

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

Case No. IPR2025-00636
U.S. Patent No. 7,421,847
Before SCOTT A. DANIELS, BARRY L. GROSSMAN, and HUNG H. BUI
Administrative Patent Judges

Table of Contents

Case Overview	3
The '847 Patent's Condensation Anticipating Features Are Obvious in View of Carter's Control Logic	8
Carter Alone or With Bunch Renders Obvious the Recited Refrigerated Display Case Components	25
Patent Owner's Overly Narrow Skill Level Definition Is Ends-Oriented and Unjustifiable	39
Patent Owner Provides No Legally Relevant Evidence of Success, Praise, Need, or Copying	49

Case Overview

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

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

(10) **Patent No.:** US 7,421,847 B2
(45) **Date of Patent:** Sep. 9, 2008

(54) **REFRIGERATION UNIT CONDENSATION PREVENTION**

(75) **Inventors:** Brent W. Murray, Longmont, CO (US); Patrick M. Bertsch, Thornton, CO (US); Robert A. Majzner, Broomfield, CO (US)
(73) **Assignee:** Bradley W. Geuke, Ault, CO (US)
(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.
(21) **Appl. No.:** 11/788,453
(22) **Filed:** Apr. 20, 2007
(65) **Prior Publication Data**
US 2007/0193294 A1 Aug. 23, 2007
Related U.S. Application Data
(62) **Division of application No. 11/069,378, filed on Mar. 1, 2005, now Pat. No. 7,207,181.**
(51) **Int. Cl.**
A47F 3/04 (2006.01)
(52) **U.S. CL.** 62/80; 62/150; 62/176.6; 62/248
(58) **Field of Classification Search** 62/80; 62/150; 176.2; 176.6; 248; 275
See application file for complete search history.

(56) **References Cited**
U.S. PATENT DOCUMENTS
3,939,666 A 2/1976 Bsshark
4,127,765 A 11/1978 Heaney
4,261,179 A 4/1981 Dageford
4,862,701 A 9/1989 Small et al.
5,778,147 A 7/1998 Kim
5,778,689 A 7/1998 Beatenbough
5,899,078 A 5/1999 Mager
6,301,913 B1 10/2001 Schulak et al.
6,470,696 B1 10/2002 Palfy et al.
6,550,261 B1 4/2003 Shima et al.
2004/0050072 A1 3/2004 Palfy et al.
Primary Examiner—William E. Tipolcai
(74) *Attorney, Agent, or Firm*—Harold A. Burdick

(57) **ABSTRACT**
Apparatus, systems and methods are disclosed for efficient elimination of door and frame condensation at widely utilized commercial freezer/refrigeration display cases. The apparatus includes a local controller unit connected with an array of case sensors including an internal case temperature sensor, an external case frame temperature sensor and a dew point sensor. The case frame temperature sensor and dew point sensor are housed to thermally isolate sensing elements thereof from effects of frame temperature changes and ambient air temperature in the vicinity of a sensing element, and to limit heat transfer by the housing to the sensing elements thereby improving sensing accuracy and apparatus performance.

20 Claims, 29 Drawing Sheets

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)

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

3

Case Overview

The '847 Patent: An Obvious Collection of Known Elements

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

(10) Patent No.: US 7,421,847 B2
(43) Date of Patent: Sep. 9, 2008

(54) REFRIGERATION UNIT CONDENSATION PREVENTION

(75) Inventors: Brent W. Murray, Longmont, CO (US); Patrick M. Burdick, Thornton, CO (US); Robert A. Majumder, Brookfield, CO (US)

(76) Assignee: Bradley W. Geishe, Auh, CO (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 11/788,453

(22) Filed: Apr. 20, 2007

(65) Prior Publication Data
US 2007/0193294 A1 Aug. 23, 2007

Related U.S. Applications
(62) Division of application No. 11/069,378, filed on Mar. 1, 2005, now Pat. No. 7,207,181.

(51) Int. Cl.
A47J 3/84 (2006.01)

(52) U.S. Cl. 62080; 62150; 62176.6; 62248; 62249

(58) Field of Classification Search 62080, 62150, 62176.6, 62248, 62249
See application file for complete search history.

(57) Abstract:
Apparatus, systems and methods are disclosed for efficient elimination of indoor fan condensation at widely utilized commercial freezer/refrigeration display cases. The apparatus includes a local control unit and connected with an array of case sensors including an internal case temperature sensor, an external case frame temperature sensor and a dew point sensor. The case frame temperature sensor and dew point sensor are housed to thermally isolate sensing elements therefrom from effects of free temperature changes and ambient air temperature in the vicinity of a sensing element, and to limit heat transfer by the housing to the sensing elements thereby improving sensing accuracy and apparatus performance.

20 Claims, 29 Drawing Sheets

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

EX1001, 1:48-60

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

EX1001, 5:26-29

The system of this invention is illustrated in FIG. 1 in association with a common commercial freezer/cooler display unit 21 including a display container 23 having a frame (not shown in this FIGURE) and doors 25 in frame 27 (hereinafter, refrigeration case(s)). Up to fifteen such cases 21 can

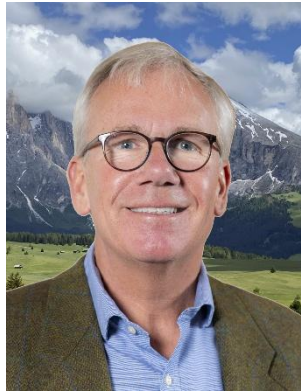
EX1001, 5:16-20

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

EX1001, 8:52-61

Case Overview

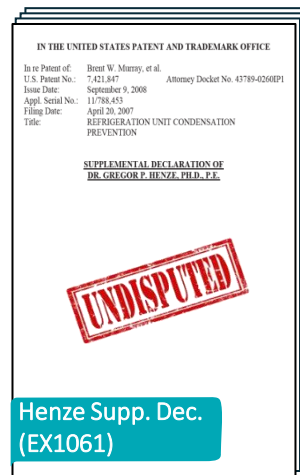
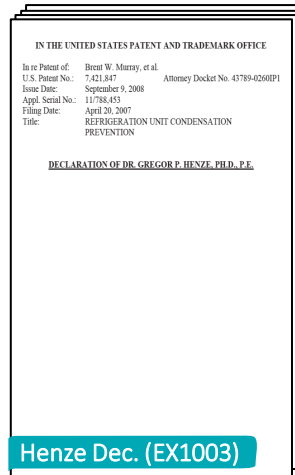
The '847 Patent: An Obvious Collection of Known Elements



Dr. Gregor Henze

Petitioner's Technical Expert

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



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

33. As I will show in the immediately following sections, condensation

control for use in refrigeration systems was known long before the '847 patent, and

those of skill in the art had already integrated various sensors, as well as control and

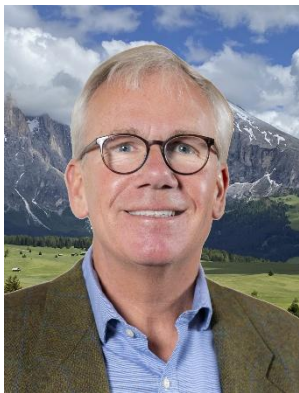
monitoring systems, for use in anti-condensation devices for refrigeration systems.

I have cited numerous textbooks, papers, and patent documents that support my understanding, each of them either preceding the '847 patent or representing information that was known to a POSITA before the '847 patent in 2005. A POSITA would have known of these references and considered them representative examples regarding the state of the art.

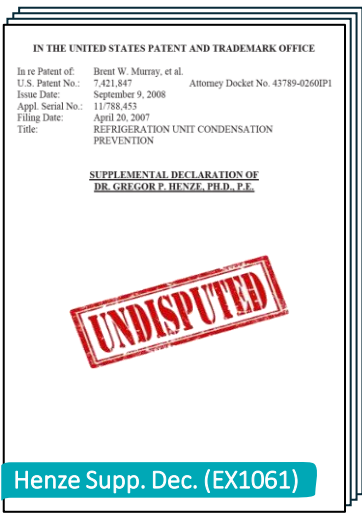
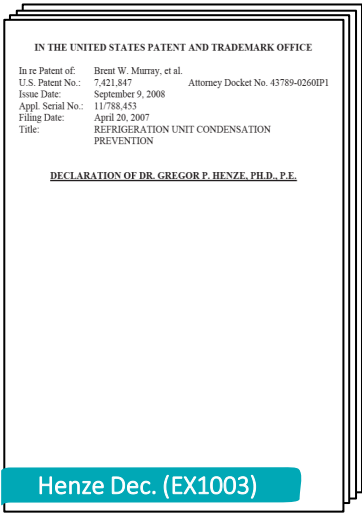
Case Overview

EX1003 Paras. 33-55

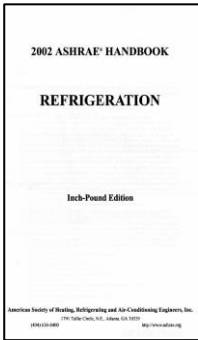
The '847 Patent: An Obvious Collection of Known Elements



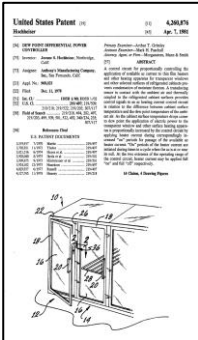
Dr. Gregor Henze
Petitioner's Technical Expert



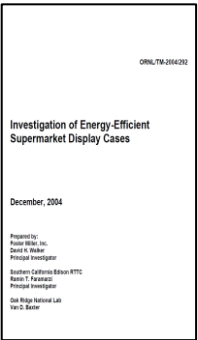
1. Condensation Control in Refrigeration Systems



EX1039



EX1016



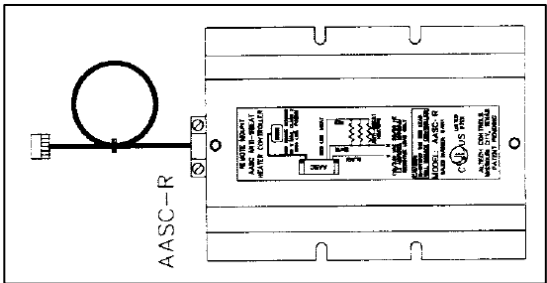
EX1024



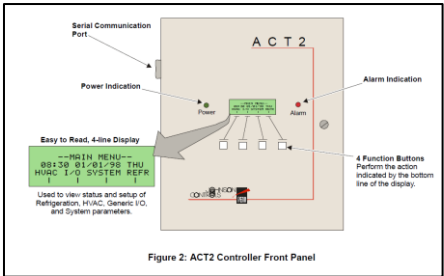
EX1021

2. Temperature and Humidity Sensor Packaging

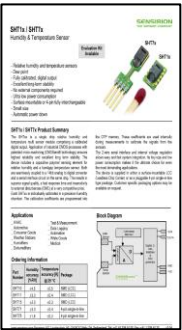
3. Control and Monitoring in Refrigeration Systems



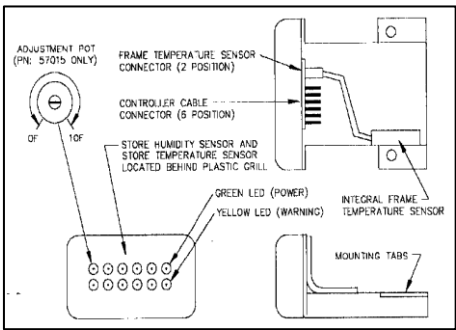
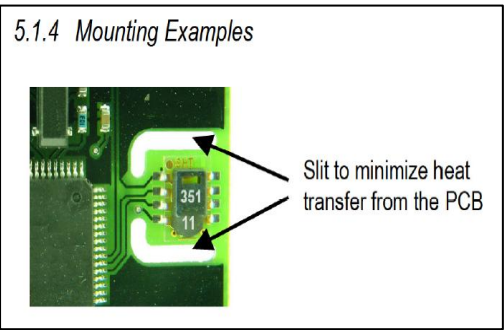
EX1021



EX1015



EX1020



EX1021

Case Overview

Grounds 1A–1B



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.

Ground 1B



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 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.

Grounds 1A-1B: Element [8.pre], Element [1.pre], Element [14.pre]

The '847 Patent's Condensation Anticipating Features
Are Obvious in View of Carter's Control Logic

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Pet. 6-7, 12-17, 36-37, 47-48; Reply 1-5

Claim 8	
[8.c]	utilizing monitored case frame temperature, ambient air temperature and relative humidity to <u>anticipate formation of condensation at the display case and activating and deactivating the frame/door heater responsive thereto.</u>
Claim 1	
[1.c]	processing said first and second output data at said display case to <u>anticipate formation of condensation at the display case and activating and deactivating the frame/door heater responsive thereto;</u> and
Claim 14	
[14.c]	<u>anticipating from said collected output data condensation formation</u> status at any of the display cases and establishing an output indicative thereof;
[14.d]	<u>establishing measures to address said condensation formation</u> status at any of the display cases responsive to said output indicative of condensation formation status; and

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Pet. 6-7, 12-17, 36-37, 47-48; Reply 1-5

Carter Anticipates Condensation Based on Dew Point, Just Like the '847 Patent

Carter (EX1004)

(12) United States Patent
Carter

(10) Patent No.: US 7,137,262 B2
(45) Date of Patent: Nov. 21, 2006

(54) SUPPLEMENTAL HEAT CONTROL APPARATUS AND METHOD FOR FREEZER/REFRIGERATION EQUIPMENT

(75) Inventor: David Carter, Asheville, NC (US)

(73) Assignee: Kendra Laboratory Products, I.P., Newton, CT (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 10/727,899

(22) Filed: Dec. 5, 2003

(65) Prior Publication Data
US 2005/0120728 A1 Jan. 9, 2005

(51) Int. Cl. F25D 21/04 (2006.01)

(52) U.S. Cl. 62/158; 62/156; 62/248; 62/273; 62/275

(56) Field of Classification Search
62/140, 275, 248, 175, 277, 278, 279, 273, 62/156

See application file for complete search history.

(56) References Cited
U.S. PATENT DOCUMENTS
4,127,765 A * 11/1978 Hsuey 62/150
4,102,149 A * 3/1980 Wade 62/277
4,380,870 A * 4/1981 Hochstetler 62/156
4,380,850 A * 6/1981 Hochstetler 62/278
5,542,258 A * 8/1996 Shan 62/150
5,779,680 A * 7/1998 Beutenebaugh 62/248

* cited by examiner
Primary Examiner—Harry B. Tanner
(74) Attorney, Agent, or Firm—Baker & Hostetler LLP

(57) ABSTRACT
A method and apparatus that provides supplemental heat from a heat source based upon the operating environment of a refrigeration or freezer. The supplemental heat is automatically controlled to provide heating to a sealing area to prevent condensation from forming.

15 Claims, 3 Drawing Sheets

START

READ CABINET SURFACE TEMPERATURE

READ AMBIENT TEMPERATURE

READ AMBIENT RELATIVE HUMIDITY

IF CABINET SURFACE TEMP < OR = CALCULATED DEW POINT + 2 DEGS C

YES / NO

ACTIVATE SUPPLEMENTAL HEAT

IF CABINET SURFACE TEMP < AMBIENT TEMPERATURE

YES / NO

DEACTIVATE SUPPLEMENTAL HEAT

refrigeration equipment. It is further desirable to provide automatic control of the supplemental heat provided to the freezer/refrigeration equipment. It is also desirable to automatically control the operation of providing supplemental heat such that it is only activated under conditions that would promote surface condensation on the sealing surface of freezer/refrigeration equipment.

EX1004, 1:22-31

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

EX1004, 2:48-54

If the cabinet surface temperature is less than or equal to the dew point plus 2 degrees C., a positive determination **60** is made. Based upon the positive determination, the control unit **28** enacts the switching unit **30** to activate supplemental heat **62** to the sealing surface **24** of the refrigerator or freezer equipment **10** via the heating unit **34**.

EX1004, 5:49-54

'847 Patent (EX1001)

(54) REFRIGERATION UNIT CONDENSATION PREVENTION

(75) Inventors: Brent W. Murray, Longmont, CO (US); Patrick M. Bertsch, Thornton, CO (US); Robert A. Majner, Broomfield, CO (US)

(56) References Cited
U.S. PATENT DOCUMENTS
3,939,666 A 2/1976 Bushuk
4,127,765 A 11/1978 Hsuey
4,261,179 A 4/1981 Dagfield
4,862,701 A 9/1989 Snell et al.

(52) U.S. Cl. 62/86; 62/150; 62/176.6; 62/248

(58) Field of Classification Search 62/80

performs in the vicinity of a sensing element, and to limit heat transfer by the housing to the sensing elements thereby improving sensing accuracy and apparatus performance.

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

EX1001, 1:23-27

through **15g**. Heaters are activated just above dew point and thus just before moisture appears on freezer surfaces. Con-

EX1001, 8:51-52

Case temp

Frame Temp

Dew Point

Power supply 120 VAC to 12V and 5 VDC

AC IN

Intermed AC To sensor

71

65/67

31

43

53

57

IN

OUT

Communications

CPU

AD

Dew Point Temp

Compare dew point and frame temp

Relay

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

10

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Pet. 12-17, 36-37, 47-48; Reply 1-5

Carter Activates and Deactivates the Heater “Responsive” to Anticipating Condensation

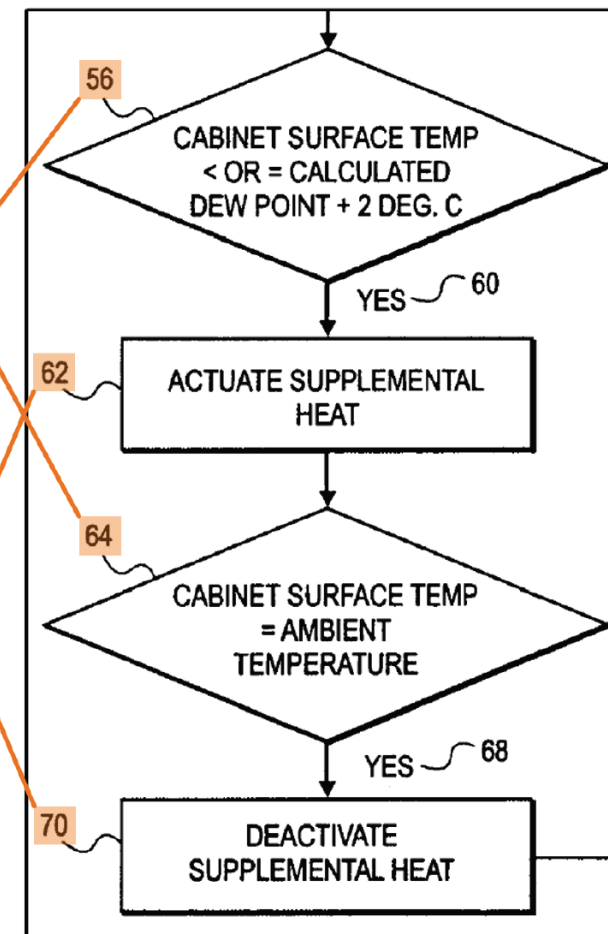
PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 7,421,847 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

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.

Pet. 14-15

Anticipate Formation of
Condensation at the Display Case

Activating and Deactivating the
Frame/Door Heater Responsive
Thereto



Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Pet. 12-17, 36-37, 47-48; Reply 1-5

Carter's Heater Deactivation Is "Responsive" to Anticipated Condensation

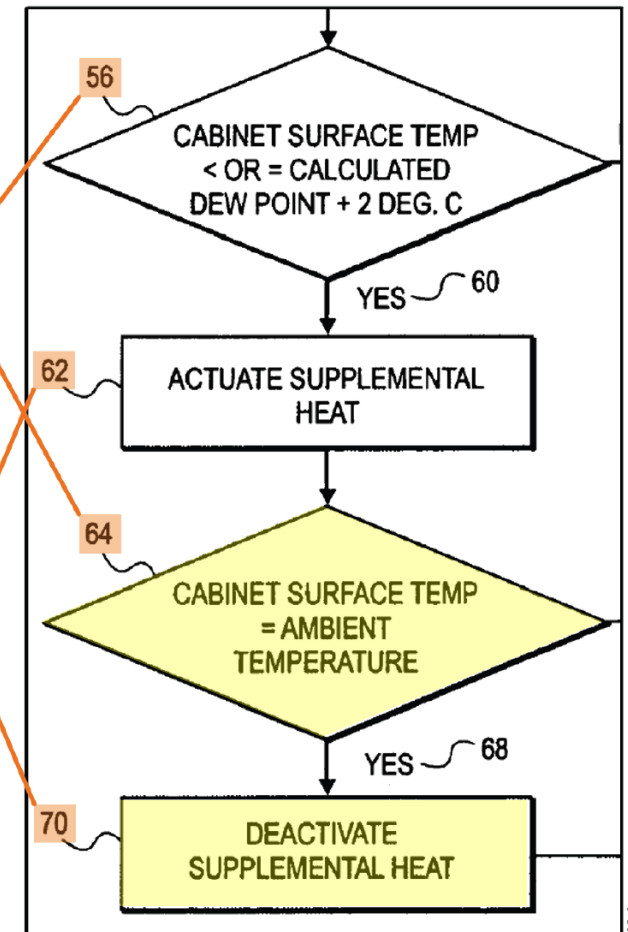
PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

Indeed, everyone agrees that Carter's control scheme activates the heater when condensation is anticipated from surface/ambient temperatures and relative humidity. See Pet. 12-15; POR 21 (conceding "Carter triggers heat at dew point + constant"). And, as illustrated below, heater deactivation in Carter is inextricably linked to the anticipating and activating steps as part of the same causal ("responsive") control loop. See Pet. 14-15; EX1004, 5:55-63; EX1003 ¶¶81-82.

EX1004, Figure 3 (annotated). In Carter's control loop, heater deactivation is the programmed response to the conclusion of a state where the system anticipates condensation. EX1061 ¶¶32-37; see also *id.* ¶¶38-40 (addressing, *inter alia*, Patent Owner and Mr. Pollock's unrealistic 100% humidity scenario).

Anticipate Formation of Condensation at the Display Case

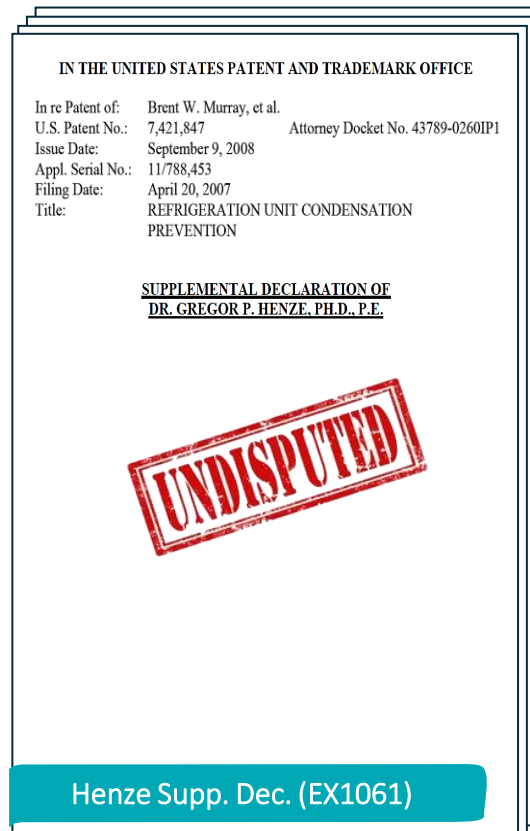
Activating and Deactivating the Frame/Door Heater Responsive Thereto



Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Pet. 12-17, 36-37, 47-48; Reply 1-5

Carter Deactivates When Condensation Is No Longer Anticipated



38. A POSITA would have anticipated that condensation would not occur at a surface temperature heated to the ambient air temperature. Mr. Pollock appears to agree that “there is no risk of condensation on Carter’s sealing surface when this area is heated far above the dew point of the air (i.e., all the way to ambient temperature).” EX2037 ¶44. As noted in my Prior Declaration (EX1003 ¶85), this is because ambient temperature is always greater than dew point, unless fully saturated, particularly in controlled indoor environments like those where a POSITA would normally expect to find a refrigerated display case used for commercial purposes (e.g., a grocery store).

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Pet. 12-17, 36-37, 47-48; Reply 1-5

Carter Deactivates When Condensation Is No Longer Anticipated

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

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

UNDISPUTED

Henze Supp. Dec. (EX1061)

39. For example, a study prepared in 2004 for the federally funded Oak Ridge National Laboratory and titled “Investigation of Energy-Efficient Display Cases” notes that:

The standard rating condition to specify the refrigeration load of a display case is for operation in an indoor environment with a 75°F dry-bulb temperature and a relative humidity of 55 percent.

EX1024 at 32; *see also id.* at 3, 19 (“Display cases are used throughout a supermarket for the merchandising of perishable food products.”). At this “standard rating condition,” the dew point is approximately 58°F, which is about 17°F below ambient.² Or, stated in reverse, ambient (75°F) is 17°F above the 58°F dew point temperature. In the standard, common conditions for refrigerated display cases, this buffer of 17°F is a comfortable margin above dew point, such that a POSITA would anticipate no condensation when the surface temperature rises to the level of dew point plus the offset. The margin is sufficient to account for the various sensor

INVESTIGATION OF ENERGY-EFFICIENT DISPLAY CASES

Various control methods and technologies exist that are energy efficiency measures (EEMs) that could be applied to display cases and result in the reduction of the refrigeration load and of the energy consumption of the refrigeration system. Examples of such technologies include:

- Energy-efficient display case fans and lights - The use of more efficient fan motors and lights can reduce both refrigeration load and direct energy consumption.
- Controls for anti-sweat heaters also help in load and energy reduction.

EX1024, 25

Each of these configurations has unique operating characteristics, particularly the make-up of their refrigeration loads, or requirements. The open, multi-deck display cases have a large portion of their requirements attributable to ambient air entrainment in the display case air curtain. The requirement of the single-deck display case has a significant component that is due to thermal radiation with the surrounding environment. The refrigeration load of glass door cases is largely due to the use of anti-sweat heaters in the doors that prevent condensation on the glass. The resulting refrigeration requirement for each of these display case configurations is different. Similarly, lighting, heater, and fan, requirements will vary with case configuration. The rating procedure must, therefore, compare like case configurations in order to determine energy savings.

EX1024, 153

Prepared for
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for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-00OR22725
Subcontract No. 4000007074
COTR: Van D. Baxter

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Rebuttal to: “Carter makes no use of the dew point reference at shut-off.” POR at 21.

Reply 1-3

(12) **United States Patent** (10) **Patent No.:** **US 7,421,847 B2**
Murray et al. (45) **Date of Patent:** **Sep. 9, 2008**

8. 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:
placing a temperature sensing unit in contact with the display case frame to monitor case frame temperature;
mounting a dew point sensing unit on the display case to monitor ambient air temperature and relative humidity outside the display case; and
utilizing monitored case frame temperature, ambient air temperature and relative humidity to anticipate formation of condensation at the display case and activating and deactivating the frame/door heater responsive thereto.

16. The method of claim 14 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 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.

United States Court of Appeals for the Federal Circuit

03-1269, -1286
EDWARD H. PHILLIPS,
Plaintiff-Appellant,
v.
AWH CORPORATION,
HOPEMAN BROTHERS, INC., and LOFTON CORPORATION,
Defendants-Cross Appellants.

DECIDED: July 12, 2005

**No Independent
Claim Recites Dew-
Point-Based Heater
Deactivation**

understand the claim terms. For instance, although the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments. See, e.g., *Nazomi Communications, Inc. v.*

particular, we have expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment. *Gemstar-TV Guide*, 383 F.3d at 1366. That is not just because section

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Rebuttal to: “Carter makes no use of the dew point reference at shut-off.” POR at 21.

Pet. 15-17; Reply 3-5

Carter Renders Obvious Dew-Point-Based Heater Deactivation

Cabinet Surface Temp = Ambient Temp

is mathematically equivalent to:

[Carter Algorithm](#)

Cabinet Surface Temp = Dew Point + Floating Offset,

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

Frame Temp – Set Point High > Dew Point

and its mathematical equivalent:

['847 Patent Algorithm](#)

Frame Temp > Dew Point + Set Point High.

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

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,

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).

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Rebuttal to: “Carter makes no use of the dew point reference at shut-off.” POR at 21.

Pet. 15-17; Reply 3-5

Dew-Point-Based Deactivation Was a Beneficial and Predictable Variation of Carter

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

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

UNDISPUTED

Henze Dec. (EX1003)

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

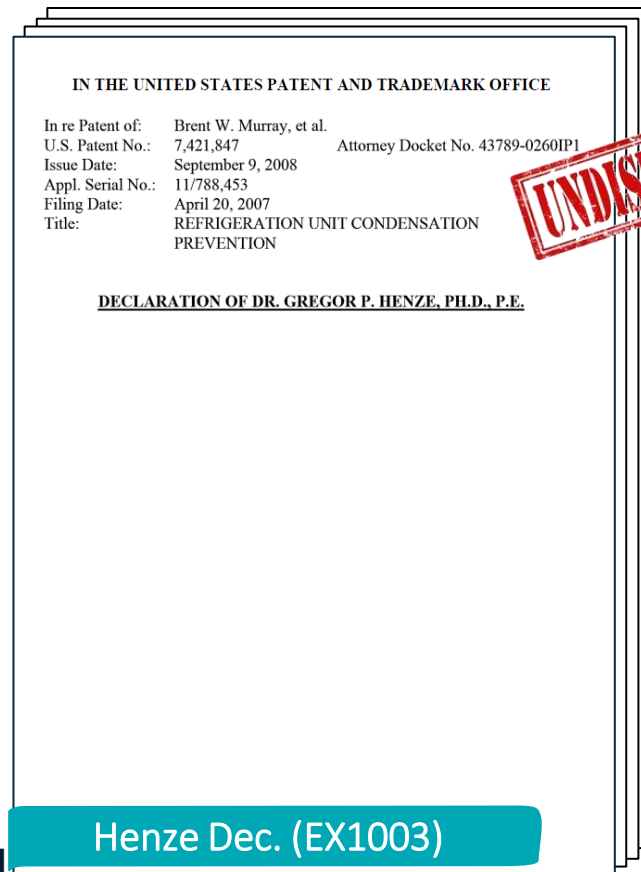
94. As the POSITA would have understood, because the offset is a function of ambient conditions, it cannot be selected, adjusted, or modified. Thus, the POSITA would have appreciated the efficiency and operational advantages of providing a control system that allows a manufacturer, technician, or operator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

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Rebuttal to: “Carter makes no use of the dew point reference at shut-off.” POR at 21.

Pet. 15-17; Reply 3-5

Dew-Point-Based Deactivation Was a Beneficial and Predictable Variation of Carter



...ect the buffer value as a set point based on existing or expected conditions. One obvious and predictable approach for the POSITA would be to ¹replace Carter's ambient temperature target for heater deactivation with a target temperature equal to dew point plus a preselected set point. Another obvious and predictable approach for the POSITA would be to ²introduce the set point feature as a user-selectable alternative mode of operation for the control system.

EX1003 Para. 94

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Reply 5

Rebuttal to: “Here, common sense is being used to fill in a missing limitation. That invocation fails...” *Sur-Reply at 13.*

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

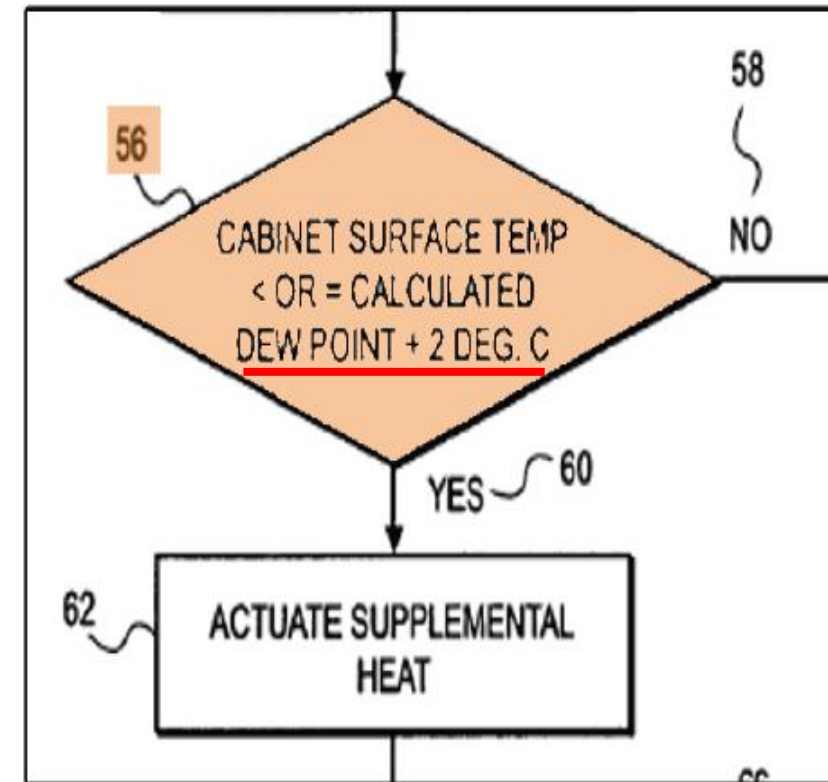
UNITED STATES PATENT AND TRADEMARK OFFICE

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

PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE

Reply 5

Pet. Reply (Paper 24)



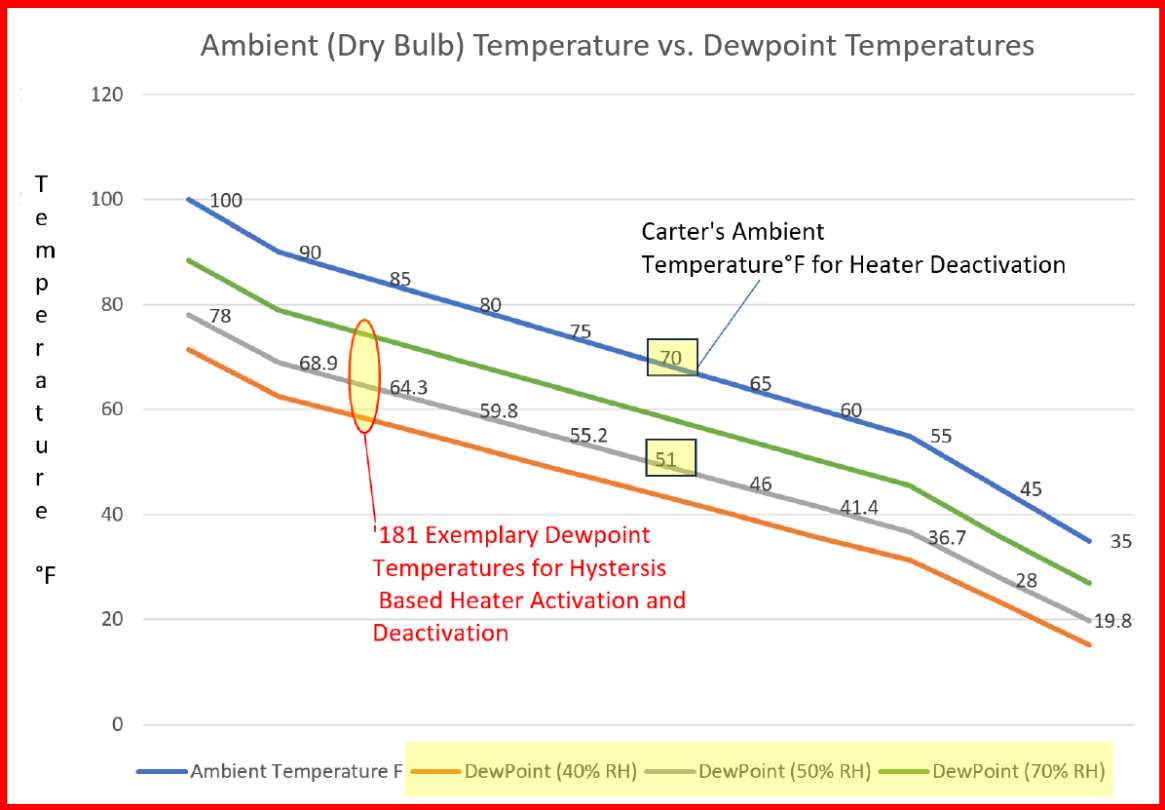
EX1004, 5:21–54, Figure 3; see also 2:4–32, 3:40–53

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Rebuttal to: *“Carter deactivates late[r] in lower humidity as compared to the '847 Patent.”* POR at 21-25.

Reply 3-4
EX1061, Paras. 48-51

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



Henze Supp. Dec. (EX1061)

In re Patent of:	Brent W. Murray, et al.	
U.S. Patent No.:	7,421,847	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	

48. In his “Ambient Temperature vs. Dewpoint Temperature” chart, Mr. Pollock decided to chart certain “band[s] of dew point temperatures” at 40%, 50%, and 70% relative humidity. EX2037 ¶38.

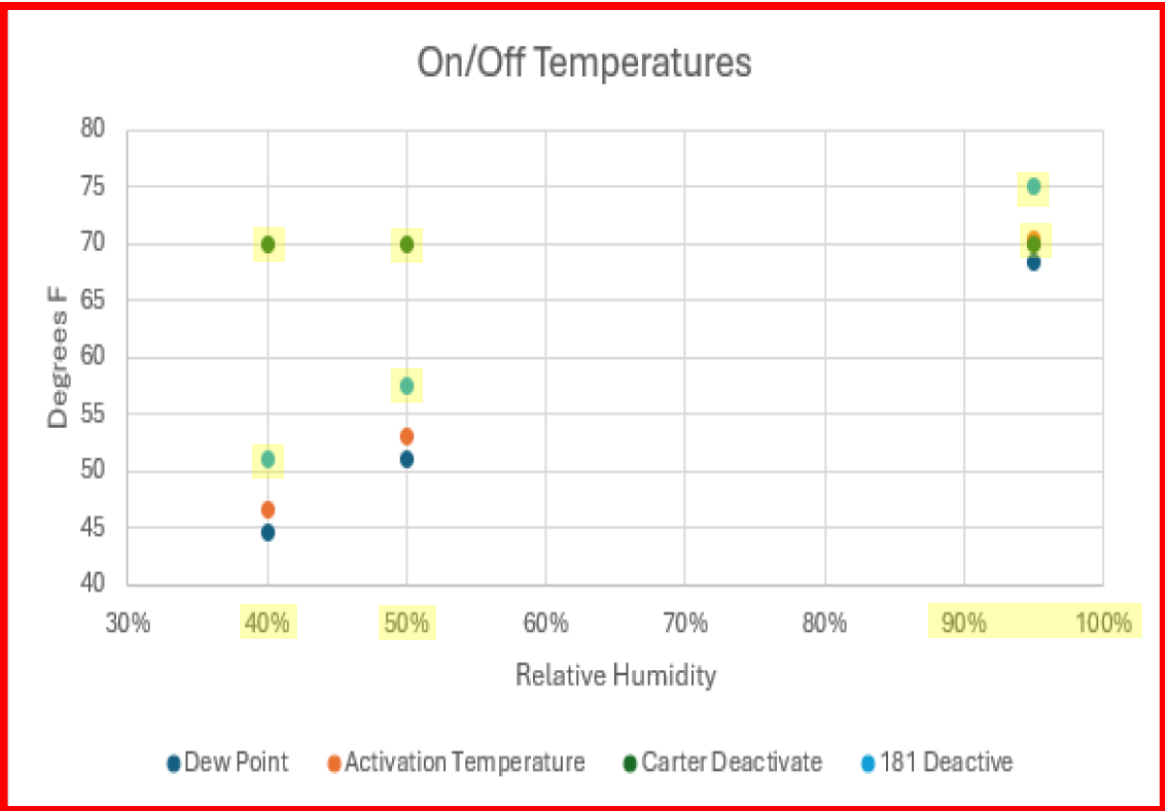
EX2037 ¶38. He also highlights certain dew point temperatures along these bands. Nowhere in his analysis does Mr. Pollock provide an objective basis for selecting these particular humidity and dew point values. Importantly, the chart has neither an abscissa label nor scale, rendering the chart largely unreadable and forcing the reviewer to guess. Moreover, as an aside, I note that Mr. Pollock’s chart references

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Rebuttal to: “Carter deactivates late[r] in lower humidity as compared to the '847 Patent.” POR at 21-25.

Reply 3-4
EX1061, Paras. 48-51

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



Henze Supp. Dec. (EX1061)

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,421,847 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

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

49. In his “On/Off Temperatures” chart, Mr. Pollock decided to chart deactivation surface temperatures at relative humidity values of 40%, 50%, and 95%. He also decided to use an ambient air temperature of “70°F” and a preselected setpoint of “dew point plus 6.5°F” or “dewpoint plus 4.5°F” for the '847 patent’s deactivation algorithm. EX2037 ¶¶38–39. Nowhere in his analysis does Mr. Pollock provide an objective basis for selecting these particular humidity or setpoint values.

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Rebuttal to: *"Carter deactivates late[r] in lower humidity as compared to the '847 Patent." POR at 21-25.*

Reply 3-4
EX1061, Paras. 48-51

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

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

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

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

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

A. Not that I see currently.

EX1062, 267:13-25

Q. Oh, let me reask. Thank you.

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

A. Yes.

MR. JONES: Objection, form.

A. For this --

MR. JONES: Go ahead.

A. Yes, for this example.

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

A. Yes.

EX1062, 268:8-24

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Anthony Inc.
Petitioner

v.
ControlTec, LLC
Patent Owner
Patent No. 7,421,847

Inter Partes Review No. IPR2025-00636
Ref. 43789-0260IP1
VIDEO DEPOSITION of MICHAEL A. POLLOCK
Thursday, March 26, 2026
9:02 a.m. EDT
Boston, Massachusetts

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

Pollock Depo. (EX1062)

Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Rebuttal to: “Carter deactivates late[r] in lower humidity as compared to the '847 Patent.” POR at 21-25.

Reply 3-4
EX1061, Paras. 52-53

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

53. One can also disprove Mr. Pollock's biased conclusion without modifying his chosen setpoint value of dew point plus 4.5°F. EX2037 ¶38. Instead of changing the setpoint, one can modify his selected relative humidity value—e.g., from Mr. Pollock's value of 50% to a modified value of 85.7%. For example, at an ambient temperature of 70°F and 85.7% relative humidity, air has a dew point temperature of approximately 65.5°F.⁴ That means dew point plus 4.5°F (Mr. Pollock's setpoint) is about the same as the ambient temperature of 70°F, meaning the two algorithms will deactivate the heater at about the same surface temperature.

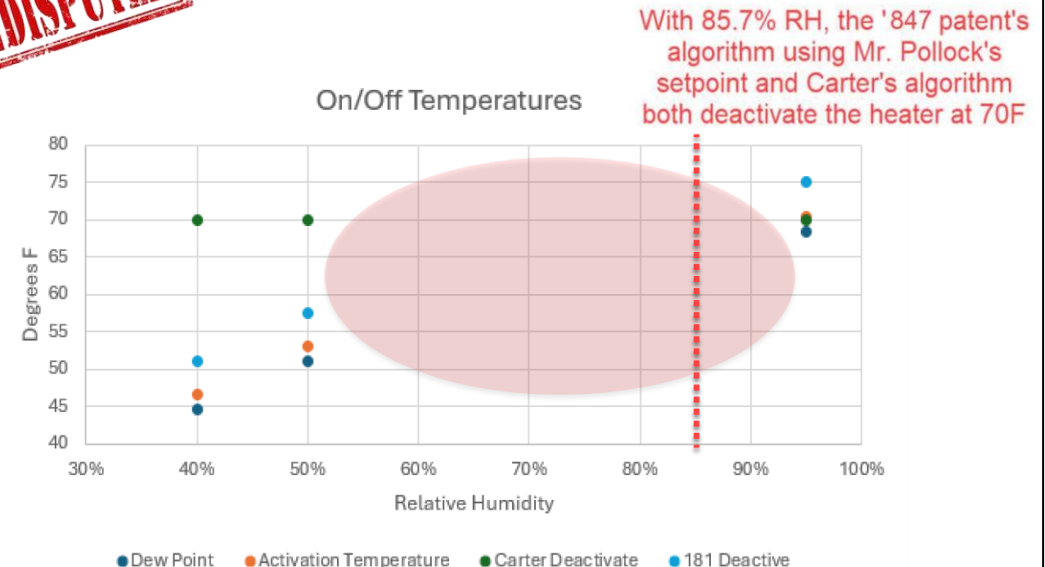
Mr. Pollock's “On/Off Temperatures” chart would have revealed this fact had he not left such a large gap between the relative humidity values he selectively chose to examine. Below, I have marked this unexplored area in Mr. Pollock's chart with a large red oval and added a red dotted line to illustrate where the two algorithms would simultaneously deactivate the heater using Mr. Pollock's 4.5°F setpoint.

Henze Supp. Dec. (EX1061)

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,421,847 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

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

UNDISPUTED



Grounds 1A-1B ([8.c], [1.c], [14.c]-[14.d]): Anticipating Condensation

Rebuttal to: *“Carter deactivates late[r] in lower humidity as compared to the '847 Patent.”* POR at 25.

Reply 3-4
EX1061, Paras. 52-53

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

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

A. Yes.

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

A. Yes, generally.

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

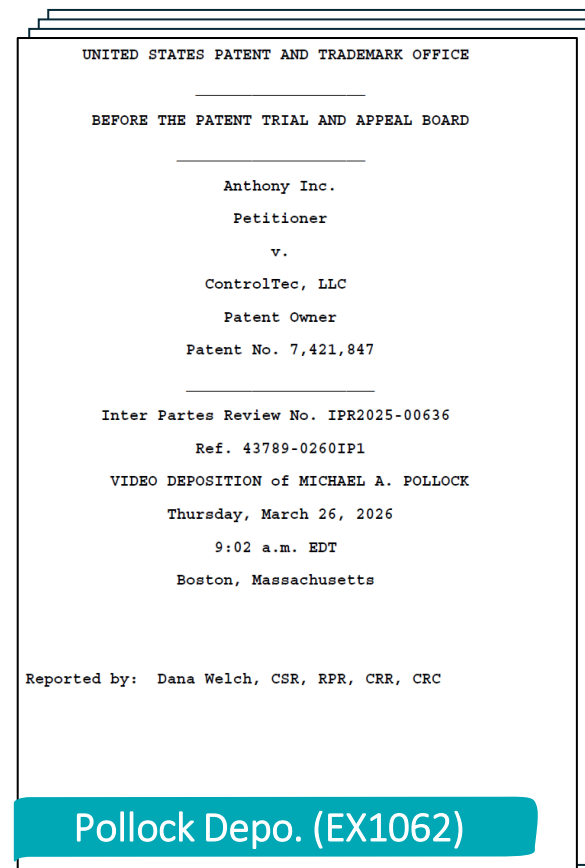
A. Yes, at that point, I think that's correct.

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

MR. JONES: Objection, form.

A. Not specifically.

EX1062, 250:8-22



Grounds 1A-1B: Element [8.pre], Element [1.pre], Element [14.pre]

Carter Alone or With Bunch Renders Obvious the
Recited Refrigerated Display Case Components

Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

Pet. 8-10, 26-33, 43, 46

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:

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:

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:

Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

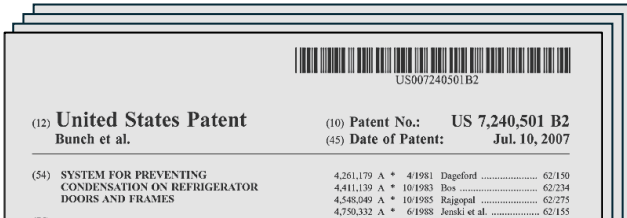
Pet. 8-10, 26-33, 43, 46

Like Carter and the '847 Patent, Bunch Teaches Energy Efficient Condensation Prevention on a Display Case

This invention relates generally to refrigeration devices. This invention relates particularly to devices for **reducing energy consumption by refrigerator door and frame heaters while maintaining protection against condensation.**

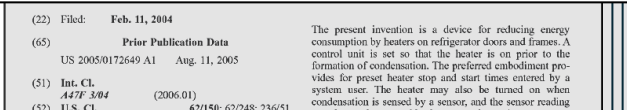
Shopkeepers display refrigerated or frozen products in **temperature-controlled display cases, such as refrigerators with glass display doors** or open-air, “coffin,” coolers. The refrigerators and freezers are referred to herein as “refrigerators.” Changes in temperature and humidity in the surrounding area causes condensation and frost to build up on the refrigerators. This obstructs visibility of the products and can cause unsafe conditions as the condensation falls to the floor. As a result, it is desirable to **prevent the build-up of condensation and frost on refrigerators.**

EX1006, 1:5-23



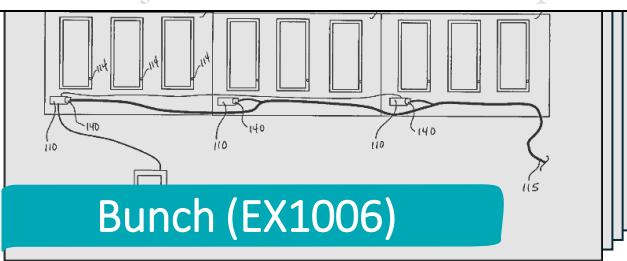
on or turned on unnecessarily. It would be desirable to **prevent condensation with the minimum amount of heat, and consequent energy expenditure, necessary.**

EX1006, 1:41-43

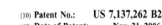


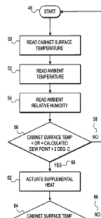
Therefore, it is an object of this invention to provide door heating **where condensation has not yet been detected but is anticipated.** It is another object of this invention to provide

EX1006, 2:8-10



(12) United States Patent Bunch et al.	(16) Patent Class. US 7,240,501 B2 Int. Class. Jul. 10, 2007
(51) SYSTEM FOR PREVENTING CONNECTION OF REFRIGERATOR DOORS AND FRIGES Inventor: Jack Bunch, Florida, US (US); Bruce G. Malovez, Illinois, US (US); Stephen Maxwell Shultz, Charlotte, AZ (US); Matthew Warner, Gilbert, AZ (US)	4,231,279 A • 419301 Dufford • 02310 4,661,139 A • 019910 Ito • 02324 4,524,844 A • 019910 Rappard • 02325 4,793,832 A • 02000 Senck • 02351 5,690,800 A • 020010 Tominaga • 02654 5,526,228 A • 19990 Shen • 02671 5,910,875 A • 19990 Shultz • 02672 6,047,887 B2 • 20000 Shultz et al. • 02677 6,254,887 B2 • 20010 Gelling et al. • 02618
(72) Assignee: Dore Mbow, LLC, Tucson, AZ (US)	* cited by examiner
(*) Notes: Subject is any disclosure, the term of which is extended or adjusted under 35 U.S.C. 154(a), 9 days.	Priority Examiner: Maureen Knapik (74) Attorney: dore, dore & Pines, Charlotte Law Group, LLC
(11) Appl. No. 18774,289	(13) ABSTRACT
(22) Filed: Feb. 24, 2004	The present invention is a device for reducing energy consumption to be used on refrigerators and freezers. A control unit is set so that the heater is on prior to the direction of evacuation. The preferred embodiment provides for pre-heating dry and wet times entered at a control unit. The heater may then be turned on when condensation is minimal by a sensor, and the energy saving may be used to the control time. A programmer provides individual indication of each connected control unit and is used to limit, remove and adjust one or more control units' settings. A communication line is used to enable energy monitoring and, in addition, a specialized control unit programmer for only setting the unit to a least-on state.
(56) References Cited	4 Claims, 5 Drawing Sheets
U.S. PATENT DOCUMENTS	
3,728,040 A • 41937 Jandt • 02340	
(57) Abstract	
(58) Field of Invention	
(59) Classification	
(60) References Cited	
(61) References Cited	
(62) References Cited	
(63) References Cited	
(64) References Cited	
(65) References Cited	
(66) References Cited	
(67) References Cited	
(68) References Cited	
(69) References Cited	
(70) References Cited	
(71) References Cited	
(72) References Cited	
(73) References Cited	
(74) References Cited	
(75) References Cited	
(76) References Cited	

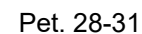
 US000173762R2	
(12) United States Patent Carter	(16) Patent No. US 7,137,262 B2 (18) Date of Patent Nov. 21, 2006
(54) SUPPLEMENTAL HEAT CONTROL APPARATUS AND METHOD FOR FREEZER/REFRIGERATION EQUIPMENT	
(73) Inventor: David Carter, Asheville, NC (US) (74) Attorney: Kendra Laboratory Products, New York, N.Y. (US)	(51) Field of Classification Search 421.50, 421.60, 273, 241, 275, 276, 279, 273, 421.56 See application file for complete search history. (52) References Cited U.S. PATENT DOCUMENTS 4,152,384 A * 1/1984 Blythe 421.50 4,152,148 A * 1/1984 Blythe 421.57 4,269,876 A 1/1984 Blythe 421.57 4,308,838 A 1/1984 Blythe 421.57 4,562,558 A * 9/1984 Shaw 421.50 5,774,681 A * 1/1998 Bostanovich 421.40 * cited by examiner <i>Primary Examiner</i>—Harry B. Tamar <i>474 Attorney, Agent, or Firm</i>—Baker & Hostetler LLP
(11) Pub. No. 2007/028,411 A1	
(56) Other Publications US 2006/0120728 A1 Jun. 8, 2006	
(57) ABSTRACT A method and apparatus that provides supplemental heat from a heat source below the opening on treatment of a refrigerated or frozen. The supplemental heat is automatically controlled to provide heating to a sealing area to prevent condensation from forming.	
(58) Claims 13 13 Claims, 3 Drawing Sheets	



```

graph TD
    HEAT --> RST1[REQUIREMENT SOURCE TEMPERATURE]
    RST1 --> RT[REQUIREMENT TEMPERATURE]
    RT --> RH[REQUIREMENT RELATIVE HUMIDITY]
    RH --> DCE[DENSITY CORRECTION FACTOR CORRELATION EQUATION]
    DCE -- YES --> CR[CALCULATE REFRIGERANT LEAK]
    DCE -- NO --> DST1[DENSITY SURFACE TOP]
    CR --> DST2[DENSITY SURFACE TOP]
    DST1 --> DST3[DENSITY SURFACE TOP]
    DST2 --> DST3
  
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Carter (EX1004)



Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

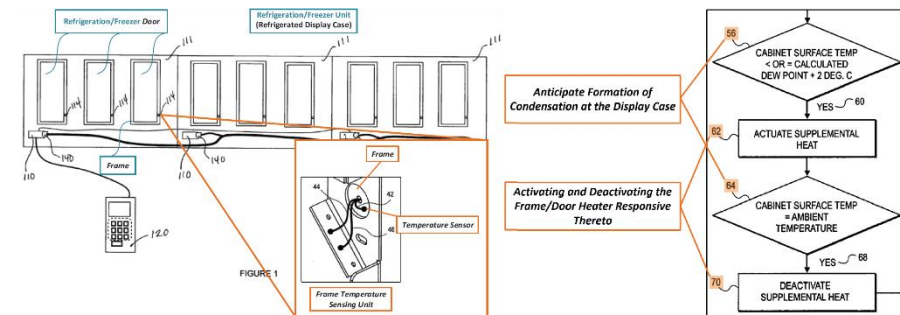
Pet. 26-31

Carter-Bunch: A Predictable Improvement

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

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

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.



Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

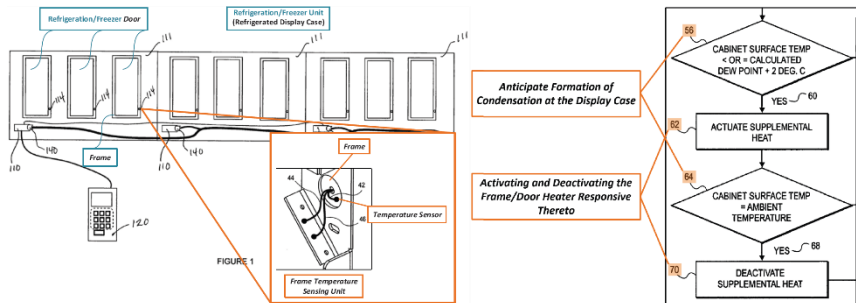
Pet. 26-31

Carter-Bunch: A Predictable Improvement

UNDISPUTED

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

Figure 3; EX1006 (Bunch), 4:26–43. For instance, the POSITA would have appreciated that in relatively dry environments Bunch's pre-set heater operations may actuate heaters more than necessary—operating heaters on the user-selected duty cycles alone without condensation ever triggering Bunch's condensation sensors (sensors 114). EX1006 (Bunch), 4:26–36; *supra* §IX.A. By contrast, in similar dry environments Carter's control process would not actuate the heaters until door/frame temperatures approach the local dew point, which may occur very seldom in dry environments. EX1004 (Carter), 5:21–63, Figure 3; *supra* §VIII.A. As a result, the POSITA would have expected that Carter's control process would likely actuate the heaters less often than Bunch's—thus, conserving energy—while still providing the same (or better) condensation prevention.



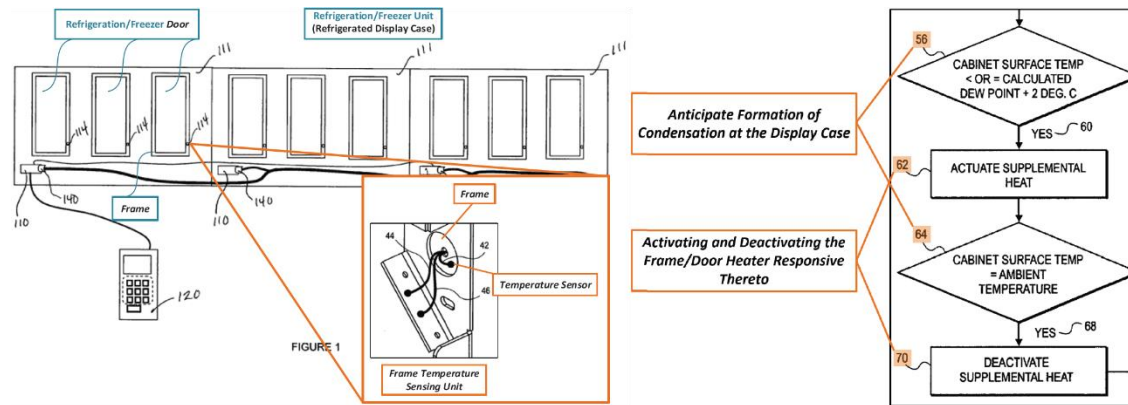
117. Similarly, the POSITA would have appreciated that in relatively humid environments, Bunch's override process may be actuated more often upon formation of condensation between pre-schedule heater operations. In other words, as would have been apparent to the POSITA, humid environments will increase the potential of condensation occurring during Bunch's pre-scheduled heater off periods, thus, triggering Bunch's condensation detector override process more often. EX1006 (Bunch), 4:37–44; *supra* §IX.A. Because Bunch's override relies on detecting the actual existence of condensation, the system would be less effective at preventing condensation in such environments. On the other hand, the POSITA would have understood that because Carter's control process triggers heater operation prior to and in anticipation of condensation formation (EX1004 (Carter), 5:21–63, Figure 3; *supra* §VIII.A), it (Carter's system) would likely be more effective at condensation prevention than Bunch's system in humid environments. *Supra* §VIII.A

Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

Rebuttal to: *“Replacing Bunch’s time schedules with Carter’s ambient algorithm...is a wholesale change in Bunch’s principle of operation.”* POR at 37.

Reply 6-7

Carter and Bunch Share a Common Operating Principle



(12) **United States Patent** (10) Patent No.: US 7,240,501 B2
Bunch et al. (45) Date of Patent: Jul. 10, 2007

The 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) and a power source 115. Control unit 110 is the means for signal-

The Combination preserves and promotes Bunch’s guiding principle of

“prevent[ing] condensation” by providing “[a] control unit [that] is set so that the heater is on prior to the formation of condensation.” EX1006, 2:23–25, 2:55–58.

To wit, Carter shares Bunch’s goal of “prevent[ing]” condensation before it starts via the controlled application of “supplemental heat.” EX1004, 4:62–67; Pet. 28. In

(12) **United States Patent** (10) Patent No.: US 7,137,262 B2
Carter (45) Date of Patent: Nov. 21, 2006

As shown in FIG. 2, the heating unit 34 is designed to generally traverse the sealing surface 24 of the refrigeration or freezer equipment 10 by way of the heating unit 34. By providing supplement heat generally to the sealing surface area, the effects of condensation can be eliminated or prevented in accordance with the present invention.

Reply 6

Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

Rebuttal to: “Bunch teaches away from ambient triggered path the Petition suggests.” POR at 41.

Reply 7

Bunch Does Not Disparage or Discourage Carter’s Approach

(12) **United States Patent** (10) **Patent No.:** **US 7,240,501 B2**
Bunch et al. (45) **Date of Patent:** **Jul. 10, 2007**

They are referred to generally as anti-sweat controllers. One anti-sweat controller known in the art attaches one or more condensation sensors to the refrigerator door and turns on a door heater when condensation is sensed. Traditionally, a single control box is used to control all the sensors of a given refrigerator. These devices fail, however, to prevent condensation because the heater is not activated until after condensation is sensed. Another version uses a humidistat to sense humidity in the aisle and, when the humidity goes above a given level, the heater is turned on, often regardless of whether condensation is actually present. This increases energy consumption because the heater is either constantly on or turned on unnecessarily. It would be desirable to

PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE

see also id. 41 (alleging “Bunch teaches away”). The passage in Bunch that Patent Owner cites is discussing a particular preexisting solution where “when the humidity goes above a given level, the heater is turned on, often regardless of whether condensation is actually present.” EX1006, 1:36–39. But that’s not how Carter works. Just like the ’847 patent, Carter activates the heater when the surface temperature of the refrigerated case drops below a preselected setpoint above dewpoint. EX1004, 5:31–54; POR 21 (admitting same); EX1061 ¶¶54–55.

Reply 7

Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

Rebuttal to: *“The proposed combination...requires substantial reengineering rather than mere substitution.”* POR at 41.

Reply 7

The Carter-Bunch Combination Was Within a POSITA’s Technical Grasp

• Control logic replacement: As mentioned above, the Carter-Bunch Combination does not “eliminat[e] Bunch’s principal disclosed feature”; it promotes and incrementally improves what Bunch teaches prevent condensation before it starts, and the Combination. In addition, Mr. Pollock’s not requires “continuous acquisition fusion of” wholesale change from Bunch. In fact, Bunch or more condensation sensors.” EX1006 (Bunch would also require monitoring an onboard clock and stop times,” as well as fusion of the implement the override functionality. EX1006 times work in cooperation with the sensors, override the preset times.”).

• System objectives and tradeoffs: As I have noted, the same goal of “energy savings” in the Combination. Integrating Carter’s teachings with Bunch in the Carter-Bunch Combination preserves this aspect of both references. The Combination is complementary and not disruptive to their respective principles of operation in this way. The difference between them is that Bunch relies on a human operator or designer to anticipate condensation by establishing the preset heater on/off time windows, while Carter uses ambient temperature/humidity sensors and a surface temperature to employ the same anticipatory heating concept in a more automated fashion. In short, there is no difference in principle, just implementation.

Nor does Patent Owner detract from the Carter-Bunch Combination by contending that creating such a system in the real world “demands reengineering Bunch’s logic, hardware, and system behavior.” POR 39–40. Such modifications were plainly “within [the skilled artisan’s] technical grasp” and thus “the product not of innovation but of ordinary skill.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398,

• Sensor domain and placement: Mr. Pollock argues that the Carter-Bunch Combination would require “different signal conditioning, calibration, and implementing Carter’s sensors. Again, however, wholesale change. To the extent Carter’s sensors calibrating, there is no reason to believe Bunch’s not also require the same. In addition, sensor unclaimed features. They are also rudimentary could have been well acquainted with conducting engineering practices when designing or deploying an example, temporal smoothing (e.g., averaging) is sensor noise in airflow, static pressure, mixed air temperature measurements to prevent undesired (g) and enhance control loop stability. Common sensor conditioning and periodic calibration measure, airside economizer, ventilation airflow, and

• Programmer and network configuration: That Bunch’s programmer and communications host would need to be reconfigured for the control scheme in the Carter-Bunch Combination is not the kind of wholesale change that would dissuade a POSITA from pursuing this predictable design option. Establishing programmable setpoints based on dew point, as in the Carter-Bunch Combination, was well-known by the time of the ’847 patent in 2005. The screenshots below, excerpts from a 1999 installation and operation manual for a refrigerated display case controller, demonstrate this fact.

Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

Rebuttal to: “[The Petition] never explains how Carter’s preferred mounting translates to a supermarket display case.” POR at 49.

Reply 8-9
EX1003 Paras. 34-41
EX1061 Paras. 59-62

Sensor Positioning: Known, Routine, and Ubiquitous Technology

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

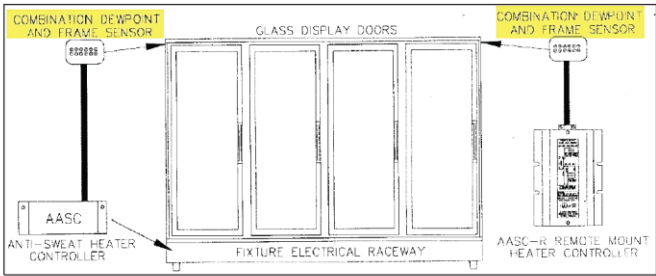
DECLARATION OF DR. GREGOR P. HENZE, PH.D., P.E.

Henze Dec. (EX1003)

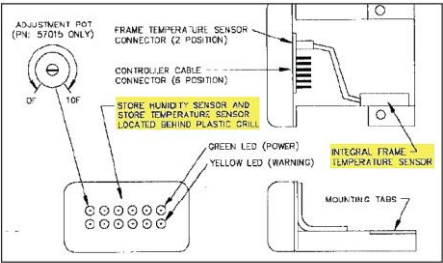
(“[r]educ[ing] use of anti-sweat heaters through... improved heater controls”). As discussed, contemporaneous literature shows that there were a variety of known control schemes for keeping the surfaces of refrigerated display cases above dewpoint to prevent condensation (*supra*, §VI.B.1), and the kinds of temperature/humidity sensors and controllers used to implement those schemes were likewise well known (*supra*, §VI.B.2–3). Indeed, the concept of controlling anti-sweat heaters based on surface temperature and dew point, such as described in Carter, was so apparent and effective that it reached commercial adoption at or around the same time as the ’847 patent in 2005. *Supra* §VI.B.1 (noting EX1021, 3 (discussing the “AASC controller,” “a stand alone anti-sweat heater controller that determine[d] the store’s dewpoint and monitor[ed] the actual frame temperature [of a refrigerated case] to control the frame heat to maintain the frame temperature just above the dewpoint”). By 2005, the notion of substituting such teachings from a reference like Carter in place of those from a similar reference like Bunch—both references targeting energy efficient anti-sweat control systems—would have been readily apparent to the POSITA and within the abilities of the POSITA to contemplate and implement successfully.

EX1003 Para. 119

AASC ANTI-SWEAT HEATER CONTROLLER



EX1021 at 3.



EX1021 at 5. As shown below, the Aletech system’s Combination Sensor was

EX1061 Paras. 60-61

Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

Rebuttal to: “[The Petition] never explains how Carter’s preferred mounting translates to a supermarket display case.” POR at 49.

Reply 8-9
EX1003 Paras. 34-41
EX1061 Paras. 59-62

Sensor Positioning: Known, Routine, and Ubiquitous Technology

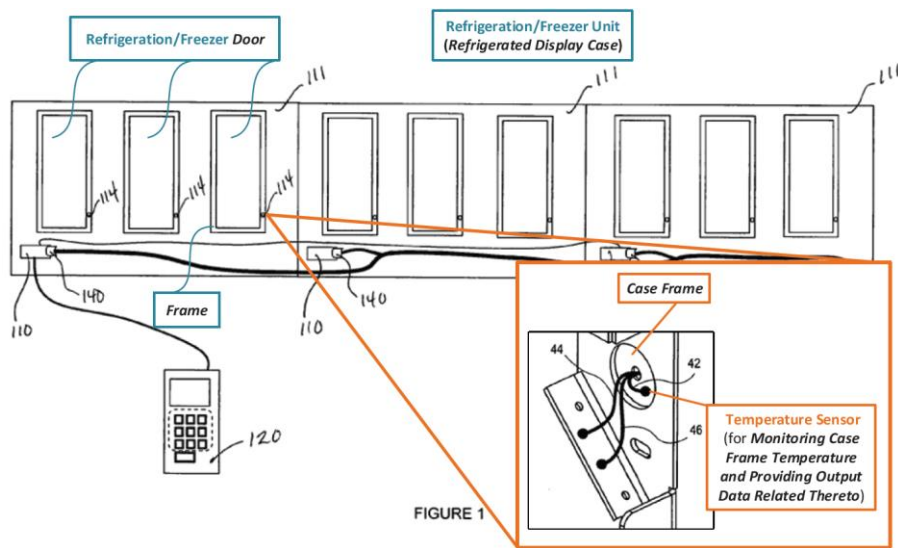
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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

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

Henze Dec. (EX1003)

(“[r]educ[ing] use of anti-sweat heaters through...improved heater controls”). As discussed, contemporaneous literature shows that there were a variety of known control schemes for keeping the surfaces of refrigerated display cases above dewpoint to prevent condensation (*supra*, §VI.B.1), and the kinds of temperature/humidity sensors and controllers used to implement those schemes were likewise well known (*supra*, §VI.B.2–3). Indeed, the concept of controlling anti-sweat heaters based on surface temperature and dew point, such as described in Carter, was so apparent and effective that it reached commercial adoption at or around the same time as the ’847 patent in 2005. *Supra* §VI.B.1 (noting EX1021, 3 (discussing the “AASC controller,” “a stand alone anti-sweat heater controller that determine[d] the store’s dewpoint and monitor[ed] the actual frame temperature [of a refrigerated case] to control the frame heat to maintain the frame temperature just above the dewpoint”). By 2005, the notion of substituting such teachings from a reference like Carter in place of those from a similar reference like Bunch—both references targeting energy efficient anti-sweat control systems—would have been readily apparent to the POSITA and within the abilities of the POSITA to contemplate and implement successfully.



(12) **United States Patent** (10) Patent No.: **US 7,240,501 B2**
Bunch et al. (45) Date of Patent: **Jul. 10, 2007**

The invention includes one or more condensation sensors 114 that are attached to refrigerator, preferably positioned uniquely for each refrigerator where condensation forms the soonest, such as on the door jams, headers, or mullions.

Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

Rebuttal to: “[The Petition] never explains how Carter’s preferred mounting translates to a supermarket display case.” POR at 49.

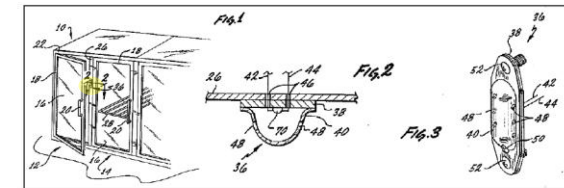
Reply 8-9
EX1003 Paras. 34-41
EX1061 Paras. 59-62

Sensor Positioning: Known, Routine, and Ubiquitous Technology

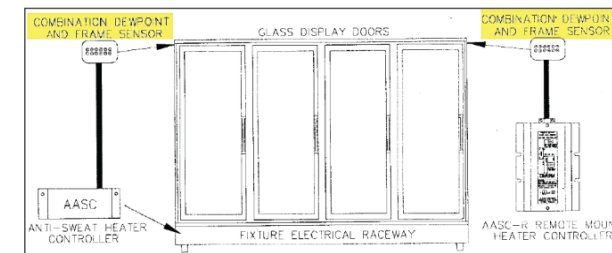
First, these sensor-mounting details are **phantom limitations**. For example,

Second, even if Carter’s sensor assembly could not be physically integrated with Bunch’s display case, **the test for obviousness does not require prior art to be “bodily incorporated” or “physically combinable.”** *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016) (quote omitted); *In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985).

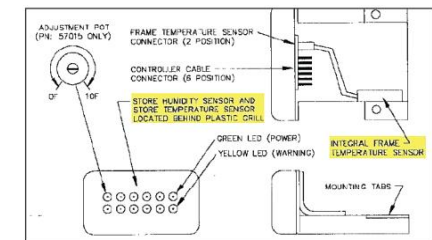
Third, **the sensors in Carter’s sensor assembly unit were ubiquitous**, and a skilled artisan would have **readily identified suitable mounting locations** on Bunch’s display case. See EX1003 ¶¶34–41; EX1061 ¶¶59–62.



EX1016, Figures 1–3.



EX1021 at 3.



EX1021 at 5. As shown below, the Allech system’s Combination Sensor was

Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

Pet. 9-10

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

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

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.*

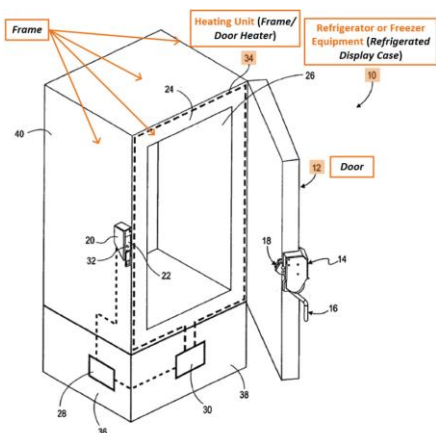


FIG. 1

Pet. 10

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

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

Grounds 1A-1B (Elements [8.pre], [1.pre], [14.pre]): Display Case

Pet. 9-10
Reply 9-10

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

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

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

Q. Could be, based on what?

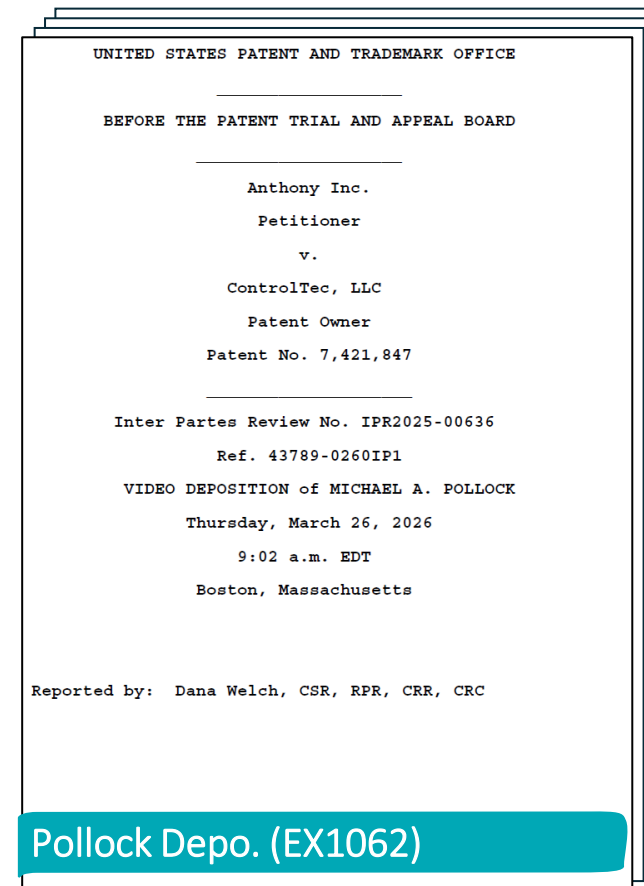
A. If you could view the inside portion through glass, I think it could be a display case.

Q. A refrigerated --

A. Refrigerated display case.

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

A. Yes.



EX1062, 195:21-196:12

Level of Ordinary Skill in the Art

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

Level of Ordinary Skill in the Art

Pet. 4-5; POR 14

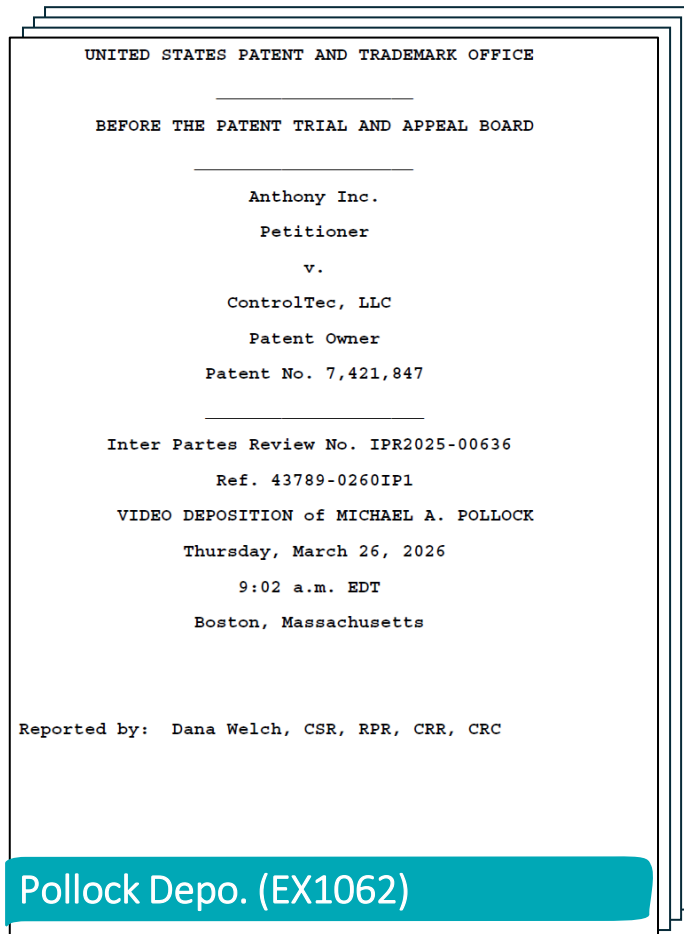
The Parties' Respective Skill Level Definitions

Petitioner	Patent Owner
The qualifications for a POSITA would have included a bachelor's degree in mechanical engineering, electrical engineering, or a comparable field and at least three to five years of experience related to heating, ventilating, air conditioning, and refrigeration (HVAC&R) systems. EX1003, ¶¶31–32. <i>Additional experience could substitute for a formal degree or training (and vice versa).</i> <i>Id.</i>	A POSITA would have a bachelor's degree in mechanical engineering, electrical engineering, or a related field, and at least two years' professional experience working with refrigerated display cases. EX.2037, ¶10.

Level of Ordinary Skill in the Art

Patent Owner's Unduly Narrow Skill Level Definition Targets Dr. Henze

POR 15-18



A. Because Mr. Henze, he appears to meet that description and that brought it current in my mind.

Q. So you had Dr. Henze in mind when you put together your definition for a POSITA in this case?

A. As I read his report, yes, Dr. Henze was in my mind for regarding that definition.

Q. Okay. So as you put together your definition of a POSITA for the '181 and '847 patents, you were aware that Dr. Henze had a higher level of educational experience?

MR. JONES: Objection, form.

A. I reviewed his credentials, yes.

Q. You were aware he has a Ph.D.?

A. Yes.

Q. And you had Dr. Henze's credentials in mind when you put together your proposed definition of POSITA?

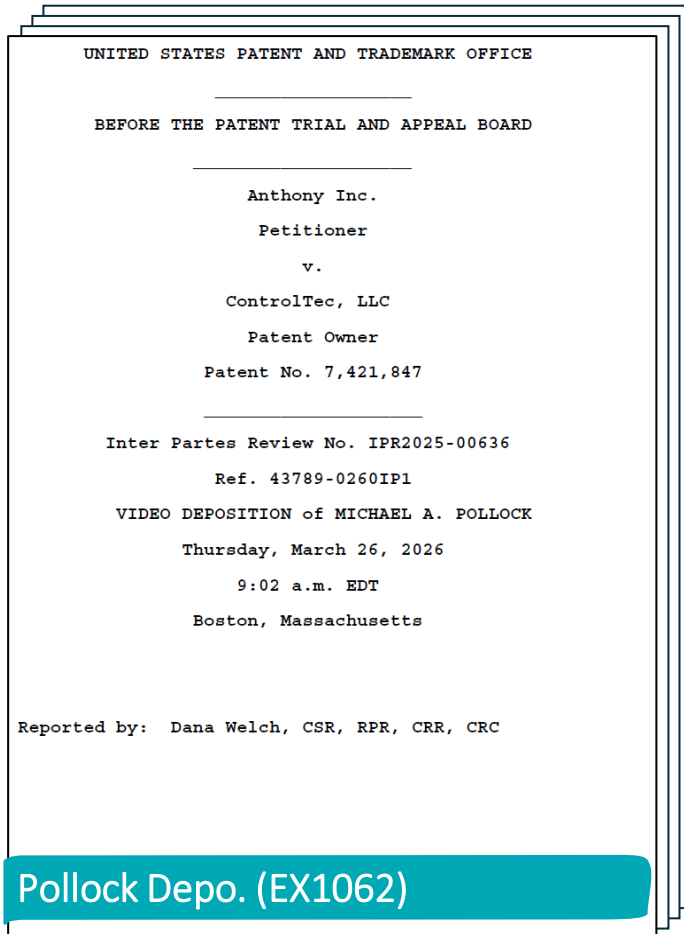
A. Yes.

EX1062, 206:5-23

Level of Ordinary Skill in the Art

Patent Owner's Unduly Narrow Skill Level Definition Targets Dr. Henze

POR 15-18



Q. It sounds like a reasonable statement that a higher level of experience -- or of education could qualify or compensate for a lack of real-world experience?

MR. JONES: Same objections.

A. It sounds reasonable.

EX1062, 208:14-19

Level of Ordinary Skill in the Art

Pet. 4-5, 52-53; Reply 16
EX1003 Paras. 26-30, 162-163; EX1061 Paras. 16-24

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

Henze Dec. (EX1003)

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,421,847 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

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

162. First, King is within the same field of endeavor as the '847 patent. The '847 patent pertains to the field of “remediat[ing] condensation build up” in heating, ventilating, air conditioning, and refrigerating (HVAC&R) systems. EX1001 ('847 patent), 1:14–18. Although its preferred embodiments and claims involve refrigeration systems, a POSITA would have understood that the '847 patent's focus on condensation control invokes the broader context of HVAC&R.

EX1003 Para. 162

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

EX2019 at 155:2-4

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Henze Depo. (EX2019)

Level of Ordinary Skill in the Art

Pet. 4-5, 52-53; Reply 16; EX1003 Paras. 26-30, 162-163; EX1061 Paras. 16-24

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

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

EX1003
Para. 163

163. Tellingly, the '847 patent expressly confirms that the kind of “condensation control” techniques it describes are not limited to refrigeration and are instead “utilized in a variety of applications.” EX1001 ('847 patent) 1:48–54. For example, at Column 1, Line 53, the '847 patent cites US2004/0050072, a published patent application from 2004 directed to “sensing or predicting when condensation having a given physical state is present or imminent and for suppressing such condensation from a surface, such as a vehicle windscreen, eyewear, goggles, helmet visor, computer monitor screen, window, electronic equipment, etc.,” (EX1029 at Abstract). Then again, at Column 1, Line 54, the '847 patent cites US5,778,147, an issued patent from 1998 describing “[a] dew preventing mechanism [that] prevents the formation of dew on the grilles of an air discharge port of a room air conditioner,” (EX1040 at Abstract). Clearly, the inventors of the '847 patent appreciated that condensation control is a broad technical field, one not limited to refrigeration.

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

(10) **Patent No.:** US 7,421,847 B2
(45) **Date of Patent:** Sep. 9, 2008

EX1001,
1:48-67

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

Such devices and systems have not proven altogether successful, however, due to inaccuracy of temperature readings, particularly where both cold and warm environments are adjacent one another such as is found at commercial freezer/refrigeration display cases. Failure to configure such systems to enhance accuracy of readings has resulted in erratic condensation control, on some occasions wasting energy unduly

Level of Ordinary Skill in the Art

Pet. 4-5, 52-53; Reply 16
EX1003 Paras. 26-30, 162-163; EX1061 Paras. 16-24

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Brent W. Murray, et al.
U.S. Patent No.: 7,421,847 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

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

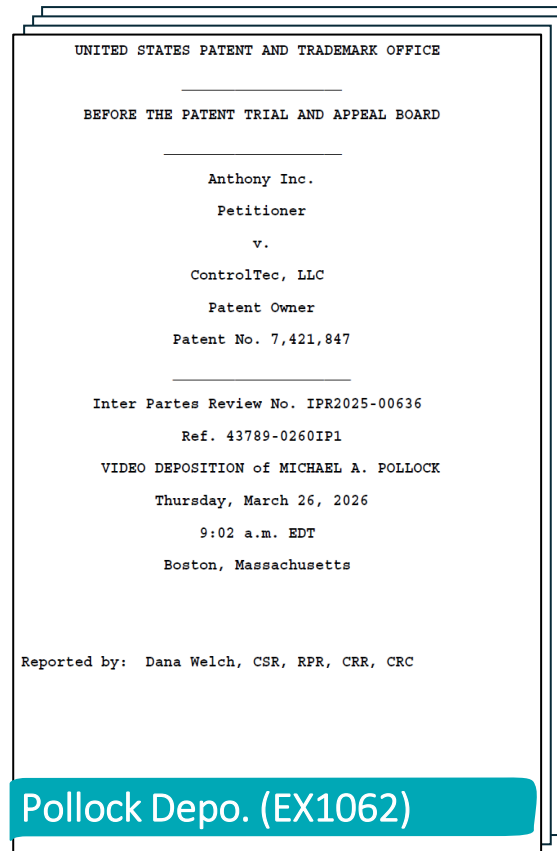
Henze Supp. Dec. (EX1061)

18. The problems presented in the '847 patent are archetypal HVAC&R considerations that are not unique to refrigerated display cases. It is my opinion that the technical challenges associated with mitigating condensation on refrigerated display cases are applications of classical engineering principles, for which a bachelor's degree in mechanical engineering, electrical engineering, or a closely related field, supplemented by three to five years of professional experience in heating, ventilating, air conditioning, and refrigeration (HVAC&R) systems, constitutes a sufficient qualification. Refrigerated display cases do not operate under a unique set of physical laws. Rather, they are governed by the universal principles of thermodynamics, psychrometrics, and heat transfer that form the bedrock of a standard engineering curriculum and broader HVAC&R practice that I have been educating for more than 25 years.

Level of Ordinary Skill in the Art

Pet. 4-5, 52-53; Reply 16-18
EX1003 Paras. 26-30, 162-163; EX1061 Paras. 16-24

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



Q. Does your prior work with the air conditioners and steam condensation systems and HVAC building systems form part of the expertise that you believe makes you qualified to opine on the issues in this case?

A. Yes.

Q. Why is that?

A. Because condensation is a consideration on all the systems I looked at inclusive of commercial refrigeration systems and refrigerated display cases.

Q. Do you believe that the work that you've done with condensation and dew point sensing and other applications is relevant to your analysis relating to refrigerated display cases?

MR. JONES: Objection, form, calls for a legal conclusion.

A. Yes.

EX1062, 80:1-18

Q. The scientific principles associated with dew point sensing in a refrigerated display case, sensing temperature and relative humidity, are the same scientific principles that are used to sense dew point in other applications like HVAC building systems, right?

MR. JONES: Form.

A. In general terms, the measurement of temperature and relative humidity can be used to determine the dew point.

Q. That's a thermodynamic principle that you probably learned in your undergraduate work at Drexel, right?

A. Yes.

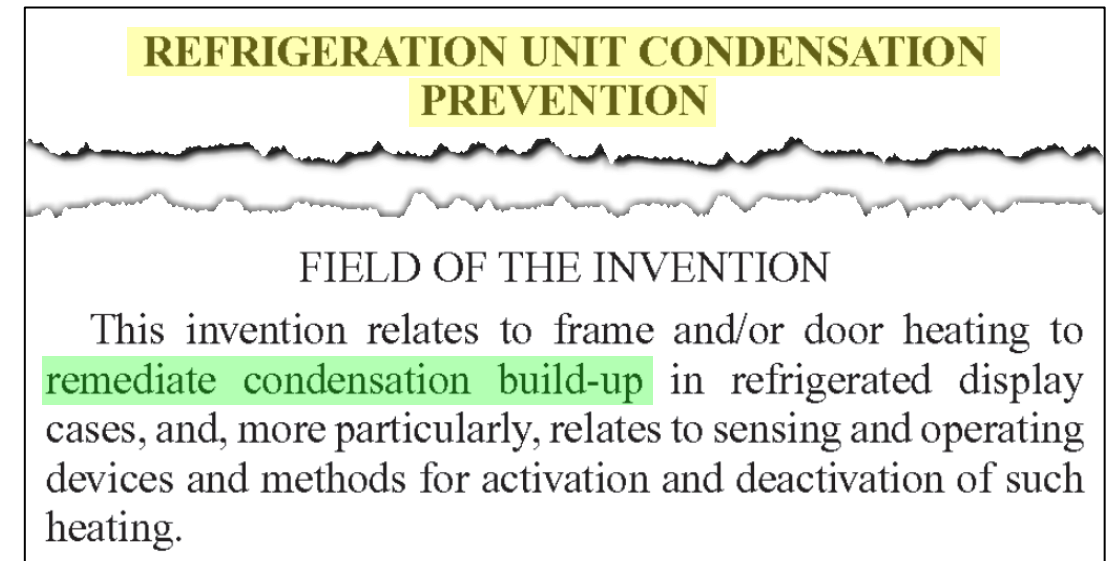
EX1062, 89:3-16

Level of Ordinary Skill in the Art

Reply 16-18

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

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



EX1001, 1:1-18

8. 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:

EX1001, 10:1-3

Level of Ordinary Skill in the Art

Pet. 4-5; Reply 18

Dr. Henze Has Ample Refrigeration & Display Case Experience

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

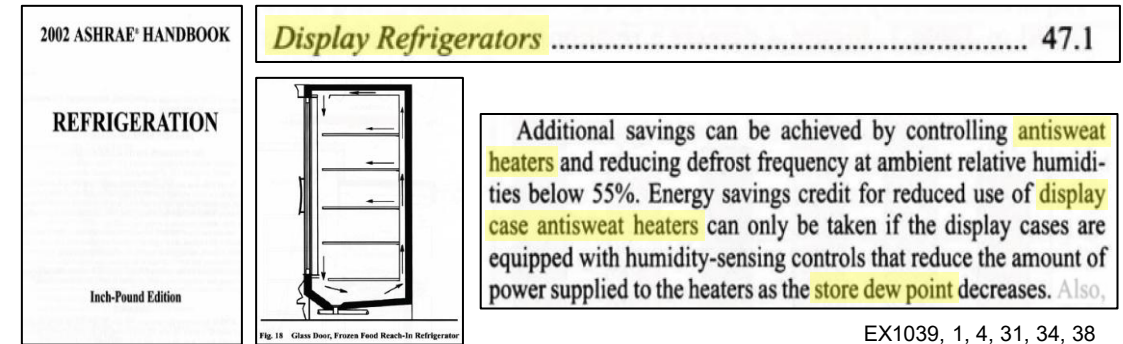
operations focusing on novel sensing, control, and fault detection approaches. I am certified by the American Society of Heating, Refrigerating, and Air Conditioning Engineers as a High-Performance Building Design Professional.¹ I am also a licensed professional mechanical engineer (P.E.) in Nebraska.

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

EX1003 Para. 12

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

EX1003 Para. 14



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

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

EX1061 Para. 30

Objective Indicia

Patent Owner Provides No Legally Relevant
Evidence of Success, Praise, Need, or Copying

Objective Indicia—No Presumption of Nexus to AS-20

Reply 19-25

United States Court of Appeals
for the Federal Circuit

FOX FACTORY, INC.,
Appellant

v.

SRAM, LLC,
Appellee

2018-2024, 2018-2025

Appeals from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in Nos. IPR2017-
00118, IPR2017-00472.

Decided: December 18, 2019

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Also represented by ARPITA BHATTACHARYYA, ROBERT F.
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Louis, MO, argued for appellee. Also represented by
MICHAEL HENRY DURBIN, MICHAEL JOHN HICKEY.

claimed.” 851 F.2d at 1392 (emphasis added). That is, pre-
suming nexus is appropriate “when the patentee shows
that the asserted objective evidence is tied to a specific
product and that product ‘embodies the claimed features,
and is coextensive with them.’” *Polaris Indus., Inc. v. Arc-*

944 F.3d 1366, 1373-74 (Fed. Cir. 2019)

Objective Indicia—No Presumption of Nexus to AS-20

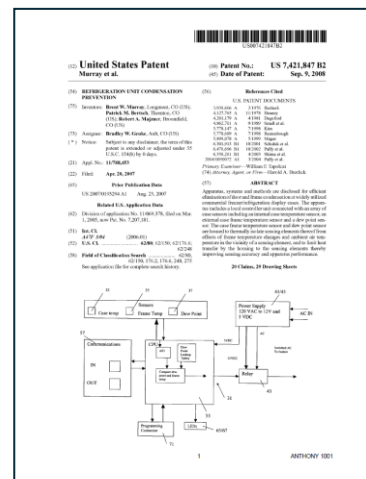
Cited evidence does not refer to AS-20 Controller

Patent Owner Response

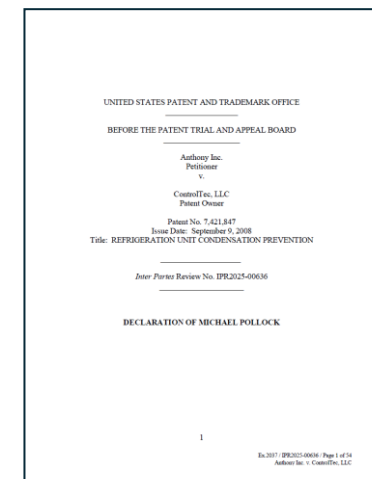
That nexus is satisfied in two independent ways here. First, the ControlTec product practicing the '847 Patent (the ControlTec AS-20 controller) implements the precise elements the petition challenges—dual set-points enabling dew-point anticipation and reliable hysteresis, together with a co-located, insulated-pocket housing that stabilizes sensing accuracy at the case. *See generally*, EX.1001; EX.2037, ¶¶65–66. Where, as here, the commercial product embodies the challenged claims, a presumption of nexus applies. *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392–94 (Fed. Cir. 1988). *Second, even*

POR 68

Ex. 1001 ('847 Patent):



Ex. 2037 (Pollock Dec):



65. To the extent evidence is presented of commercial success, industry adoption, or long-felt but unresolved need for stable, energy-efficient condensation control at refrigerated display cases using dew-point-referenced dual set points and compact, thermally isolating housing structures, those considerations would further support nonobviousness. In my experience, accurate, practical, robust dew-point anticipation with reliable hysteresis at the case-level controller was not a solved problem by 2005 and required the sort of holistic structural and algorithmic design disclosed in the '847 Patent.

66. I reviewed Claim 14 of US Patent No. 11,160,393 (the '393 Patent), which is assigned to Anthony's affiliate Hill Phoenix, and Claim 8 of the '847 patent and it is my opinion that the Petitioner claimed, copied, and patented essentially the same subject matter in Claim 14 as Patent Owner did in the '847 Patent. It appears that Petitioner patented approximately the same subject matter of the '847 Patent twelve years later. I provide a chart below comparing these claims with comments on their comparison:

Ex. 2037 ¶¶ 65-66

Objective Indicia—No Presumption of Nexus to AS-20

Reply 19-20

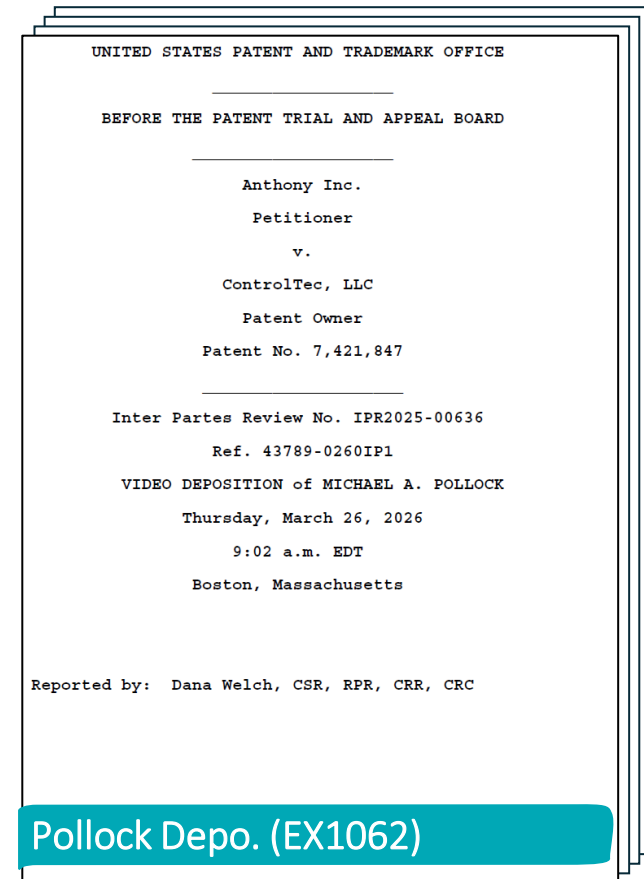
Patent Owner's expert did not opine that (or evaluate whether) the AS-20 Controller practices the '847 patent

Q. So you haven't reached any opinions about whether any specific products meet any of the limitations of the claims in the '181 or '847 patents?

MR. JONES: Objection, form.

A. No, I wasn't asked to do that.

EX1062, 67:17-25



Objective Indicia—No Nexus-in-Fact

Reply 19-25

United States Court of Appeals
for the Federal Circuit

FOX FACTORY, INC.,
Appellant

v.

SRAM, LLC,
Appellee

2018-2024, 2018-2025

Appeals from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in Nos. IPR2017-
00118, IPR2017-00472.

Decided: December 18, 2019

ERIK R. PUKNYS, Finnegan, Henderson, Farabow, Gar-
rett & Dunner, LLP, Palo Alto, CA, argued for appellant.
Also represented by ARPITA BHATTACHARYYA, ROBERT F.
McCAULEY; JOSHUA GOLDBERG, DANIEL FRANCIS
KLADOWSKI, Washington, DC.

RICHARD BENNETT WALSH, JR., Lewis Rice LLC, St.
Louis, MO, argued for appellee. Also represented by
MICHAEL HENRY DURBIN, MICHAEL JOHN HICKEY.

A finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations. *See In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996). To the contrary, the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the “direct result of the unique characteristics of the claimed invention.” *Id.*

944 F.3d 1366, 1373-74 (Fed. Cir. 2019)

Objective Indicia—No Nexus-in-Fact

Cited evidence does not refer to any “unique characteristics of the claimed invention”

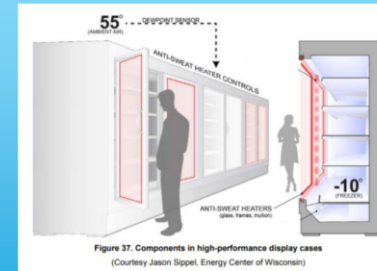
Patent Owner Response

Langsdorff Licensing Ltd., 851 F.2d 1387, 1392–94 (Fed. Cir. 1988). Second, even apart from that presumption, the marketplace attributes of success track those same claimed advantages, including reduced energy consumption without increased fogging or sweating and improved sensing stability in the compact controller package. See EX.2029, P.13-18 (comparing anti-sweat control strategies and finding that cycling via case-specific dew point (ControlTec’s method) produced the most energy savings against all other methods). Where the evidence demonstrates that the commercial products embody the claims and that customers and competitors prized the specific claimed capabilities, the required nexus is established.

POR 68-69

Cycling via Case Dew Point

- Computer analyzes
 - Frame temperature
 - Store Dew Point
- Determines required temperature of doors and frame to prevent condensation
- Controlled per case rather than store-wide
- Savings = \$110/door



E+Sd Energy & Store Development Conference

September 23 - 26, 2018
at Atlanta Hotel | Atlanta, GA



Ex.2029 / IPR2025-00636 / Page 1 of 33
Anthony Inc. v. ControlTec, LLC

EX2029 (Conference Presentation) at 1, 18

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

’847 patent’s claims. For example, similar to the report I discussed above, this presentation generically references the approach of heater “[c]ycling via case specific dew point” but does not explain the specific algorithm or indicate whether dew point is determined using ambient air temperature and relative humidity, as claimed in the ’847 patent. EX2029 at 13, 18. There is no basis to assume the

EX1061 ¶ 76

Objective Indicia—No Nexus-in-Fact

“Cycling via case dew point” is not a “novel” or “unique” characteristic

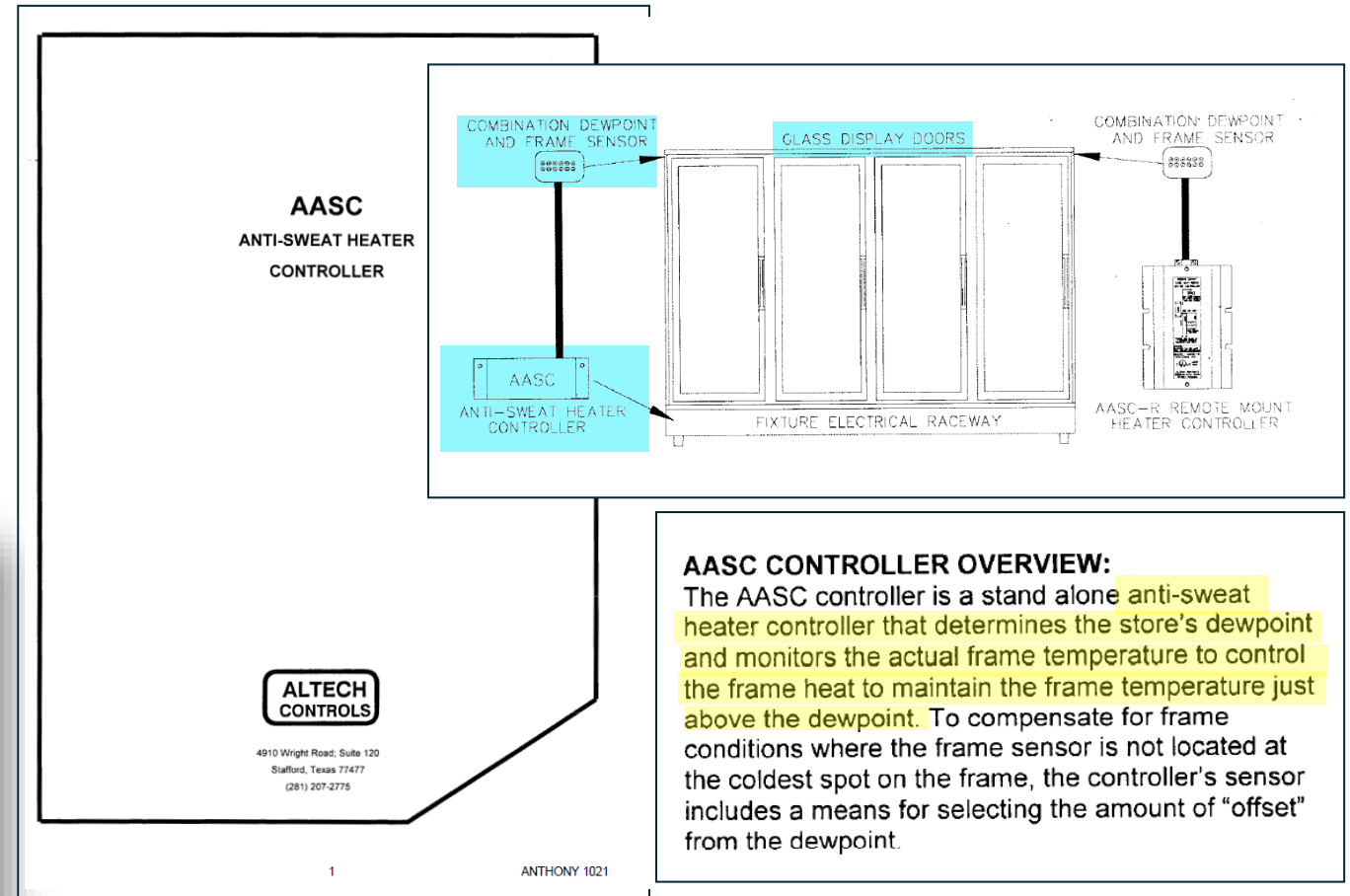
“Where the offered secondary consideration actually results from something other than what is both claimed and *novel* in the claim, there is no nexus to the merits of the claimed invention.” *In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011).

Henze Supp. Dec. (EX1061)

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

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

77. Additionally, there can be no nexus between an alleged objective indicia and the '847 patent's claims because the combined claim features are not new or unique. They were quite well known, as I discussed above and in my Prior Declaration. Taking claim 8 as an example, the Altech Controls anti-sweat system that I discussed above includes each and every claim feature. I provide a claim chart below to demonstrate this point (using pin citations to EX1021).



EX1021 at 1, 3; see also EX1003 at 39 n. 3 (explaining “the Altech AASC controller described in EX1021 was available to the refrigeration industry before or contemporaneous with the filing date of the '847 patent in 2005”)

Objective Indicia—No Nexus to Commercial Success

Rebuttal to: *"In a market dominated by two capable suppliers, persistent commercial success attributable to the claimed design establishes non-obviousness."* POR at 70.

Reply 21

The evidence shows a diverse, saturated market

EX1066 at 1



Anti-Sweat Heater Control System

CONTROLLERS

AASC ALTECH
PRE-WIRED

ALTECH SENSORS

CPC CONTROLLER
WITH SENSORS

ALTECH REMOTE
WITH SENSORS
SMART CONTROLLER

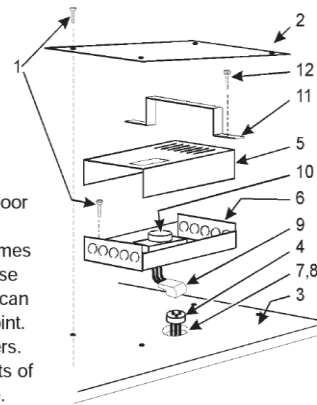


EX1067 at 83

EX1068 at 1, 17

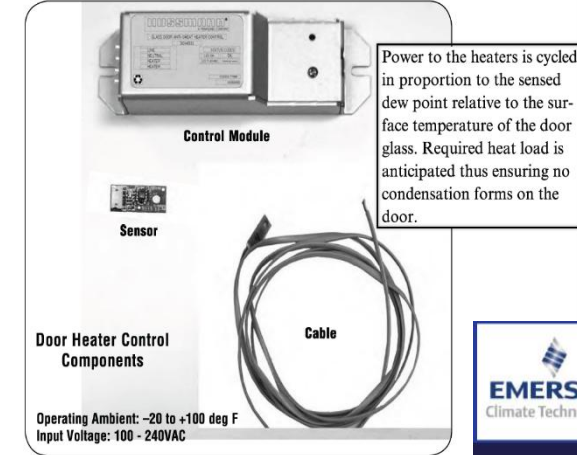
TYLER

The TYLER ESM/ESS control system is designed to effect energy savings in the operation of N5FGA and N5FGNA glass door merchandisers. This is accomplished by cycling the anti-sweat heat in the door frames and door glass. Ardco Swingline doors use 90 watts of heat (.75 amps) per door that can be cycled on and off based on the dewpoint. Less energy is used as the dewpoint lowers. The ESM draws its very small requirements of 3 watts @ 120 volts (0.03A) from the case.



AASC
ANTI-SWEAT HEATER
CONTROLLER
EX1021 at 1, 3

HUSSMANN®



Power to the heaters is cycled in proportion to the sensed dew point relative to the surface temperature of the door glass. Required heat load is anticipated thus ensuring no condensation forms on the door.

EX1065 at 1, 3

AASC CONTROLLER OVERVIEW:

The AASC controller is a stand alone anti-sweat heater controller that determines the store's dewpoint and monitors the actual frame temperature to control the frame heat to maintain the frame temperature just above the dewpoint. To compensate for frame conditions where the frame sensor is not located at the coldest spot on the frame, the controller's sensor includes a means for selecting the amount of "offset" from the dewpoint.

EX1064 at 1



Dewpoint Sensor (P/N 809-6112)
The Control Link ACC uses an external dewpoint sensor (Figure 2) to measure the dewpoint of the outside air next to the case doors. This sensor is typically mounted directly above or to the side of the case doors.

Objective Indicia—No Industry Praise

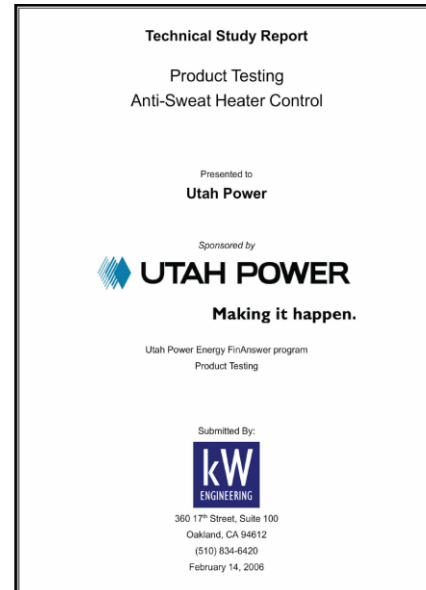
Reply 22

A test performed on one case in one store—not “rapid adoption” or praise

Patent Owner Response

EX.2029, P.1-2. After testing various designs, the consensus was that ControlTec’s controller method, i.e. “Cycling via Case Dew Point,” generated incremental savings versus all other methods. EX.2029, P.13-18. That praise also tracks another independent report performed by KW Engineering, which determined that ControlTec’s AS-20 anti-sweat heater controller, when tested and monitored on a 5-door refrigerated case, saved 6,228 kWh annually and reduced average annual peak demand by 0.63kW—a “reduction in energy use of the door and frame anti-sweat heats of 72%.” See EX.2030, Pg. 5-10; see also *Leo Pharm. Prods., Ltd. v. Rea*, 726 F.3d 1346, 1358 (Fed. Cir. 2013). The rapid adoption of these controllers by sophisticated supermarket operators—entities that measure sweating, fogging, and energy costs closely—corroborates that the invention delivered benefits the prior art did not.

POR 71-72



EX2030 at 1, 5, 6

Technical Approach

The refrigerated case at Dan’s Food Store in Salt Lake City, UT was chosen to evaluate the energy savings associated with the AS-20 controls was a 5-door case containing frozen pizza and pre-packaged dinners. The case was a Hussmann reach-in freezer case with Anthony doors factory installed.



ControlTec’s AS-20 anti-sweat heater control limits the duty cycle of the heaters by continuously monitoring the store dewpoint temperature and glass temperature. The heaters will turn on when the glass temperature falls below the dewpoint temperature and remain on until the temperature of the glass is 2°F above the store dewpoint temperature.

Overview of Technical Approach

Several steps were required to determine the energy savings. These steps included:

- Monitor baseline energy use of a refrigerated case for a period of three weeks with no anti-sweat heater controls.
- Monitor the energy usage of the same case with AS-20 anti-sweat heater control system for a period of three weeks. Additionally record the air temperature and humidity (dewpoint) in close proximity to the case and outside the store.

Objective Indicia—No Long-Felt Need

Reply 22

Patent Owner's expert never considered long-felt need

Patent Owner Response

F. Long-felt need and failure of prior approaches.

Prior to ControlTec's innovation, there was long-felt need to reduce energy consumption without sacrificing condensation control. EX.2037, ¶¶64–66; see also *WBIP v. Kohler Co.*, 829 F.3d 1317, 1329–31 (Fed. Cir. 2016). Continuous heating

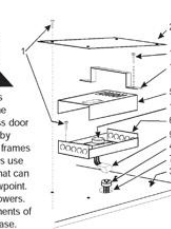
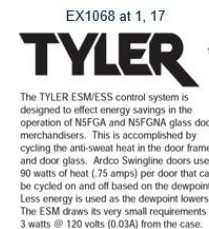
POR 72

EX2037 (Pollock Dec):

65. To the extent evidence is presented of commercial success, industry adoption, or long-felt but unresolved need for stable, energy-efficient condensation control at refrigerated display cases using dew-point-referenced dual set points and compact, thermally isolating housing structures, those considerations would further support nonobviousness. In my experience, accurate, practical, robust dew-point

EX2037 ¶ 65

Market needs already met:



AASC CONTROLLER OVERVIEW:
The AASC controller is a stand alone anti-sweat heater controller that determines the store's dewpoint and monitors the actual frame temperature to control the frame heat to maintain the frame temperature just above the dewpoint. To compensate for frame conditions where the frame sensor is not located at the coldest spot on the frame, the controller's sensor includes a means for selecting the amount of "offset"

AASC
ANTI-SWEAT HEATER
CONTROLLER
EX1021 at 1, 3

Objective Indicia—No Copying

Anthony explained dew point-based control schemes to Patent Owner in 2004, not the other way around

Patent Owner Response

Shortly after the DOE's Notice of Noncompliance Determination, Anthony modified its energy controller to copy the functionality of ControlTec's AS-20 controller. See EX.2028; EX.2035. Indeed, the modified Anthony Energy Controller from 2019 incorporated the same dual set-point condensation-anticipation strategy and co-located, insulated sensor housing approach to stabilize sensing at the case. See EX.2028, P.3-10; EX.2035. This alignment is not coincidental or the product of vague convergence; Anthony had access to ControlTec's product information under the co-development agreement, (see EX.2026, ¶1.1(a)), and by and through Paul Artwohl, Anthony's VP of Engineering, who was involved in both the development of the co-developed product and Anthony's 2019 Energy Controller. EX.2034. In a two-company market, the decision by Anthony to adopt the same structural and control architecture is cogent evidence that Anthony perceived value in the claimed solution and sought to emulate it to remain viable. EX.2004 ¶¶4-6.

----- Original Message -----

From: Artwohl, Paul

To: brad@controltecllc.com

Cc: Clark, Jeff ; Stewart, Michael ; Edgerly, Roger ; Kato, Dennis

Sent: Monday, August 30, 2004 11:00 AM

Subject: Phone Message of 8-30-04

Brad Geuke
Control Tec, LLC
P.O. 69
Severance, Colorado 80546

Brad,

Related to your phone message that you left today, you are asking for input related to the control theme on your new control unit. The unit that we tested used a sensor which controlled heater power based on moisture on the surface of the sensor/equipment. You asked if we had input or experience related to controlling the heaters off dew point, and whether this approach would be a "better".

Controlling off dew point is a good approach, but you must have more sensors. You must know the room dew point, which normally requires two sensors, one for room temperature and one for room relative humidity. >From there, you would also need another sensor to monitor equipment surface temperature. The room sensors need to be far enough away from the equipment to give representative room conditions.

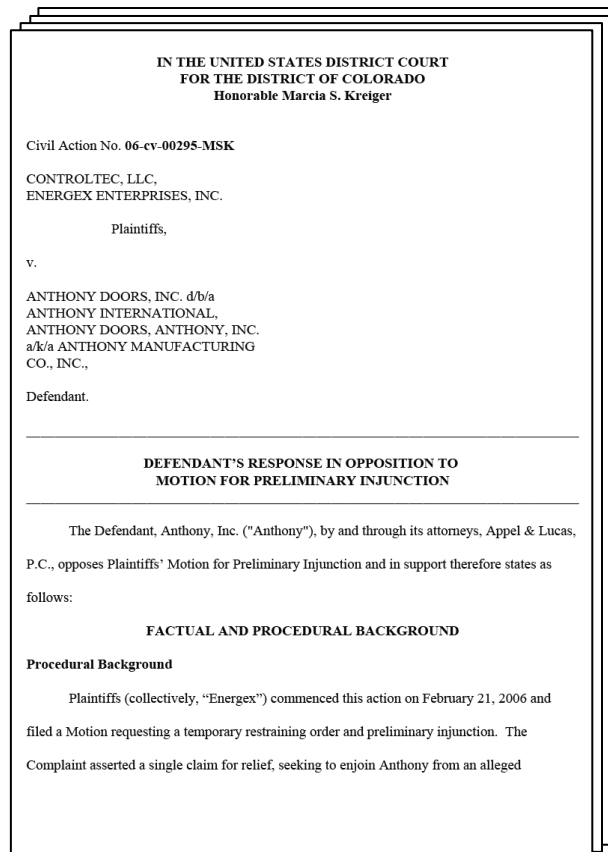
You need to keep in mind that we are not designing your controller. We can give comments based on our field experience, but the bottom line is we are here to test your design and to give back constructive feedback.

EX2034 at 1

POR 70-71

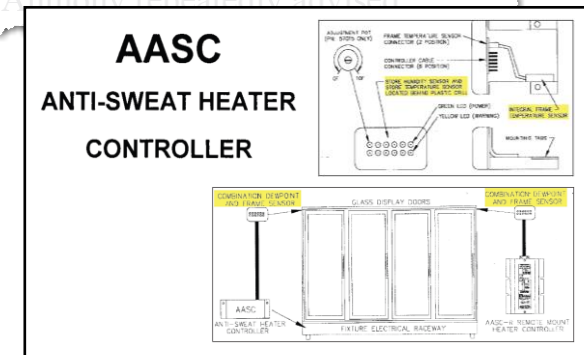
Objective Indicia—No Copying

No need to copy—there were already “similar products in the market place”



Pricing of the AS-20 units has been a contentious issue for some time. Energex originally proposed to charge Anthony \$326 for each unit. In November, 2005, Energex advised Anthony that the cost of the units would be \$419.00 per unit and other pricing, in the \$300-400 range, was proposed by Energex at various different times. Anthony continually advised Energex that the proposed pricing was not competitive because similar products in the market place (Altech Controls Corporation part number 57000 and CPC (Emerson) part number 810-6121) were available in the \$125 to \$140 range. In addition, Anthony repeatedly advised

EX1071 at 6



EX1021 at 1, 3, 5

Objective Indicia—No Copying

DOE Notice was unrelated to control method of anti-sweat controller

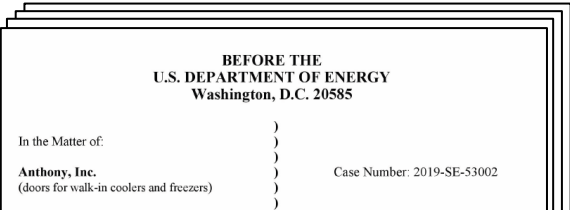
Patent Owner Response

stabilized case-level sensing. EX. EX.2037, ¶¶65–66. In December 2018, Anthony self-reported to the DOE that it had been non-compliant with the new DOE regulations since 2009:

Per the Report, Anthony’s failure to provide the antisweat door heater controllers resulted in the sale of 141,826 noncompliant WICF [walk-in coolers and freezers] doors since 2009.

The DOE mandated that Anthony (1) “modify a basic [anti-sweat controller] model to bring it into compliance with the current applicable standard” EX.2027, P.4; and (2) “assign new model numbers and . . . maintain, and provide upon request to DOE, records that demonstrate that modifications have been made to all units of the new basic model prior to distribution in commerce.” EX.2027, P.4. The

Shortly after the DOE’s Notice of Noncompliance Determination, Anthony modified its energy controller to copy the functionality of ControlTec’s AS-20 controller. See EX.2028; EX.2035. Indeed, the modified Anthony Energy



DOE conservation standards for display doors for WICFs are subject to design standards adopted by Congress in Section 312 of the Energy Independence and Security Act of 2007 (EISA). 42 U.S.C. § 6313(f); 10 C.F.R. 431.306(b)(3) and(4). In order to meet the statutorily specified heat power draw requirements, a door model may require the use of an antisweat heat controller. Anthony stated that, despite being aware of the requirement, it sold numerous doors without antisweat heat controllers, where those devices are needed to meet the applicable heat power draw requirements because many of their customers did not want to receive controllers from Anthony and wanted to use their own controllers instead. Per the Report, Anthony’s failure to provide the antisweat door heater controllers resulted in the sale of 141,826 noncompliant WICF doors since 2009.

Anthony also reported that it distributed in commerce at least 44,774 WICF display doors that do not meet the applicable energy conservation performance standards at 10 C.F.R. § 431.306(d), regardless of the use of an anti-sweat heat controller. The Report indicates that, when Anthony

EX2027 at 1, 2

Objective Indicia—No Copying

DOE Notice did not “mandate” modification of an anti-sweat controller

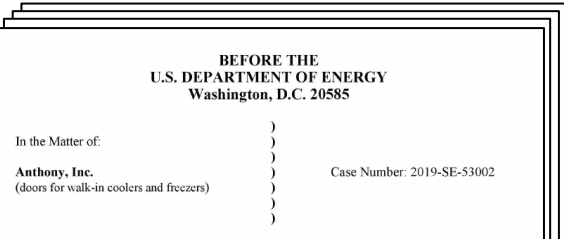
Patent Owner Response

stabilized case-level sensing. EX. EX.2037, ¶¶65–66. In December 2018, Anthony self-reported to the DOE that it had been non-compliant with the new DOE regulations since 2009:

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Shortly after the DOE’s Notice of Noncompliance Determination, Anthony modified its energy controller to copy the functionality of ControlTec’s AS-20 controller. See EX.2028; EX.2035. Indeed, the modified Anthony Energy



On December 20, 2018, Anthony, Inc. (“Anthony”) provided the U.S. Department of Energy (“DOE”) a Voluntary Report of Non-Compliance With Energy Conservation Standards Applicable to Display Doors for Walk-In Coolers and Freezers, including Attachments A and B (“Report”). The Report informed DOE that the company manufactured and distributed in commerce approximately 168,570 WICF display doors² since 2009 that failed to satisfy DOE conservation standards at 10 C.F.R. § 431.306.³ Anthony informed DOE that these non-compliant doors belong to various medium temperature and low temperature WICF display door basic models, which it identified as follows:

OPTIONAL ACTIONS BY ANTHONY

In addition to the mandatory steps listed above that Anthony must complete, Anthony may elect to modify a basic model to bring it into compliance with the current applicable standard.

Objective Indicia—No Copying

Cited evidence does not show “modifi[cation]” of any Anthony controller

Patent Owner Response

stabilized case-level sensing. EX. EX.2037, ¶¶65–66. In December 2018, Anthony self-reported to the DOE that it had been non-compliant with the new DOE regulations since 2009:

Per the Report, Anthony’s failure to provide the antisweat door heater controllers resulted in the sale of 141,826 noncompliant WICF [walk-in coolers and freezers] doors since 2009.

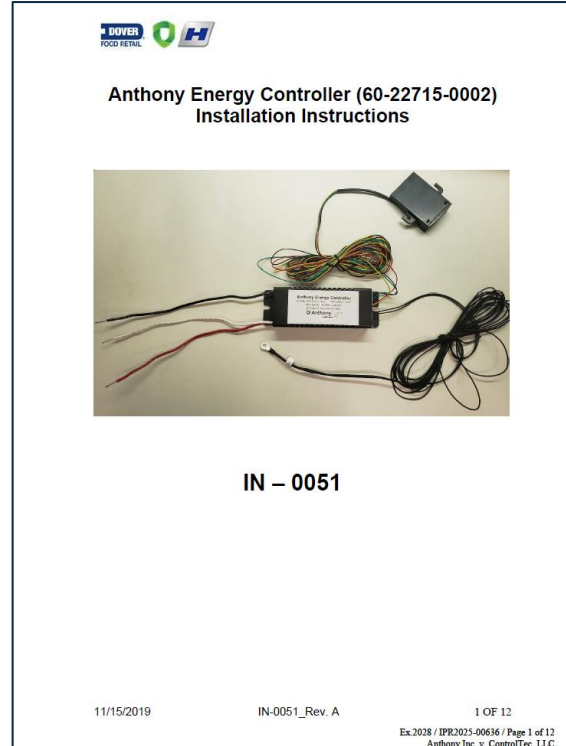
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Shortly after the DOE’s Notice of Noncompliance Determination, Anthony modified its energy controller to copy the functionality of ControlTec’s AS-20 controller. See EX.2028; EX.2035. Indeed, the modified Anthony Energy

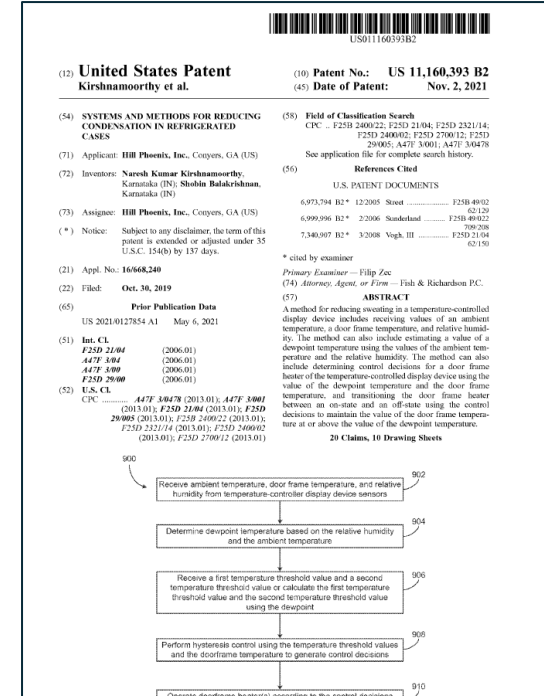
POR 64-65, 70

FISH.

EX2028 (Installation Instructions)



EX2035 (Hill Phoenix Patent)



(54) **SYSTEMS AND METHODS FOR REDUCING CONDENSATION IN REFRIGERATED CASES**

(71) Applicant: **Hill Phoenix, Inc.**, Conyers, GA (US)

(72) Inventors: **Naresh Kumar Kirshnamoorthy**, Karnataka (IN); **Shobin Balakrishnan**, Karnataka (IN)

Anthony Is Not Subject to Assignor Estoppel



Minerva Surgical, Inc. v. Hologic, Inc., 594 U.S. 559, 576 (2021)
(emphasis added)

Still, our endorsement of assignor estoppel comes with limits—true to the doctrine’s reason for being.... When an assignor warrants that a patent is valid, his later denial of validity breaches norms of equitable dealing.... But when the assignor has made neither explicit nor implicit representations in conflict with an invalidity defense, then there is no unfairness in its assertion. And so there is no ground for applying assignor estoppel.

One example of non-contradiction is when the assignment occurs before an inventor can possibly make a warranty of validity as to specific patent claims. Consider a common employment arrangement. An employee assigns to his employer patent rights in any future inventions he develops during his employment; the employer then decides which, if any, of those inventions to patent. In that scenario, the assignment contains no representation that a patent is valid. **How could it? The invention itself has not come into being.** See Lemley, *Rethinking Assignor Estoppel*, 54 *Houston L. Rev.* 513, 525–527 (2016). And so the employee’s transfer of rights cannot estop him from alleging a patent’s invalidity in later litigation.

Case No. 1:06-cv-00295-MSK-MEH Document 1-2 filed 02/21/06 USDC Colorado
pg 1 of 16

EXHIBIT A

otherwise in
by and among
Inc., a Color
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controllers for
and cooler de

Colorado was
Energex sub

Secretary of S

Confidential

Colorado;

Court for the
d/s/a Anthony
Inc. Case No.
dated Febru
business oppo
competition (

Anthony and
Mutual Gene
among Antho
past and pres
including, wh
that they may

agreed to ente
304-7175

WHEREAS, pursuant to the terms of the Settlement Agreement, the parties have agreed to enter into this Agreement, pursuant to which the parties are agreeing to work together to design and develop an Anti-Sweat Controller which allows for efficiencies in the usage of energy in a manner to be mutually determined by the parties (the "Co-Developed Product"), on the terms and conditions set forth herein.

(b) Energex shall use commercially reasonable efforts to patent the Co-Developed Product (the "Co-Developed Product Patent") and to obtain any other relevant intellectual property rights as may be necessary to allow for the exclusive ownership, development, marketing and sale of the Co-Developed Product and other products which are similar to, or use similar technology or processes to those used by, the Co-Developed Product (such rights, together with the Co-Developed Product Patent and any rights relating thereto, the "Co-Developed Product Intellectual Property"), and to take any and all such actions as may be reasonably necessary to ensure that the Co-Developed Product Patent is and remains valid and enforceable to the extent permitted by applicable law. Energex shall take all actions required to ensure that all of the Co-Developed Product Intellectual Property shall be co-owned by Energex and Anthony in accordance with Section 5 hereof.

5. Co-Developed Product Intellectual Property.

(a) Anthony and Energex hereby acknowledge and agree that any ownership right, if any, in and to Co-Developed Product Intellectual Property shall be shared equally by the parties during the term of this Agreement. Anthony and Energex hereby further acknowledge and agree that any benefits arising out of or relating to the Co-Developed Product Intellectual Property shall be shared equally by the parties during the term of this Agreement.

(b) Upon termination of this Agreement in accordance with the terms hereof, Anthony shall transfer all right, title and interest that it has in and to any Co-Developed Product Intellectual Property to Energex. Energex shall bear any costs as may be reasonably incurred by Anthony in effectuating the transfer contemplated by this Section 5(b).

(c) Notwithstanding anything in this Agreement to the contrary, neither Anthony, on the one hand, nor Energex, on the other, shall sell, license or otherwise transfer any Co-Developed Product Intellectual Property without obtaining the prior written consent of the other.

(d) Subject to Sections 5(a) and (b) hereof, the parties hereto acknowledge that any existing or new intellectual property developed by the parties independently of each other shall reside exclusively with such respective parties.