

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BROAD OCEAN TECHNOLOGIES, LLC,
Petitioner,

v.

NIDEC MOTOR CORPORATION,
Patent Owner.

Case IPR2015-01663
Patent 5,818,194

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

BOUCHER, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
37 C.F.R. § 42.108

On August 3, 2015, Broad Ocean Technologies, LLC (“Petitioner”) filed a Petition (Paper 3) pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1, 3, 6, 8, 13, 21, 23, 32–34, and 39 of U.S. Patent No. 5,818,194 (“the ’194 patent”). Nidec Motor Corporation (“Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”) on

November 18, 2015. Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we deny the Petition and do not institute an *inter partes* review.

I. BACKGROUND

A. The '194 Patent (Ex. 1001)

The '194 patent describes a “blower motor unit having a variable speed motor and that is suitable for direct, drop-in replacement in a residential HVAC (heating, ventilation, and air conditioning) system that employs a PSC [permanent split capacitor] motor.” Ex. 1001, abst. Figures 1 and 3 of the '194 patent are reproduced below.

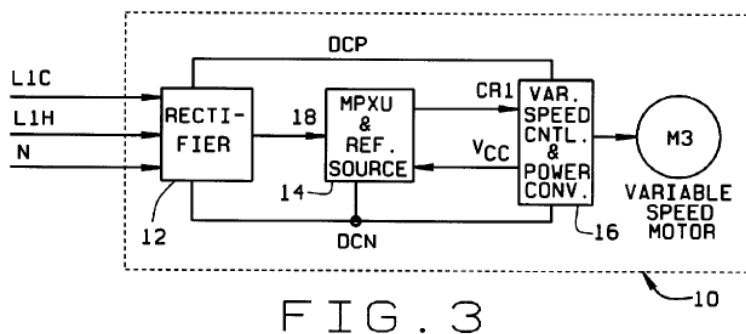
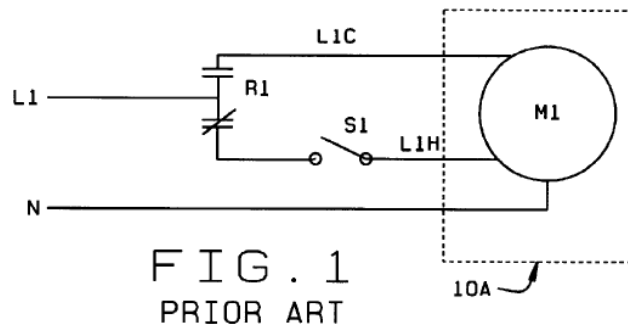


Figure 1 (top) illustrates a schematic circuit of a prior-art HVAC system, and Figure 3 (bottom) provides a schematic block diagram that illustrates a drop-

in replacement, rectangle 10 of Figure 3, for a portion of Figure 1, namely rectangle 10A of Figure 1. *Id.* at col. 3, l. 61, col. 4, ll. 20–23.

Figure 1 shows a “typical configuration of a fixed speed HVAC motor used in residential systems,” with single-phase AC input power supplied through connections L1 (the hot side of the AC supply) and N (the neutral side at earth potential). *Id.* at col. 1, ll. 30–36. Power to fixed- or multiple-speed motor M1 is controlled by relay R1 and switch S1, which control whether L1C is energized for cooling operation or L1H is energized for heating operation. *Id.* at col. 1, ll. 38–56.

The ’194 patent states that “state-of-the[-]art HVAC systems use electronic variable speed motor controllers,” instead of the fixed- or multiple-speed motors illustrated in Figure 1, and asserts that the “standard approach for implementing variable speed motors is different from and generally more complex than the system used for fixed speed motors.” *Id.* at col. 2, ll. 1–5; *see id.* at col. 1, ll. 65–67. Accordingly, the ’194 patent proposes providing “a ‘drop in’ replacement of a PSC motor in an HVAC system to realize [advantages associated with variable-speed motor implementations] without requiring changes to the HVAC system.” *Id.* at col. 2, ll. 50–53.

Such drop-in replacement is illustrated in Figure 3, in which fixed- or multiple-speed motor M1 is replaced with rectifier 12, system 14, variable speed control and power converter 16, and variable-speed motor M3. *Id.* at col. 4, ll. 20–29. The same inputs, L1C, L1H, and N, are used for both the fixed- or multiple-speed system of Figure 1 and the variable-speed system of Figure 3. *Id.* at col. 4, ll. 29–34. System 14 includes a multiplexing unit and a reference source. *Id.* at col. 4, ll. 25–26. The ’194 patent contemplates

embodiments in which voltage or current sensing is used to convert a signal from an AC source (connected to either L1C or L1H) to a logic level signal, and may use corresponding configurations for rectifier 12. *Id.* at col. 4, l. 41–col. 5, l. 5. The multiplexing unit may select one of heating and cooling references, depending on which of the inputs L1H or L1C is energized with an applied current, so that the selected reference signal is applied to a reference input of the variable-speed motor. *Id.* at col. 8, ll. 6–30.

B. Illustrative Claims

Claims 1 and 39 of the '194 patent are illustrative of the claims at issue:

1. A variable speed blower motor unit comprising:
 - a variable speed motor having at least two operating speeds and a reference input for selecting an operating speed;
 - a power input comprising a first and a second current input, each of the current inputs coupled to the motor so that an operating current applied to either of the current inputs supplies operating power to the motor;
 - a multiplexing unit coupled to the power input and the motor reference input, the multiplexing unit selecting one of at least a pair of reference signals and applying the selected reference signal to the reference input, the selection depending upon which of the first and the second current inputs has an operating current applied thereto; and
 - a reference source coupled to the multiplexing unit and supplying the at least a pair of reference signals thereto.

39. A method of controlling a variable speed motor comprising the steps of:
 - (a) generating a plurality of reference signals for application to a reference input of the motor;

(b) supplying operating power to the motor via one of a plurality of current inputs;

(c) selecting one of the plurality of reference signals for application to the reference input of the motor in accordance with which one of the plurality of current inputs is supplying operating power to the motor; and

(d) applying the selected one of the plurality of reference signals to the reference input of the motor to thereby select an operating speed of the motor.

C. References

Petitioner relies on the following references.

Ballard	US 4,946,096	Aug. 7, 1990	Ex. 1003
Dempsey	US 4,815,524	Mar. 28, 1989	Ex. 1004
Collins	US 3,911,677	Oct. 14, 1975	Ex. 1005
Ohi	US 5,043,642	Aug. 27, 1991	Ex. 1006
Shahrodi	US 5,126,642	June 30, 1992	Ex. 1007

D. Asserted Grounds of Unpatentability

Petitioner challenges claims 1, 3, 6, 8, 13, 21, 23, 32–34, and 39 on the following grounds. Pet. 1.

References	Basis	Claim(s) Challenged
Ballard and Collins	§ 103(a)	1, 6, 8, 21, 23, and 39
Dempsey and Collins	§ 103(a)	1, 6, 8, 21, 23, and 39
Ballard, Collins, and Ohi	§ 103(a)	3 and 32–34
Ballard, Collins, and Shahrodi	§ 103(a)	13

E. Related Proceedings

The parties assert that the '194 patent is the subject of *Nidec Motor Corp. v. Broad Ocean Motor LLC*, 2:15-cv-00443-JRG-RSP (E.D. Tex.). Pet. 1; Paper 6, 2. Patent Owner also identifies *Nidec Motor Corp. v.*

SNTech, Inc., 4:12-cv-00115 (E.D. Mo.) as involving the '194 patent.
Paper 6, 2.

II. ANALYSIS

A. Claim Construction

Only terms which 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. “variable speed blower motor” and “variable speed motor”

The preamble of independent claim 1 recites a “variable speed blower motor unit.” Independent claim 1 also recites, as an element in the body of the claim, a “variable speed motor.” A “variable speed motor” is also recited in the body of independent claim 21 and in the preamble of claim 39, which is directed to a “method of controlling a variable speed motor.”

Petitioner contends that a person of ordinary skill in the art “would understand the term ‘variable speed blower motor’ to denote a motor capable of being operated at more than one setting to drive a device that moves air,” supporting its position with testimony by Michael D. Sidman, Ph.D. Pet. 14 (citing Ex. 1008 ¶ 28). Petitioner does not expressly address construction of “variable speed motor,” or otherwise distinguish the term from “variable speed blower motor.” In responding to Petitioner’s proposed construction of “variable speed blower motor,” Patent Owner contends that “one of ordinary skill in the art reading the specification would understand that a ‘variable speed motor’ is a motor that can be electronically controlled to produce a wide range of speeds rather than a fixed set of one or more separate speeds.”

Prelim. Resp. 9. We find the parties’ articulated positions relevant to construing both “variable speed blower motor” and “variable speed motor.”

First, we are not persuaded that the preamble’s recitation of a “variable speed blower motor” in claim 1 is limiting because “the body of the claim fully and intrinsically sets forth the complete invention, including all of its limitations.” *See Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999). Because “the preamble offers no distinct definition of any of the claimed invention’s limitations, but rather merely states . . . the purpose or intended use of the invention, . . . the preamble is of no significance to claim construction.” *Id.* (citing *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997); *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989); *Kropa v. Robie*, 187 F.2d 150, 152 (CCPA 1951)). Accordingly, we do not construe expressly “variable speed blower motor.”

Second, we are not persuaded by Petitioner’s reasoning as it applies to construction of “variable speed motor.” Petitioner observes that the ’194 patent “states that [the] objective of the invention is [to] create a variable speed blower motor replacement unit that can be used as a drop-in replacement unit for the PSC motor,” and that “[t]his objective is achieved by allowing the replacement variable speed motor to have the same electrical connections as the original PSC motor.” Pet. 13 (citing Ex. 1001, col. 3, ll. 13–16, col. 4, ll. 13–16). Although we find Petitioner’s characterization of the ’194 patent accurate in this respect, we agree with Patent Owner that Petitioner’s proposed construction “encompasses the older-style PSC motor replaced,” i.e., captures multiple-speed motors. Prelim. Resp. 6–7. The

'194 patent expressly distinguishes between multiple-speed and variable speed motors:

The discussion to this point has concerned fixed speed motors, or multiple-speed motors, the speeds of which are controlled by the selection of taps on the motor winding. Today, state-of-the-art HVAC systems use electronic variable speed motor controllers. The standard approach for implementing variable speed motors is different from and generally more complex than the system used for fixed speed motors.

Ex. 1001, col. 1, l. 65–col. 2, l. 5. We further agree with Patent Owner that Dr. Sidman relies on insufficient intrinsic evidence to support the broader construction proposed by Petitioner. Prelim. Resp. 7 (citing Ex. 1008 ¶ 28).

For purposes of this Decision, we construe “variable speed motor” as a motor that can be controlled to produce a range of speeds rather than one or more fixed or preset speeds.

2. “*multiplexing unit*”

Each of independent claims 1 and 21 recites a “multiplexing unit.” Petitioner proposes that the term be construed as “a unit that is capable of providing, at an output, different electrical signals based on one or more inputs.” Pet. 17 (citing Ex. 1008 ¶ 31). Patent Owner does not propose a construction of the term. Because our analysis does not require that we do so, we do not construe the term expressly for purposes of this Decision.

B. *Ballard and Collins*

Petitioner challenges claims 1, 6, 8, 21, 23, and 39 as unpatentable under 35 U.S.C. § 103(a) over Ballard and Collins; challenges claims 3 and

32–34 as unpatentable under 35 U.S.C. § 103(a) over Ballard, Collins, and Ohi; and challenges claim 13 as unpatentable under 35 U.S.C. § 103(a) over Ballard, Collins, and Shahrodi. Pet. 12.

Ballard describes “a method and apparatus for temporarily operating a furnace from an auxiliary power source.” Ex. 1003, col. 1, ll. 7–9. Figure 1 of Ballard is reproduced below.

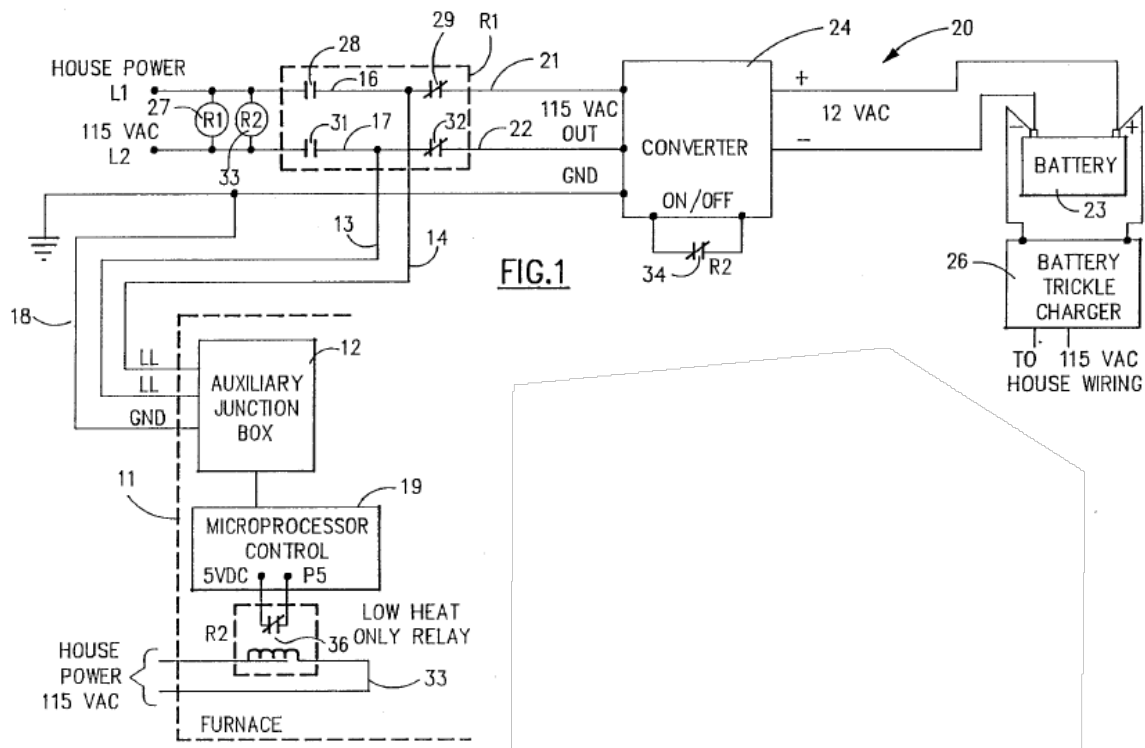
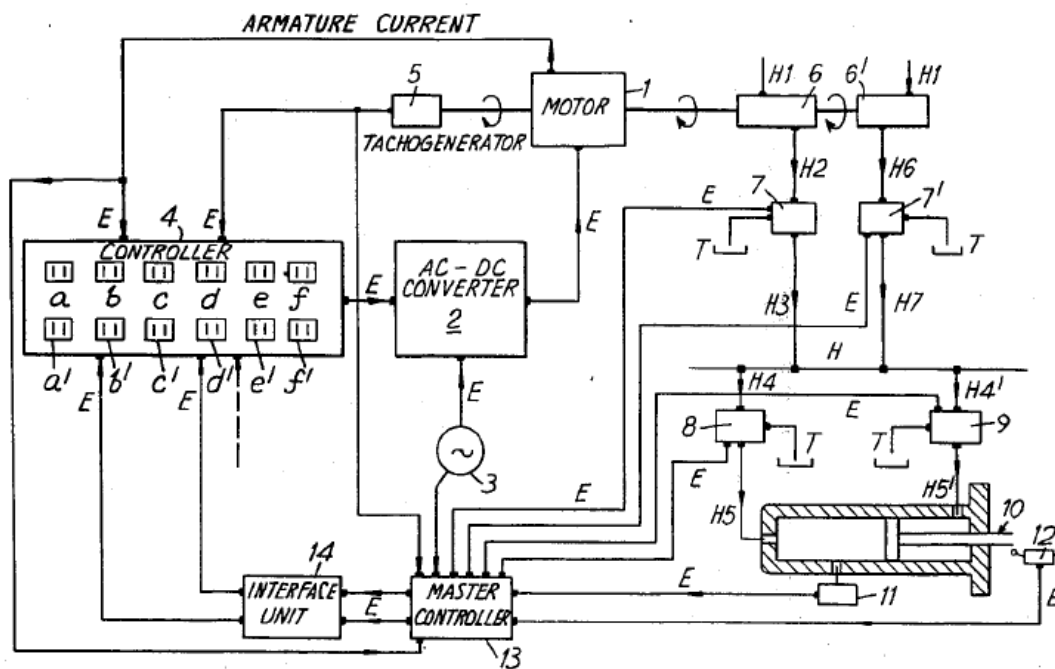


Figure 1 provides a schematic illustration of electrical circuitry in a residential furnace powered by an AC power source connected across terminals L1 and L2 via junction box 12 and lines 13 and 14, which are connected respectively to main power lines 16 and 17. *Id.* at col. 3, ll. 23–29. The furnace is grounded by ground wire 18. *Id.* at col. 3, ll. 29–30. Auxiliary circuit 20, which includes auxiliary lines 21 and 22, and DC battery 23, is automatically connected upon loss of power to terminals L1

and L2 by a relay circuit that includes relay R1, relay contacts 28 and 29 in lines 16 and 21 respectively, and relay contacts 31 and 32 in lines 17 and 22 respectively. *Id.* at col. 3, l. 40–col. 4, l. 6. Petitioner contends that a person of ordinary skill in the art “would understand that the input connections of Ballard closely map the L1H, L1C and N input connections of the device disclosed in Figure 1 of the ‘194 patent,” and supports its contention with testimony by Dr. Sidman. Pet. 20 (citing Ex. 1008 ¶ 41). Petitioner further asserts that “Ballard senses AC house voltage at the input mains connections L1 and L2 by the coil of 33 of ‘low heat only relay’ R2 and provides that indication to the microprocessor,” contending that, to a person of ordinary skill in the art, “this is equivalent to the sensing of AC power across input connections L1C and N in the ‘194 patent.” *Id.* (citing Ex. 1008 ¶ 41).

Collins describes a hydraulically operated injection molding machine for molding synthetic resin materials. Ex. 1005, col. 1, ll. 16–18. The sole drawing of Collins is reproduced below.



The drawing of Collins illustrates a system in which “an essentially conventional variable speed drive” responds to instructions from controller 4 to vary power supplied to variable-speed DC electric motor 1 from AC source 3 via AC/DC converter 2. *Id.* at col. 3, ll. 20–27. Petitioner contends that “Collins teaches both a multiplexing unit and a reference source for operation of a variable speed DC electric motor,” and supports that contention with testimony by Dr. Sidman. Pet. 21 (citing Ex. 1008 ¶¶ 59, 60); see Pet. 21–23. Patent Owner does not contest the assertion.

1. Combination of Ballard and Collins

Petitioner contends that a person of ordinary skill in the art “would have been motivated to improve the base device of Ballard with the improvement found in Collins.” Pet. 24. Petitioner purports to apply the framework set forth in “Exemplary Rationale C” in the Manual of Patent Examining Procedure (“MPEP”) § 2143 for use of a known technique to improve similar devices in the same way. *Id.* at 24–26. That section of the MPEP sets forth a threshold requirement that “Office personnel must resolve the *Graham* [i.e., *Graham v. John Deere Co.*, 383 U.S. 1 (1966)] factual inquiries.” MPEP § 2143.I.C. After resolving such factual inquiries,

Office personnel must articulate the following:

(1) a finding that the prior art contained a “base” device (method, or product) upon which the claimed invention can be seen as an “improvement;”

(2) a finding that the prior art contained a “comparable” device (method, or product that is not the same as the base device) that has been improved in the same way as the claimed invention;

(3) a finding that one of ordinary skill in the art could have applied the known “improvement” technique in the same way to

the “base” device (method, or product) and the results would have been predictable to one of ordinary skill in the art; and

(4) whatever additional findings based on the Graham factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

Id. Petitioner identifies the “base” device as Ballard’s “residential furnace with a circulation motor that can be run at low or high speed modes corresponding to the respective low or high mode of the burner that is connected to a residential AC power source but can automatically connect to a second auxiliary power source.” Pet. 25 (citing Ex. 1003, abstr., col. 2, ll. 11–14). Petitioner further identifies the “comparable” device as that disclosed by Collins, “in that its speed and torque are controlled by a variable speed drive.” *Id.* (citing Ex. 1008 ¶ 63). Petitioner reasons that “the device of Collins provides an improvement in the form of a controller that incorporates twelve digital switch units that enables a steady reference signal corresponding to a particular motor speed to be set.” *Id.* (citing Ex. 1005, col. 3, ll. 27–33; Ex. 1008 ¶ 63).

First, even effecting the combination articulated by Petitioner does not arrive at the structures claimed in independent claims 1 and 21 of the ’194 patent, nor does it arrive at the method claimed in independent claim 39. Underlying Petitioner’s analysis for each of these independent claims is its position that “Ballard discloses the (1) variable speed motor, (2) reference input and (3) power inputs.” See Pet. 17. But the multiple-speed motor described by Ballard is not a “variable speed motor,” as we have construed the term. Rather, “Ballard discloses a multiple fixed speed motor of the type replaced by the invention claimed in the ’194 patent.” Prelim. Resp. 21 (citing Ex. 1003, col. 1, ll. 59–63; Ex. 1008 ¶ 38).

Second, we are not persuaded that Petitioner has identified adequately in Collins a “comparable” device that has been improved in the same way as the claimed invention. That is, Petitioner has not demonstrated sufficiently that Collins is analogous art, as necessary for a reference to qualify as prior art for an obviousness determination under 35 U.S.C. § 103(a). *See In re Klein*, 647 F.3d 1343, 1348 (Fed. Cir. 2011). “Two criteria have evolved for determining whether prior art is analogous: (1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the inventor’s endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Clay*, 966 F.2d 656, 658 (Fed. Cir. 1992). (citing *In re Deminski*, 796 F.2d 436, 442 (Fed. Cir. 1986); *In re Wood*, 599 F.2d 1032, 1036 (CCPA 1979)). Petitioner has not shown that controlling various stages of an injection molding machine is within the same field of endeavor as the ’194 patent, which is concerned with HVAC systems and “an improved variable speed control . . . designed to be connected to the standard power terminals used for a permanent split capacitor (PSC) motor.” Ex. 1001, col. 1, ll. 9–10. Nor has Petitioner demonstrated sufficiently that Collins’s driving of hydraulic pumps is reasonably pertinent to that particular problem.

Dr. Sidman testifies that, in his opinion, “the device of Collins is a comparable device to the device[] of Ballard . . . in that the motor’s speed or torque can be controlled by a variable speed drive.” Ex. 1008 ¶ 63. Such reasoning presumes that Ballard describes a variable speed motor that could benefit from the variable control taught by Collins, a presumption we find unwarranted in light of our construction of the term “variable speed motor.”

For the foregoing reasons, we conclude that Petitioner has not demonstrated a reasonable likelihood of prevailing on its challenge of independent claims 1, 21, or 39 as unpatentable under 35 U.S.C. § 103(a) over Ballard and Collins, nor has it demonstrated a reasonable likelihood of prevailing on its challenge of claims 3, 6, 8, 13, 23, or 32–34, which suffers from the same deficiencies.

C. Dempsey and Collins

Petitioner challenges claims 1, 6, 8, 21, 23, and 39 as unpatentable under 35 U.S.C. § 103(a) over Dempsey and Collins. Pet. 12. Dempsey relates to “a speed control system for a furnace air delivery blower operating continuously.” Ex. 1004, col. 1, ll. 8–10. In particular, Dempsey addresses a problem of “condensate dwell” that results from condensation of flue gases within a furnace’s heat exchanger during the beginning of a heating cycle, when the heat exchanger is cold. *Id.* at col. 1, ll. 31–36. To overcome this problem, Dempsey discloses sensing when the blower is in a continuous mode of operation—if such a mode is sensed at the start of a heating cycle, the blower is automatically turned off, and a predetermined period of time is allowed to elapse for the heat exchanger to warm after ignition. *Id.* at col. 2, ll. 28–36.

Figure 3 of Dempsey is reproduced below.

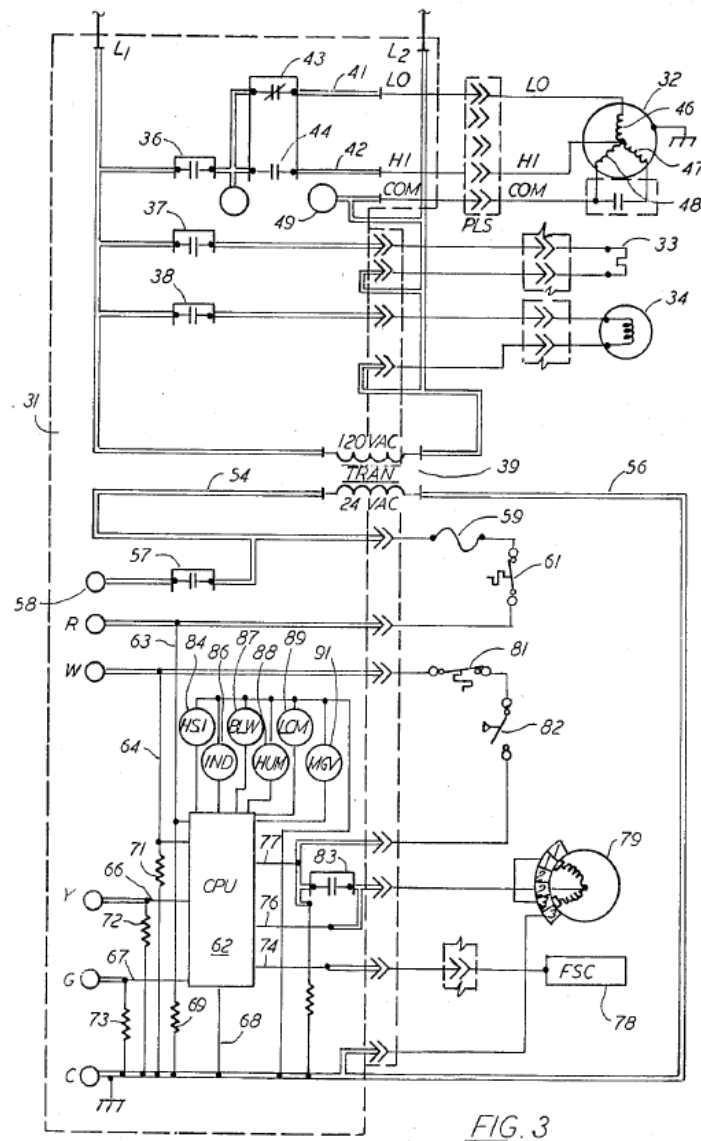


Figure 3 illustrates the control circuitry of a forced-air furnace that includes the above-described sensing capability. *Id.* at col. 3, ll. 13–14. Blower motor 32 is powered by parallel leads 41 and 42 for low- and high-speed connections, respectively. *Id.* at col. 3, ll. 22–28. Normally, relay contact 43 (connected to low-speed lead 41) is closed and relay contact 44 (connected to high-speed lead 42) is open. *Id.* at col. 4, ll. 21–27. As Petitioner observes, “relay contacts 43 and 44 are controlled to cause the blower motor to operate at either low or high speeds.” Pet. 37 (citing Ex.

1004, col. 4, ll. 31–34). Dempsey thus discloses a multiple-speed motor with two fixed speeds. *See* Prelim. Resp. 29 (citing Ex. 1008 ¶ 50). Dempsey implements its control mechanism with microprocessor 62. Ex. 1004, col. 4, l. 36–col. 5, l. 18.

Petitioner identifies Collins as teaching “a multiplexing unit and a reference source.” Pet. 37. Petitioner’s analysis of claims 1, 6, 8, 21, 23, and 39 generally parallels its analysis of its challenge of those claims as unpatentable under 35 U.S.C. § 103(a) over Ballard and Collins. That is, Petitioner purports to apply the framework set forth in “Exemplary Rationale C” of MPEP § 2143 to argue that claims 1, 6, 8, 21, 23, and 39 would have been obvious over the combination of Dempsey and Collins, identifying the furnace of Dempsey as a “base” device and the Collins device as a “comparable” device that has been improved in the same way as the claimed invention. *Id.* at 37–39.

Our analysis also parallels our analysis of the Ballard-Collins grounds. First, the multiple-speed motor described by Dempsey is not a “variable speed motor,” as we have construed the term. Second, Petitioner has not persuaded us that it has identified adequately in Collins a “comparable” device that has been improved in the same way as the claimed invention, as Petitioner contends. Petitioner has not demonstrated sufficiently that Collins is analogous art because it has not shown persuasively that Collins is either within the same field of endeavor as the ’194 patent or reasonably pertinent to the problem of improved variable speed control designed to be connected to the standard power terminals used for a PSC motor. *See supra*.

Accordingly, we conclude that Petitioner has not demonstrated a reasonable likelihood of prevailing on its challenge of claims 1, 6, 8, 21, 23, and 39 as unpatentable under 35 U.S.C. § 103(a) over Dempsey and Collins.

III. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is denied and no *inter partes* review is instituted.

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