

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ZHONGSHAN BROAD-OCEAN MOTOR CO. LTD.,
Petitioner,

v.

NIDEC MOTOR CORPORATION,
Patent Owner.

Case IPR2015-00465
Patent 8,049,459 B2

Before BENJAMIN D. M. WOOD, JAMES A. TARTAL, and
PATRICK M. BOUCHER, *Administrative Patent Judges*.

TARTAL, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(A) and 37 C.F.R. § 42.73

I. INTRODUCTION

Petitioner, Zhongshan Broad-Ocean Motor Co. Ltd., filed a corrected Petition requesting an *inter partes* review of claims 1–7 and 16–18 of U.S. Patent No. 8,049,459 B2 (Ex. 1001, “the ’459 patent”). Paper 6 (“Pet.”). Patent Owner, Nidec Motor Corporation, filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). We instituted an *inter partes* review of claims 1–3, 7, and 18 as anticipated under 35 U.S.C. § 102 by Mullin¹ and by Pant.² Paper 10 (“Inst. Dec.”).

After institution of trial, Patent Owner filed a Response (Paper 14, “PO Resp.”), to which Petitioner replied (Paper 20, “Pet. Reply”). Patent Owner also filed a Motion to Amend (Paper 16, “Mot.”), proposing a substitute claim to claim 18. Petitioner, in turn, filed an Opposition to the proposed amended claim (Paper 19, “Pet. Opp.”), and Patent Owner followed with a Reply (Paper 23, “PO Reply”). The Petition is supported by the Declaration of Mr. Joseph C. McAlexander (Ex. 1007) and the Second Declaration of Mr. Joseph C. McAlexander (Ex. 1011). The Response is supported by the Declaration of Dr. Mark N. Horenstein (Ex. 2001). An oral hearing was held on March 22, 2016. Paper 31 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c). In this Final Written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, we determine, based on the record before us, that Petitioner has shown by a preponderance of the evidence that claims 1, 3, 7, and 18 are unpatentable.

¹ U.S. Application No. 2008/0180048 A1 (Ex. 1006, “Mullin”), published July 31, 2008 (also referred to as “the ’048 Publication” in the Petition).

² U.S. Application No. 2007/0069683 A1 (Ex. 1003, “Pant”), published March 29, 2007 (also referred to as “the ’683 Publication” in the Petition).

Additionally, Patent Owner concedes that claim 18 is unpatentable. *See* PO Resp. 4 (not disputing claim 18 is anticipated by Mullin); *see also* Tr. 17:15–16 (Counsel for Patent Owner states “I believe we have conceded that claim 18 is unpatentable without an amendment.”). Petitioner has not shown by a preponderance of the evidence that claim 2 is unpatentable. We further determine that Patent Owner has not met its burden of showing that the proposed substitute claim to claim 18 is patentably distinct over the prior art of record, and thus, we *deny* the Motion to Amend.

II. BACKGROUND

A. *The ’459 Patent (Ex. 1001)*

The ’459 patent, titled “Blower Motor for HVAC Systems” issued November 1, 2011, from U.S. Application No. 12/206,062, filed September 8, 2008. Ex. 1001. The ’459 patent describes a “blower motor assembly having a variable speed motor that is suitable for direct, drop-in replacement in a residential HVAC (heating, ventilation, and air conditioning) system that employs a [permanent split capacitor] PSC motor.” *Id.* at Abstract. According to the ’459 patent, “HVAC systems traditionally use fixed speed or multiple speed permanent split capacitor (PSC) motors. These motors generally have two independent power connections to accommodate heating or cooling modes of operation.” *Id.* at 2:5–9. The ’459 patent explains that, when in circulation mode, the blower motor operates continuously, typically at the speed used for cooling, which is usually well in excess of the speed necessary to achieve air circulation, magnifying blower mode inefficiencies. *Id.* at 1:43–2:3. Due to inefficiencies with PSC motors, “many newer HVAC systems use variable speed motors such as brushless permanent

magnet (BPM) motors and corresponding electronic variable speed motor controllers. The speed of a BPM can be electronically controlled and set specifically to match the airflow requirements for each application, thus permitting more efficient operation.” *Id.* at 2:66–3:5. According to the ’459 patent, replacing an existing PSC motor with a variable speed motor has required “costly, time-consuming, and complex changes in the mechanical, wiring, or control configuration of the system.” *Id.* at 3:14–18. With the intention of resolving such issues, the ’459 patent describes “a blower motor assembly broadly comprising a rectifier, a novel sensing circuit, a variable speed motor, and the motor’s associated motor controller and power converter.” *Id.* at 3:58–64. Figure 2 of the ’459 patent is reproduced below.

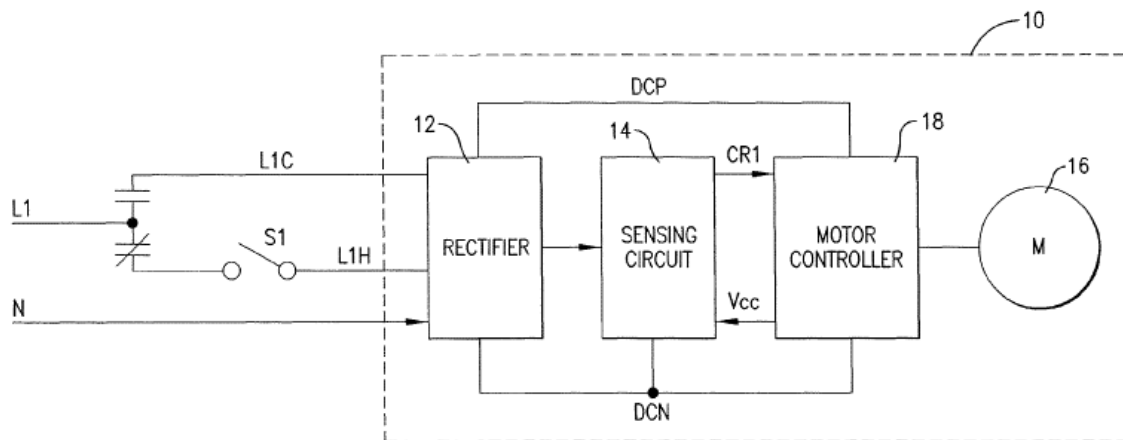


Fig. 2.

Figure 2 shows blower motor assembly 10, including rectifier 12, sensing circuit 14, variable speed motor 16, and the motor’s associated motor controller and power converter 18. *Id.* at 6:44–49. As explained by Mr. McAlexander, “sensing circuit 14 monitors L1C or L1H inputs and generates a logic level signal CR1 whenever AC power is detected in either

of these inputs.” Ex. 1007 ¶ 14 (citing Ex. 1001, 7:21–23). If sensing circuit 14 senses power in L1C, the motor controller 18 causes the motor 16 to drive the blower fan at a speed selected for the cooling mode of operation of the HVAC system. *Id.* (citing Ex. 1001, 8:9–12). Alternatively, motor controller 18 causes motor 16 to drive the blower fan at a speed selected for the heating mode of operation of the HVAC system if no power is detected on L1C by sensing circuit 14. *Id.* (citing Ex 1001, 8:12–17).

The ’459 patent further discloses embodiments with additional power input connections and sensor circuits to provide for additional fan blower speeds. Figure 6 of the ’459 patent is reproduced below.

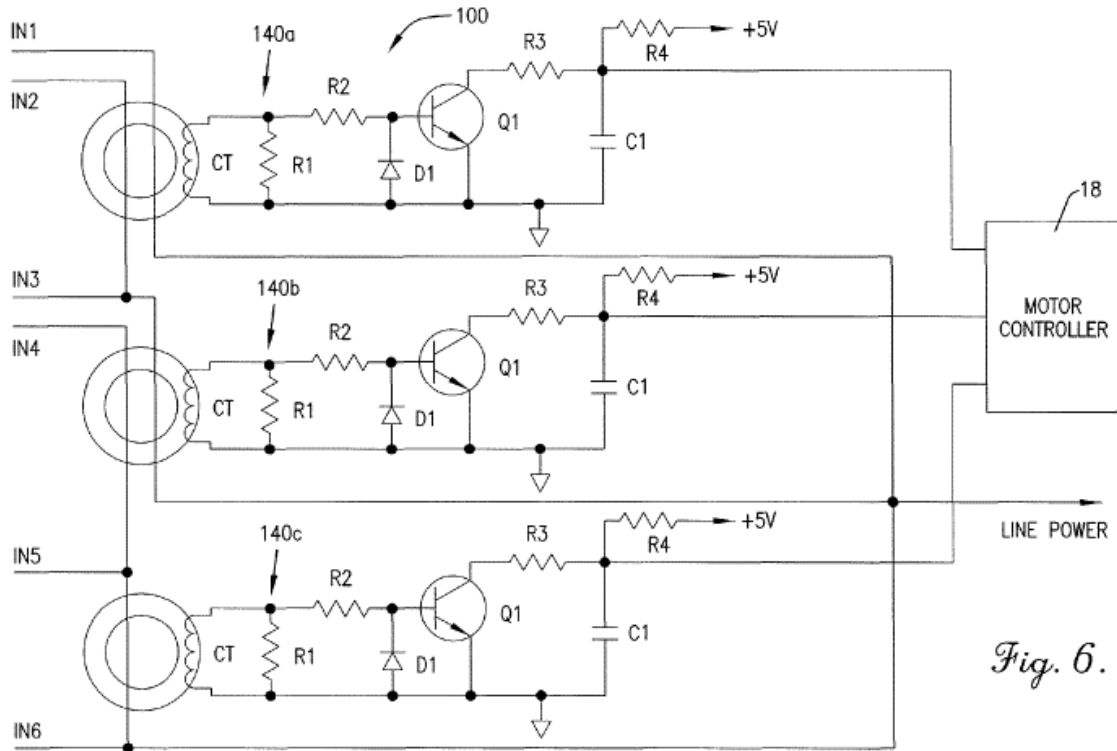


Fig. 6.

Figure 6 shows blower motor assembly 100, including six power connections IN1 to IN6, and three sensing circuits 140a, 140b, and 140c that provide signaling to motor controller 18. *Id.* ¶ 15 (citing Ex. 1001, 8:65–

9:2). The power inputs IN1 to IN6 may correspond to any set of operating parameters for the motor and, based on which of the sensing circuits 140a, 140b, or 140c transmits a signal, motor controller 18 selects an operating speed of motor 16. *Id.* (citing Ex. 1001, 9:3–11, 35–37).

B. Illustrative Claim

Claims 1 and 18 of the '459 patent are independent. Claims 2, 3 and 7 depend from claim 1. Claim 1 of the '459 patent is illustrative of the claims at issue:

1. A blower motor assembly comprising:
 - a variable speed motor and motor controller;
 - a power input coupled with the motor controller and comprising at least first, second, and third inputs for receiving AC power from an AC power source;
 - at least two sensing circuits, each of said at least two sensing circuits operable for sensing which of at least one of the first, second, and third inputs power is applied to and for delivering a corresponding signal to the motor controller for selecting a corresponding operating parameter for the motor;wherein a first one of the sensing circuits senses power applied to the first and second inputs, a second one of the sensing circuits senses power applied to the second and third inputs, and wherein the motor controller is operable for determining that power is applied to the first input when the first sensing circuit senses power.

Ex. 1001, 17:37–53.

III. ANALYSIS

A. Claim Construction

Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

1. *“inputs for receiving AC power from an AC power source”*

Petitioner contends that “inputs for receiving AC power from an AC power source,” as recited in claim 1, means “connections that enable alternating current (AC) to be supplied from a power source.” Pet. 6. Petitioner notes that the ’459 patent discloses that “[p]ower to the blower motor 10 is provided via the same set of power input connections provided to the PSC motors M1 ... i.e., L1C, L1H, and neutral N.” *Id.* (quoting Ex. 1001, 6:49–52). From this, Petitioner asserts that one input for receiving AC power is the neutral line N. Pet. 6.

In our Institution Decision we agreed with Petitioner’s proposed construction over the arguments raised by Patent Owner in its Preliminary Response based on the record at that time. The ’459 patent states that the blower assembly may be equipped with “several sensing circuits for sensing current or voltage in the hot inputs and/or the neutral lines for controlling various aspects of the variable speed motor.” Ex. 1001, Abstract. The ’459 patent further states that “[a] sensing circuit is configured for sensing current in one of the neutral inputs and for providing a corresponding signal to the motor controller for controlling an operational parameter of the motor such as the motor’s rotation direction.” *Id.* at 4:26–34. The specification thus discloses neutral inputs that are used exactly the way the claim recites the operability of the sensing circuits, i.e., “for delivering a corresponding signal to the motor controller for selecting a corresponding operating parameter for the motor.” In its Response, Patent Owner does not dispute that one input for receiving AC power is the neutral line. PO Resp. 13, n.3 (stating that, for purposes of this proceeding, it accepts our construction of “power input”

in the Institution Decision). Based on the record, as fully developed, we maintain our determination that “inputs for receiving AC power from an AC power source” means “connections that enable alternating current (AC) to be supplied from a power source.”

2. Additional Claim Terms

For purposes of this Decision, no express construction of any additional claim term is necessary.

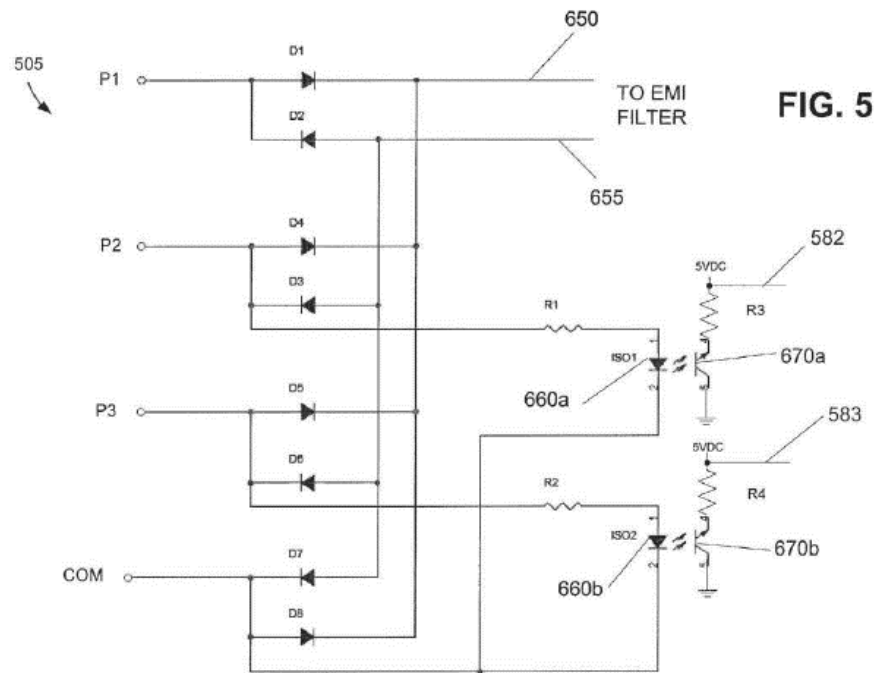
B. Asserted Anticipation by Mullin

Petitioner contends claims 1–3, 7, and 18 are anticipated by Mullin. Pet. 29–38. Mullin discloses:

A brushless direct current (BLDC) motor having a simulated tapped-winding input. The BLDC motor includes a stator/rotor assembly having a stator and a rotor. The BLDC motor has a common input and a plurality of power inputs. Each power input corresponds to an operating parameter. The BLDC motor receives an AC voltage across the common input and one of the power inputs and operates the stator/rotor assembly according to an operating parameter corresponding to the power input receiving power.

Ex. 1006, Abstract.

Figure 5 of Mullin is reproduced below.



Mullin Figure 5 is a schematic illustration of an input interface 505 for a BLDC motor simulating a tapped-winding. Ex. 1006 ¶ 18. “The input interface 505 includes three power input lines P1, P2, and P3; a common input line COM; diodes D1-D8; resistors R1-R4; and opto-isolators ISO1 and ISO2.” *Id.* ¶ 46. “Opto-isolators ISO1 and ISO2 include an optical transmitter such as a light-emitting-diodes (LEDs) 660a or 660b.” *Id.* ¶ 47. Petitioner provides a claim chart identifying disclosures in Mullin corresponding to each of the limitations of claims 1–3, 7, and 18. Pet. 33–38.

1. Claim 1

Claim 1 recites a blower motor assembly comprising, among other things, “a variable speed motor and motor controller.” There is no dispute that BLDC motor 275 and controller 535 correspond to the recited “variable

speed motor and motor controller.” See Pet. 33 (citing Ex. 1006 ¶¶ 26–27). There also is no dispute that Mullin’s disclosure of power inputs P2, COM, and P3 correspond to the “power input . . . comprising at least first, second and third inputs for receiving AC power,” as claimed. *Id.* (citing Ex. 1006 ¶ 41). Nor is there any dispute that Mullin’s opto-isolators ISO1 and ISO2 with triggering phototransistors 670a and 670b correspond to the claimed “at least two sensing circuits.” *Id.* at 33–34 (citing Ex. 1006 ¶ 46).

Claim 1 requires that each sensing circuit is “operable for sensing which of at least one of the first, second, and third inputs power is applied to and for delivering a corresponding signal to the motor controller for selecting a corresponding operating parameter for the motor.” We agree with Petitioner, and Patent Owner does not dispute, that Mullin also discloses this limitation, as explained by Petitioner:

“When AC power is applied across the common input COM and the second power input P2, the AC signal is also present across ISO1,” and during the positive half-cycle of this AC signal, line 582 is coupled to the controller 535. [Ex. 1006] ¶ [0048]. A square-wave signal is thus present on line 582 and at the controller 535 in this circumstance. [*Id.*] at ¶ [0048]. Similarly, “[w]hen AC power is applied across the common input COM and the third power input P3, the AC signal is also present across ISO2,” and during the positive half-cycle of this AC signal, line 583 is coupled to the controller 535. [*Id.*] at ¶ [0049]. A square-wave signal is therefore present on line 583 and at the controller 535 in this other circumstance.” [*Id.*] at ¶ [0049].

Pet. 32–33. Thus, sensing circuit ISO1 is operable for sensing AC power applied to power inputs COM and P2, and delivers a corresponding square-wave signal to the controller. Similarly, sensing circuit ISO2 is operable for

sensing AC power applied to power inputs COM and P3, and delivers a corresponding square-wave signal to the controller.

The disagreement of the parties focuses on whether Mullin discloses “a first one of the sensing circuits senses power applied to the first and second inputs, a second one of the sensing circuits senses power applied to the second and third inputs, and wherein the motor controller is operable for determining that power is applied to the first input when the first sensing circuit senses power.” *See* PO Resp. 21–26. More particularly, the issue is whether that limitation requires power to be sensed at the second input. Indeed, Patent Owner acknowledges that Mullin’s sensors detect power at P2 and P3 (PO Resp. 23) and Petitioner concedes that Mullin does not detect power at the second input (COM). Tr. 12:20–13:2.

We agree with Petitioner that, for Mullin to anticipate claim 1, Mullin need not disclose power sensed at COM. *See* Pet. Reply 19–22. The claim language does not require power to be sensed at any specific location, only that one sensing circuit senses “power applied to” the first and second inputs, and the other senses “power applied to” the second and third inputs. Patent Owner does not direct us to any persuasive disclosure in the ’459 patent to support its contention that claim 1 requires that power be sensed at the second input. *See* PO Resp. 21–26. Similarly, although Dr. Horenstein states that “the Mullin circuit is incapable of providing unique information that power has been connected to COM,” a point not in dispute, Dr. Horenstein provides only conclusory assertions and no persuasive explanation for why claim 1 would be understood to require such “unique information” for the second input. *See* Ex. 2001 ¶¶ 56, 63.

Moreover, in Mullin, when a sensor detects power at either P2 or P3, power is necessarily applied to COM (neutral) to complete the circuit, even if the sensor does not directly detect power at COM. As Dr. Horenstein explained, “at least two inputs from the source of AC power – generally line and neutral – would have to be connected in order to complete the circuit and enable the flow of power to the motor.” Ex. 2001 ¶ 53.

Mr. McAlexander similarly explained that by the very nature of alternating current, “the flow of electric charge periodically reverses direction.” Ex. 1011 ¶ 12. Thus, when alternating current is applied to Mullin’s input P2 and COM it will “be input from the input P2 and return by way of the COM, and at other times it will be input from the COM and return by way of the input P2.” *Id.* ¶ 13. The same is true of P3 and COM. *See id.* As shown by Petitioner, Dr. Horenstein

confirmed during cross-examination that, when AC power, as referred to in Mullin, is applied to the power input P2 and common input COM as shown above, the opto-isolator ISO1 senses this power and outputs a corresponding signal, [and] when Mullin’s AC power is applied to the power input P3 and common input COM as shown above, the opto-isolator ISO2 senses this power and outputs a corresponding signal.

Pet. Reply 22; *see also* Ex. 1010, 68:24–69:19. Accordingly, the testimony of Mr. McAlexander and Dr. Horenstein supports our determination that Mullin discloses a first sensing circuits that “senses power applied to the first and second inputs” and a second sensing circuit that “senses power applied to the second and third inputs,” as well as a motor controller that is “operable for determining that power is applied to the first input when the first sensing circuit senses power,” as required by claim 1.

We have considered each of the arguments raised by Patent Owner, and we determine, based on the information presented, that claim 1 of the '459 patent is anticipated by Mullin.

2. Claim 2

Claim 2, which depends from claim 1, further requires that “the motor controller is operable for determining that power is applied to the second input when both the first sensing circuit and the second sensing circuit sense power.” Petitioner contends in its claim chart, with no additional explanation, that Mullin discloses this limitation because:

“When power is applied between the common input COM and the second power input P2, the input interface 505 provides a signal on line 582 and no signal on line 583 and the controller operates the motor based on a second operating parameter (e.g., 1000 RPM). And when power is applied between the common input COM and the third power input P3, the input interface 505 provides a signal on line 583 and no signal on line 582 and the controller operates the motor based on a third operating parameter (e.g., 850 RPM).”

Pet. 35 (quoting Ex. 1006 ¶ 45) (emphasis omitted). Petitioner’s argument is premised on the contention that the claim language “when both the first sensing circuit and the second sensing circuit sense power” means “*when* the first sensing circuit *or when* the second sensing circuit sense power.”

Petitioner, however, does not explain why this interpretation of the claim language comports with the broadest reasonable interpretation of the claim, particularly since the '459 patent is directed to sensing circuits that deliver signals to a motor controller to control the speed of the variable speed motor. Petitioner’s interpretation results in sending the same signal if either of the two sensing circuits senses power. Indeed, neither party directs us to

anything in the specification of the '459 patent to illuminate how claim 2 should be construed.

Patent Owner argues that “Mullin never discloses that power will be applied simultaneously to P2 and P3,” or “that both sensors will sense power simultaneously.” PO Resp. 27–28. Thus, Patent Owner’s argument is premised on the contention that the claim language “when both” requires sensing power at the first sensing circuit and the second sensing circuit at the same time, but Patent Owner provides little explanation why its interpretation of the claim language is the broadest reasonable interpretation.

Petitioner argues in reply that “claim 2 includes no requirement that the ‘first sensing circuit’ and the ‘second sensing circuit’ sense power simultaneously,” and further argues “[n]or does Patent Owner present any argument with reference to, *e.g.*, the 459 Patent specification or prosecution history as to why this additional limitation should be read into this claim.” Pet. Reply 23. Petitioner’s reply, however, fails to recognize that Petitioner bears the burden of demonstrating that Mullin anticipates the claim, including providing sufficient evidence and argument in support of its proposed claim interpretation. The Petition fails to provide a sufficient explanation to support that “when both” should be construed in the manner asserted by Petitioner, particularly when the more natural reading of the claim language conveys that two sensing circuits sense power at the same time. Although Petitioner provided a second declaration from Mr. McAlexander in reply to Patent Owner’s response, neither that declaration nor Mr. McAlexander’s first declaration provides sufficient support for how claim 2 would have been understood by a person of

ordinary skill to show that it is anticipated by Mullin. *See* Exs. 1007 and 1011. Because Petitioner failed to persuasively prove that claim 2 requires only that one of two sensors senses power for the motor controller to determine that power is applied to the second input, Petitioner has not shown by a preponderance of the evidence that claim 2 of the '459 patent is anticipated by Mullin.

3. Claims 3 and 7

Claim 3, which depends from claim 1, further requires “the motor controller is operable for determining that power is applied to the third input when the second sensing circuit senses power.” Claim 7, which also depends from claim 1, requires that “the operating parameter is a speed of the motor.” Petitioner has shown how the additional features of claims 3 and 7 are disclosed by Mullin (Pet. 33–36), and Patent Owner does not assert any additional arguments in opposition to Petitioner’s contentions with respect to claims 3 and 7 beyond those Patent Owner asserted with respect to claim 1. Accordingly, Petitioner has shown by a preponderance of the evidence that, as demonstrated in the Petition, claims 3 and 7 of the '459 patent are anticipated by Mullin.

4. Claim 18

As noted above, Patent Owner concedes that claim 18 is unpatentable. *See* PO Resp. 4 (not disputing claim 18 is anticipated by Mullin); *see also* Tr. 17:15–16. Additionally, Petitioner has shown by a preponderance of the evidence that, as demonstrated in the Petition, claim 18 of the '459 patent is anticipated by Mullin. Pet. 36–38.

C. Asserted Anticipation by Pant

Petitioner contends claims 1–3, 7, and 18 are anticipated by Pant.
Pet. 13–24. Pant discloses:

A method of and apparatus for controlling an electric machine. The method can include using a controller to detect whether power is present at a first node of the controller, detect whether power is present at a second node of the controller, generate at least one signal based at least in part on the detection, and energize the electric machine using a detected power when the at least one signal indicates power is present at at least one of the first node, the second node, and a combination of the first node and the second node.

Ex. 1003, Abstract.

Figure 3 of Pant is reproduced below.

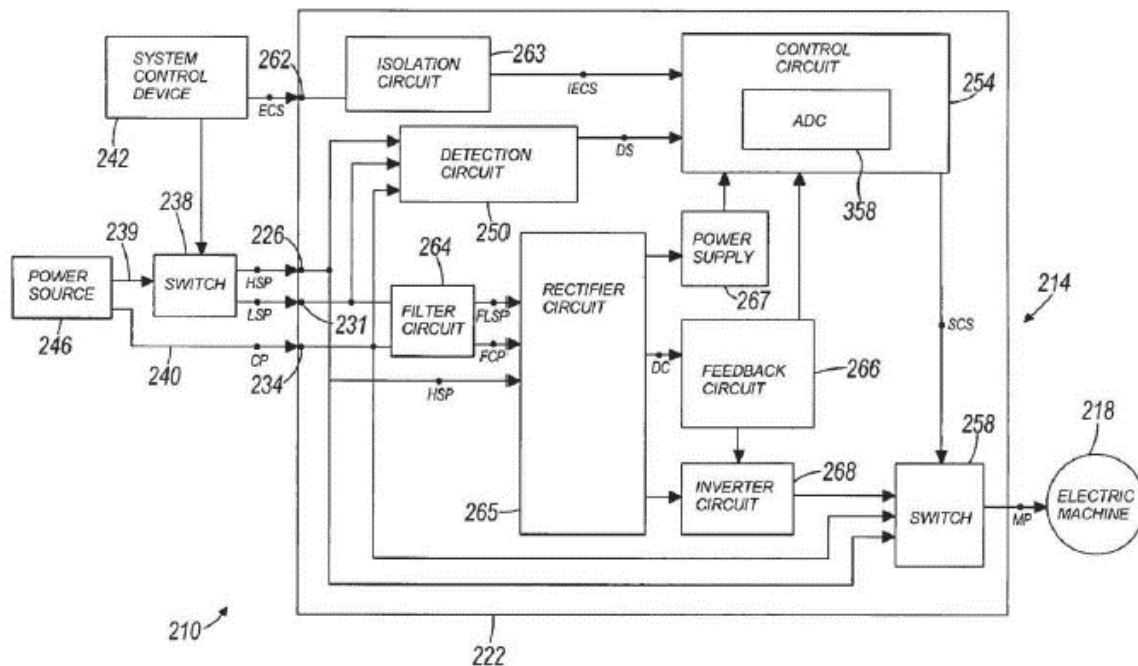


FIG. 3

Pant Figure 3 illustrates HVAC system 210, including electric machine 218 connected to controller 222. Ex. 1003 ¶ 34. Pant states that “[t]he

illustrated electric machine 218 comprises an induction motor such as a single-speed, single-phase (SSSP) permanent split capacitance (PSC) motor or a multiple-tapped, single-phase (MTSP) PSC motor,” and that “[i]n other constructions, the electric machine 218 can comprise other types of electric motors,” including “brushless permanent magnet motors.” *Id.* Controller 222 includes first power connection 226, second power connection 231, and third power connection 234.

Figure 4 of Pant is reproduced below.

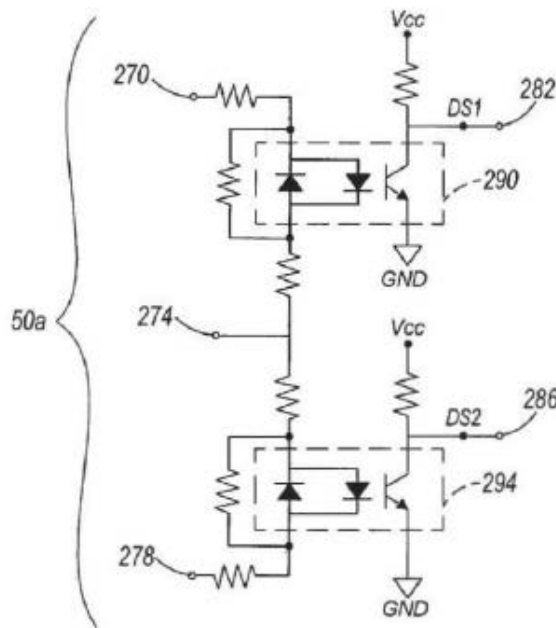


FIG. 4

Pant Figure 4 illustrates a solid-state detection circuit 250a, including connection 270 corresponding to the high-speed power (HSP) input, connection 274 corresponding to the common power (CP) input, and connection 278 corresponding to the low-speed power (LSP) input. Ex. 1003 ¶ 42. As explained by Petitioner, “when voltage greater than a threshold level is detected across the first and second connections 270 and

274, a portion of a first electrical isolation device 290 receives a signal that is output as a detection signal DS1 on the fourth connection 282.” Pet. 16 (citing Ex. 1003 ¶ 42). Similarly, “when voltage greater than a threshold level is detected across the second and third connections 274 and 278, a portion of a second electrical isolation device 294 receives a signal that is output as a detection signal DS2 on the fourth connection 286.” *Id.* (citing Ex. 1003 ¶ 43).

The detection signal DS that includes the first and second detection signals DS1 and DS2 can be in the following states: (i) a first state when power is not detected at the first and third connections 270 and 278; (ii) a second state when power is detected only at the first connection 270; (iii) a third state when power is detected only at the third connection 278; and (iv) a fourth state when power is detected at both the first and third connections 270 and 278.

Id. (citing Ex. 1003 ¶ 44).

Control circuit 254 of controller 222 selects a control mode based, at least in part, on the detection signal DS it receives. “[C]ontrol circuit 254 can include a plurality of control modes including an OFF control mode, a first operational control mode, second operational control mode, and a third operational control mode,” corresponding to the first, second, third, and fourth states of the signal DS. Ex. 1003 ¶ 54. Control circuit 254 transmits a switch control signal SCS to switch 258 by which electric machine 218 is energized to operate at a high-speed power HSP, a low-speed power LSP, and the like. Pet. 17 (citing Ex. 1003 ¶ 55).

Petitioner provides a claim chart identifying disclosures in Pant allegedly corresponding to each of the limitations of claims 1–3, 7, and 18. Pet. 17–24.

1. Claim 1

There is no dispute that the “brushless permanent magnet motor” (“BPM motor”) disclosed by Pant is a variable speed motor, as required by claim 1. Patent Owner also recognizes that Pant discloses that a BPM motor may be substituted for a PSC motor. PO Resp. 11. Patent Owner, however, argues that Pant fails to disclose the claim elements as arranged in the claim because it refers to the BPM motor as an alternative construction, and “provides no details as to how one would actually incorporate a variable speed motor, such as a BPM, into the disclosed HVAC system so as to take advantage of its variable-speed capability.” *Id.* Patent Owner’s argument is not persuasive because Pant discloses the use of a variable speed motor in the same system in which it describes the use of a PSC motor, and need not explicitly describe a system that takes advantage of all of the benefits of a variable speed motor to anticipate claim 1.

Patent Owner further argues that the “variable speed motor and motor controller” recited by claim 1 requires not only a “variable speed motor,” but also a “variable speed motor controller.” PO Resp. 10. Patent Owner further contends that “[a] variable speed motor controller is an electronic controller capable of producing control signals to operate a ‘variable speed motor’ in a wide range of speeds,” and that Pant does not disclose “a variable-frequency controller” to drive a BPM. *Id.* at 10, 12. The ’459 patent explains that “many newer HVAC systems use variable speed motors such as brushless permanent magnet (BPM) motors and corresponding electronic variable speed motor controllers.” Ex. 1001, 2:67–3:3. Claim 1, however, does not require the “electronic variable speed motor controller”

described in the specification in association with “newer HVAC systems,” but instead only recites a “motor controller.” Further, Patent Owner identifies insufficient support from the specification of the ’459 patent for its contention that claim 1 should be read to require a “variable speed motor controller,” much less any express description of what such a “variable speed motor controller” would necessarily include. To suggest that a variable speed motor controller must operate a variable speed motor in “a wide range of speeds,” is, at best, ambiguous. Moreover, although a drop-in replacement blower motor assembly may desirably operate at a wide range of speeds for purposes of producing a drop-in replacement for a multitude of systems, in any single system application the assembly need only operate at a limited number of speeds to function, and that is all that claim 1 requires. As explained during the oral hearing:

JUDGE TARTAL: Can I just ask counsel, in the same vein of claim 1, do any of the additional limitations correspond to, what I think you described as a wide range of speeds?

So, in other words, if it is only utilizing two sensing circuits and identifying two or three operating situations, how is that encompassed by a wide range of speeds that a variable motor would correspond to?

MR. BROWN: It is not encompassed by that particular language, Your Honor. It is the concept that the system is going to be dropped into different systems.

So for any one system, there is going to be three, five, six speeds that it needs to operate at. But because it can chameleon-like be substituted in the different systems, it will have different variable speeds depending on which system it is put into, but there is not, within the body of claim 1, there is not a direct further reference to the variable range of speeds.

Tr. 23:13–24:4. To be clear, common sense dictates that the motor controller of claim 1 must be capable of controlling the variable speed motor

also recited in claim 1. Thus, so long as the controller is “capable of producing signals to operate a ‘variable speed motor,’” it satisfies the requirement of claim 1 for a “motor controller.” Dr. Horenstein makes passing reference to Pant’s lack of a “variable frequency controller,” but claim 1 does not recite such a controller, and Dr. Horenstein provides no persuasive explanation for why the claim should be construed to require such a controller. Dr. Horenstein also recognizes that the motor controller of Pant is capable of operating the BPM motor disclosed by Pant. Ex. 2001 ¶¶ 29–31. That is all that claim 1 requires of a motor controller.

There is no dispute that Pant discloses three power connections 226, 231, and 234 corresponding to the “power input . . . comprising at least first, second and third inputs for receiving AC power,” as claimed. Pet. 18 (citing Ex. 1003 ¶ 35). Nor is there any dispute that Pant’s first electrical isolation device 290 and second electrical isolation device 294 correspond to the claimed “at least two sensing circuits.” *Id.* at 18–19 (citing Ex. 1003 ¶¶ 42–43); *see also* PO Resp. 14.

As discussed above, claim 1 also requires that each sensing circuit is “operable for sensing which of at least one of the first, second, and third inputs power is applied to and for delivering a corresponding signal to the motor controller for selecting a corresponding operating parameter for the motor.” We agree with Petitioner, and Patent Owner does not dispute, that Pant discloses this limitation, as described above in reference to Pant Figure 4. *See* Pet. 18–19.

As with the ground based on Mullin, the disagreement of the parties again focuses on whether the asserted anticipatory reference discloses “a

first one of the sensing circuits senses power applied to the first and second inputs, a second one of the sensing circuits senses power applied to the second and third inputs, and wherein the motor controller is operable for determining that power is applied to the first input when the first sensing circuit senses power.” See PO Resp. 12–19. Patent Owner acknowledges that “it is true that both sensors [of Pant] can detect a *voltage differential* between either HSP and CP or LSP and CP,” but further argues that neither sensor is arranged to sense power present at the common (neutral) input 274. PO Resp. 14. Patent Owner states that “Pant itself expressly describes the purpose of sensors 290 and 294 is to detect power at node 270 and 278 respectively.” *Id.* at 15.

For the same reasons discussed above with respect to anticipation by Mullin, we agree with Petitioner that, for Pant to anticipate claim 1, Pant need not disclose power sensed at CP. See Pet. Reply 19–22. The claim language only requires that one sensing circuit senses “power applied to” the first and second inputs, and that a second senses “power applied to” the second and third inputs. Petitioner has persuasively shown from Pant, and Dr. Horenstein does not dispute, that (1) “when the power source 246 supplies current to the first and/or third connections 270 and 278, this current may return by way of the ‘second,’ common power CP, connection 274”; (2) “when voltage greater than a threshold level is detected across the first and second connections 270 and 274, a portion of the first electrical isolation device 290 outputs a detection signal DS1 on the fourth connection 282”; and, (3) “when voltage greater than a threshold level is detected across the second and third connections 274 and 278, a portion of the second

electrical isolation device 294 outputs a detection signal DS2 on the fourth connection 286.” Pet. Reply 14–16. Thus, we agree with Petitioner that

when the AC power from the power source 246 is applied to Pant’s connections 270 and 274 . . . , this power is detected by the first electrical isolation device 290, *i.e.*, the “first one of the sensing circuits,” [a]nd when the AC power is applied to Pant’s connections 278 and 274 . . . , this power is detected by the second electrical isolation device 294, *i.e.*, the “second one of the sensing circuits.”

Id. at 16.

We have considered each of the arguments raised by Patent Owner, and we determine, based on the information presented, that claim 1 of the ’459 patent is anticipated by Pant.

2. Claim 2

As noted above, claim 2, which depends from claim 1, further requires that “the motor controller is operable for determining that power is applied to the second input when both the first sensing circuit and the second sensing circuit sense power.” Petitioner contends in its claim chart that Pant discloses the recited feature because Pant’s detection signal DS is in a fourth state “when detected power is present at both of the first connection 270 [HSP] and the third connection 278 [LSP],” and that a “fourth operational control mode is selected when the detection signal DS is in the fourth state.” Pet. 20 (emphasis omitted) (quoting Ex. 1003 ¶¶ 44, 54.) Thus, unlike the ground based on Mullin discussed above, Petitioner contends that Pant’s motor controller is operable for determining that power is applied to the second input when the first and second sensing circuits sense power at the same time. Petitioner, however, does not expressly explain in the Petition

how the detection of power at HSP and LSP determines that power is applied to the second input 274 [CP], as required by claim 2.

Patent Owner argues that “under no circumstance is the *motor controller* of Pant determining that the second input [CP] receives power.” PO Resp. 20. In reply, Petitioner explains that when an alternating current is present between connections 270 and 274, “it will at times flow from the connection 274 [CP] to the connection 270,” and similarly, when an alternating current is present between connections 278 and 274, “it will at times flow from the connection 274 to the connection 278.” Pet. Reply 18. Thus, according to Petitioner, at the times when the second connection 274 is functioning as the current input, “the first electrical isolation device 290 and the second electrical isolation device 294 will still output detection signals DS1 and DS2, respectively,” and “Pant’s apparatus is therefore operable to determine that power is applied to the common power CP connection 274, *i.e.*, Petitioner’s proposed ‘second input.’” *Id.* Petitioner also contends that claim 2 “includes no requirement that the ‘second input’ identify an operating parameter for the ‘motor controller’ that is distinct from that identified by the ‘first and third inputs.’” Pet. Reply 17.

We find Petitioner’s interpretation of claim 2 unsupported, and therefore, unreasonably broad based on the record in this case. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Because there is no dispute that Pant does not expressly disclose a motor controller for determining that power is applied to a second input

identified by Petitioner as CP or neutral, Petitioner is necessarily relying on an inherency argument.

To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.

In re Robertson, 169 F.3d 743, 745 (Fed. Cir. 1999) (citations omitted) (internal quotation marks omitted). Petitioner provides no sufficient evidence to establish that a person of ordinary skill would recognize Pant as requiring a motor controller for determining that power is applied to a second neutral input. The first Declaration of Mr. McAlexander says little specific about claim 2, and offers only a conclusory opinion that “the various claimed components and their functions were also well-known in the art.” Ex. 1007 ¶ 18. The second Declaration of Mr. McAlexander does not discuss claim 2. Because Petitioner failed to persuasively prove that Pant expressly or inherently discloses the recited features of claim 2, Petitioner has not shown by a preponderance of the evidence that claim 2 of the ’459 patent is anticipated by Pant.

3. Claims 3 and 7

Petitioner has shown how the additional features of claims 3 and 7 are disclosed by Pant (Pet. 20–21), and Patent Owner does not assert any additional arguments in opposition to Petitioner’s contentions with respect to claims 3 and 7 beyond those Patent Owner asserted with respect to claim 1. Accordingly, Petitioner has shown by a preponderance of the evidence that,

as demonstrated in the Petition, claims 3 and 7 of the '459 patent are anticipated by Pant.

4. Claim 18

As noted above, Patent Owner concedes that claim 18 is unpatentable. *See* PO Resp. 4 (not disputing claim 18 is anticipated by Mullin); *see also* Tr. 17:15–16. Additionally, Petitioner has shown by a preponderance of the evidence that, as demonstrated in the Petition, claim 18 of the '459 patent is anticipated by Pant. Pet. 21–24.

D. Motion to Amend

Pursuant to 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121, Patent Owner requests amendment of claim 18 with the following proposed changes reflecting underlined additions and bracketed deletions:

A blower motor assembly comprising:

a variable speed motor and motor controller;

a power input coupled with the motor controller for providing operating current for powering the variable speed motor and comprising at least first, second, and third inputs for receiving AC power from an AC power source wherein each input corresponds to a different operating parameter for the motor;

at least two sensing circuits, each of said at least two sensing circuits is adapted for sensing a magnetic field generated by the operating current flowing through the power input to determine which of at least one of the first, second, and third inputs power is applied to and for delivering a corresponding signal to the motor controller for selecting ~~[[a]]~~ the corresponding operating parameter for the motor;

wherein the motor controller determines to which of the first, second, and third inputs power is applied by determining which of the sensing circuits sense power and which of the sensing circuits sense no power and wherein the motor controller selects the corresponding operating parameter based upon power sensed at more than one of said sensing circuits.

Mot. 1. The burden is on Patent Owner to show a patentable distinction of the proposed substitute claim. 37 C.F.R. § 42.20(c); *see also Nike, Inc. v. Adidas AG*, 812 F.3d 1326, 1334 (Fed. Cir. 2015) (“[T]he Board permissibly interpreted [37 C.F.R. § 42.20(c)] as imposing the burden of proving patentability of a proposed substitute claim on the movant: the patent owner.”) Patent Owner must demonstrate how its proposed amendment is patentable over the prior art of record and the prior art known to patent owner. *Idle Free Systems, Inc. v. Bergstrom, Inc.*, IPR2012-00027, Paper 26, at 6 (PTAB June 11, 2013); *MasterImage 3D, Inc. v. RealD Inc.*, IPR2015-00040, Paper 42, at 2 (PTAB July 15, 2015) (precedential). Patent Owner identifies the closest prior art as Mullin and Pant, as well as, Nordby,³ Rowlette,⁴ and Woodward.⁵ Mot. 10–15. Patent Owner contends, and Petitioner does not dispute, that none of the identified closest prior art anticipates the proposed amended claim. Accordingly, we focus our discussion on whether Patent Owner has sufficiently demonstrated that the proposed amended claim would not have been obvious over a combination of the identified closest prior art.⁶

³ U.S. Patent No. 5,818,194 (Ex. 1004, “Nordby”), issued October 6, 1998.

⁴ U.S. Patent No. 5,397,970 (Ex. 1005, “Rowlette”), issued March 14, 1995.

⁵ U.S. Patent No. 7,272,302 B1 (Ex. 2002, “Woodward”), issued September 18, 2007. Patent Owner further identifies two additional patents, U.S. Patent No. 6,952,088 B2 (Ex. 2003) and U.S. Patent No. 6,801,013 B2 (Ex. 2004) as containing the same disclosure as Woodward. Mot. 14.

⁶ For purposes of this Decision we need not reach Petitioner’s additional contentions that, because the proposed amended claim is unsupported by a sufficient written description and is indefinite, it does not comply with 35 U.S.C. §112. *See* Pet. Opp. 4–9. We note Petitioner’s contentions in this regard are not supported by the Second Declaration of Mr. McAlexander.

The dispute between the parties over the proposed amended claim focuses not on whether each of the features Patent Owner seeks to add to claim 18 was known in the art identified by Patent Owner, but on whether it would have been obvious to combine those features to arrive at the proposed amended claim 18. Patent Owner concedes that claim 18, absent amendment, is unpatentable, and we agree with Petitioner, as discussed above, that Mullin discloses all of the features of original claim 18. *See* Tr. 17:15–16. With regard to the proposed amendments to claim 18, Patent Owner acknowledges Nordby “does disclose a sensing circuit adapted to sense a magnetic field.” Mot. 13. Additionally, Petitioner has shown, and Patent Owner does not dispute, that Woodward discloses the features of the proposed amendments concerning a motor controller that selects the corresponding operating parameter based upon power sensed at more than one sensing circuit. *See* Pet. Opp. 19–21; *see also* Mot. 14–15.

To show that the proposed amended claim would not have been obvious, Patent Owner first contends that:

Each of the references above is missing at least two of the required limitations of the proposed amended claim. Each provides a complete solution to the problem it is addressing. There is no reason one of skill would engage in mixing and matching elements in the different references to arrive at the proposed amended claim 18.

Mot. 15. Patent Owner’s attorney argument, which cites no evidence, does not support the contention that the proposed amended claim would not have been obvious to a person of ordinary skill in the art. Nonobviousness cannot be established by attacking the references individually when unpatentability is predicated upon a combination of prior art disclosures. *See In re Merck &*

Co., 800 F.2d 1091, 1097 (Fed. Cir. 1986). Even if each prior art reference is “missing at least two of the required limitations,” that has limited bearing on whether a combination of those references renders the claim obvious. Similarly, Patent Owner provides insufficient support for its implicit argument that one would not combine the references because, individually, they provide a “complete solution” to the problem they intend to address. Where “a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” See *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). Thus, Patent Owner’s suggestion that there “is no reason one of skill would engage in mixing and matching,” fails to adequately address whether the combination would have been obvious. See Mot. 15.

Patent Owner next argues that:

Dr. Horenstein explains that the current based sensor of Nordby is not substitutable into any of the other system architectures. There is no reason one of skill would have sought to replace those voltage based opto-isolator systems with the bulky current transformer and attendant circuitry of Nordby shown, for instance, in Nordby Figure 8. (Horenstein, ¶¶ 104-105).

Mot. 16. Contrary to Patent Owner’s argument, Dr. Horenstein does not state that the Nordby sensor “is not substitutable” into any of the other systems. The cited portions of Dr. Horenstein’s declaration are reproduced below:

XI. No Motivation to Combine the Prior Art

104. In my opinion, a person of skill would not find reasons to combine the above prior art references to arrive at what is disclosed in the ’459 patent. For all the references except

Nor[d]by – Pant, Mullin, Rowlette, and Woodward, -- voltage sensing is implemented by using optoisolators (i.e. optocouplers.) The circuitry associated with optocouplers is simple, requiring only one or two resistors on the input and output sides to turn the opto-coupler device into a suitable voltage sensor. With regard to Nor[d]by, without the simplifying circuitry disclosed in the '459 patent (See, for example, Figure 5 of the '459 patent), a person of skill would not be motivated to eschew the simple optocoupler sensor for a magnetic sensing torus requiring the complex, multi-component circuit shown in Figure 8 of Nor[d]by.

105. Moreover, achieving the sensing of current in multiple inputs requires that the many parts in the circuit of Figure 8 of Nor[d]by be replicated for multiple instances, thus also multiplying the parts count. Given the simplicity of the optocoupler circuit, a skilled person simply would not be motivated to combine the sensor of Nor[d]by with the circuit configurations of the other prior art to arrive at the invention disclosed in the '459 patent.

Ex. 2001 ¶¶ 104–105. Thus, Dr. Horenstein contends there is a lack of a motivation to combine the references because opto-couplers are simpler and require fewer parts than the current based sensor of Nordby. In *KSR*, the Supreme Court rejected the Federal Circuit's rigid application of its “teaching, suggestion, motivation” test in favor of an expansive and flexible approach. 550 U.S. at 415. The Supreme Court noted that often, it will be necessary:

to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.

Id. at 418. Moreover, the Federal Circuit has explained that:

an implicit motivation to combine exists not only when a suggestion may be gleaned from the prior art as a whole, but when the “improvement” is technology-independent and the combination of references results in a product or process that is more desirable for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient. Because the desire to enhance commercial opportunities by improving a product or process is universal – and even common-sensical – we have held that there exists in these situations a motivation to combine prior art references even absent any hint of suggestion in the references themselves. In such situations, the proper question is whether the ordinary artisan possesses knowledge and skills rendering him capable of combining the prior art references.

Dystar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co., 464 F.3d 1356, 1368 (Fed. Cir. 2006). In this case, Patent Owner’s contention that there is no motivation to substitute one sensor for another is not supported by anything beyond conclusory statements. Moreover, contrary to the assertion that voltage and current sensors are “not substitutable,” Nordby expressly states that “[v]oltage (potential) sensing may be used, or alternately, current (flow) sensing may be used. Since the sensing scheme is used only to detect the presence or absence of voltage or current on the sensed line and does not require any significant accuracy, the cost of either type of sense circuitry can be made very low.” Ex. 1004, 4:43–48. In light of the evidence that current and voltage sensors were known to be interchangeable, Patent Owner’s contention that there was “no reason one of skill would have sought to replace those voltage based opto-isolator systems with the bulky current transformer and attendant circuitry of Nordby,” is insufficient to demonstrate the combination of references was not obvious. See Mot. 16.

Finally, Patent Owner argues that:

even if one adopted the sensor arrangement in Woodward and made a hypothetical combination with one of the other pieces of prior art, the combination still does not disclose the proposed amended claim. Woodward does not show current sensing and does not show sensing the power inputs that provide operating power to the motor. (Horenstein, ¶ 106).

Id. Patent Owner's argument is not persuasive because the fact that Woodward does not show the current sensing of Nordby fails to address what is shown by Woodward in combination with Nordby and Mullin. Dr. Horenstein's testimony is that the combination would not meet the requirements of proposed amended claim 18 because "Woodward shows the monitoring of signals, not current-carrying conductors, as is done in the '459 patent." Ex. 2001 ¶ 106. It is undisputed that Woodward does not disclose current sensing. Thus, Patent Owner's argument that Woodward monitors signals, not current-carrying conductors, says nothing about whether the combination of Nordby and Woodward, with Mullin, would render the proposed amended claim obvious. Thus, independent of Petitioner's opposition to the Motion, Patent Owner has not demonstrated by a preponderance of the evidence that proposed amended claim 18 would not have been obvious over at least Mullin, Nordby, and Woodward.

Additionally, although the burden is not on Petitioner to show unpatentability of the proposed amended claim 18, Petitioner's evidence supports the determination that the claim would have been obvious over Mullin, Nordby, and Woodward. Mr. McAlexander explains that the additional features of proposed amended claim 18 absent from Mullin are disclosed by Nordby and Woodward. "Nordby's Fig. 8 shows one

embodiment of a sensing element used to sense current transmitted by input lines L1C, L1H, and N of an HVAC motor control system.” Ex. 1011 ¶ 15. Mr. McAlexander further explains why Nordby’s current sensors would be used in Mullin. “Further, opto-isolators such as those disclosed in Mullin were well-known as a legacy means by which to communicate between analog and digital components of a circuit. Current sensors, such as those taught in Nordby, were more recently implemented as an alternative to those opto-isolators.” *Id.* ¶ 17. Mr. McAlexander concludes that

[t]his substitution would have been well within the ability of one of ordinary skill in the art, and it would do no more than yield the predictable result of allowing the detection of current within Mullin’s input interface 505 by sensing with transformers CT1 the magnetic fields output by currents across the inputs COM, P2, and P3.

Id. ¶ 18. Mr. McAlexander also explains the operation of Woodward to demonstrate that Woodward confirms it was already known in the art at the time of filing of the ’459 patent for “the motor controller [to select] the corresponding operating parameter based upon power sensed at more than one of said sensing circuits,” as recited in proposed substitute claim 18, and that “it was well known that when timing is not a factor, multiplexing circuitry is generally preferred because it advantageously requires less physical space, less current, and it consumes less material.” *Id.* ¶¶ 22–23.

In reply Patent Owner argues that Petitioner’s combination of Mullin, Nordby, and Woodward “smacks of hindsight.” PO Reply 6–11. Patent Owner argues that opto-isolators “provide a complete solution,” use fewer components, and occupy a smaller footprint, and that there is no suggestion or motivation to substitute Nordby sensors in Mullin. *Id.* at 8–9. We find

Patent Owner's argument misplaced in determining whether the substitution of one known element for another would have been obvious. Patent Owner also argues that Petitioner's rationale for the asserted combination is contradictory because using Nordby's sensors would require more space, while Petitioner contends Woodward is beneficial because it requires less space. *Id.* at 9. We are not persuaded that the asserted combination is not obvious merely because the addition of some elements from Nordby may require additional space, while at the same time elements from Woodward are beneficial because they require less space. Patent Owner offers insufficient persuasive evidence, as opposed to attorney argument, in response, and its arguments fail to address the relative significance of the purported issues over space. Further, Petitioner demonstrates that the sensing circuit of Nordby with the amplifier "could all be embedded in one small tiny little chip." Ex. 2005, 50:3–4. Thus, the evidence suggests that any additional space that would have been required by the sensing circuit of Nordby would have been insignificant.

Finally, Patent Owner again argues that "Woodward does not teach sensing the power inputs that supply operating current to the motor, and this deficiency is never addressed by Broad Ocean or its expert." PO Reply 11. As noted above, Patent Owner's argument about what is lacking from Woodward is limited in what it says about whether the combination of Nordby and Woodward, with Mullin, would render the proposed amended claim obvious. Patent Owner fails to sufficiently address why the combination of Nordby and Mullin, together with Woodward, fails to disclose any additional feature of proposed amended claim 18. We find

Patent Owner's arguments in support of the Motion insufficient to demonstrate that the proposed amended claim would not have been obvious over a combination of the identified closest prior art.

E. Conclusion

We conclude Petitioner has established by a preponderance of the evidence that claims 1, 3, 7, and 18 are unpatentable under 35 U.S.C. § 102 as anticipated by Mullin and by Pant. Petitioner has not established by a preponderance of the evidence that claim 2 is unpatentable under 35 U.S.C. § 102 as anticipated by Mullin or by Pant. Patent Owner has not established by a preponderance of the evidence the patentability of proposed amended claim 18.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 3, 7, and 18 of the '459 patent are held unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Amend is *denied*; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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IPR2015-00465
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