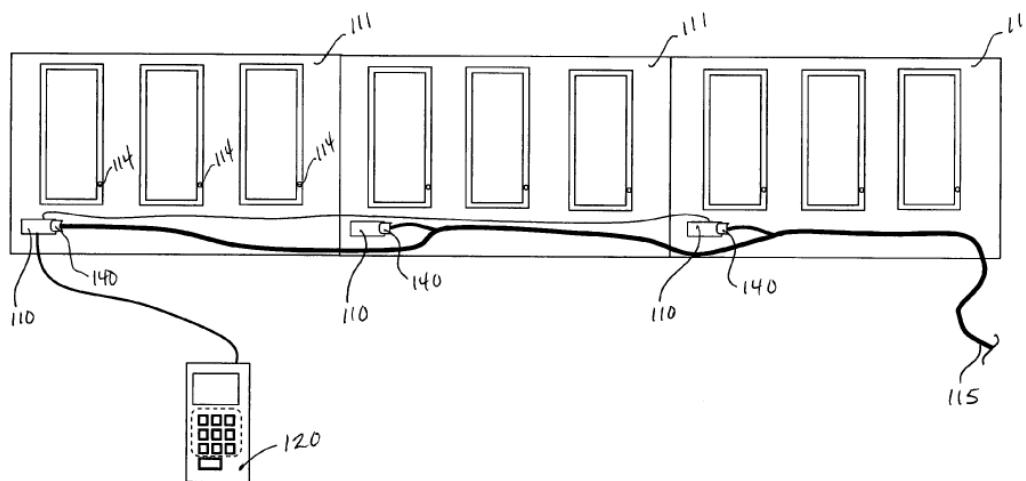
B. GROUND 1B: Claims 1–20 Are Obvious Over Carter and Bunch

1. Bunch (EX1006)

Bunch describes a system “for reducing energy consumption by heaters on refrigerator doors and frames” of “temperature-controlled display cases” used by “[s]hopkeepers [to] display refrigerated or frozen products.” EX1006, Abstract, 1:14–16; EX1003, ¶¶109–110. Like the ’847 patent, Bunch explains that “it is an

object of [his] invention to provide door heating where condensation has not yet been detected but is anticipated.” EX1006, 2:8–10.

As shown below in Figure 1, Bunch’s system “is used to prevent condensation on the doors and frames of a refrigerator 111 in conjunction with a heater (not shown, but usually incorporated in the door or frame).” EX1006, 2:55–57. A “control unit 110” that includes “a computer processor” is used “for signaling the heater and...for adjusting and regulating power to the heater” based on pre-set heater operation times and condensation sensor measurements. EX1006, Abstract, 2:58–63, 3:11–26; 4:26–43. More specifically, Bunch’s control unit turns the heaters on and off at “pre-set start and stop times” (e.g., “15 minute duty cycles”). EX1006, 4:26–36. If the duty cycles are “insufficient to prevent condensation”—as indicated by the condensation sensor—the control unit will “override the pre-set ‘off’ time and cause the heater to run until no more condensation is detected.” EX1006, 4:26–43.



EX1006, Figure 1.

2. Motivation to Combine and Reasonable Expectation of Success

The Carter-Bunch Combination represents the predictable and expected result of applying Carter's condensation-control teachings about triggering heater activation/deactivation based on ambient dew point and door/frame surface temperature in the context of Bunch's refrigerated display case with condensation control capabilities. EX1003, ¶111. From a POSITA's perspective, the teachings of Carter and Bunch are complementary: Each of these references aims to prevent condensation before it starts by selectively operating heaters in an energy-efficient manner. *Supra* §V.A.1 (summarizing Carter); §V.B.1 (summarizing Bunch). Accordingly, the POSITA would have viewed integrating the complementary teachings of Carter and Bunch as nothing more than applying known solutions to known problems and achieving predictable outcomes. EX1003, ¶111. The fundamental aspects of Bunch's disclosure would remain intact, bolstered by the beneficial condensation-control teachings of Carter—namely, Carter's sensor assemblies and algorithmic steps—in a way that the POSITA would reasonably expect to succeed. EX1003, ¶111.

The following reasons, taken separately or collectively, support the Carter-Bunch Combination. EX1003, ¶¶112–119.

First, a POSITA would have been prompted to pursue this Combination based on the teachings, suggestions, and motivations that Bunch provides regarding prior “anti-sweat controllers” that activate heaters based on “condensation sensors.” EX1006, 1:24–32; EX1003, ¶113. As Bunch explains, “[t]hese devices fail...to prevent condensation because the heater is not activated until after condensation is sensed.” EX1006, 1:24–32. Thus, Bunch’s teachings encourage the POSITA to seek known solutions where anti-sweat “door heating” is provided when “condensation has not yet been detected but is anticipated” and “prior to the formation of condensation.” EX1006, 2:8–25; EX1003, ¶113, ¶¶34–41. Appreciating that a complementary reference like Carter describes sensor assemblies and algorithmic steps for implementing such a preventative and anticipatory solution, the POSITA would have been amply motivated to combine Carter’s teachings with those of Bunch. EX1003, ¶113 (citing/quoting EX1004, Abstract (“The supplemental heat is automatically controlled to provide heating to a sealing area to prevent condensation from forming.”), 2:4–31, 4:13–5:54, Figures 1–3).

Second, a POSITA would have been prompted to pursue the Carter-Bunch Combination based on the teachings, suggestions, and motivations that Bunch provides regarding prior “anti-sweat controllers” that activate heaters based on “a humidistat.” EX1006, 1:24–43; EX1003, ¶114. As Bunch explains, with these devices, the heater is activated “when the humidity goes above a given level..., often

regardless of whether condensation is actually present,” which “increases energy consumption because the heater is either constantly on or turned on unnecessarily.” EX1006, 1:24–43. Thus, Bunch’s teachings encourage the POSITA to seek known solutions where anti-sweat “door heating” is provided selectively—i.e., when “condensation has not yet been detected but is anticipated”—in order to “reduc[e] energy consumption.” EX1006, 2:8–25; EX1003, ¶¶114, ¶¶34–41. Appreciating that a complementary reference like Carter describes specific sensor assemblies and algorithmic steps for implementing such an energy-efficient solution, the POSITA would have been amply motivated to combine Carter’s teachings with those of Bunch. EX1003, ¶114 (citing/quoting EX1004, 2:4–31, 4:13–5:54, Figures 1–3).

Third, a POSITA would have been prompted to make the Carter-Bunch Combination by the prospect of achieving certain predictable benefits and advantages. EX1003, ¶¶115–117. In other words, the POSITA would have appreciated that the condensation-control technique Bunch describes could be predictably improved by integrating Carter’s teachings. EX1003, ¶115. As one example, the POSITA would have recognized that Bunch’s pre-set “duty cycle” approach does not fully achieve the stated goal of preventing condensation. *Id.* This is why Bunch relies on the detection of actual condensation as an override or backup: Because there is a risk that “the pre-set cycle timing is insufficient to prevent condensation.” EX1006, 4:26–44; EX1003, ¶115. As a result, the POSITA would

have been incentivized to pursue teachings from supplemental references like Carter that provide more robust preventative solutions for actuating heaters before condensation occurs. EX1003, ¶115 (discussing EX1006, 4:26–44), ¶¶34–41. Instead of relying on user-selected duty cycles or isolated humidity readings, Carter teaches a more accurate, adaptable, and energy efficient condensation-control technique that predicts the onset of condensation by comparing the surface temperature of the display case to ambient dewpoint. EX1003, ¶¶116–117.

Fourth, a POSITA would have understood that a predictable implementation of the Carter-Bunch Combination would be achieved by merely substituting known elements (Bunch’s condensation sensor and duty-cycle-based condensation control process) for other known elements in the field (Carter’s surface temperature and ambient temperature/humidity sensors and corresponding condensation control process) to obtain predictable results. EX1003, ¶¶118–119, ¶¶34–51. Supplementing Bunch’s condensation control system with Carter’s teachings in this way would not have disturbed the other aspects of Bunch’s system, and it would have produced substantially similar functionality to what Bunch described (i.e., preventing condensation with selective heater activation). *Id.*; *CyWee Grp. Ltd. v. ZTE (USA), Inc.*, 90 F.4th 1358, 1366 (Fed. Cir. 2024).

3. Claim Element Analysis

(a) Claim 1

Element[1.pre]: A method for condensation control at a refrigerated display case having at least one door, a frame and at least one frame/door heater, said method comprising the steps of:

The Carter-Bunch Combination renders obvious Element[1.pre]. EX1003, ¶120. For example, the Combination includes Bunch’s teachings (as supplemented by Carter) to deploy a ***condensation control*** system “for reducing energy consumption by ***heaters*** on ***refrigerator doors*** and ***frames***” of “temperature-controlled ***display cases***” used by “[s]hopkeepers [to] ***display refrigerated*** or frozen products.” EX1006, Abstract, 1:14–16; *see also* EX1004, Abstract 1:1–11, 2:22–31, 2:35–43, 3:40–53, 4:44–55, 6:30–49; *supra* Element[8.pre], Ground 1A. Per Bunch, “***refrigerator 111***” (***refrigerated display case***) has “***doors*** and ***frames***” with “a ***heater*** (not shown, but usually incorporated in the ***door or frame***) and a power source.” EX1006, 2:55–58, Figure 1. And the Carter-Bunch Combination provides a process (***method***) by which a “control unit 110 signals when the ***heaters*** should be [turned] on prior to the formation of ***condensation***” on the doors and frame of a ***refrigerated display case***. EX1006, Abstract, 2:8–35, 4:26–44; *supra* §V.B.2 (motivation-to-combine).

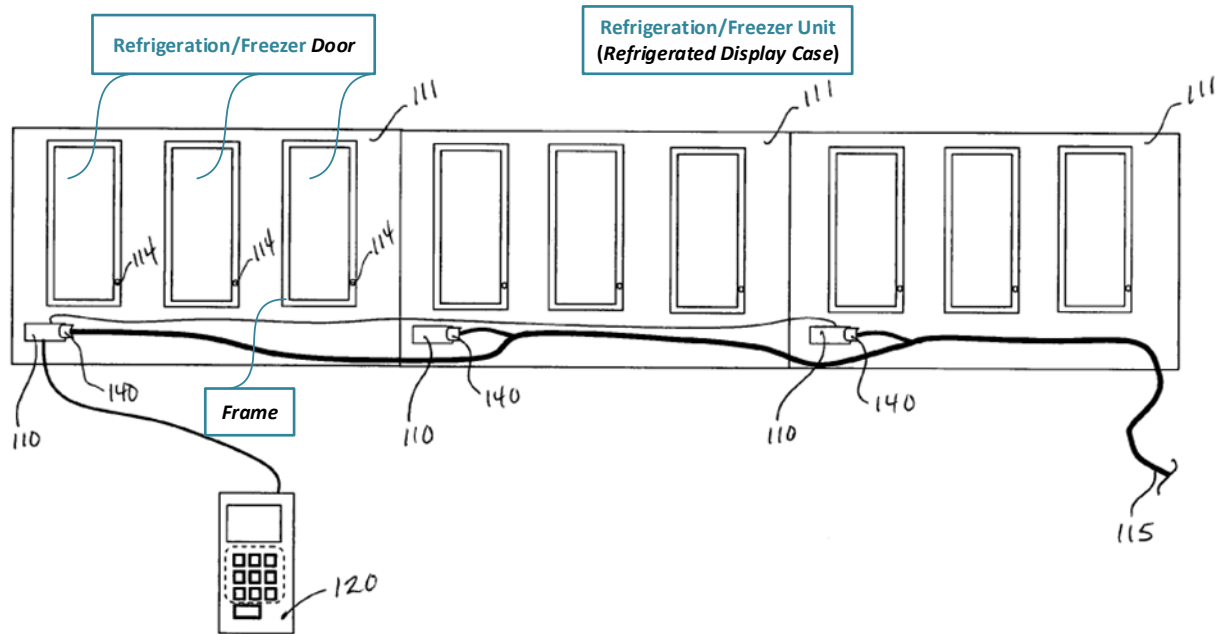
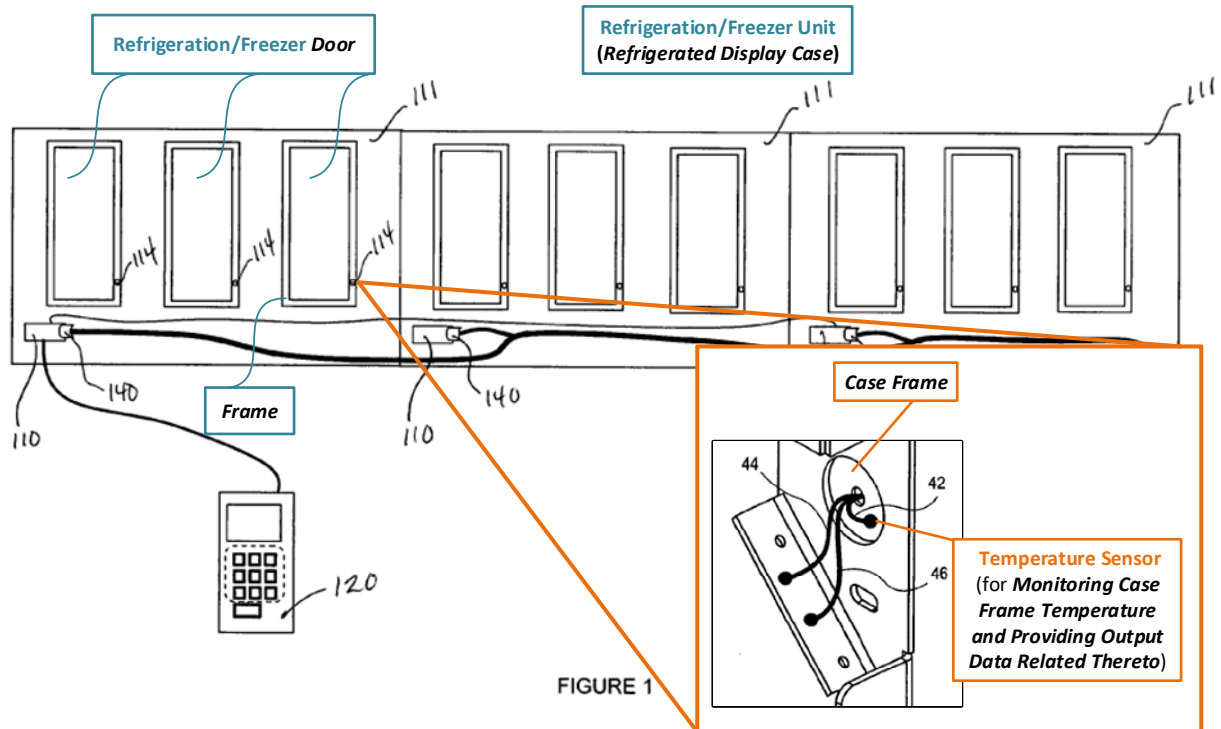


FIGURE 1

EX1006, Figure 1 (annotated).

Element[1.a]: monitoring case frame temperature and providing first output data related thereto;

The Carter-Bunch Combination renders obvious Element[1.a]. EX1003, ¶121. As discussed at §V.B.2, the Combination features Carter’s “sensor assembly unit 32 [that includes]...a surface temperature sensor 42.” EX1004, 5:1–20; *see also* 4:36–43. As discussed at Elements[8.a] and [8.c] of Ground 1A, Carter’s surface temperature sensor 42 ***monitors case frame temperature and provides first output data related thereto*** for executing the condensation-control process algorithm. EX1004, 5:31–33; *see also* 4:44–46 (“control unit 28” receives “information from the sensor assembly unit 28”), 5:21–6:7, Figure 3 (e.g., step 50).



EX1006, Figure 1 (annotated); EX1004, Figure 2 (annotated).²

Element[1.b]: monitoring ambient air temperature and relative humidity outside the display case and providing second output data related thereto;

The Carter-Bunch Combination renders obvious Element[1.b]. EX1003, ¶122. As discussed at §V.B.2, the Combination features Carter’s “sensor assembly unit 32 [that] is composed of...an ambient temperature sensor 44, and an ambient

² Annotated images within this Petition that incorporate figures from multiple references are used as visual aids intended to demonstrate the combination of teachings from the relevant references and are not intended to suggest physical or mechanical incorporation of any particular structures (e.g., bodily incorporation).

relative humidity sensor 46.” EX1004, 5:1–20; *see also* 4:36–43. As discussed at Elements[8.b]–[8.c] of Ground 1A, these respective sensors perform “a measurement 52 of the ambient [*air*] *temperature* and a measurement of the ambient *relative humidity* 54” and *provide second output data related thereto* for executing the condensation-control process algorithm. EX1004, 5:33–35; *see also* 4:44–46 (“control unit 28” receives “information from the sensor assembly unit 28”), 5:21–6:7, Figure 3 (e.g., steps 52 & 54).

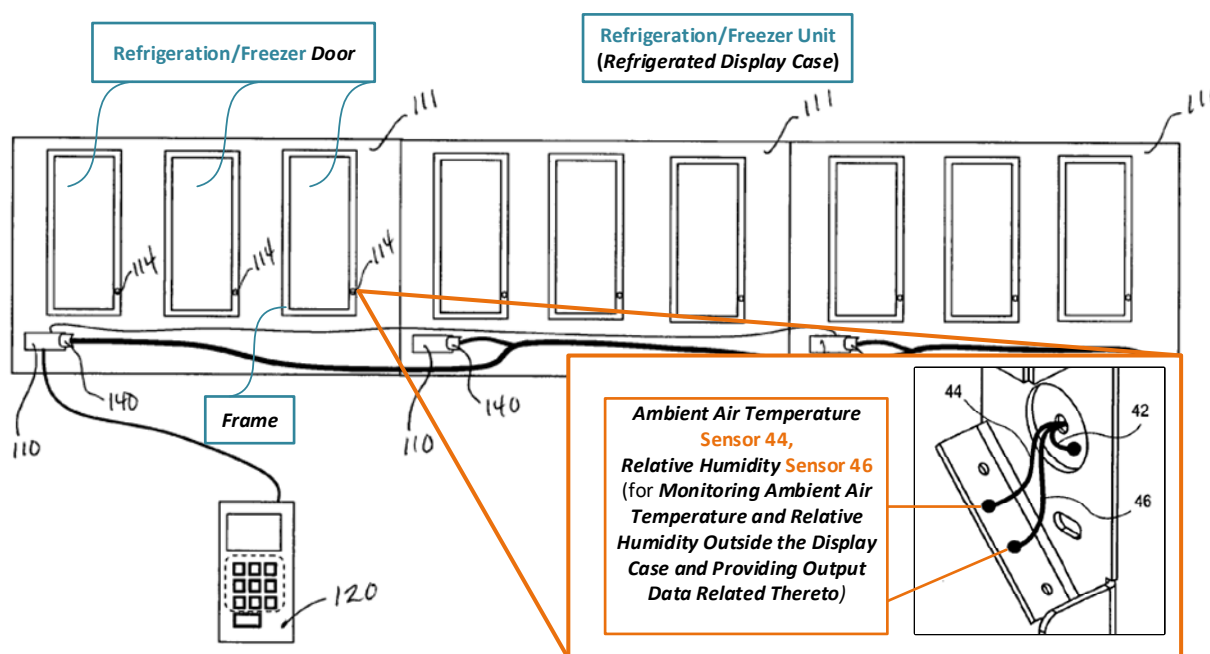


FIGURE 1

EX1006, Figure 1 (annotated); EX1004, Figure 2 (annotated).

The Board should reject any argument by Patent Owner that Element[1.a] and Element[1.b] require the *first* and *second output data* to be in any specific format, e.g., analog or digital. Each of these elements refer to *data* generically, and the '847

patent itself is silent in regard to any particular format for sensor *output data*. Besides, even if these elements were erroneously interpreted to require a specific data format, Claim 1 would be no less obvious. The notion of implementing Carter's sensors to communicate using either analog or digital data would have been an obvious design choice that a POSITA would have considered by applying ordinary skill and common sense to the selection and purchase of specific sensor components. EX1003, ¶123 (explaining, among other things, that sensor output for computer-processor-based control systems is converted to digital data and the location of the analog-to-digital circuitry is a matter of design choice).

Element[1.c]: processing said first and second output data at said display case to anticipate formation of condensation at the display case and activating and deactivating the frame/door heater responsive thereto; and

The Carter-Bunch Combination renders obvious Element[1.c]. EX1003, ¶124. As discussed at §V.B.2, the Combination employs Carter's condensation control scheme in the context of Bunch's refrigerated display case. The Combination thus renders obvious Element[1.c] for at least the same reasons presented above at Element[8.c] of Ground 1A regarding Carter. EX1003, ¶124 (explaining that Carter and Bunch both describe controllers *at the display case* for performing the data *processing* steps of the control algorithm); EX1004, 4:36–55

(discussing local “control unit 28”); EX1006, 2:54–3:14 (discussing local “control unit 110”).

Element[1.d]: communicating said first and second output data related to monitored case frame temperature, ambient air temperature and relative humidity and a record of display case frame/door heater activation and deactivation to a remote centralized processing location.

The Carter-Bunch Combination renders obvious Element[1.d]. EX1003, ¶¶125–126. For example, the Combination includes Bunch’s teachings regarding “a communications host [that] is used to enable remote monitoring and control” of the condensation control unit on a refrigerated display case. EX1006, 2:32–33. Bunch teaches that the “communications host” is used to “log[] and manage[] system information [that] allows a system user to monitor and control a network of [condensation] control units.” EX1006, 4:4–25. In context of the Carter-Bunch Combination, it would have been apparent or obvious to a POSITA that this “system information” includes ***the first and second output data related to monitored case frame temperature, ambient air temperature and relative humidity and a record of display case frame/door heater activation and deactivation.*** EX1003, ¶125. Indeed, the POSITA would have appreciated that such information is foundational to monitoring, controlling, and troubleshooting operations of the Carter-Bunch condensation control system and, thus, would have been motivated to ensure its capture in the logs of the communications host. EX1003, ¶125, ¶¶52–60; EX1006,

4:4–25 (“allows the user to see runtime and load savings”) (“a user can troubleshoot and monitor...each control unit”).

Bunch further teaches that the communications host is operable to transfer the “system information” to a *remote* computer (*centralized processing location*) via “web-based software application.” EX1006, Abstract (“enable[s] remote monitoring and control”), 4:4–25 (“either locally or remotely”); EX1003, ¶126. Moreover, notwithstanding this express teaching from Bunch, it would have been further obvious or apparent to a POSITA to enable remote access to operational data logs and system information. First, software packages for remotely accessing logs and graphs from refrigeration system controllers were well-known. EX1003, ¶126 (citing software suites that feature remote access to refrigeration control equipment), ¶¶52–60. Second, the POSITA would have appreciated that the data storage, processing, and human interface capabilities on a refrigerated display case are limited compared to that of a personal computer, server, or workstation. EX1003, ¶126. Accordingly, the POSITA would have been motivated to convey data collected and stored on the case to a more capable central computing device. *Id.*

(b) Claim 2

Element[2]: The method of claim 1 wherein said communicating step includes wirelessly receiving said first and second output data and said record from a selected one of a plurality of refrigerated display cases and wirelessly communicating with said processing location.

The Carter-Bunch Combination renders obvious Element[2]. EX1003, ¶¶127–128. As discussed at §V.B.2 and Element[1.d], the Combination includes Bunch’s teaching “to monitor and control a network of [condensation] control units” via a “communications host.” EX1006, 4:4–20; *see also* 1:44–58, 2:10–16. According to Bunch, the “communications host” *receives* “system information” (*first and second output data...and a record*, per Element[1.d]) from “up to 128 control units” (*a selected one of a plurality of refrigerated display cases*). EX1006, 4:4–20. Bunch further teaches that the communications host is operable to transfer the “system information” to a *remote* computer (*centralized processing location*) via “web-based software application.” EX1006, Abstract (“enable[s] *remote* monitoring and control”), 4:4–25 (“either locally or *remotely*”); EX1003, ¶127.

While Bunch does not explicitly teach that the communications host is designed to communicate *wirelessly*, this straightforward adaptation would have been obvious to a POSITA. EX1003, ¶128. For one, by 2005, a POSITA would have appreciated that wired and wireless configurations were well-known binary alternatives for communicating data, such that disclosure of one renders the other obvious. *Id.* Additionally, the POSITA would have been motivated to employ

wireless communications to obtain the predictable cost, flexibility, and scalability benefits over wired transmission lines. *Id.*

(c) Claim 3

Element[3]: The method of claim 1 wherein said monitoring steps include reducing data inaccuracy by thermally isolating units utilized for monitoring.

The Carter-Bunch Combination renders obvious Element[3] for at least the same reasons presented above in Elements[9]–[10], Ground 1A (discussing Carter’s teachings and the knowledge/motivations of a POSITA to *reduce data inaccuracy by thermally isolating units utilized for monitoring*).³ EX1003, ¶129.

(d) Claim 4

Element[4]: The method of claim 1 further comprising accumulating said data and said record at said processing location to provide at least one of selective data/record viewing and data/record reporting.

The Carter-Bunch Combination renders obvious Element[4] for at least the same reasons presented above in Ground 1B Element[1.d]. EX1003, ¶130. Further, the Combination includes Bunch’s teaching that a “communications host 121...logs and manages system information” (*data/records*) and makes such information *viewable* to users through a “web-based software application.” EX1006, 4:4–20; *see*

³ Note that the language of Element[3] is generic and does not specify the manner in which the *units utilized for monitoring* must be *thermally isolated*.

also 1:44–58, 2:10–16. It would have been apparent to a POSITA that one way of viewing such data and records would be by **viewing a report**, such as a data log, through the “web-based software application.” EX1003, ¶130, ¶¶52–60.

(e) **Claim 5**

Element[5]: The method of claim 1 further comprising accumulating a history of said record of display case frame/door heater activation and deactivation and selectively compiling efficiency reports related thereto at said processing location.

The Carter-Bunch Combination renders obvious Element[5]. EX1003, ¶131. For example, as discussed at Element[1.d] of Ground 1B, the Combination includes Bunch’s teaching that a “communications host 121...logs and manages system information” (***accumulating a history or records/data***) including “runtime [data] and load savings.” EX1006, 4:4–20; *see also* 1:44–58, 2:10–16. It would have been apparent or obvious for a POSITA to include ***frame/door heater activation and deactivation*** as well as ***efficiency reports related thereto*** within the “runtime and load savings” data logged by the communications host. EX1003, ¶131, ¶¶52–60. From the POSITA’s perspective, doing so would have supported Bunch’s intention of providing a system with “remote monitoring and control,” and would have enabled the user to monitor the “energy consumption” of the system. EX1003, ¶131 (explaining that a POSITA would have been motivated to quantify and monitor energy efficiency); EX1006, 1:39–43, 2:16–18.

(f) Claim 6

Element[6]: The method of claim 1 further comprising remotely recalibrating frame/door heater activation or deactivation based on data acquisition.

The Carter-Bunch Combination renders obvious Element[6]. EX1003, ¶¶132–133. The Combination includes Bunch’s teaching of a “programmer 120” that communicates with control units “for measuring, setting, and adjusting certain parameters.” EX1006, 3:27–67, Figure 1; *see also* 1:44–58, 2:10–16 Bunch’s adjustable parameters include “set points” pertaining to sensors and other aspects of the condensation control scheme. *Id.* For example, Bunch describes a scenario where a shopkeeper adjusts various parameters “to achieve demand savings, i.e., reducing power consumption during higher rate periods.” *Id.* In this way, Bunch teaches or at least renders obvious the notion of ***recalibrating frame/door heater activation or deactivation based on data acquisition***, a technique that was well known and implemented commercially by the time of the ’847 patent in 2005. EX1003, ¶132, ¶¶52–60. Additionally, a POSITA would have appreciated that Bunch’s programmer 120 is a ***remote*** device at least in the sense that it is a separate component from the local case control unit 110. EX1003, ¶133 (further explaining that it would have been obvious to utilize Bunch’s communications host to facilitate ***remote calibration*** via the “web-based software application” described at EX1006, 4:4–25).

(g) Claim 7

Element[7]: The method of claim 1 further comprising establishing constantly updatable on-site automated control parameters for the step of processing said first and second output data to anticipate formation of condensation at the display case and activating and deactivating the frame/door heater.

The Carter-Bunch Combination renders obvious Element[7]. EX1003, ¶134. As discussed at Element[6], Bunch describes the ability to adjust or ***update parameters***, which are stored ***on-site*** by heater control units, and which control ***frame/door heater activation and deactivation***. There is nothing within the '847 Patent to suggest that the rate at which such parameters are updated is critical to the operations of anti-sweat controllers/heaters. Moreover, it would have been apparent and obvious to a POSITA that the rate at which such control parameters could be altered to optimize the system for use in changing environments is an obvious design choice. EX1003, ¶134 (“[F]rom a POSITA’s perspective, configuring the system such that ***parameters*** are ***updatable*** at any time—***constantly***—would have been commonsensical.”).

(h) Claim 8

Element[8.pre]: A method for condensation control at a refrigerated display case having at least one door, a frame and at least one frame/door heater, said method comprising the steps of:

See Element[1.pre], Ground 1B (the combination of teachings from Carter and Bunch); and Element[8.pre], Ground 1A (Carter’s teachings). EX1003, ¶135.

Element[8.a]: placing a temperature sensing unit in contact with the display case frame to monitor case frame temperature;

See Element[1.a], Ground 1B (the combination of teachings from Carter and Bunch regarding *monitoring display case frame temperature* with a *temperature sensing unit placed on a frame*); and Element[8.a], Ground 1A (Carter's teachings). EX1003, ¶136.

Element[8.b]: mounting a dew point sensing unit on the display case to monitor ambient air temperature and relative humidity outside the display case; and

See Element[1.b], Ground 1B (the combination of teachings from Carter and Bunch *monitoring ambient air temperature and relative humidity* with a *dew point sensing unit mounted outside a display case*); and Element[8.b], Ground 1A (Carter's teachings). EX1003, ¶137.

Element[8.c]: 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.

See Element[8.c], Ground 1A (Carter's teachings); and Element[1.c], Ground 1B (similar). EX1003, ¶138.

(i) Claim 9

Element[9]: The method of claim 8 further comprising thermally isolating said dew point sensing unit from variations in temperature of the display case frame or display case door.

See Element[9], Ground 1A. EX1003, ¶139.

(j) Claim 10

Element[10]: The method of claim 8 further comprising thermally isolating said temperature sensing unit from variations in temperature of ambient air.

See Element[10], Ground 1A. EX1003, ¶140.

(k) Claim 11

Element[11]: The method of claim 8 further comprising mounting an internal case temperature sensing unit inside the display case and monitoring internal case temperature.

See Element[11], Ground 1A. EX1003, ¶141.

(l) Claim 12

Element[12]: The method of claim 11 further comprising storing data related to readings at said sensing units and operation of the frame/door heater.

See Elements[1.d], [2], and [4]–[5], Ground 1B (Bunch’s teachings regarding accumulating *data related to* sensor *readings* and *frame/door heater operations*); and Element[12], Ground 1A (teachings from Carter and the knowledge of a POSITA). EX1003, ¶142.

(m) Claim 13

Element[13]: The method of claim 12 further comprising wirelessly accessing said stored data.

See Element[2], Ground 1B (teachings from Bunch and the knowledge of a POSITA regarding *wireless data* communications). EX1003, ¶143.

(n) Claim 14

Element[14.pre]: A method for condensation control at any of a plurality of refrigerated display cases, each of the display cases having at least one door, a frame and at least one frame/door heater, said method comprising the steps of:

The Carter-Bunch Combination renders obvious Element[14.pre]. EX1003, ¶144. The Combination features Bunch's condensation control system architecture that employs *multiple condensation control units* at a *plurality of display cases*, *each with multiple doors, frames and frame/door heaters*. EX1006, Abstract, 1:14–16; *see also* EX1004, Abstract 1:1–11, 2:22–31, 2:35–43, 3:40–53, 4:44–55, 6:30–49; *supra* Element[1.pre], Ground 1B.

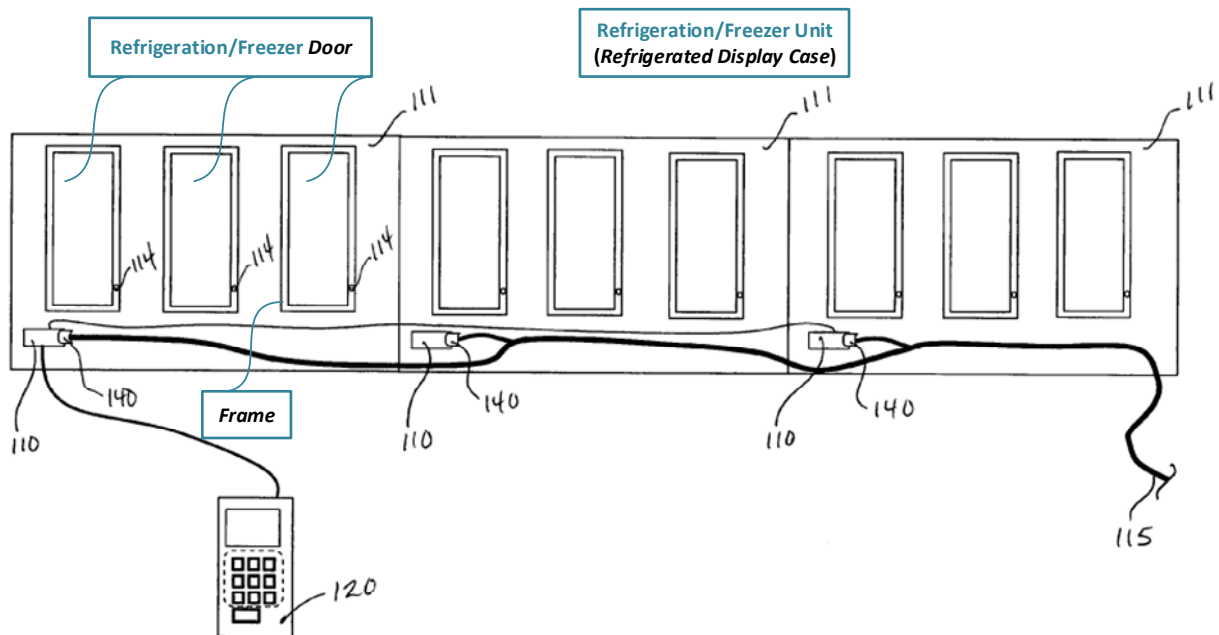


FIGURE 1

EX1006, Figure 1 (annotated).

Element[14.a]: monitoring selected parameters related to each of the display cases in the plurality of display cases and providing output data related thereto;

See Elements[1.a]–[1.b], Ground 1B (the combination of teachings from Carter and Bunch regarding the ***monitoring*** of ***selected parameters*** of surface temperature, ambient air temperature, and ambient relative humidity and ***providing output data related thereto***); and Elements[8.a]–[8.b], Ground 1A (Carter’s teachings). EX1003, ¶145.

Element[14.b]: collecting said output data;

See Elements[1.a]–[1.c], Ground 1B (the combination of teachings from Carter and Bunch regarding the ***collecting*** first/second ***output data*** from monitoring the selected parameters of surface temperature, ambient air temperature, and ambient relative humidity); and Elements[8.a]–[8.c], Ground 1A (Carter’s teachings). EX1003, ¶146.

Element[14.c]: anticipating from said collected output data condensation formation status at any of the display cases and establishing an output indicative thereof;

See Element[1.c], Ground 1B (the combination of teachings from Carter and Bunch regarding ***anticipating formation of condensation at display cases*** from processing temperature and humidity sensor ***output data***); and Element[8.c], Ground 1A (Carter’s teachings). EX1003, ¶147.

Element[14.d]: establishing measures to address said condensation formation status at any of the display cases responsive to said output indicative of condensation formation status; and

See Element[1.c], Ground 1B (the combination of teachings from Carter and Bunch regarding the activation/deactivation of frame/door heaters as ***measures to address condensation formation at display cases***); and Element[8.c], Ground 1A (Carter's teachings). EX1003, ¶148.

Element[14.e]: compiling a record of said data and said measures.

See Element[1.d], [2], and [4]–[5], Ground 1B (the combination of teachings from Carter and Bunch regarding ***compiling*** and communicating ***data records*** including sensor ***data*** and heater activation/deactivation ***measures***); and Element[12], Ground 1A (Carter's teachings and the knowledge of a POSITA). EX1003, ¶149.

(o) Claim 15

Element[15.pre]: The method of claim 14

Element[15.a]: wherein said monitoring step includes monitoring temperature of display case doors or display case frames of each of the display cases and monitoring dew point at each of the display cases by monitoring ambient air temperature and relative humidity outside of each of the display cases, and

See Elements[1.a]–[1.b], Ground 1B (the combination of teachings from Carter and Bunch regarding ***monitoring display case frame temperature, ambient air temperature, and relative humidity***); and Elements[8.a]–[8.b], Ground 1A (Carter's teachings). EX1003, ¶150.

Element[15.b]: wherein said step of establishing measures to address said condensation formation status includes the step of activating a selected 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.

See Element[1.c], Ground 1B (the combination of teachings from Carter and Bunch regarding ***activating frame/door heaters*** responsive to anticipating condensation); Element[8.c], Ground 1A (Carter's teachings regarding ***activating a 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***). EX1003, ¶151; see also ¶¶72–81 (fn4).

(p) Claim 16

Element[16.pre]: The method of claim 14

Element[16.a]: wherein said monitoring step includes monitoring temperature of display case doors or display case frames of each of the display cases and monitoring dew point at each of the display cases by monitoring ambient air temperature and relative humidity outside of each of the display cases, and

See Elements[1.a]–[1.b], Ground 1B (the combination of teachings from Carter and Bunch regarding ***monitoring display case frame temperature, ambient air temperature, and relative humidity***); and Elements[8.a]–[8.b], Ground 1A (Carter's teachings). EX1003, ¶152.

Element[16.b]: wherein said step of establishing measures to address said condensation formation status includes the step of deactivating a selected display case frame/door heater when monitored display case door or frame temperature rises above a preselected set point above a dew point value derived from monitored ambient temperature and relative humidity.

See Element[1.c], Ground 1B (the combination of teachings from Carter and Bunch regarding *deactivating frame/door heaters*); Element[8.c], Ground 1A (Carter's teachings regarding *deactivating a selected display case frame/door heater when monitored display case door or frame temperature rises above a preselected set point above a dew point value derived from monitored ambient temperature and relative humidity*). EX1003, ¶153; ¶¶82–94.

(q) Claim 17

Element[17]: The method of claim 14 further comprising the steps of monitoring internal case temperatures of said plurality of display cases and compiling a record thereof.

See Element[11], Ground 1A (Carter's teachings and the knowledge of a POSITA regarding *monitoring internal case temperatures of display cases* with sensors), Element[12], Ground 1A (Carter's teachings and the knowledge of a POSITA regarding storing data relating to sensor readings); and Elements[1.d], [2], and [4]–[5], Ground 1B (Bunch's teachings regarding *compiling records* of sensor readings). EX1003, ¶154.

(r) Claim 18

Element[18]: The method of claim 14 further comprising the step of communicating said record to a remote processing location.

See Elements[1.d], [2], and [4]–[5], Ground 1B (Bunch’s teachings regarding *communication of records*). EX1003, ¶155.

(s) Claim 19

Element[19]: The method of claim 14 further comprising the step of reducing output data inaccuracy by thermally isolating units utilized for monitoring.

See Elements[9]–[10], Ground 1A (Carter’s teachings regarding *thermally isolating units utilized for monitoring*); and Element[3], Ground 1B (applying Carter’s teachings in the context of Bunch). EX1003, ¶156.

(t) Claim 20

Element[20]: The method of claim 14 further comprising the step of establishing constantly updatable automated control parameters for the steps of anticipating condensation formation status and establishing measures to address said condensation formation status at any of the display cases.

See Element[7], Ground 1B. EX1003, ¶157.

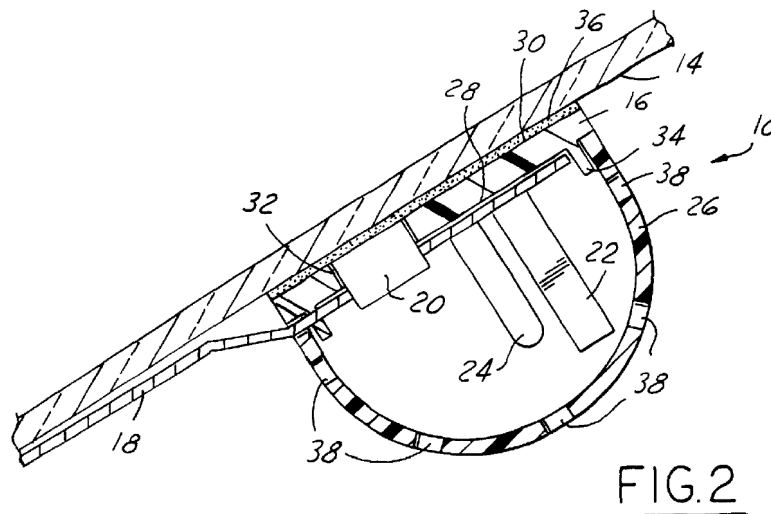
C. GROUND 1C: Claims 3, 9–10, 19 Are Obvious Over Carter, Bunch, and King

1. King (EX1005)

(a) Brief Summary of King’s Disclosure

King describes “an automotive windshield fog sensor” that provides the necessary data to “predict glass fog formation.” EX1005, Abstract, 1:4–6; EX1003,

¶¶158–160. Similar to the '847 patent, King's sensor package includes “an ambient air temperature sensor [22], an ambient humidity sensor [24] and a glass temperature sensor [20]” that is “in thermal contact with the glass surface 14 in order to measure [its] temperature.” EX1005, 1:54–60, 2:48–50. As shown below, these sensors are connected by a “flex circuit” and located in a shared housing formed by a “thermal barrier tray 16” and “a protective dome 26.” EX1005, 1:61–2:7, 2:40–50.



EX1005, Figure 2.

(b) King Is Analogous Art

King is analogous art to the '847 patent. EX1003, ¶¶161–166; *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004).

Field of Endeavor: Broadly stated, the '847 patent pertains to the field of “remediat[ing] condensation build up.” EX1001, 1:14–18, 1:48–54 (explaining that “condensation control” is “utilized in a variety of applications”); EX1003, ¶¶162–

163; *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1238 (Fed. Cir. 2010) (courts “construe the scope of analogous art broadly”). A POSITA would have understood that King’s disclosure of an integrated sensor package for use in a system that prevents “fog”—condensation—falls within the ’847 patent’s field. EX1003, ¶164.

Reasonable Pertinence: King and the ’847 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* §II.A (summarizing the ’847 patent), *with* V.C.1.a (summarizing King); *see also* EX1003, ¶165. In both King and the ’847 patent, the design problem involves mechanically supporting, electrically connecting, and thermally isolating the sensors. *Id.* King is therefore reasonably pertinent to at least one of the problems that the ’847 patent’s inventors were trying to solve. *Id.*; *Donner Tech., LLC v. Pro Stage Gear, LLC*, 979 F.3d 1353, 1359–61 (Fed. Cir. 2020).

2. Motivation to Combine and Reasonable Expectation of Success

The Carter-Bunch-King Combination represents the predictable and expected result of applying in the context of Bunch’s refrigerated display case with condensation control capabilities: **(a)** Carter’s complementary teachings on triggering heater activation/deactivation based on door/frame surface temperature; and **(b)** King’s complementary teachings on an integrated sensor package suitable

for implementing the Carter-Bunch condensation control scheme. EX1003, ¶167. From a POSITA's perspective in 2005, integrating the complementary teachings of Carter, Bunch, and King would have involved nothing more than applying known solutions to known problems and achieving predictable outcomes. EX1003, ¶167, ¶¶42–51. The fundamental aspects of Bunch's disclosure would remain intact, bolstered by the beneficial teachings of Carter and King in a way that the POSITA would reasonably expect to succeed. EX1003, ¶167.

A POSITA would have been motivated to incorporate King's teachings of an integrated sensor package for implementing the Carter-Bunch condensation control scheme. EX1003, ¶168. The following reasons, taken separately or collectively, support the Combination. EX1003, ¶¶168–174.

First, a POSITA would have been prompted to integrate King's teachings with Carter and Bunch based on the following understandings:

- (i) that the Carter-Bunch condensation control scheme relies on surface temperature, ambient air temperature, and relative humidity sensors;
- (ii) that the housing and mounting accommodations for these sensors significantly impacts the accuracy of their sensor readings, and
- (iii) that the accuracy of the sensor readings significantly impacts whether the heater on the refrigeration case is operated effectively and efficiently, as envisioned by Carter and Bunch.

EX1003, ¶169, ¶¶42–49. Thus, when tasked with implementing the Carter-Bunch condensation control scheme, the POSITA would have faced a routine sensor packaging problem. EX1003, ¶170. Recognizing that King’s disclosure represents a known, suitable, and beneficial 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-Bunch-King Combination. *Id.* (explaining that King’s integrated sensor package provides additional flexibility in terms of mounting configurations compared to Carter’s teachings, for example).

Second, a POSITA would have been motivated to make the Carter-Bunch-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, ¶171. 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. *Id.*

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, ¶172; EX1005, 1:36–45 (other designs may “require[] separate wire harnesses” to mount the ambient temperature and relative humidity sensors away from the surface temperature sensor), 2:8–16

(“reducing manufacturing costs” by “simplification of [the] wiring by use of a common ground”) (“providing a simple, inexpensive” solution).

Fourth, a POSITA would have understood that a predictable implementation of the Carter-Bunch-King Combination would be achieved by merely integrating known elements (King’s integrated sensor package) with other known elements in the field (the Carter-Bunch condensation control scheme/system) to obtain predictable results. EX1003, ¶¶173–174, ¶¶42–51. Further supplementing the combined Carter-Bunch teachings of a condensation control system with King’s teachings regarding a compatible sensor package in this way would not have disturbed the other aspects of Carter-Bunch, and it would have produced substantially similar functionality to what Bunch and Carter described (i.e., preventing condensation with selective heater activation). *Id.*; *CyWee Grp. Ltd. v. ZTE (USA), Inc.*, 90 F.4th 1358, 1366 (Fed. Cir. 2024).

3. Claim Element Analysis

(a) Claim 3

Element[3]: The method of claim 1 wherein said monitoring steps include reducing data inaccuracy by thermally isolating units utilized for monitoring.

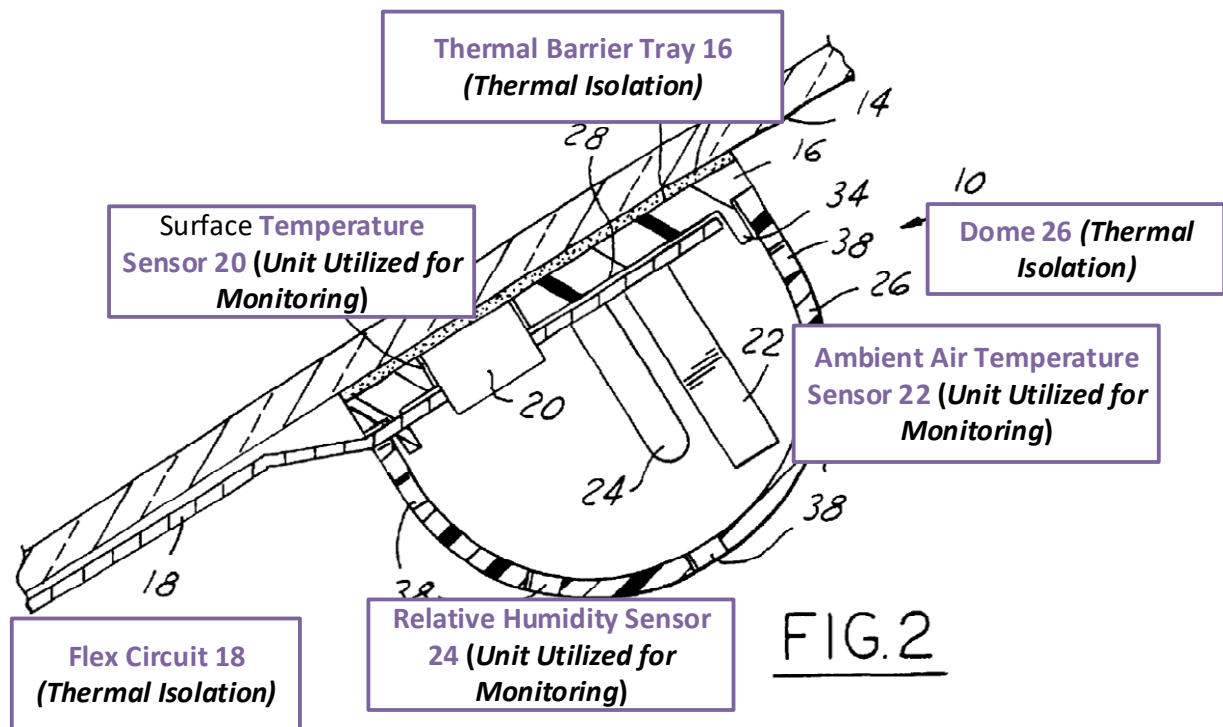
The Carter-Bunch-King Combination renders obvious Element[3]. EX1003, ¶¶175–181. As discussed at §V.C.2, the Combination features King’s teachings regarding a “sensor *unit*” in conjunction with teachings from Bunch and Carter

regarding a refrigerated display case with condensation control functionality. As in Carter, King’s sensor *unit* includes “an ambient air temperature sensor, an ambient humidity sensor and a [surface] temperature sensor” for *monitoring* ambient air temperature, ambient humidity, and [surface] temperature. EX1005, 3:21–4:10 (explaining that “humidity and ambient temperature values” produced by sensors 22 and 24 are used “for the calculation of the ambient dew point”), Figure 4; *see also* 1:9–14, 2:52–60; *supra* Elements[8.a]–[8.b] of Ground 1B (discussing Carter’s teachings regarding the claimed *monitoring steps*).

In pursuing the Carter-Bunch-King Combination, a POSITA would have contemplated locating a “sensor *unit*” according to King’s teachings such that the above-discussed surface temperature sensor is placed against—and, thus, *monitors* the temperature of—the frame of Bunch’s refrigerated display case. Such a configuration was well known in the art and even taught by Carter (*see* Element[1.a], Ground 1B; Element [8.a], Ground 1A). EX1003, ¶176. As a POSITA would have appreciated, a frame-mounted deployment would position the sensor unit more discreetly than, for example, a glass-door arrangement without sacrificing its functional capabilities. *Id.*

In King’s sensor *unit*, “[t]he electrical connections are made by using a flex circuit.” EX1005, 1:54–60. The flex circuit also serves to physically locate and secure the sensors and functions as a “*thermal [isolation]* barrier.” *See, e.g.,*

EX1005, 1:66–2:7, 2:55–57; 3:3–19. King further explains that “[a]ll three sensors are located beneath a protective dome which is secured to a perimeter wall of [a *thermal barrier*] tray.” 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, flex circuit, and the thermal barrier tray (taken together or individually) *thermally isolate* the sensing *units utilized for monitoring*. EX1003, ¶177.

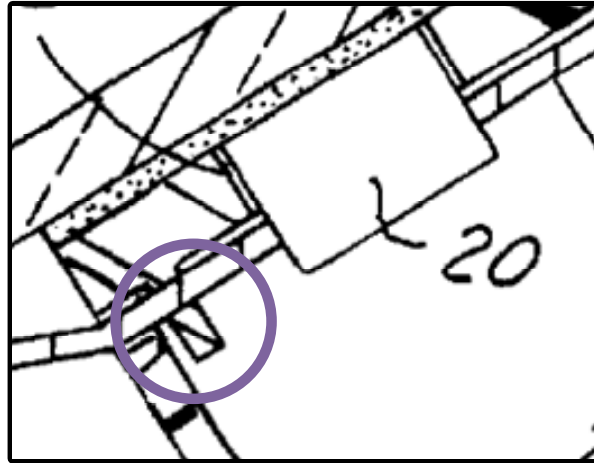


EX1005, Figure 2 (annotated).

Additionally/Alternatively, it would have been apparent or obvious to a POSITA from King's disclosure that the structure of the above-discussed dome-and-tray assembly provides *thermal isolation* for the *sensing units* by minimizing heat transfer contacts⁴. EX1003, ¶¶178–181. This is so for at least the following three reasons (taken individually or collectively). First, King teaches that the *sensing units* are secured to the dome-and-tray assembly by an interface between the flex circuit and the tray's perimeter wall. EX1005, 3:11–16 (“The conductor sensor end 42 [of the flex circuit 18] generally conforms to the perimeter wall 34, thereby securing the end 42 and soldered sensors 20, 22, and 24 to 15 the tray 16.”). King makes no mention of any further contact with the *sensing units*, and a POSITA would have appreciated that contact limited to the outer periphery of the flex circuit and the tray's perimeter wall is minimal. EX1003, ¶179.

Second, King's figures illustrate the minimal heat transfer contact between the *sensing units* and the dome-and-tray assembly. EX1003, ¶180. As shown in Figure 2, and consistent with King's description, the only contact interface King illustrates is at the periphery of the flex circuit and the perimeter wall of the tray (circled below), which a POSITA would have deemed minimal. *Id.*

⁴ Note that the language of Element[3] is generic and does not specify the manner in which the *units utilized for monitoring* must be *thermally isolated*.



EX1005, Figure 2 (excerpted-annotated).

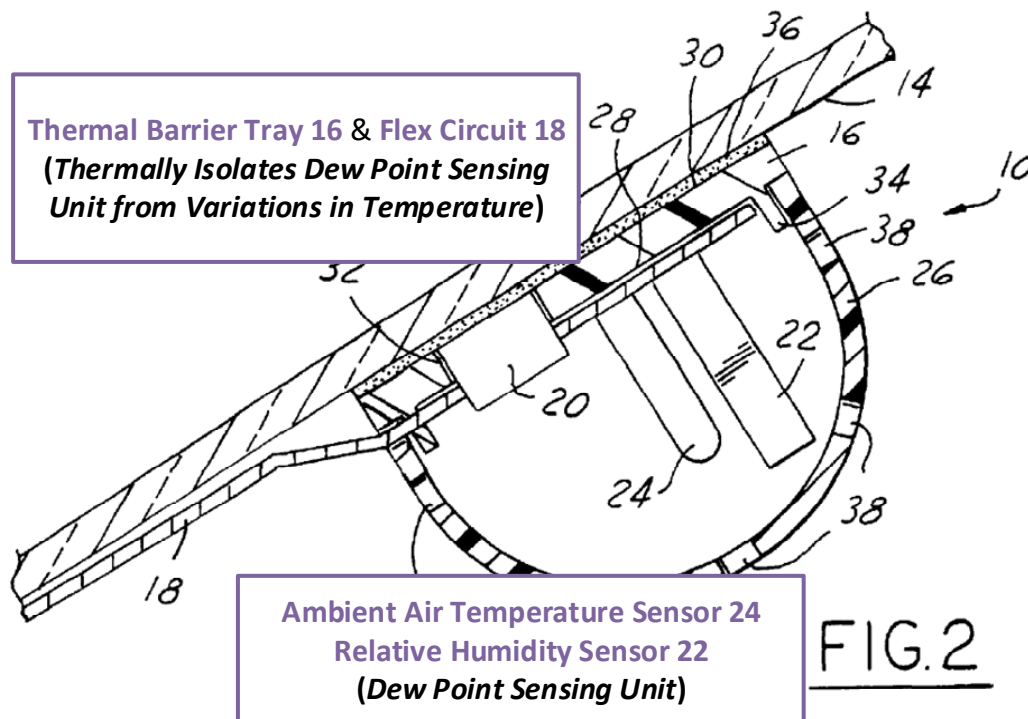
Third, as discussed above at Element[9], Ground 1A (fully incorporated here), a POSITA would have been motivated to pursue the commonplace design goal of promoting *sensor accuracy*, particularly in the context of a condensation control system reliant on sensor readings like that of the Carter-Bunch-King Combination. EX1003, ¶181, ¶¶42–49, 97–98. To achieve this goal, the POSITA would have employed the known technique of minimizing heat transfer contacts between the sensing units and any potential heat sources/sinks that are not the subject of the respective sensor measurements. *Id.*

(b) Claim 9

Element[9]: The method of claim 8 further comprising thermally isolating said dew point sensing unit from variations in temperature of the display case frame or display case door.

The Carter-Bunch-King Combination renders obvious Element[9]. EX1003, ¶182. As discussed at Element[3], King teaches a sensor unit that includes “an

ambient air temperature sensor, an ambient humidity sensor and a glass temperature sensor.” EX1005, 1:54–60. As in Carter, King teaches that “humidity and ambient temperature values” produced by sensors 22 and 24 are used “for the calculation of the ambient *dew point*.” EX1005, 3:21–4:10, Figure 4; *see also* 1:9–14, 2:52–60. Per the analysis at Element[3], King’s “tray and the flex circuit also serve as a *thermal barrier isolating* the ambient air sensor and humidity sensor” (*dew point sensing unit*) from *variations in temperature* of a surface beneath the sensor housing—i.e., a *display case frame or display case door*. EX1005, 2:55–63; *see also* 1:48–65; EX1003; ¶182.

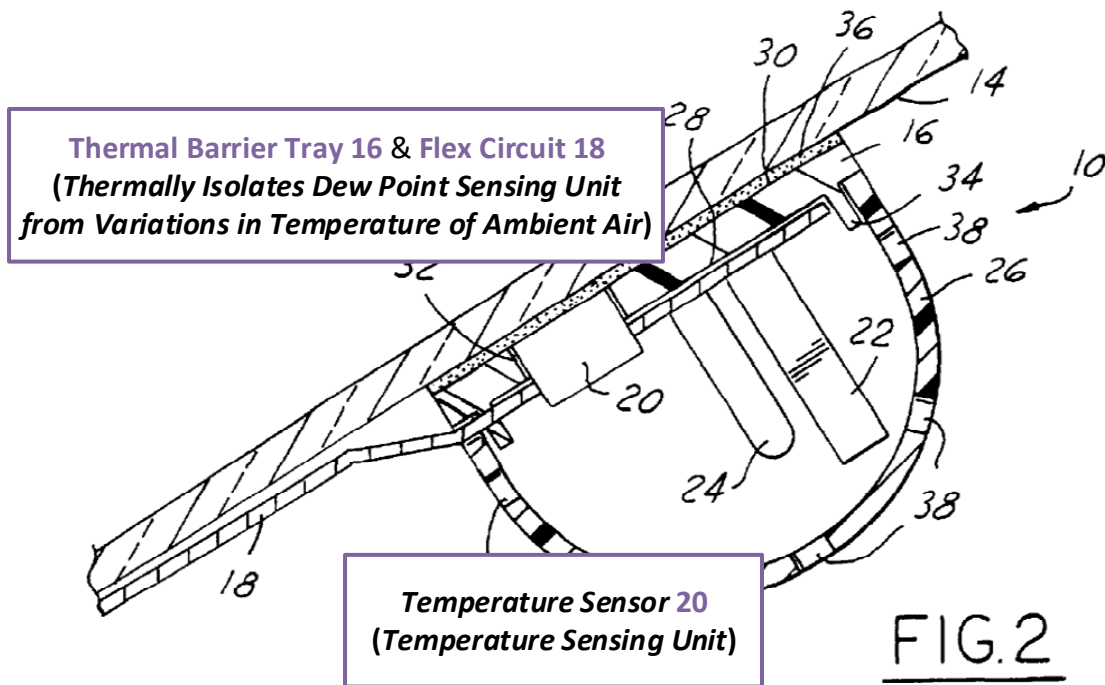


EX1005, Figure 2 (annotated).

(c) Claim 10

Element[10]: The method of claim 8 further comprising thermally isolating said temperature sensing unit from variations in temperature of ambient air.

The Carter-Bunch-King Combination renders obvious Element[10]. EX1003, ¶183. As discussed at Element[3], King teaches a sensor *unit* that includes “an ambient air temperature sensor, an ambient humidity sensor and a [surface] *temperature sensor*” (*temperature sensing unit*). EX1005, 1:54–60. Additionally, it would have been apparent or obvious to a POSITA that just as King’s thermal barrier tray and flex circuit *thermally isolate* the relative humidity sensor 22 and ambient temperature sensor 24 from temperature variations in the surface beneath the sensor housing (per analysis at Element[9]), these same components also perform a *thermally isolating* function in the opposite direction, serving as “a *thermal barrier*” to *isolate* the surface temperature sensor 20 (*temperature sensing unit*) *from variations in the ambient air*. EX1005, 2:55–63; *see also* 1:48–65; EX1003; ¶183. This understanding is consistent with a POSITA’s knowledge and motivation to improve sensor accuracy by thermally isolating sensor from potential heat sources/sinks other than those that are the subject of the intended measurements. EX1003; ¶183, ¶¶42–49, 97–98.



EX1005, Figure 2 (annotated).

(d) Claim 19

Element[19]: The method of claim 14 further comprising the step of reducing output data inaccuracy by thermally isolating units utilized for monitoring.

See Element[3], Ground 1C. EX1003, ¶184.

D. GROUND 1D: Claims 2, 11–13, 17 Are Obvious Over Carter, Bunch, and Gatling

1. Gatling (EX1007)

Gatling describes a system for “monitoring and controlling temperature” in an array of refrigerated display cases. EX1007, 1:7–10, Abstract; EX1003, ¶185. Among other things, Gatling discloses placing a “product-simulating probe 50” in each refrigerated case to measure the temperature within. EX1007, 4:66–5:15. The

probe wirelessly transmits temperature data to a receiver, which, in turn, transmits the data to a controller that “logs and analyzes the temperature data and controls the temperature of the display case[.]” EX1007, 6:15–24.

2. Obviousness Analysis

(a) Claim 2

Element[2]: The method of claim 1 wherein said communicating step includes wirelessly receiving said first and second output data and said record from a selected one of a plurality of refrigerated display cases and wirelessly communicating with said processing location.

The Carter-Bunch-Gatling Combination renders obvious Element[2]. EX1003, ¶¶186–182. As discussed above at Element[2] of Ground 1B, *wirelessly communicating* was well-known in the art by the time of the ’847 patent in 2005. EX1003, ¶128. For example, Gatling teaches the notion of *wirelessly communicating* in the refrigeration context for the beneficial purpose of avoiding “expensive and extremely cumbersome” wired communications. EX1007, 1:1–3, 1:40–54, 1:55–2:6, 5:12–30, 6:25–61, Figures 6–7; *see also* EX1006, 1:44–58 (discussing the inconvenience of hardwired anti-sweat controllers). More, Gatling teaches a “wireless transceiver” for carrying out this function, which parallels the ’847 patent’s implementation of a “communications board/transmitter/receiver.” *Id.*; EX1001, 5:35–6:9; *see also* EX1003, ¶207; *supra*, §IV.I (claim construction).

A POSITA would have been motivated to employ Gatling’s teachings to employ *wireless communications* as a predictable improvement to the wired

configurations disclosed throughout Bunch. EX1003, ¶187. As discussed above at Element[2] of Ground 1B, wireless communications were a predictable alternative that a POSITA would have been motivated to pursue based on the known cost, flexibility, and scalability benefits. Additionally, it would have been apparent to POSITA that such *wireless communications* would further Bunch’s intent to provide a system that is easy to “program[], repair, and reinstall[].” EX1006, 1:44–58, 2:10–12; EX1003, ¶187.

(b) Claim 11

Element[11]: The method of claim 8 further comprising mounting an internal case temperature sensing unit inside the display case and monitoring internal case temperature.

The Carter-Bunch-Gatling Combination renders obvious Element[11]. EX1003, ¶¶188–189. The Combination includes Gatling’s teachings to control the refrigeration of a *refrigerated display case* based on “multiple temperature readings including air-discharge temperature sensed by a discharge temperature sensor and/or food product temperatures approximated by a product simulating probe.” EX1007, 4:58–65 (reference numbers omitted); *see also* 1:40–54, 3:16–4:5, 6:15–24, 6:41–61, 7:20–8:12, Figures 1, 5–8. Per Gatling, the discharge temperature sensor and product simulating probe (individually or collectively, *internal case temperature sensing unit*) are mounted inside the display case for monitoring internal case temperatures. *Id.*

A POSITA would have been motivated to incorporate Gatling's above-discussed teachings with Carter-Bunch and would have had a reasonable expectation of success in doing so. EX1003, ¶189 . First, using temperature sensors within a refrigerated display case for monitoring temperatures within the case, as Gatling teaches, was well known at the time of the '847 patent for the beneficial purpose of facilitating closed-loop refrigeration/temperature control and ensuring product quality. EX1003, ¶189 (citing EX1007, 1:40–45). Second, even if internal case temperature sensors were not so ubiquitous (which they were), a POSITA would have (i) appreciated that one basic design goal of a refrigerated display case is to achieve a target operating temperature and (ii) recognized that a common-sense approach to achieving that goal includes monitoring the existing temperature within the case. EX1003, ¶189 .

(c) Claim 12

Element[12]: The method of claim 11 further comprising storing data related to readings at said sensing units and operation of the frame/door heater.

The Carter-Bunch-Gatling Combination renders obvious Element[12] for at least the same reasons discussed above at Element[12] of Ground 1A; and Elements, [1.d], [2], and [4]–[5] of Ground 1B. EX1003, ¶190. In addition to the above-discussed understanding of a POSITA in view of Carter's teachings, Gatling reinforces that the Combination includes ***storing data related to readings at said***

sensing units and operation of the frame/door heater. EX1003, ¶190. Gatling, for example, teaches a controller for a refrigerated display case with data “logging capabilities.” EX1007, 3:40–43, 6:15–24, 6:62–7:3, 1:40–41. A POSITA would have been motivated to include a long-term storage means (e.g., non-volatile memory) for logging *sensor readings* and *heater operation* data for the purpose of facilitating system performance analyses. EX1003, ¶190, ¶¶52–60.

(d) Claim 13

Element[13]: The method of claim 12 further comprising wirelessly accessing said stored data.

See Elements[2] and [12], Ground 1D (Gatling’s teachings regarding *data* storage and *wireless data* communications); and Element[2], Ground 1B (teachings from Bunch and the knowledge of a POSITA regarding *wireless data* communications). EX1003, ¶191.

(e) Claim 17

Element[17]: The method of claim 14 further comprising the steps of monitoring internal case temperatures of said plurality of display cases and compiling a record thereof.

See Element[11], Ground 1D (Gatling’s teachings regarding *monitoring internal case temperatures* with sensors); Element[11], Ground 1A (Carter’s teachings and the knowledge of a POSITA regarding *monitoring internal case temperatures of display cases* with sensors); Element[12], Ground 1A (Carter’s teachings and the knowledge of a POSITA regarding storing data relating to sensor

readings); and Elements[1.d], [2], and [4]–[5], Ground 1B (the combination of teachings from Carter and Bunch regarding *compiling records* of sensor readings). EX1003, ¶192.

VI. ANALYSIS ON DISCRETION

A. 35 U.S.C. §325(d)—*Advanced Bionics*

The asserted combinations in this Petition are materially different from the art references considered during prosecution of the '847 patent. None of the four presently asserted references were considered during prosecution, a cursory process that concluded without a single prior art rejection. These references offer new and distinct teachings that provide the features erroneously deemed missing from the prior art by the Examiner. Neither part of the *Advanced Bionics* framework is met. Denying institution under §325(d) would be inconsistent with the Board's precedent.

B. 35 U.S.C. §314(a)—*Fintiv*

Institution should not be discretionarily denied under §314(a) because no *Fintiv* factor favors that result.

Factor 1 weighs against denial because the parallel district court litigation is currently stayed.

Factor 2 weighs against denial because the parallel district court litigation has no scheduled trial date.

Factor 3 weighs against denial because Petitioner diligently filed this Petition while the co-pending litigation remains stayed and in its infancy.

Factor 4 also weighs against denial. As noted above, no trial date has been scheduled. No *Fintiv* stipulation has been offered given the lack of a trial date, and it otherwise remains too early to assess the suitability of a stipulation.

Factor 5 is neutral. Although the parties in the parallel litigation are the same, there is no indication that the parallel litigation will reach a jury trial before the conclusion of this IPR.

Factor 6 weighs against denial in view of this Petition's compelling merits.

VII. FEES—37 C.F.R. §42.103

Petitioner authorizes the Patent and Trademark Office to charge any fees to Deposit Account No. 06-1050.

VIII. MANDATORY NOTICES—37 C.F.R. §42.8(a)(1)

A. Real Party-In-Interest—37 C.F.R. §42.8(b)(1)

Anthony Inc. is the petitioner and the real party-in-interest. Additional parties that may constitute real parties-in-interest, though Petitioner does not concede as much, are Dover Corporation and Hillphoenix, Inc.

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

Petitioner is not aware of any disclaimers, reexamination certificates or petitions for *inter partes* review for the '847 patent. The '847 patent is the subject

of the following co-pending civil action: *ControlTec, LLC v. Anthony, Inc. et al.* 1-24-cv-00883 (DDE) (pending). And Petitioner has petitioned for *inter partes* review of a related patent—U.S. Patent No. 7,207,181—in Case No.: IPR2025-00559.

C. Lead and Back-Up Counsel—37 C.F.R. §42.8(b)(3)

Petitioner provides the following designation of counsel.

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D. Service Information

Please address all correspondence and service to the address listed above.

Petitioner consents to electronic service by email at IPR43789-0260IP1@fr.com.

Respectfully submitted,

Dated: February 24, 2025

/Kenneth Wayne Darby Jr./

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CERTIFICATION UNDER 37 CFR §42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 12,190 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated: February 24, 2025

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on February 24, 2025, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided by Federal Express to the Patent Owner by serving the correspondence address of record as follows:

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