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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte BRIAN D. MERRY, GABRIEL L. SUCIU,
JESSE M. CHANDLER, JOSEPH BRENT STAUBACH,
and GARY D. ROBERGE

Appeal 2019-002415
Application 14/745,550
Technology Center 3700

Before MURRIEL E. CRAWFORD, KENNETH G. SCHOPFER, and
AMEE A. SHAH, *Administrative Patent Judges*.

SCHOPFER, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the
Examiner's decision to reject claims 1–19. We have jurisdiction under
35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37
C.F.R. § 1.42. Appellant identifies the real party in interest as United
Technologies Corporation. Appeal Br. 1.

BACKGROUND

The Specification “relates to improvements in providing cooling air from a compressor section to a turbine section in a gas turbine section.”

Spec. ¶ 1.

CLAIMS

Claims 1 and 15 are the independent claims on appeal. Claim 1 is illustrative of the appealed claims and recites:

1. A gas turbine engine comprising;
 - a main compressor section having a high pressure compressor with a downstream discharge, and more upstream locations;
 - a turbine section having a high pressure turbine;
 - a tap tapping air from at least one of said more upstream locations in said compressor section, passing said tapped air through a heat exchanger and then to a cooling compressor, said cooling compressor compressing air downstream of said heat exchanger, and delivering air into said high pressure turbine; and
 - said cooling compressor rotating at a speed proportional to a speed of at least one rotor in said turbine section, and said cooling compressor being allowed to rotate at a speed that is not proportional to a speed of said at least one rotor under certain conditions.

Appeal Br. 6.

REJECTIONS

1. The Examiner rejects claims 1–6, 11, 12, and 15–18 under 35 U.S.C. § 103 as unpatentable over Elovic² in view of Glickstein³ and Stanton.⁴

² Elovic, US 4,254,618, iss. Mar. 10, 1981.

³ Glickstein et al., US 5,452,573, iss. Sept. 26, 1995.

⁴ Stanton, US 2,620,636, iss. Dec. 9, 1952.

2. The Examiner rejects claim 7 under 35 U.S.C. § 103 as unpatentable over Elovic in view of Glickstein and Stanton “and further in view of an engineering expedient.”
3. The Examiner rejects claims 8, 9, and 19 under 35 U.S.C. § 103 as unpatentable over Elovic in view of Glickstein, Stanton, and Berryann⁵ “and further in view of an engineering expedient.”
4. The Examiner rejects claim 10 under 35 U.S.C. § 103 as unpatentable over Elovic in view of Glickstein, Stanton, Berryann, and Jarrell⁶ “and further in view of an engineering expedient.”
5. The Examiner rejects claims 13 and 14 under 35 U.S.C. § 103 as unpatentable over Elovic in view of Glickstein, Stanton, and Ress.⁷

DISCUSSION

Rejection 1

With respect to the rejection of claims 1–6, 11, 12, and 15–18 over Elovic, Glickstein, and Stanton, Appellant raises arguments with respect to these claims as a single group.⁸ See Appeal Br. 2–4. We select claim 1 as representative of this group of claims, and claims 2–6, 11, 12, and 15–18 will stand or fall with claim 1. See 37 C.F.R. 41.37(c)(1)(iv).

With respect to claim 1, the Examiner finds that Elovic teaches a gas turbine engine with the claimed features except that Elovic does not teach “[a] cooling compressor downstream of the heat exchanger, for delivering

⁵ Berryann et al., US 2013/0000317 A1, pub. Jan. 3, 2013.

⁶ Jarrell et al., US 2010/0005810 A1, pub. Jan. 14, 2010.

⁷ Ress, Jr. et al., US 2013/0199156 A1, pub. Aug. 8, 2013.

⁸ Although Appellant provides a separate heading for certain claims, Appellants do not provide any separate, substantial arguments regarding the rejections of these claims. See Appeal Br. 4–5.

said [tapped] air to the turbine and said heat exchanger nor said cooling compressor being driven at a speed proportional to said rotor during some conditions and not proportional during at least one other condition.” Final Act. 6–7 (citing Elovic Fig. 2; col. 3, ll. 45–64; col. 5, ll. 5–25; col. 6, ll. 30–40).

Regarding the claimed “tap,” the Examiner notes that Elovic teaches that “it may be desirable to extract the cooling air from the compressor 20 at a location other than the compressor discharge.” Elovic col. 6, ll. 30–32. The Examiner also finds that Glickstein teaches that “[i]t is desirable to provide high pressure cooled air, over a wide range of pressures for engine needs, . . . [which] is achieved by pulling air from bleed/tap ports . . . which feed into a heat exchanger . . . before being delivered to a radial impeller [] that eventually directs air to needed higher pressure cooling.” Final Act. 7 (citing Glickstein col. 1, ll. 15–20, 45–51; col. 2, ll. 30–37; col. 3, ll. 20–35; col. 4, ll. 20–35; col. 5, ll. 20–34, 45–67; col. 6, ll. 15–35). More specifically and as required by the claim, the Examiner finds that Glickstein teaches interstage bleeding and auxiliary compressing. *Id.* The Examiner determines that it would have been obvious to incorporate an interstage tap and auxiliary compressor into the flow cooling system of Elovic “for the purposes of providing improved pressure of cooling from lower stage, (colder) air, but still meeting the high pressure cooling needs of the turbine. . . . This would yield the limitation of claim 1 save for the clutch and speed proportion.” *Id.*

Regarding the compressor speed conditions required by claim 1, the Examiner further relies on Stanton. Final Act. 7–8. Specifically, the Examiner finds that Stanton teaches “[i]t is known to power cooling devices

from an engine, and that said engine may not always operate fast enough to power said cooling devices” and that “a clutch can disengage from the engine, and permit a flywheel with enough energy to power said cooling device until such time as the engine is fast enough.” *Id.* (citing Stanton col. 3, ll. 1–25; col. 4, ll. 5–14). The Examiner concludes that it would have been obvious to modify Elovic based on this teaching so that the compressor continues to provided needed cooling at all engine speeds. *Id.* at 8.

We agree with and adopt the Examiner’s findings and conclusions with respect to claim 1, to the extent consistent with our findings below. *See* Final Act. 6–8; *see also* Ans. 3–8. As discussed below, we are not persuaded of reversible error by Appellant’s arguments.

Appellant first argues that Elovic does not disclose a cooling compressor and “[t]here is no showing that Elovic would have any need for such a complex structure as its tapped air is already at the highest pressure, downstream of the high pressure compressor.” Appeal Br. 3. We disagree for the reasons provided by the Examiner. *See* Ans. 4. First, Elovic expressly discloses that “it may be desirable to extract the cooling air from the compressor 20 at a location other than the compressor discharge.” Elovic col. 6, ll. 30–32. Second, although Elovic does not provide further explanation, the Examiner relies on Glickstein to teach the specific arrangement claimed. *See* Final Act. 7; *see also* Ans. 4–5. The Examiner explains that it would have been obvious to include a downstream compressor as taught by Glickstein “for the purposes of providing improved pressure of cooling from [a] lower stage, (colder) air, but still meeting the high pressure needs of the turbine.” Final Act. 7. Glickstein supports the Examiner’s reasoning. In particular, Glickstein is concerned with providing

“the capability for producing high pressure air, with air flow rates varying over a wide range, in response to aircraft requirements.” Glickstein col. 2, ll. 32–35. Thus, Elovic contemplates that it may be desirable to extract cooling air from other locations, and Glickstein provides a reason why this would be desirable and discloses a specific system in which this is accomplished. Thus, we determine that the Examiner’s conclusion is supported by adequate reasoning with rational underpinnings. *See KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007).

Further, to the extent Appellant argues that the combination of Elovic and Glickstein is based on “hindsight and only hindsight” (Appeal Br. 3), we are not persuaded. Appellant has not identified how the rejection includes any knowledge gleaned only from Appellant’s disclosure. *In re McLaughlin*, 443 F.2d 1392, 1395, (CCPA 1971). Specifically, Appellant does not contend that any specific structure is lacking from the art of record. And to the extent Appellant argues that the reasoning for the combination is only provided by Appellant’s disclosure, we disagree for the reasons discussed above.

Appellant also argues that Stanton is old and not analogous art. Appeal Br. 4. Specifically, Appellant argues “that the Elovic technology is advanced far beyond that of Stanton, and that the ‘problem’ solved by Stanton is not shown to exist in Elovic;” that Stanton’s “‘technology’ has been passed by the time of Elovic, and has nothing to do with its gas turbine engine issues;” and that “Stanton has [nothing] to do with Elovic or Glickstein.” *Id.* We disagree. A reference is considered analogous when it is from the same field of endeavor as the claimed invention or if it is

reasonably pertinent to the particular problem with which the inventor is involved. *In re Klein*, 647 F.3d 1343 (Fed. Cir. 2011).

Here, we determine that Stanton is at least reasonably pertinent to the particular problems addressed by the inventors in this application. The Specification discloses that “[t]his application relates to improvements in providing cooling air from a compressor section to a turbine section in a gas turbine engine.” Spec. ¶ 1. More specifically, the Specification discloses that a gas turbine engine may experience “very immediate deceleration in speed” and that if the “auxiliary compressor 114 also dramatically reduces speed, there can be stability issues, and the auxiliary compressor could experience a phenomenon called surge.” *Id.* at 62. We find that Stanton is reasonably pertinent to this problem. Stanton discloses a vehicle air conditioning system that is driven by a wheel 12 when the automobile is traveling above a certain speed and is driven by the vehicle engine when the vehicle is traveling below that speed. *See* Stanton col. 4, ll. 15–23. Further, Stanton’s device includes pulleys that function as flywheels, which provide sufficient energy to power the cooling apparatus when the vehicle slows down or stops suddenly “so that the engine will have time to begin operation.” *Id.* at col. 4, ll. 39–44. Stanton includes flywheels to prevent operation instability of the air conditioning compressor when the vehicle slows or stops suddenly. Thus, the Specification and Stanton are both concerned with continuous and stable operation of a compressor during periods of deceleration and stoppage, and therefore, we determine that Stanton is reasonably pertinent to the problem addressed in the Specification, regardless of the age of Stanton.

Finally, Appellant indicates that the Examiner has not provided a “reason why the Stanton clutch for a refrigerant circuit associated with an automobile might provide some teaching or benefit into the Elovic gas turbine engine cooling system.” Appeal Br. 4. However, in the rejection, the Examiner determines that it would have been obvious to incorporate Stanton’s teachings into Elovic’s device “to continue operating the compressor to continue providing needed cooling.” Final Act. 8. Thus, the Examiner has provided a reason to support the combination. Further, we find that this reasoning is adequately supported on the record before us. As discussed above, Stanton teaches a means for continued operation of an air conditioning compressor when a vehicle slows or stops. And, we agree with the Examiner that one of ordinary skill in the art would recognize a similar need for continued cooling during deceleration or sudden stops in gas turbine engines. *See Ans. 6–7.*

Based on the foregoing, we are not persuaded of reversible error in the rejection of claim 1. Accordingly, we sustain the rejection of claim 1. We also sustain the rejection of claims 2–6, 11, 12, and 15–18, which fall with claim 1.

Rejections 2–5

Appellant does not provide any separate, substantial arguments regarding the rejections of claims 7–10, 13, 14, and 19. Thus, for the reasons discussed above, we also sustain the rejections of these claims.

CONCLUSION

We AFFIRM the rejections of claims 1–19.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136 (a). *See* 37 C.F.R. § 1.136 (a)(1)(iv).

In summary:

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1-6, 11, 12, 15-18	103	Elovic, Glickstein, Stanton	1-6, 11, 12, 15-18	
7	103	Elovic, Glickstein, Stanton, “engineering expedient”	7	
8, 9, 19	103	Elovic, Glickstein, Stanton, Berryann, “engineering expedient”	8, 9, 19	
10	103	Elovic, Glickstein, Stanton, Berryann, Jarrell, “engineering expedient”	10	
13, 14	103	Elovic, Glickstein, Stanton, Ress	13, 14	
Overall Outcome			1-19	

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AFFIRMED