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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RANDY SCOTT BURNHAM, DAVID JON RENKEN,
ERICHALBERT LUCHT, and CULLEN EVAN HALL

Appeal 2018-009178¹
Application 14/432,407²
Technology Center 3700

Before ANTON W. FETTING, PHILIP J. HOFFMANN, and
BRADLEY B. BAYAT, *Administrative Patent Judges*.

BAYAT, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the rejection of claims 1, 3–6, 9–14, 16–20, and 22–25, which are all the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ Our Decision references the corrected Appeal Brief (“Appeal Br.”), filed Feb. 22, 2018, the Reply Brief (“Reply Br.”) filed Sept. 26, 2018, the Examiner’s Answer (“Ans.”) mailed July 26, 2018, and the Final Office Action (“Final Act.”), mailed Apr. 20, 2017.

² Appellants identify “Thermo King Corporation” as the real party in interest. Appeal Br. 2.

BACKGROUND

Appellants' disclosed embodiments "relate to a transport refrigeration system (TRS). More specifically, the embodiments disclosed here relate to methods and systems to detect operation conditions of a compressor of the TRS so as to control operation of a generator set (genset) configured to provide power to the compressor, based on the operation condition of the compressor." Spec. 1:7-11.

ILLUSTRATIVE CLAIM

10. A method to control an operation of a prime mover of a transport refrigeration system comprising:

[(a)] monitoring an operation parameter of a generator set, wherein the generator set is configured to supply power to a compressor of a transport refrigeration system, and wherein the generator set includes the prime mover coupled to a generator;

[(b)] determining an operation parameter pattern based on the operation parameter over a period of time;

[(c)] detecting whether the operation parameter pattern includes a periodic fluctuation of the operation parameter over the period of time, wherein the periodic fluctuation of the operation parameter is indicative of a periodical load/unload duty cycle of the compressor;

[(d)] determining a first operation condition of the compressor when the periodic fluctuation is not detected;

[(e)] determining a second operation condition of the compressor when the periodic fluctuation is detected;

[(f)] operating the prime mover at a first operation speed when determining the first operation condition of the compressor; and

[(g)] operating the prime mover at the second operation speed that is lower than the first operation speed when determining the second operation condition of the compressor;

[h] wherein the compressor is a scroll compressor and detecting whether the operation parameter pattern includes the periodic fluctuation includes determining whether the periodic fluctuation has a frequency of the periodical load/unload duty cycle of the scroll compressor.

Appeal Br., Claims App'x. 5 (added bracketed notations).

REJECTIONS

Claims 1, 3–6, 9, and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Grey et al. (EP 1790921 A1, pub. May 30, 2007) (“Grey”).

Claims 10–14, 16, 17, and 22–25 are rejected under 35 U.S.C. §103(a) as being unpatentable over Grey and Guo et al. (US 7,815,423 B2, iss. Oct. 19, 2010) (“Guo”).

Claim 18 is rejected under 35 U.S.C. §103(a) as being unpatentable over Grey, Guo, and Miyaji (US 7,606,639 B2, iss. Oct. 20, 2009).

Claim 19 is rejected under 35 U.S.C. §103(a) as being unpatentable over Grey and Renken et al. (US 2008/0087029 A1, pub. Apr. 17, 2008) (“Renken”).

DISCUSSION

In rejecting independent claim 10 as obvious over Grey and Guo, the Examiner found that Grey discloses limitations (a), (b), (d), (e), (f), and (g) as claimed except that:

Grey is silent with respect to explicitly detecting whether the operation parameter pattern includes a periodic fluctuation of the operation parameter over the period of time [(as recited in limitation (c))], wherein the periodic fluctuation of the operation parameter is indicative of a periodical load/unload cycle of the compressor; detecting whether the operation parameter pattern includes the periodic fluctuation includes determining whether

the periodic fluctuation has a frequency of a periodical load/unload duty cycle of the compressor [(as recited in limitation (h))].

Final Act. 9 (“Grey is silent with respect to the compressor being a scroll compressor.”). The Examiner determined:

However, it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the controller of Grey to determine different operation conditions over a period of time by detecting whether the operation parameter pattern includes a periodic fluctuation since Grey discloses two distinct and different operation modes used over different periods of time. It should be noted that the frequency of the periodical unload/load duty cycle of the compressor would be similar to the periodic fluctuation of the operation parameter pattern. Additionally, Grey discloses the two different time periods which correspond to two different operation conditions and two different operation speeds. Specifically a low speed when the second operation is present (¶ 64) when the compressor is unloaded. *Therefore it would be obvious to one of ordinary skill in the art at the time the claimed invention to realize that the act of measuring the power consumption over a period of time could easily be correlated to detecting different operation conditions, thus this act would be considered “obvious to try” as it would yield a predictable solution with a reasonable expectation for success.*

Id. at 9–10 (emphasis added). Further, to cure the deficiency in Grey as to “the compressor being a scroll compressor,” the Examiner found “Guo teaches a refrigeration system (Figures 6A and 6B) that discloses a scroll compressor (scrolls 226 and 232).” *Id.* at 9. And, the Examiner concluded that “[i]t would have been obvious to one of ordinary skill in the art at the time the . . . invention was made to modify the compressor of Grey with the scroll compressor of Guo to increase reliability of the system while allowing

for a more continuous flow of gas throughout the scroll compressor during activation.” *Id.*

As indicated in the rejection, the Examiner acknowledges that Grey does not disclose limitation (c) and relies on an “obvious to try” rationale to account for this missing limitation. In support of this rationale, the Examiner relies on Figure 3 and paragraphs 62–65 of Grey, and asserts that “it is clear that the operation parameter is the speed sensed by sensors 56 of the prime mover 52.” Ans. 18.

“Figure 3 of Grey shows a graph of the electrical power consumed by the refrigeration unit 10 over time.” Grey ¶ 62. Grey teaches that the state of the compressor is determined by voltage sensor 69 monitoring the current and voltage of the AC output or by monitoring measured values of the current and voltage at the output of the energy storage device 65. *Id.* ¶¶ 57–58. When the current or voltage of the AC output measured by the sensor 69 increases, the generator control unit 68 causes the engine to speed up to meet the increased power demand; the generator control unit 68 causes the engine to speed up when the current drawn from the energy storage device 68 increases. *Id.* ¶ 65. When the compressor 52 is switched off again, the current at the AC output will fall and the generator control unit 68 will reduce the speed of the engine. *Id.* ¶ 67.

Appellants argue that

Grey is silent and does not contemplate monitoring the speed sensed by the speed sensor 56 and determining a speed pattern based on the speed over a period of time. At most, paragraph [0055] of Grey teaches that the speed sensor 56 produces an output which is indicative of the engine speed and supplies the signal to the speed controller 58. The speed controller 58 controls operation of the fuel injection system so as to control the speed of the engine.

Reply Br. 7. We are persuaded by Appellants' argument.

The Examiner relies on Figure 3 of Grey as teaching that one can monitor the speed from the speed sensor 56 to determine whether to change the speed of the engine (Ans. 25–26), but, as Appellants point out, “Fig[ure] 3 clearly shows a graph of electrical power consumed by the refrigeration unit 10 over time and not the speed sensed by the speed sensor 56.” Reply Br. 7 (citing Grey ¶ 62). Grey provides no correlation between the electrical power consumed by the refrigeration unit 10 and the speed sensed by speed sensor 56. *See* Grey ¶ 55 (“The speed sensor 56 produces an output which is indicative of the engine speed and supplies this signal to speed controller 58.”). “Rather, Grey teaches that by monitoring the electrical power consumed by the refrigeration unit 10, the generator control unit 68 can change the speed of the engine. It would be inferred by those skilled in the art that if the speed of the engine is changed based on a change of state of the compressor (identified by the electrical power consumed by the refrigeration unit 10), the speed sensed by the sensor 56 does not reflect the state of the compressor or correlate to the electrical power consumed by the refrigeration unit 10.” *Id.* at 7–8. *See* Grey ¶ 13 (“The control unit may be, for example, arranged to increase the speed of the engine when the compressor is switched on, and/or to decrease the speed of the engine when the compressor is switched off.”). Thus, we are persuaded that the Examiner has not adequately shown that “it would . . . be ‘obvious to try’ to obtain the features of ‘determining whether the operation parameter pattern includes a periodic fluctuation of the operation parameter over the period of time, wherein the periodic fluctuation of the operation parameter is indicative of a

periodical load/unload duty cycle of the compressor' based on the teachings of Grey." Appeal Br. 13.

Regarding an "obvious to try" rationale to support a conclusion of obviousness, the Supreme Court stated:

When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 421 (2007).

To reject a claim based on this rationale, Office personnel must resolve the *Graham* factual inquiries. Then, Office personnel must articulate the following:

- (1) a finding that at the time of the invention, there had been a recognized problem or need in the art, which may include a design need or market pressure to solve a problem;
- (2) a finding that there had been a finite number of identified, predictable potential solutions to the recognized need or problem;
- (3) a finding that one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success; 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.

MPEP § 2143(I)(E). "If any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claim would have been obvious to one of ordinary skill in the art." *Id.*

Here, the record does not support an obvious-to-try rationale. For example, the Examiner does not find that at the time of the invention, there had been a recognized problem or need in the art, does not discuss any design need or market pressure to solve such a problem, and/or does not explain why there are only a finite number of identified, predictable solutions to solve such a problem. Thus, we determine that the Examiner's rationale is not adequately supported on the record before us.

Accordingly, we do not sustain the rejection of independent claim 10 as unpatentable over Grey and Guo. We also do not sustain the rejection of independent claim 1 and 16, which are rejected based on the same flawed rationale. *See* Final Act. 3–5, 7–9. Further, we do not sustain the rejection of dependent claims 3–6, 9, 11–14, 17, 20, and 22–25 for the same reasons. *Cf. In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) (“dependent claims are nonobvious if the independent claims from which they depend are nonobvious”). Because the Examiner does not rely on the additional cited references (Miyaji and Renken) to rectify the above-noted deficiency, we sustain the rejection of dependent claims 18 and 19 for the same reasons discussed above as to claims 1 and 16.

CONCLUSION

We REVERSE the rejections of claims 1, 3–6, 9–14, 16–20, and 22–25 under 35 U.S.C. §103(a).

REVERSED