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Title: REFRIGERATION UNIT CONDENSATION
PREVENTION

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

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LISTING OF CHALLENGED CLAIMS

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

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

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

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

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

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

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

Claim 8	
[8.pre]	A method for condensation control at a refrigerated display case having at least one door, a frame and at least one frame/door heater, said method comprising the steps of:
[8.a]	placing a temperature sensing unit in contact with the display case frame to monitor case frame temperature;

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

Claim 9

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

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

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

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

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

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

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

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

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

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

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

I, Gregor P. Henze, declare as follows:

I. INTRODUCTION

1. I have been retained as a technical expert on behalf of Anthony Inc. (“Anthony”/“Petitioner”). I understand that Anthony is requesting that the Patent Trial and Appeal Board institute an *inter partes* review (“IPR”) proceeding with respect to U.S. Patent No. 7,421,847 (“the ’847 patent”) (EX1001).

2. I understand that this declaration (“Supplemental Declaration”) will be submitted in support of Petitioner’s Reply to Patent Owner’s Response to the Petition for *inter partes* review of the ’847 patent. This Supplemental Declaration supplements certain portions of my prior declaration in support of the Petition for this IPR Proceeding (EX1003, “Prior Declaration”). In my Prior Declaration, I address many topics, including (but not limited to) my background and qualifications, the level of skill in art, an overview of the ’847 patent, a POSITA’s background knowledge, certain legal standards explained to me by counsel, and a detailed analysis of the prior art against the claim elements of the ’847 patent.

3. I maintain all of my earlier analysis and continue to hold the opinions expressed in my Prior Declaration. This Supplemental Declaration does not replace my Prior Declaration. These declarations are complementary and should be read in tandem. Accordingly, this Supplemental Declaration does not cover every topic addressed in my Prior Declaration.

4. In forming this Supplemental Declaration, I have considered the following: the declaration of Patent Owner's expert Mr. Pollock (EX2037), the Board's institution decision (Paper 10), my personal knowledge and experience, including my research and work experience, and the third-party documents cited throughout my analysis.

5. Note that my citations to non-patent literature throughout this Declaration reference the absolute page number added to the exhibit (as opposed to the original pagination of the document). For patent literature, I've used the column/line numbers or paragraph numbers. Also note that, unless I've indicated otherwise, all emphasis (bold/italics/underline) in any quoted text are ones I have added.

6. Although I cite and quote to selected portions of various references in this Supplemental Declaration, the reader should understand that these citations are representative examples. A POSITA would have viewed each reference in its entirety and in combination with other references. Accordingly, I intend the references identified in this Declaration to be viewed as incorporated in their entireties.

7. I am not, and never have been, an employee of Anthony. I received no compensation for this Supplemental Declaration beyond my normal hourly compensation based on my time spent analyzing the '847 patent, the prior art

publications cited below, and various issues related thereto. I will not receive any added compensation based on the outcome of any IPR or other proceeding involving the '847 patent.

II. LEGAL PRINCIPLES

8. In forming my analysis and conclusions expressed in this Supplemental Declaration, I have applied the legal principles described in the following paragraphs, which were provided to me by counsel for the Petitioner.

A. Person of Ordinary Skill in the Art

9. I understand that the factors considered in determining the ordinary level of skill in a field of art include: the level of education and experience of persons working in the field; the types of problems encountered in the field; the teachings of the prior art regarding solutions to such problems; and the sophistication of the technology at the time of the alleged invention. I understand that a person of ordinary skill in the art ("POSITA") is not a specific real individual, but rather is a hypothetical individual having the qualities reflected by the factors above and knowledge of all relevant prior art references, including the references I cite below.

B. Obviousness

10. I have been informed that a patent claim is invalid as "obvious" in light of one or more prior art references if it would have been obvious to a POSITA at the

time of the alleged invention, taking into account (1) the scope and content of the prior art, (2) the differences between the prior art and the claims, (3) the level of ordinary skill in the art, and (4) any so called “objective indicia” or “secondary considerations” of non-obviousness, which include: (i) “long-felt but unresolved need” for the claimed invention, (ii) commercial success attributable to the claimed invention, (iii) unexpected results of the claimed invention, and (iv) “copying” of the claimed invention by others. I understand that for objective indicia to carry weight in an obviousness analysis, there must be a “nexus” between any alleged objective indicia and the merits of the claimed invention. In this context, “nexus” means there must be some evidence showing that the alleged objective indicia are the direct result of the unique characteristics of the claimed invention. Accordingly, there can be no “nexus” if the objective indicia relate only to features or combinations of features already known in the prior art.

11. While I do not know the exact date that the alleged invention of the ’847 patent was made, I do know that the ’847 patent’s earliest claimed priority date is March 1, 2005. For purposes of my obviousness analysis, I have applied a date of March 1, 2005 as the date of the alleged invention (“Critical Date”), although in many cases the same analysis would hold true even if the date of the alleged invention were earlier or later.

12. I have been informed that a claim can be obvious in light of a single prior art reference or multiple prior art references. To be obvious in light of a single prior art reference or multiple prior art references, there must be a reason that would have prompted a POSITA to modify or supplement the single prior art reference, or to combine two or more references, in a manner that provides the elements of the claimed invention. This reason may come from a teaching, suggestion, or motivation to combine, or may come from the reference(s) themselves, the knowledge or “common sense” of a POSITA, or from the nature of the problem to be solved, and this reason may be explicit or implicit from the prior art as a whole. I have been informed that, under the law, the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. I also understand it is improper to rely on hindsight in making the obviousness determination.

13. I understand that an obviousness determination also requires that a POSITA would have had a reasonable expectation of success. This concept has been explained to me as relating to the relative likelihood or predictability—from the perspective of a POSITA—of successfully modifying the prior art in a manner that would meet the claimed limitations of the patent being challenged (here the ’847 patent). I understand that the expectation of success need only be “reasonable” and,

thus, does not require the absolute certainty gleaned from physically creating the proposed prior art modification.

C. Claim Interpretation

14. I understand that, for purposes of my analysis in this *inter partes* review proceeding, the terms appearing in the patent claims should be interpreted according to their “ordinary and customary meaning.” In determining the ordinary and customary meaning, I understand that the words of a claim are first given their plain meaning that those words would have had to a person of ordinary skill in the art at the time of the alleged invention. I also understand that the structure of the claims, the specification and file history may be used to better construe a claim. Moreover, I understand that even treatises and dictionaries may be used, albeit under limited circumstances, to determine the meaning attributed by a person of ordinary skill in the art to a claim term.

III. ANALYSIS

15. The analysis and opinions expressed in my Prior Declaration fully explain why [1] each and every feature of the '847 patent's challenged claims is in the prior art; and [2] a POSITA would have been motivated to combine the known prior art elements in a manner that reaches the claimed invention. Patent Owner's expert, Mr. Pollock, has considered my opinions and offered his own, some of which

are inconsistent with my view. I will address certain points of dispute below. The fact that I have not addressed all of Dr. Pollock's opinions (and cited documentation) should not be interpreted as agreement with any of them.

A. Person of Ordinary Skill in the Art (POSITA)

16. Based on my knowledge and experience in the field and my review of the '847 patent and its file history, I believe that a POSITA would hold a bachelor's degree in mechanical engineering, electrical engineering, or a comparable field and at least three to five years of professional experience working with heating, ventilating, air conditioning, and refrigeration (HVAC&R) systems. Such experience could be obtained through research and study in a graduate program or through comparable exposure through industry employment, and additional years of experience could substitute for the advanced-level degree.

17. I expressed this same opinion in my Prior Declaration, and I maintain that it is the correct articulation of the ordinary skill level. EX1003, ¶¶31–32.

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.

19. The phenomenon of condensation occurs when the surface temperature of a surface falls below the dew point temperature of the ambient indoor air. Addressing condensation risk requires the application of thermal energy to maintain the surface temperature above saturation point. A degreed engineer with three to five years of experience in the HVAC&R industry has already applied these calculations to countless scenarios, from evaluating building envelopes in the context of heating load calculations containing windows experiencing condensation risk to cooling coils that only dehumidify when the apparatus (coil surface) dew point temperature is below the air's dew point. To suggest that the physics of a display case frame are so distinct as to require further specialized refrigerated display case experience is to suggest that the laws of heat transfer and psychrometrics change based on the equipment's chassis. But that is definitely not the case.

20. Furthermore, the electrical integration of anti-sweat heaters—specifically the use of controllers to modulate power based on dew point approach—falls squarely within the competency of an electrical or mechanical engineer with a few years of applied experience. For example, the logic used in pulse-width modulation for on/off devices such as heaters and sensor-driven feedback loops is common across the HVAC&R sector. A professional with the proposed background possesses the necessary “applied intuition” to account for real-world variables such as sensor uncertainty, air velocity, and ambient fluctuations without requiring exposure to a specific product category. The three-to-five-year experience threshold is particularly significant as it represents the period during which a professional transitions from theoretical proficiency to the mastery of industry standards, particularly those set by ASHRAE.

21. Ultimately, the problem of display case condensation is generic in nature because the variables are finite and the governing equations are fixed. While a specialist may have greater familiarity with certain manufacturer-specific hardware characteristics, they do not possess a superior scientific methodology. The analytical framework provided by a relevant engineering degree, combined with the practical rigors of multi-year HVAC&R employment or graduate-level research, provides all the requisite expertise to design, troubleshoot, and optimize these

systems with a high degree of professional certainty. No further specialization is required to meet the standard of care for this technical domain.

22. The '847 patent background talks about issues with “reactive” sensors that detect condensation directly only after it has already formed, and it proposes using temperature and humidity sensing to instead anticipate the formation of condensation through dew point calculation. EX1001 ('847 patent), 1:22–47. Each of these types of sensors was well-known and used in many applications in the HVAC&R field. Direct condensation detection primarily employs resistive, capacitive, or optical technologies to identify liquid-phase moisture. Resistive condensation sensors utilize interdigitated conductive tracks that act as an open circuit when dry; the formation of moisture bridges these tracks, sharply dropping resistance to trigger a control response. While simple, their exposed electrodes are susceptible to environmental fouling. Capacitive sensors instead monitor the dielectric constant of the sensing surface, which rises significantly as water replaces air. This allows electrodes to be hermetically sealed, providing superior long-term reliability in harsh HVAC&R environments. For high-precision applications, optical sensors project an infrared beam into a prism. The presence of condensation disrupts the refractive index at the prism's surface, scattering the light and reducing the signal captured by a photodetector. This optical method represents the “gold standard” for accuracy, frequently used in the calibration of industrial climate

controls. Thus, a POSITA with several years' experience in the HVAC&R field would be very familiar with these sensors, whether or not they had specific hands-on experience with refrigerated display cases.

23. The '847 patent background also talks about problems with the accuracy of temperature readings, especially where both cold and warm environments are adjacent to one another. EX1001 ('847 patent), 1:48–2:4. Again, this problem is not unique to refrigerated display cases, and a POSITA with several years' experience in the HVAC&R field would understand how to address these issues. The accuracy of temperature measurement in environments where extreme thermal gradients exist—such as the interface between a refrigerated interior and a heated frame—is frequently compromised by a phenomenon known as “stem effect.” This occurs when the sensor's own lead wires or mounting hardware act as a thermal bridge, conducting heat from the warmer ambient environment directly into the sensing element. This physical reality creates a localized bias, causing the sensor to report a temperature higher than the actual surface or air it is intended to measure. Furthermore, sensors in these high-gradient zones are susceptible to radiant heat exchange; a sensor positioned to monitor cold air may be “washed” by infrared radiation from an adjacent warm frame, leading to an inaccurate representation of the true thermal state. These measurement challenges are not unique to the refrigerated display case industry; they are fundamental hurdles

encountered across the entire spectrum of thermal science. An HVAC&R professional with three to five years of experience is well-versed in these common errors and understands that the solution lies in the application of standard mitigation techniques, such as the use of thermal decoupling materials, proper sensor immersion depths, and reflective radiation shielding.

24. While the '847 patent does discuss refrigerated display cases, the claims are not directed toward any purportedly novel features of a refrigerated display case. Instead, the claim elements focus on the sensors and heating controls, reaffirming that the main problem statement of the '847 patent relates to these general HVAC&R concepts.

25. I have reviewed Mr. Pollock's discussion of what he claims to be "specific concerns" a POSITA would have to address in the context of refrigerated display cases, and I disagree.

26. For example, I disagree that thermal characteristics of refrigerated display cases lead to unique concerns "due to the frame and glass/viewing window combination used." EX2037 ¶10. While not all refrigerators require consideration of the thermal characteristics of a frame and glass combination, many other HVAC&R applications do. For example, when designing an HVAC&R system for a building, a POSITA must consider and develop systems to remediate the potential risk of condensation on building windows. In many modern commercial buildings,

architects specify large glazing surfaces, for instance deployed in atria. A POSITA would likely be tasked with specifying glazing, structural, and HVAC systems to prevent condensation by designing a code compliant façade, an HVAC system capable of dehumidifying and/or heating the indoor air under all conditions for there to be a safe “dew point margin” of any surface of 2–3°C above the air’s dew point, along with a sensing and alarming infrastructure to detect and respond to condensation risk. Other common HVAC systems that require condensation control include chilled ceilings, chilled beams, and thermally activated building structures (TABS) that embed water tubes in the concrete core of the building’s floor structure.

27. I also disagree that “customer interactions with refrigerated display cases lead to different concerns related to the size, shape and location of sensors to prevent interference of customers with such systems.” EX2037 ¶10. Sensor placement is always a consideration in designing an HVAC&R system, and there are many such systems where a POSITA would consider how to place sensors to avoid potential interference from third parties. The assertion that customer interaction necessitates specialized expertise in sensor placement is at odds with the broader discipline of HVAC&R engineering. A POSITA recognizes that physical and environmental interference from third parties is a standard design consideration encountered across nearly all public-facing climate control systems. Whether designing for a high-traffic hotel lobby, a school, a hospital, or a public transit

vehicle, an engineer must routinely account for the risks of accidental impact, intentional tampering, and localized thermal anomalies caused by human proximity. Because these design considerations that balance hardware accessibility with data integrity are foundational to the standard of care across the HVAC&R industry, the specific geometry of a refrigerated display case does not represent a unique technical hurdle. Consequently, an engineer with the proposed three-to-five-year professional background possesses the requisite competency in sensor integration to transfer their skill to retail refrigeration for solving these common placement challenges.

28. I also disagree that supermarket display cases present unique challenges relating to “coordination of sensors, packaging, airflow, and control hysteresis,” or “that small differences in sensor placement, thermal isolation, and algorithm design materially affect performance, energy use, and reliability” more so than other HVAC&R applications. EX2037 ¶10. Again, a POSITA knows to evaluate each of these considerations when designing a multitude of different HVAC&R systems. The assertion that refrigerated display cases present a unique nexus of sensor coordination, airflow, and control hysteresis is technically unfounded, as these interdependencies define the baseline complexity of any automatically controlled thermal system. Control hysteresis—the management of deadbands to prevent short-cycling—is a common application of control theory common to all HVAC&R problems involving on/off and multistage equipment. Similarly, the fact that

performance and energy use are sensitive to variations in and proper selection of sensor placement or thermal isolation reflects universal thermodynamic principles rather than a sector-specific challenge. A POSITA with the proposed background is adequately trained to determine these variables using standard heat transfer calculations, design thinking, and control system design. Because coordinating sensor packaging with airflow is a requirement in any high-performance thermal environment, the refrigerated display case remains a standard application of engineering rigor. No specialized industry tenure is required to navigate these variables, as they are governed by the same mathematical and physical laws found in any commercial or industrial climate control installation.

29. I also disagree that a POSITA with the background articulated in my Prior Declaration lacks the ability to understand the components of the '847 claims (such as a display case door) without direct professional experience working on refrigerated display cases. To the contrary, I expect that even most consumers who have shopped at a supermarket understand what a display case door is. From an engineering standpoint, these components are standard thermal and mechanical assemblies composed of well-understood elements: multi-pane insulated glass units (IGUs), thermal breaks, elastomeric gaskets, and resistive heating elements. Therefore, no specialized tenure in retail refrigeration is necessary to deconstruct, analyze, or optimize these components, as they do not possess any domain-specific

complexity that deviates from established laws of thermodynamics, heat transfer, and material science.

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 glycol loops to mitigate refrigerant leakage and the development of dual air-path air handling units for optimized heat recovery. Furthermore, the experience encompasses the application of advanced control algorithms, including model predictive control, to manage the dynamic and nonlinear interactions between compressor power, head pressure, and fluctuating thermal loads. Consequently, this professional engagement provides a foundation for addressing the challenges of refrigerated display cases, as these units represent a subsystem of the more complex thermal systems managed and optimized within the greater body of HVAC&R work.

31. In short, I had no difficulty evaluating the '847 patent or the prior art. I believe myself to be fully qualified to render opinions on this case on whether the '847 patent claims were obvious.

B. Carter's Heater Deactivation Technique

32. The '847 patent's independent claims 1, 8, and 14 each require anticipating the formation of condensation based on various sensors monitoring the refrigerated case. Independent claims 1 and 8 further require "activating and deactivating the frame/door heater responsive [to]" the anticipated condensation. Independent claim 14 more broadly recites "establishing measures to address" the condensation, while dependent claims 15 and 16 further require that the "measures" include activating and deactivating the heater using "preselected set point[s] above a dew point value." I provide the pertinent claim elements below for reference.

Claim 1	
[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

Claim 8	
[8.c]	utilizing monitored case frame temperature, ambient air temperature and relative humidity to anticipate formation of condensation at the display case and activating and deactivating the frame/door heater responsive thereto.

Claim 14	
[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
Claim 15	
[15.b]	wherein said step of establishing measures to address said condensation formation status includes the step of activating a selected display case frame/door heater when monitored display case door or frame temperature drops below a preselected set point above a dew point value derived from monitored ambient temperature and relative humidity.
Claim 16	
[16.b]	wherein said step of establishing measures to address said condensation formation status includes the step of deactivating a selected display case frame/door heater when monitored display case door or frame temperature rises above a preselected set point above a dew point value derived from monitored ambient temperature and relative humidity.

33. Mr. Pollock argues that Carter's teachings cannot disclose or render obvious these aspects of the '847 patent's claims because:

Carter's core control triggers are distinct in objective and method. Carter actuates supplemental heat when cabinet surface temperature falls below "dew point + 2°C," but deactivates based on an "ambient equals surface" condition. This deactivation criterion is not dew-point-based hysteresis control; it changes the reference variable and, in practice, leads to a humidity-dependent offset on one side and a non-dew-point termination on the other. That is a materially different control logic than the '847 Patent's use of

preselected set points above dew point on both activation and deactivation legs to ensure stable margins expressly keyed to dew point.

EX2037 ¶34. In other words, Mr. Pollock says, “Carter’s mixed criteria” lacks the ’847 patent’s “distinct, preselected set points” and, thus, does not “anticipate condensation,” as claimed. EX2037 ¶35. I disagree.

34. Mr. Pollock’s argument relies on claim elements—namely, preselected set points above dew point—that are not recited or implied by independent claims 1, 8, and 14. For example, independent claim 8 broadly recites that (i) condensation is “anticipate[d]” by “utilizing monitored case frame temperature, ambient air temperature and relative humidity”, and (ii) heater activation and deactivation are “responsive thereto.”¹ Carter plainly satisfies these requirements.

35. Carter’s control scheme activates the heater when the monitored surface (frame) temperature falls below “dew point plus a 2 degrees C.” EX1004 (Carter), 5:31–54, Figure 3. Mr. Pollock does not dispute that this aspect of Carter’s disclosure provides heater activation responsive to condensation anticipation. Instead, Mr. Pollock’s argument against Carter focuses on heater deactivation. He suggests “Carter does not teach that the deactivating is related to the anticipation of

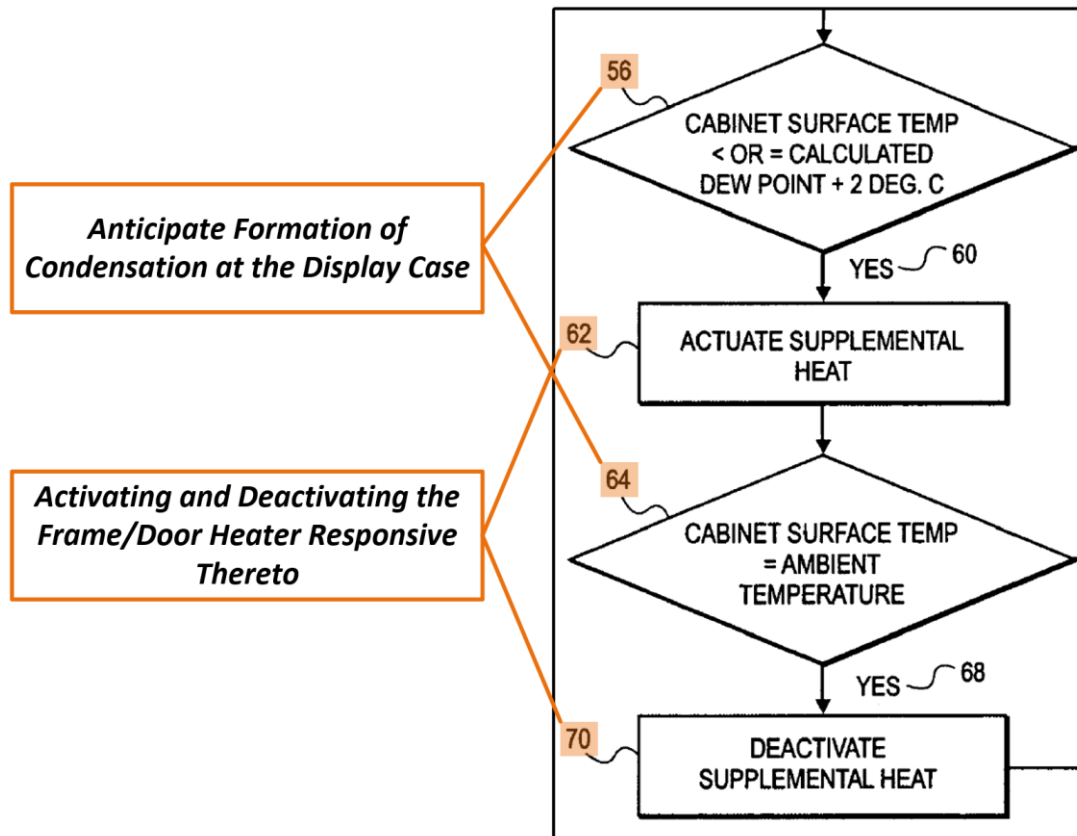
¹ Independent claim 1 has similar requirements, and independent claim 14 is even broader. My discussion in this section applies to all three independent claims.

the formation of condensation” because it is not “trigger[ed] based on being above the dew point temperature.” EX2037 ¶¶41–42. Mr. Pollock is mistaken.

36. Heater deactivation in Carter is inextricably linked to the anticipating and activating steps as part of the same causal (“responsive”) control loop. In Carter’s control loop, heater deactivation is the programmed response to the conclusion of a state where the system anticipates condensation. It occurs when the surface temperature reaches the ambient temperature, meaning condensation is no longer anticipated in the prevailing indoor conditions.

37. As I explained in my Prior Declaration (EX1003 ¶¶81–82), Carter 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 (Carter), 4:36–55; *see also* 2:22–32 (“supplemental heat...is only *activated* under conditions that would promote surface condensation”), 3:42–53. Carter also teaches or renders obvious that 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 (Carter), 5:55–63, Figure 3. Carter explains that such supplemental heat “is only activated under conditions that would promote surface condensation.” EX1004 (Carter), 2:4–32; *see also* 3:42–53. Thus,

both *activating* and *deactivating* of the *frame/door heater* occur *responsive to anticipating formation of condensation*.



EX1004 (Carter), Figure 3 (annotated).

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).

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

² I made this determination using well-known formulas derived from the August-Roche-Magnus approximation. *E.g.*, https://bmcnoldy.earth.miami.edu/humidity_conversions.pdf. I confirmed my determination using a psychrometric chart. *See* EX1031. My determination is likewise confirmed by the 2002 ASHRAE Handbook, which identifies the “ambient condition at which refrigeration load for food store display cases is normally rated” as “75°F dry bulb and 64°F wet bulb (55% rh, 57.5°F dew point).”

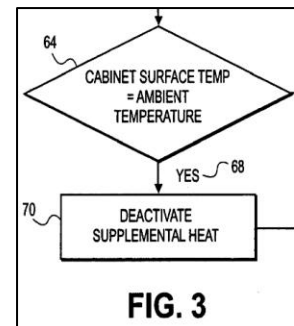
imperfections and temperature fluctuations that Mr. Pollock identifies. *See* EX2037 ¶42 (noting sensor error up to 6+ °F).

40. Mr. Pollock argues further that “in very high humidity scenarios, such as (approaching) 100% humidity, when the dew point approaches ambient temperature, the surface temperature as heated by Carter to ambient temperature could allow condensation to occur.” EX2037 ¶42. However, his premise of “100% humidity” lacks support. That is, Mr. Pollock cites no evidence to support the notion that a POSITA would expect to deploy or operate a refrigerated display case in environments with 100% relative humidity, i.e., at complete saturation. Although he mentions “an outdoor setting near where rain is occurring, such as in a stadium having refrigerated coolers for drinks,” no citation to the record follows this statement. EX2037 ¶42. As I’ve mentioned, the evidence suggests that the typical environment for a refrigerated display case is indoors at well below 100% relative humidity. Even if it is possible to use a refrigerated display case in a 100% relative humidity environment, that does not mean a POSITA would choose to design an anti-sweat condensation control scheme around such an edge scenario.

41. Setting aside for the moment my disagreement with Mr. Pollock’s erroneous assumption that the ’847 patent’s independent claims require heater deactivation based on a preselected setpoint, or any other specific algorithm (because these claims recite no such specifics), I nevertheless preemptively addressed his

view in my Prior Declaration. There (EX1003 ¶83), I noted that the '847 patent's disclosed heater deactivation algorithm can be summarized as follows:³ **Step 1.** Discounting frame temperature by a preselected set point; **Step 2.** Determining if the discounted frame temperature is above a dew point value derived from ambient temperature and relative humidity; and **Step 3.** Turning off a heater relay if the discounted frame temperature is above the dew point value. EX1001 ('847 patent), 8:61–9:2, Figure 14b. I also explained in my Prior Declaration (EX1003 ¶84), when discussing Element [8.c], that Carter teaches that the heater is deactivated when the frame temperature reaches the ambient temperature:

If the cabinet surface temperature is equal to the ambient temperature 38 the control unit 28 will deactivate the supplemental heat 70 by deactivating the switching unit[] 30. If the cabinet surface temperature is not equal to the ambient temperature 66, supplemental heat will continue to be supplied to the sealing surface 24 via the heating unit 34.



EX1004 (Carter), 5:58–63, Figure 3 (above, right).

42. A POSITA would have recognized that Carter's technique employs a floating offset responsive to ambient conditions. As was well known in the art, dew point is generally defined as the temperature at which air at a prevailing pressure

³ To be clear, although the '847 patent discloses this specific heater deactivation algorithm, the claims do not incorporate this level of detail.

becomes saturated and vapor begins to condense out of the air. EX1030, 1 (providing a definition of dew point). Accordingly, the POSITA would have known that ambient temperature is virtually always greater than dew point and that the difference between them depends on—floats according to—the relative humidity of the ambient environment. A psychrometric chart, which provides a graphical representation of the physical and thermal properties of moist air, confirms this point. EX1031. In other words, ambient temperature differs from the dew point by a floating offset. As a result, Carter’s comparison expression shown in Figure 3 (Step 64):

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

is mathematically equivalent to:

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

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

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

and its mathematical equivalent:

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

43. After describing how a POSITA would have interpreted Carter, I further explained in my Prior Declaration (EX1003 ¶91) how that the ’847 patent uses a preselected set point and Carter uses a floating offset is an insubstantial and

obvious distinction to a POSITA. In each case, the set point/offset serves as a buffer value to ensure that the frame temperature of the display case is far enough away from the dew point value to prevent anticipated condensation and without excessive on-off cycling of the heater. Absent an appropriate buffer value, the activating and deactivating target temperatures could be close enough to one another that minor variations or errors/uncertainty in temperature readings would cause the control unit to repeatedly oscillate between switching the heater on/off. Doing so would undermine the effectiveness of the control system and unnecessarily risk damage/wear to electromechanical components, such as the relay. The '847 patent's preselected set point and Carter's floating offset are both buffer values that aim to prevent this sort of unwanted, erratic control behavior.

44. Thus, I disagree with Mr. Pollock that Carter's approach to deactivation "is not dew-point-based hysteresis control." EX2037 ¶34. It is exactly that. The goal and control strategy in Carter is the same one in the '847 patent—keep the surface temperature above dew point using buffer values above dew point. In both cases, it is a hysteresis control scheme based on dew point.

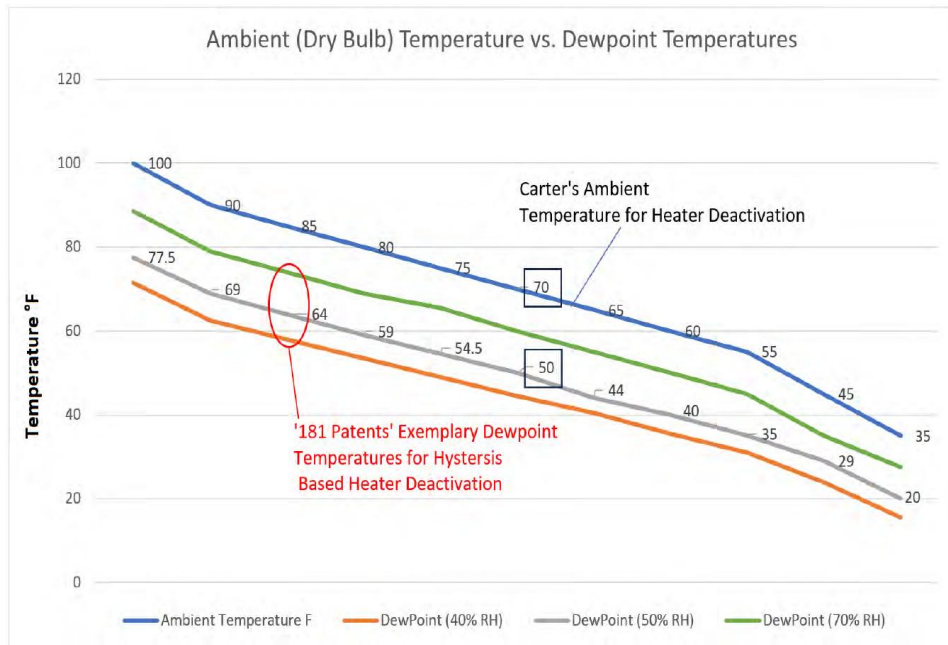
45. To advance his opposing view regarding alleged significant differences between Carter and the '847 patent, Mr. Pollock references two charts titled "Ambient Temperature vs. Dewpoint Temperature" and "On/Off Temperatures." See EX2037 ¶¶38–39. I reproduce them below in my discussion for reference.

According to Mr. Pollock, his charts show that “Carter deactivates late in lower humidity conditions and early/premature at high humidity conditions, when compared with the ’847 Patent.” EX2037 ¶56. I disagree.

46. Before providing my substantive response to Mr. Pollock, I note here that his charts are not supplied with any underlying data, assumptions, or explanation indicating his methodology for creating them. The omission of the underlying basis hinders peer review and is out of step with scientific and engineering best practices. For this threshold reason, I find Mr. Pollock’s approach unreliable.

47. Mr. Pollock’s charts and analysis do not offer a comparison between Carter and the ’847 patent with respect to specific heater-deactivation temperatures. This is because the charts and Mr. Pollock’s analysis of them are derived from specific setpoint values and relative humidity values that he (Mr. Pollock) selected in service of his position in this proceeding. Mr. Pollock provides no reasons for selecting these values; nor does he contend that the selected values have any connection to the ’847 patent.

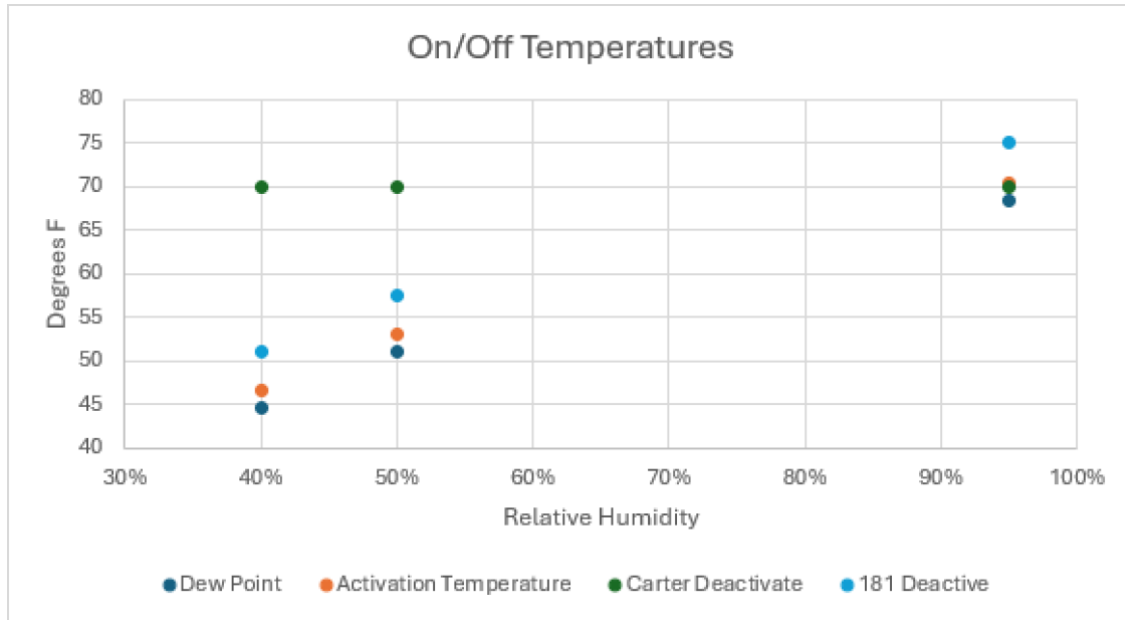
48. In his “Ambient Temperature vs. Dewpoint Temperature” chart, Mr. Pollock decided to chart certain “band[s] of dew point temperatures” at 40%, 50%, and 70% relative humidity. EX2037 ¶38.



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 the related ’181 patent, instead of the ’847 patent at issue in this proceeding. I take this error to be a clerical one.

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.



EX2037 ¶56.

50. The '847 patent does not suggest any of the values Mr. Pollock decided to use for his analysis. In fact, the '847 patent does not offer any specific values at all for relative humidity, air or surface temperature, or any preselected setpoints. Details in the '847 patent's specification about the setpoints is noticeably sparse—e.g., that they can be loaded and stored in memory (Figure 14a–14b), and that they are “updatable in real time from central processing” (9:3–5). But these details, in addition to the specific values Mr. Pollock selects for the deactivation setpoint in his analysis (e.g., 6.5°F and 4.5°F), are not expressly recited or implied in any of the '847 patent's independent claims 1, 8, and 14. In other words, those details are not

necessary to perform the broadly claimed method steps of anticipating condensation and then activating and deactivating the heater responsive thereto.

51. Given that Mr. Pollock provides no justification for his selected values, and no such justification is evident from the '847 patent, his (Mr. Pollock's) conclusion that Carter's algorithm results in "a sealing surface temperature gain of over 16°F," while the '847 patent's algorithm yields "a total temperature gain of 4.5°F" is not credible, and even misleading. EX2037 ¶39. His charts and analysis only show these different temperature gains because Mr. Pollock selected values that would produce results aligned with his conclusion that the '847 patent's algorithm is purportedly more efficient than Carter's. It is a classic case of selection bias.

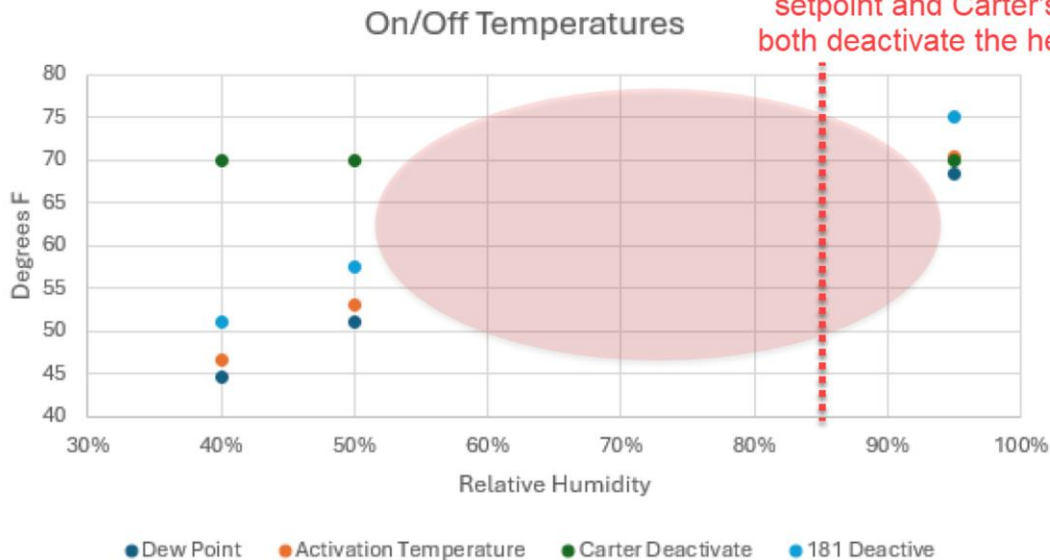
52. The flaw in Mr. Pollock's approach is easily exposed. For example, by simply changing the setpoint value, one can invalidate Mr. Pollock's biased conclusion that the '847 patent's algorithm is necessarily more energy efficient because it deactivates the heater more quickly. I will demonstrate this point using Mr. Pollock's scenario with "ambient air conditions of 70°F and 50% relative humidity, [where] air has a dew point temperature of approximately 50°F." EX2037 ¶39. In this scenario, if the setpoint is changed to dew point plus 24.5°F (from Mr. Pollock's value of 4.5°F), Carter's algorithm will deactivate the heater at a lower surface temperature of 70°F, while the '847 patent's algorithm will deactivate at a higher surface temperature of about 74.5°F. Or, if the setpoint is changed to dew

point plus 20°F, the two algorithms will deactivate the heater at about the same surface temperature of 70°F.

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.

⁴ I made this determination using well-known formulas derived from the August-Roche-Magnus approximation. *E.g.*, https://bmcnoldy.earth.miami.edu/humidity_conversions.pdf. I confirmed my determination using a psychometric chart. *See* EX1031.

With 85.7% RH, the '847 patent's algorithm using Mr. Pollock's setpoint and Carter's algorithm both deactivate the heater at 70F



EX2037 ¶38 (with annotations added in red).

C. The Routine and Predictable Carter-Bunch Combination

54. I explained at length in my Prior Declaration why a POSITA would have been motivated to incorporate Carter’s teachings about triggering heater activation/deactivation based on ambient dew point and door/frame surface temperature in the context of Bunch’s refrigerated display case with condensation control capabilities. *See* EX1003 ¶¶111–119. Mr. Pollock takes the opposite view.

55. For example, Mr. Pollock says, “Bunch...teaches away from Carter” because “Bunch distinguishes two prior approaches—waiting for surface condensation and using aisle humidistats—and proposes a different solution—scheduled duty cycles aligned with known high-risk times, plus a local moisture

override.” EX2037 ¶48; EX1006, 1:29–39. These two “prior approaches,” however, are not how Carter works. Carter does not wait for surface condensation to occur before activating the heater, nor does Carter use an aisle humidistat. Rather, 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 (Carter), 5:31–54. So, Mr. Pollock’s reference to the “prior approaches” that Bunch distinguishes has no bearing. Those approaches are not representative of Carter.

56. Mr. Pollock also argues that “replacing Bunch’s time schedules with Carter’s ambient algorithm is not a routine substitution—it is a wholesale change in Bunch’s principle of operation.” EX2037 ¶48. This statement reveals either a fundamental misunderstanding of the two references, or a severe overstatement of the distinctions between their operating principles. The Carter-Bunch 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 (Bunch), 2:23–25, 2:55–58. As I explained in my Prior Declaration (EX1003 ¶111, ¶¶113–114), Carter shares Bunch’s goal of “prevent[ing]” condensation before it starts via the controlled application of “supplemental heat.” EX1004 (Carter), 4:62–67; Pet. 28. In fact, a POSITA would have seen an ambient-based control scheme like Carter’s as a “predictable

improve[ment]” over the pre-set duty cycles that Bunch describes. EX1003, ¶¶115–117 (“more accurate, adaptable, and energy efficient”).

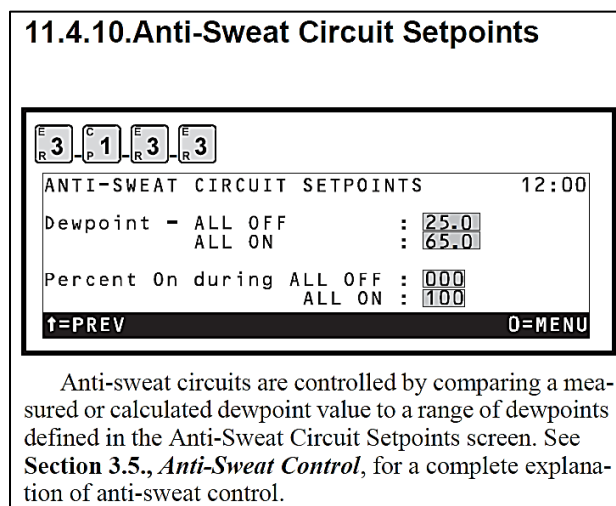
57. Mr. Pollock does not address these aspects of my Prior Declaration. His “wholesale change” theory sidesteps my analysis. Nevertheless, I will address each of Mr. Pollock’s alleged “engineering and functional implications” in turn, matching his bulleted format and headings for ease of review. EX2037 ¶49. As the following discussion will make clear, the Carter-Bunch Combination is merely an incremental improvement over Bunch that a POSITA would have been able to implement by applying known prior art teachings and routine engineering principles in the HVAC&R field.

- 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. Bunch’s guiding principle is to prevent condensation before it starts, and the same is true of the Carter-Bunch Combination. In addition, Mr. Pollock’s note that “Carter’s dew point control requires “continuous acquisition fusion of” data from three sensors is not a wholesale change from Bunch. In fact, Bunch also “continuously monitors” “one or more condensation sensors.” EX1006 (Bunch), 3:15–26. Bunch’s technique would also require monitoring an onboard clock to implement the “pre-set start and stop times,” as well as fusion of the sensor and clock information to implement the override functionality. EX1006 (Bunch), 4:26–43 (“These preset times work in cooperation with the sensors, and the sensor measurements can override the preset times.”).

- Sensor domain and placement: Mr. Pollock argues that the Carter-Bunch Combination would require “different signal conditioning, calibration, and stability requirements” for implementing Carter’s sensors. Again, however, using different sensors is not a wholesale change. To the extent Carter’s sensors would require conditioning and calibrating, there is no reason to believe Bunch’s condensation sensors would not also require the same. In addition, sensor conditioning and calibration are unclaimed features. They are also rudimentary in the sense that a POSITA would have been well acquainted with conducting such routine and common engineering practices when designing or deploying an HVAC&R system. For example, temporal smoothing (e.g., averaging) is commonly applied to suppress sensor noise in airflow, static pressure, mixed air temperature, and discharge air temperature measurements to prevent undesired actuator hunting (e.g., oscillating) and enhance control loop stability. Common control loops that benefit from sensor conditioning and periodic calibration include those for duct static pressure, airside economizer, ventilation airflow, and supply air temperature.
- System objectives and tradeoffs: As I have mentioned, Carter and Bunch share the same goal of “energy savings” in the context of condensation control. 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.

- 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.



EX1043 at 99.

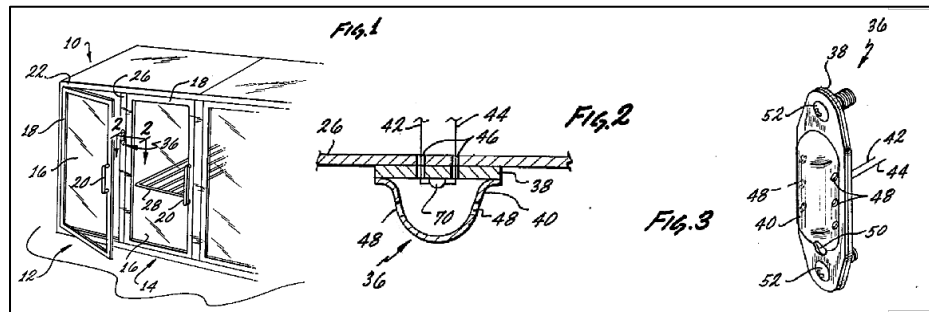
58. For all these reasons, Mr. Pollock's alleged "engineering and functional implications" are far short of a "wholesale change." Additionally, and as would have been clear to a POSITA, it is not necessary in the Carter-Bunch Combination to eliminate Bunch's preset heater on/off times or condensation-detection overrides. Those aspects could easily be retained. For example, the heaters could operate as

Bunch describes on the preset on/off times and Carter’s control scheme could be implemented between those times, with Bunch’s condensation-detection overrides being operational the entire time. Mr. Pollock’s argument that the Combination requires a wholesale change from Bunch is erroneous in this additional respect.

59. Mr. Pollock separately contends that “Carter does not teach a display case, and therefore does not consider the specifics of such [a] mounting.” EX2037 ¶¶60; *see also generally* ¶¶60–62. He claims that “something is needed to bridge this gap” and “that there are not specifics provided in the Petition.” *Id.* I note at the outset that specific mounting locations are not recited in any of the ’847 patent’s claims. Thus, whether Carter teaches “good locations for a refrigerated display case to have sensors mounted” is hardly relevant to the analysis in this case. EX2037 ¶¶61. Still, it bears noting that a POSITA would not share Mr. Pollock’s skepticism about mounting Carter’s ambient temperature, surface temperature, and relative humidity sensors on a refrigerated display case.

60. As I explained in my Prior Declaration, anti-sweat systems for refrigerated display cases with controllers that regulate heater activation based on sensor data reflecting dew point were known long before the ’847 patent. *See* EX1003 ¶¶34–41. The ’847 patent openly concedes this fact, and it even cites a 1978 patent assigned to Anthony’s Manufacturing Company, Inc. that describes this technology more than 25 years beforehand. EX1001 (’847 patent), 1:48–60 (citing

US 4,127,765 (EX1063)). My Prior Declaration (EX1003 ¶36) references another decades-old patent on anti-sweat systems for refrigerated display cases assigned to Anthony's Manufacturing Company, Inc.—US 4,260,876 (EX1016). Issued in 1981, this patent describes a sensor configured to monitor “the differential between the ambient air dew point temperature and the surface temperature of the refrigerated cabinet section in which the sensor is mounted.” EX1016, 2:15–32. As shown below, this dew point-to-surface temperature differential sensor is “coupled to the mullion surface” and includes a housing with vent holes to ensure the sensing element is “exposed to adjacent ambient air.” EX1016, 2:44–64, 4:13–68.

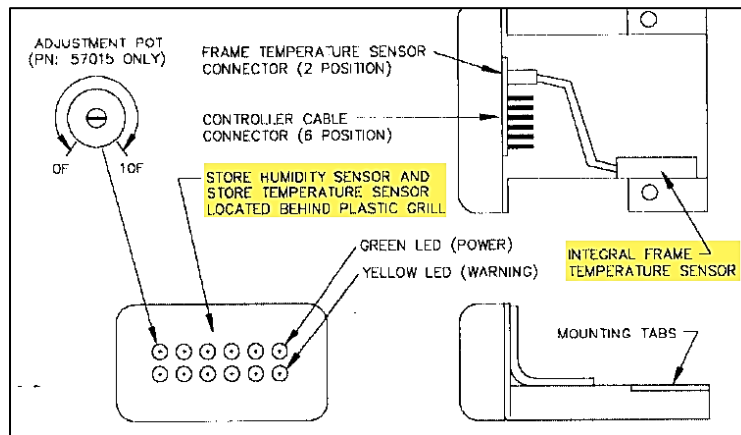


EX1016, Figures 1–3.

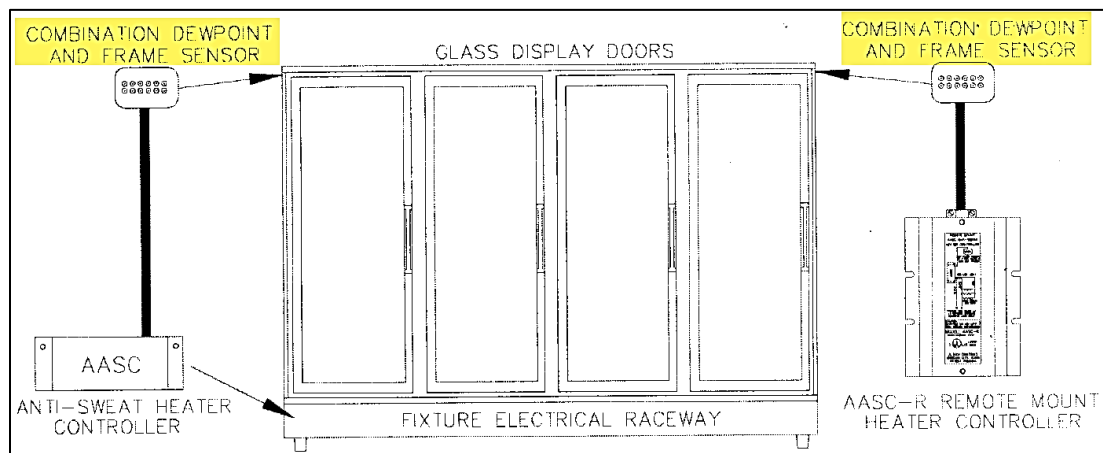
61. I also discussed in my Prior Declaration a contemporaneous anti-sweat system from a company called Altech Controls. EX1003, ¶41 (citing EX1021 and EX1022)⁵. This Altech anti-sweat system was “a stand alone anti-sweat heater

⁵ Although the EX1021 Altech Controls document is undated, I have cross-referenced it against EX1022, which is an engineering change notice from Anthony International describing the same Altech anti-sweat system (with matching descriptions and drawing/part numbers) and containing various dates in January-February 2005 and September 2004, all prior to the '847 patent's claimed priority date of March 1, 2005.

controller that determines the store's dewpoint and monitors actual frame temperature to control the frame heat to maintain the frame temperature just above the dewpoint." EX1021 at 3. It employed a "Combination Sensor contain[ing] all the sensor elements," i.e., "the store temperature and humidity sensors used to determine the store dewpoint" and "an integral frame temperature sensor" in a shared housing, quite similar to the Carter and King references. EX1021 at 5.



EX1021 at 5. As shown below, the Altech system's Combination Sensor was mounted to the top portion of the display case frame:



EX1021 at 3.

62. These documents disprove Mr. Pollock’s view that there was a “gap” in the prior art with respect to locating and mounting Carter’s well-known sensors on a refrigerated display case. Not only is sensor locating and mounting generally a routine and conventional engineering task in the HVAC&R field, but it was also a design problem with a known—and even commercially adopted—solution in the specific context at issue here.

D. King’s Sensor Assembly

63. The ’847 patent’s dependent claims 3, 9–10, and 19 each require “thermally isolating” the recited “units” that monitor, e.g., ambient temperature, frame temperature, and relative humidity. I provide the pertinent claim elements below for reference.

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

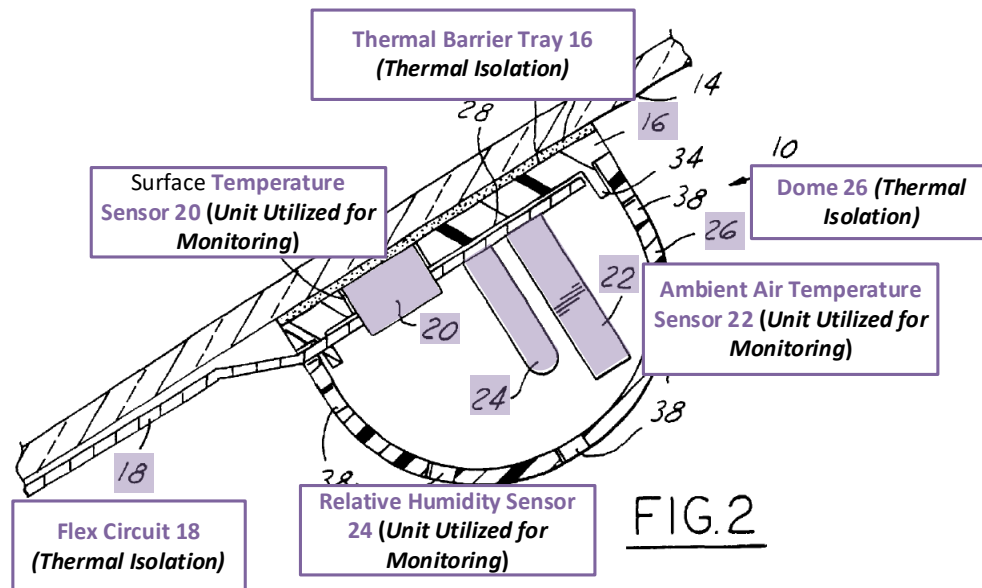
Claim 9	
[9]	The method of claim 8 further comprising thermally isolating said dew point sensing unit from variations in temperature of the display case frame or display case door.

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

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

64. I discussed these elements in my Prior Declaration, with respect to both the sensors of Carter in Grounds 1A–1B (EX1003 ¶¶95–105, ¶129, ¶¶139–140, ¶156) and King in Ground 1C (EX1003 ¶¶175–184). For example (EX1003, ¶177), I discussed how, in King’s sensor *unit*, “[t]he electrical connections are made by using a flex circuit.” EX1005 (King), 1:54–60. The flex circuit also serves to physically locate and secure the sensors and functions as a “*thermal [isolation]* barrier.” See, e.g., EX1005 (King), 1:66–2:7, 2:55–57; 3:3–19 (“Sensors 20, 22, and 24 are typically soldered to flex circuit end 42.”). King further explains that “[a]ll three sensors are located beneath a protective dome which is secured to a perimeter wall of [a *thermal barrier*] tray.” EX1005 (King), 1:48–65, Figure 2. The tray “assures that surface temperature does not alter the ambient air temperature or relative humidity levels,” and “the protective dome surrounds, and serves to protect, the sensors from any impacts.” EX1005 (King), 2:55–63; see also 1:48–65 (“The

tray and the flex circuit also serve as a *thermal* barrier *isolating* the ambient air sensor and humidity sensor from the potentially cold glass surface.”). In this way, the protective dome, flex circuit, and the thermal barrier tray (taken together or individually) *thermally isolate* the sensing *units utilized for monitoring*.”



EX1005 (King), Figure 2 (annotated).

65. Much of Mr. Pollock’s discussion on King is misplaced and irrelevant. For example, Mr. Pollock focuses on supposed language in “claim 13” about “minimizing heat transfer contacts between said sensing units and said housing means,” and he argues that King teaches no such “housing means.” EX2037 ¶55. The ’847 patent, however, does not claim any “housing means”; and claim 13 in the ’847 patent is about a completely different subject—“wirelessly accessing said stored data.” Mr. Pollock appears to have mistakenly referenced claim language from the related ’181 patent, which is not at issue in this proceeding.

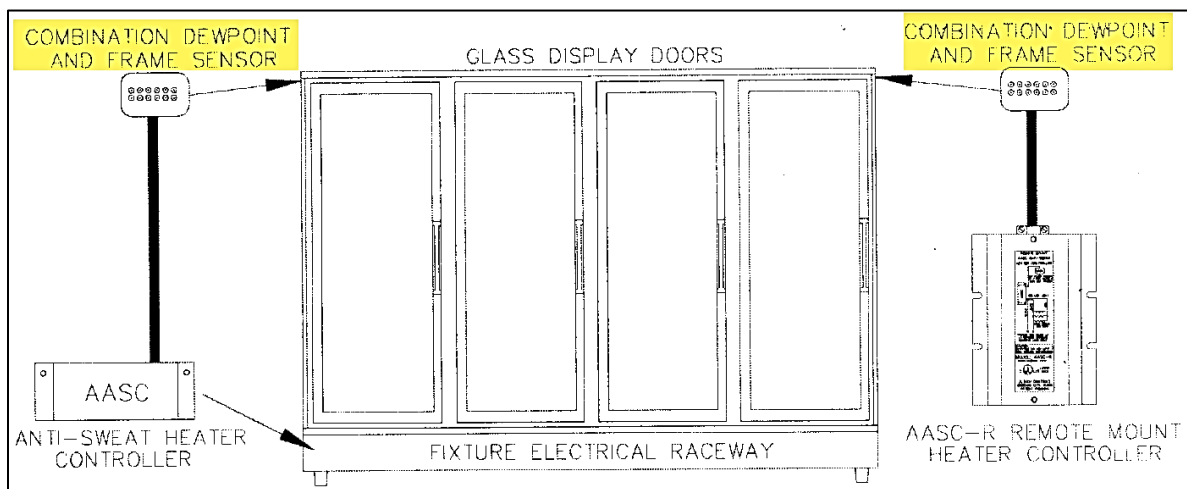
66. Elsewhere, Mr. Pollock argues that there are “fundamentally inherent problems [with placing] King’s sensor on the door surface of a refrigerated display case which opens and closes.” EX2037 ¶29; *see also generally* ¶¶27–33. He goes on to say, “I would have to make additional modifications to the systems of Carter and King to adopt them for refrigerated display cases,” naming “[t]he size, shape, orientation and materials of the housing” as purported considerations. EX2037 ¶31. Here again, I note that Mr. Pollock fixates on rudimentary implementation details that are both unclaimed and within the abilities of a POSITA to determine in the course of a routine engineering task. Notably, Mr. Pollock does not address the section from my Prior Declaration (EX1003, ¶179) where I explained:

More than just suitable, the POSITA would have viewed King’s disclosure as providing a particularly flexible and adaptable solution that could be installed at a variety of locations on the display case frame or door depending on the circumstances, including along a raceway, a frame side panel or undercarriage, a mullion, and/or integrated within a door latch assembly in the manner Carter proposed. This flexibility would enable the installer/manufacturer of the refrigeration system to easily mount the surface temperature, air temperature, and relative humidity sensors in a location that works best for a given application. Where references like Carter teach a specialized sensor mounting configuration, King proposes a more

flexible alternative that a POSITA would have likewise considered and deemed appropriate for the task at hand.

EX1003 ¶170.

67. It is important to note that I did not make these statements lightly or without support. I relied on my own personal knowledge in the HVAC&R field in addition to third-party literature from before or contemporaneous with the '847 patent. I explained the guiding principles that I gleaned from this literature at Paragraphs 33–51 of my Prior Declaration. Among the documents that I discussed in those paragraphs is EX1021, which describes the Altech anti-sweat system with a Combined Sensor similar to King's that is mounted to the top portion of the display case frame (as shown below):



EX1021 at 3.

68. Overall, Mr. Pollock seems to improperly assume that merely changing the location of King's sensor unit—i.e., from a car windshield to a different surface

like a frame of a refrigerated case—would somehow change its functionality. But that assumption is unfounded. So long as the surface temperature sensor is placed adjacent to the door or frame of the display case and the air temperature and humidity sensors face the ambient environment, the sensors and the housing will fulfill their designed monitoring and thermally isolating functionality in precisely the manner King described. This would have been clear to a POSITA from reading King, as well as from prior experience and knowledge. The POSITA would have recognized that sensor packages like King’s were known to be adaptable to a variety of different applications. For example, the Sensirion sensor package that I discussed in my Prior Declaration (EX1003 ¶¶45–47 (citing EX1020)), which included both relative humidity and air temperature sensors in a shared housing, was marketed as suitable for using in “High volume consumer products,” “White goods,” “Automotive,” and “Building control & HVAC”). *See* EX1032.

E. Secondary Considerations (Objective Indicia)

69. I understand the Patent Owner’s Response brief argues that “[o]bjective indicia here strongly corroborate non-obviousness.” POR 60. I disagree.

70. I have reviewed Pages 60–73 of the Response brief, which contain Section VII titled “Objective Indicia Corroborate Non-Obviousness.” The section alleges that there are various objective indicia—namely, commercial success, copying, industry praise and adoption, and long-felt need and failure of prior

approaches—that support finding the '847 patent's claims not obvious over the Carter, Bunch, King, and Gatling references discussed here and in my Prior Declaration. I also reviewed Paragraphs 65–66 of Mr. Pollock's declaration, which are cited repeatedly in the Response brief.

71. Mr. Pollock says that “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 non-obviousness.” EX2037 ¶65. I note that each of these features (stable, energy-efficient condensation control; dew-point-referenced dual set points; compact, thermally isolating housing structures) preexisted the '847 patent, as I have described here and in my Prior Declaration. Thus, I disagree there was a “long-felt but unresolved need” for this technology.

72. Mr. Pollock also states that “[i]n 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.” EX2037 ¶65. He does not explain what “experience” he is referring to. He also does not explain what he means by the “holistic structural and algorithmic design.” However, I disagree. Accurate, practical, robust dew-point anticipation with reliable hysteresis was a solved

problem in 2005. And the structures described in the '847 patent were also well-known, as I have described above and in my Prior Declaration. EX1003 ¶¶33–51.

73. As I noted above in my discussion of Legal Principles (Section II), I understand that for any alleged objective indicia to carry weight there must be a “nexus” to the merits of the claimed invention. My understanding is that this “nexus” requirement means there must be some evidence showing that the alleged objective indicia are the direct result of the unique characteristics of the claimed invention. Accordingly, there can be no “nexus” if the objective indicia relate only to features or combinations of features already known in the prior art.

74. Based on my review of the Response brief and Mr. Pollock’s declaration, I see no evidence of nexus. Mr. Pollock’s declaration does not even mention the word “nexus,” nor does his discussion address the concept of nexus in an implied fashion. The Response brief at Pages 68–69 argues that “nexus is satisfied in two independent ways,” but neither is supported.

75. First, the Response says “the ControlTec AS-20 controller” is a product that “implements the precise elements the petition challenges.” The citations following this statement are the '847 patent (EX1001) and Paragraphs 65–66 of the Pollock declaration (EX2037). However, these documents say nothing at all about a “ControlTec AS-20 controller.” The only document of record I am aware of that describes how the ControlTec AS-20 might work is EX2030, which is a report said

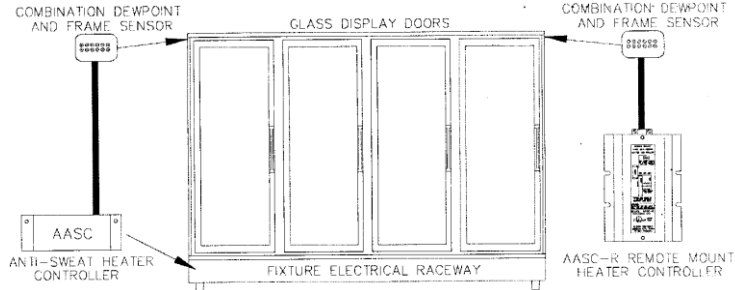
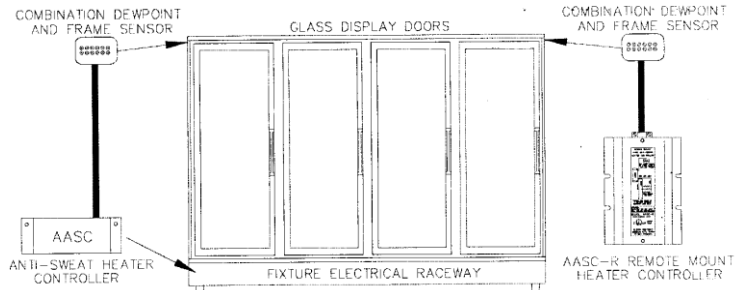
to “evaluate the potential energy savings from installing ControlTec’s AS-20 anti-sweat heater controls on refrigerated food cases.” EX2030 at 5. However, the report does not indicate that the ControlTec AS-20 implements the features of the ’847 patent’s claims. For example, the limited description indicates that “[t]he heaters will turn on when the glass temperature falls below the dewpoint temperature.” EX2030 at 5. The ’847 patent’s claims 1 and 8, by contrast, are limited to monitoring the “frame temperature.” Claims 1 and 8 also specifically require monitoring “ambient air temperature and relative humidity.” But the report does not say the same about the ControlTec AS-20. It gives no indication at all about how the ControlTec AS-20 “monitor[s] the store dewpoint temperature.” EX2030 at 5. Instead of deriving dew point from ambient air and relative humidity, the ControlTec AS-20 could employ some other type of direct dew point sensor (e.g., an active chilled mirror sensor or a passive optical condensation sensor). Additionally, the report says the ControlTec AS-20 “will turn on [the heaters] when the glass temperature falls below the dewpoint temperature.” EX2030 at 5. Waiting until the monitored surface falls below dew point is inconsistent with the language in all of the ’847 patent’s claims that require “anticipating” condensation.

76. Second, Response (at Pages 68–69) points to EX2029 as a document that alleges shows how the marketplace “prized the specific claimed capabilities,” namely “cycling via case-specific dew point (ControlTec’s method).” Again,

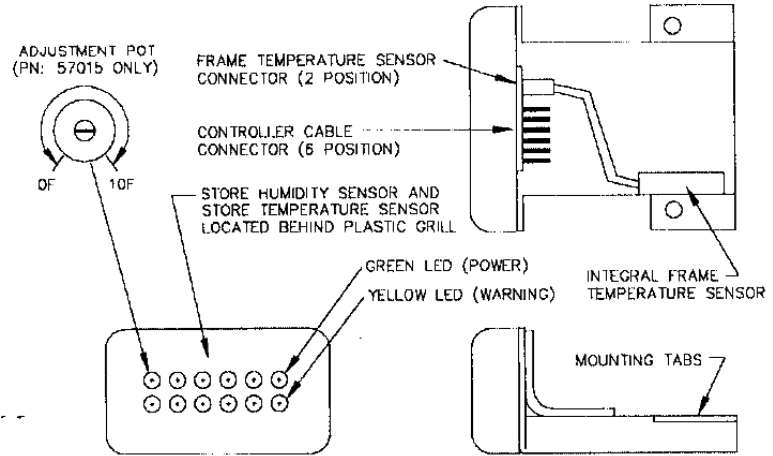
however, the cited document (EX2029) does not support the assertion in the Response. The EX2029 document, purportedly a 2018 presentation from an Energy & Store Development Conference, does not state or imply that it is referencing the '847 patent's claims. For example, similar to the report I discussed 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 presentation is addressing the '847 patent's claimed invention.

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).

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	Page 3: 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. Page 3: Patent pending frame temperature feedback optimizes the energy usage of the frame heaters over a

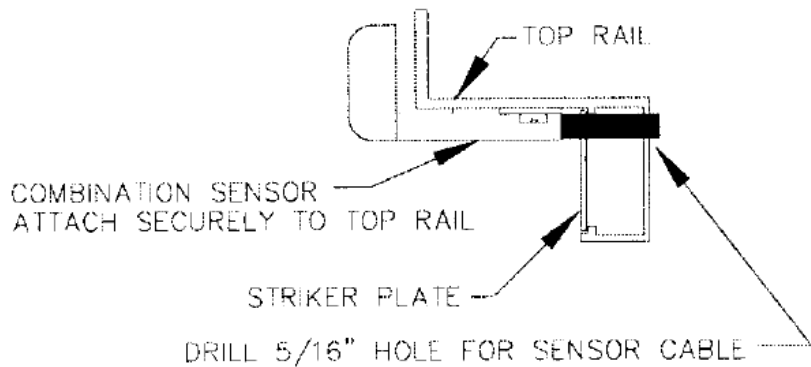
	frame/door heater, said method comprising the steps of:	wide range of store dewpoints and refrigeration modes and applications. Page 3:  The diagram shows a display case with four glass display doors. On the left side, a 'COMBINATION DEWPOINT AND FRAME SENSOR' is connected to an 'AASC ANTI-SWEAT HEATER CONTROLLER'. On the right side, a similar sensor is connected to an 'AASC-R REMOTE MOUNT HEATER CONTROLLER'. A 'FIXTURE ELECTRICAL RACEWAY' is located at the base of the case. Page 10: The XE-ASC controller is part of Altech Controls XPRT Eagle controllers. The XE-ASC can control the anti-sweat heaters for a line-up of reach-in display cases as shown in the diagram above. It determines the dewpoint of the store and then pulse-width modulates the heaters to maintain the measured frame temperature above the dewpoint.
[8.a]	placing a temperature sensing unit in contact with the display case frame to monitor case frame temperature;	Page 5: The AASC Combination Sensor contains all the sensing elements for operation of the AASC Controller. It contains the store temperature and humidity sensors used to determine the store dewpoint. It also includes an integral frame temperature sensor that can be used as the feedback element for the AASC controller. Page 3:  This diagram is identical to the one in the first row, showing a display case with four glass display doors, sensors on the left and right, and controllers at the bottom, connected by an electrical raceway.

Page 5:



Page 8: The AASC controller needs a frame temperature sensor to provide feedback for controlling the heaters. It is best if the sensor monitors the coldest exposed surface on the frame. Generally the coldest spot for frames installed in walk-in coolers or freezers is along the top rail of the frame. In contrast, reach-in display fixtures generally have the cold surface along the bottom rail.

Page 9:



Page 10: Frame temperature sensor feedback automatically compensates energy usage for the fixture temperature and the store dewpoint.

[8.b]

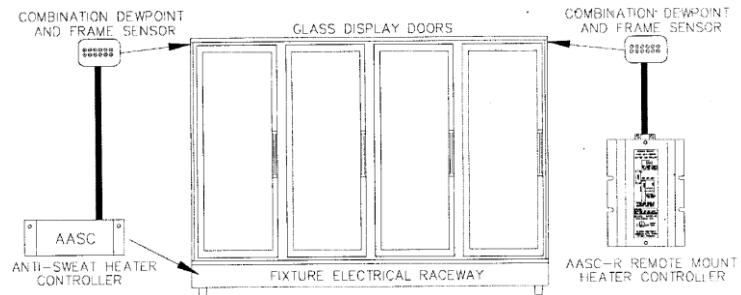
mounting a dew point sensing unit on the display case to monitor ambient air temperature and

Page 5: The AASC Combination Sensor contains all the sensing elements for operation of the AASC Controller. It contains the store temperature and humidity sensors used to determine the store dewpoint. It also includes an

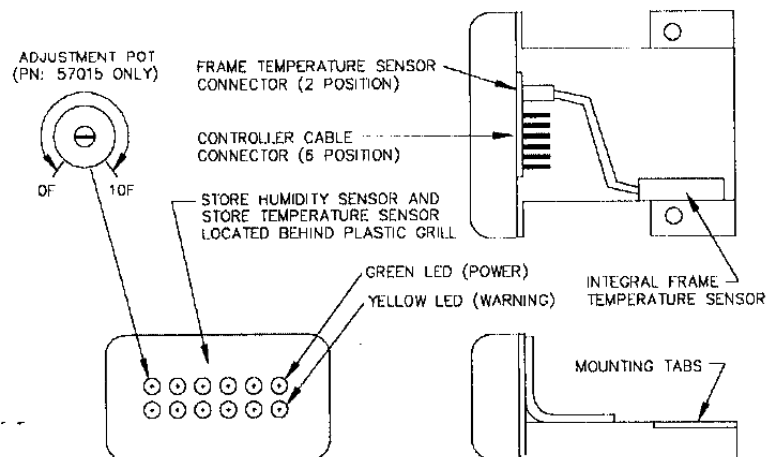
relative humidity outside the display case; and

integral frame temperature sensor that can be used as the feedback element for the AASC controller.

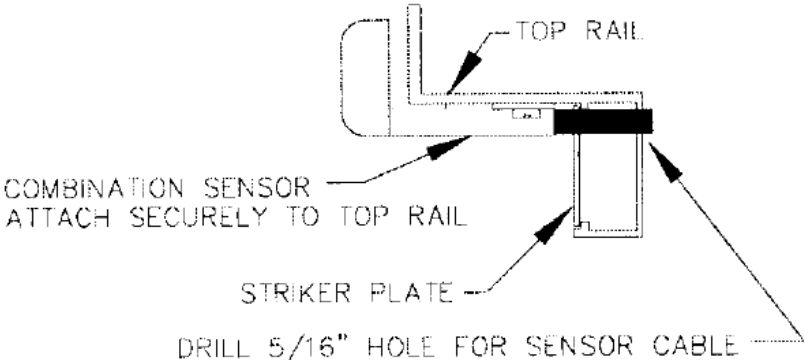
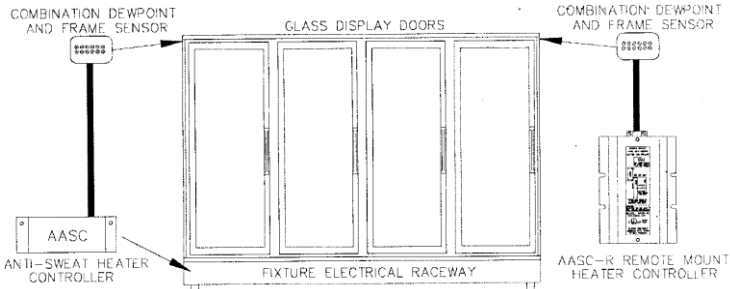
Page 3:



Page 5:



Page 8: The AASC controller needs a frame temperature sensor to provide feedback for controlling the heaters. It is best if the sensor monitors the coldest exposed surface on the frame. Generally the coldest spot for frames installed in walk-in coolers or freezers is **along the top rail of the frame**. In contrast, reach-in display fixtures generally have the cold surface **along the bottom rail**.

		Page 9:  TOP RAIL COMBINATION SENSOR ATTACH SECURELY TO TOP RAIL STRIKER PLATE DRILL 5/16" HOLE FOR SENSOR CABLE
[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.	Page 3: 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. Page 3: Patent pending frame temperature feedback optimizes the energy usage of the frame heaters over a wide range of store dewpoints and refrigeration modes and applications. Page 3: Pulsed control of the heaters reduces temperature fluctuations and extends heater life. Page 3:  COMBINATION DEWPOINT AND FRAME SENSOR GLASS DISPLAY DOORS COMBINATION DEWPOINT AND FRAME SENSOR AASC ANTI-SWEAT HEATER CONTROLLER FIXTURE ELECTRICAL RACEWAY AASC-R REMOTE MOUNT HEATER CONTROLLER Page 5: The AASC Combination Sensor contains all the sensing elements for operation of the AASC Controller. It contains the store temperature and humidity sensors used to determine the store dewpoint. It also includes an integral frame temperature sensor that can be used as the feedback element for the AASC controller.

	Page 5: The AASC Controller receives the sensor information from the Combination Sensor and determines if the anti-sweat heaters are to be energized via the internal solid-state switch. The heaters are controlled in a 10 second duty cycle. The “Percent ON” will be varied from 0 to 100% based on the perceived need for heat. The duty cycle control helps reduce temperature swing of the frame and prolongs the life of the heaters. Page 10: The XE-ASC controller is part of Altech Controls XPRT Eagle controllers. The XE-ASC can control the anti-sweat heaters for a line-up of reach-in display cases as shown in the diagram above. It determines the dewpoint of the store and then pulse-width modulates the heaters to maintain the measured frame temperature above the dewpoint. Page 10: Pulse-width modulated output reduces heater stress and maintains more uniform frame temperature. <i>*Note: As a POSITA would have understood, the pulse-width modulation technique employed by the Altech anti-sweat system involves alternately activating and deactivating the heater over a given interval of time called the “duty cycle.” When EX1021 uses the term “Percent ON” at Page 5, it is referencing the percentage of time within the duty cycle that the heaters are activated. The remainder indicates the percentage of time within the duty cycle that the heaters are deactivated.*</i>
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78. For all these reasons, the Response and Mr. Pollock’s declaration fail to establish the nexus requirement, and there can be no nexus because the combined claim features are not new or unique. Accordingly, I have not seen any evidence of any objective indicia that would carry weight in my analysis, much less sufficient weight to change my conclusions about the obviousness of the ’847 patent claims.

To be clear, I have not evaluated and I do not offer opinions regarding the truthfulness or veracity of the statements made by Mr. Pollock and in the Response regarding alleged commercial success, copying, or industry praise and adoption. I did not need to consider or opine on them due to the clear lack of nexus. To give an example, I understand Mr. Pollock purports to compare the '847 patent's claim 8 to another patent assigned to a company called Hill Phoenix. EX2037 ¶¶66. Because Mr. Pollock does not address the nexus requirement and, as I've shown above, the features of claim 8 are not new or unique, it is irrelevant whether those well-known features also appear in the patent filings of another company like Hill Phoenix. Thus, I see no reason to analyze, and have not analyzed, the Hill Phoenix patent.

79. I also understand that there is an objective indicia consideration that can show obviousness, and/or refute other evidence of non-obviousness, namely whether there has been simultaneous invention of the subject matter of the claims. As I described in my Prior Declaration, there were a number of similar controllers on the market in the 2005 time period. *See* EX1003 ¶¶33–60. In my opinion, the existence of these alternative controllers for this specific application in the same time period confirms my conclusions that the claims were obvious to a person of ordinary skill in the art.

IV. CONCLUSION

80. I declare that all statements made in this Declaration of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both (under Section 1001 of Title 18 of the United States Code).

Executed this 21st day of April, 2026.

A handwritten signature in black ink, appearing to read "Gregor Hunt", is written over a horizontal line.