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CARLSON, GASKEY & OLDS/PRATT & WHITNEY
400 West Maple Road
Suite 350
Birmingham, MI 48009

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FORD, RENE D	

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JAMES W. FULLER

Appeal 2017-002134
Application 13/678,974
Technology Center 3700

Before: ANNETTE R. REIMERS, LISA M. GUIJT, and BRENT M. DOUGAL, *Administrative Patent Judges*.

DOUGAL, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134 from a final rejection of claims 1–6, 9, and 19–22. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

CLAIMED SUBJECT MATTER

The claimed invention is directed to a control for a gas turbine engine to adjust the amount of thrust by changing a fueling level and positioning at least one effector. The Specification teaches that this is done so that "[t]he thrust provided by the engine is changed without a reduction in an airflow stability margin compared to a thrust change commanded only by a fueling change." Spec., Abstract; *see also id.* ¶¶ 1–6. Examples of the "at least one effector" in the Specification include "a variable inlet vane . . . positioned intermediate the fan and compressor" and "a variable nozzle . . . positioned to change a cross-sectioned area of the bypass duct." *Id.* ¶¶ 9, 10. Claim 1, reproduced below, is the sole independent claim:

> 1. A gas turbine engine comprising:
>
> a compressor section;
>
> a fan for delivering air into said compressor section and into a bypass duct;
>
> a combustion section and a turbine section; and
>
> a control for said gas turbine engine, programmed to change a fueling level and position an effector to move to positions in a coordinated fashion with the change in fueling level and mitigate a loss of an airflow stability margin upon receipt of a command to change thrust, and with some aspects of the positioning being transitory.

EVIDENCE

The evidence relied upon by the Examiner is:

Slater	U.S. 4,258,545	Mar. 31, 1981
Pollak	U.S. 4,947,643	Aug. 14, 1990
Rowe	U.S. 6,205,771 B1	Mar. 27, 2001
Grabowski	U.S. 2010/0162683 A1	July 1, 2010

REJECTIONS[1]

Claims 1 and 9 are rejected under 35 U.S.C. § 102(b) as anticipated by Pollak.

Claims 1, 6, and 19 are rejected under 35 U.S.C. § 102(b) as anticipated by Slater.

Claims 2 and 3 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pollak and Grabowski.

Claims 4, 5, and 20–22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Slater, Rowe, and Pollak.

OPINION

35 U.S.C. § 102(b) – Pollak

Appellant argues that Pollak does not teach "a control for said gas turbine engine, programmed to change a fueling level and position an effector to move to positions in a coordinated fashion with the change in fueling level and mitigate a loss of an airflow stability margin upon receipt of a command to change thrust," as required by claim 1. Appeal Br. 2. In particular, Appellant argues that Pollak merely "detects an operating state of an engine and positions variable vanes [i.e., effectors] in [two] predetermined positions based on the operating state of the engine," "not in coordination with [the] fueling level." *Id.* (citing Pollak col. 8:43–56, Fig. 6).

[1] The 35 U.S.C. § 112, second paragraph rejection was withdrawn. Adv. Act. 1.

Pollak Figure 6, reproduced below, is a chart illustrating a change of high compressor vane position including a "transient to steady state response" in response to a request to deaccelerate the engine. Pollak cols. 2:66–68, 8:57–62, Fig. 6.

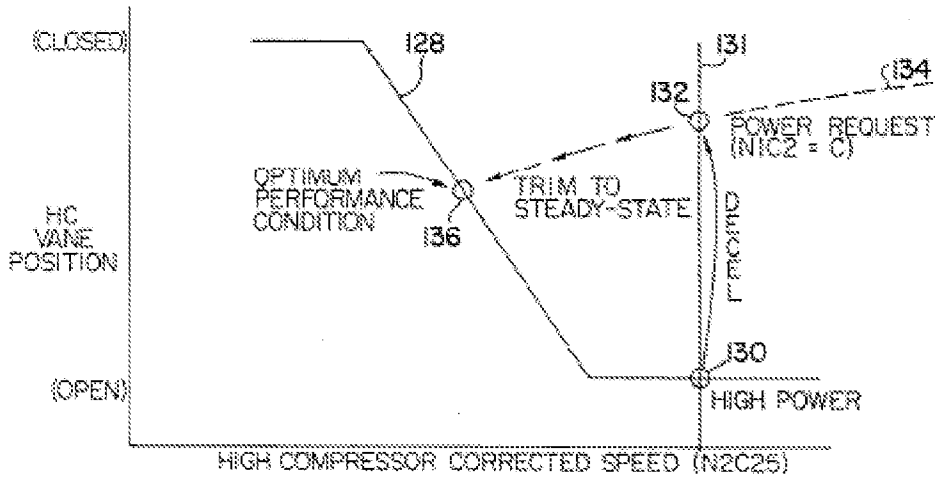

FIG. 6

Pollak's Figure 6 shows that the high compressor vanes initially move from an open position 130 along line 131 to temporary set point 132. *Id.* col. 8:60–65. If a subsequent power request is not received within a set time, the high compressor vanes move to the optimum performance condition 136. *Id.* at col. 8:67–9:4. Figure 6 does not illustrate the fuel level or the thrust level associated with deaccelerating the engine.

The Examiner found that Pollak teaches that the change in angle of the vanes is coordinated with a change in fueling level. Final Act. 6. (citing Pollak cols. 2:44–50, 4:52–67). This is supported, for example, by Pollak's summary of invention, which states:

> A controller is included which receives the parameter signals and provides, in response through signals indicative of selected engine power level controls, signals to the engine that select the magnitude of the burner fuel flow and the exhaust nozzle area

> synchronously with the magnitude of the gas path variable engine components.

Id. at col. 2:44–50. Pollak also specifically discusses the "coordinated use of main combustor fuel flow with selected geometries of variable gas path elements (e.g. fan and high compressor variable vanes) to optimize engine performance." *Id.* at col. 4:52–57.

In view of the above, Appellant's position that Pollak merely "detects an operating state of an engine and positions variable vanes [i.e., effectors] in [two] predetermined positions based on the operating state of the engine," "not in coordination with [the] fueling level" is not consistent with the teachings of Pollak. Appeal Br. 2. Thus, we are not informed of error in the Examiner's rejection.

Appellant also argues that Pollak does not disclose that the effector positioning is transitory. *Id.* at 3. Stating, in particular, that "Pollack [sic] defines a transient condition as occurring when the time elapsed from the previous power request is less than a preselected value (col. 8, 11. 45-47). This has no relationship to thrust commands and/or changes in fueling level." *Id.*

However, as discussed above, the transient condition cited by Appellant is the temporary set point/angle 132 of the high compressor vanes that occurs in response to a request to deaccelerate the engine illustrated in Figure 6. Pollak teaches a control system where such a request relies on the "coordinated use of main combustor fuel flow with selected geometries of variable gas path elements (e.g. fan and high compressor variable vanes) to optimize engine performance." Pollak col. 4:52–57.

Thus, Appellant's position that Pollak's transient condition "has no relationship to thrust commands and/or changes in fueling level" is not supported by Pollak.

35 U.S.C. § 102(b) – Slater

Claims 1 & 6

Appellant argues that "Slater does not disclose positioning an effector to mitigate the loss of an airflow stability margin," as required by claim 1. Appeal Br. 3. Appellant argues that the above highlighted limitation is not purely functional, but rather a structural limitation. *Id.* Appellant states that "the claims recite structural features (i.e., the nozzle and the control) which are not described in the cited prior art." *Id.*

Claim 6 is the only claim rejected as anticipated by Slater that includes a nozzle. Slater teaches "the bypass duct 32 defines a variable area fan exhaust nozzle 36" (Slater col. 2:41–42), which the Examiner identifies as the claimed nozzle (Final Act. 8). After stating that Slater does not teach a nozzle, Appellant does not further explain his position. Thus, we are not informed of any differences between Slater's nozzle 36 and the "variable nozzle" of claim 6, and therefore, we are not informed of errors in the Examiner's rejection.

Concerning the control, Appellant states: "[t]he function of a controller defines its structure by defining software and/or hardware for performing the function." Appeal Br. 3–4. Appellant then asserts that Slater is not "capable of performing the function without further programming." *Id.* at 4. Appellant also argues that "Slater only discloses that a control

system can eliminate the effect of constant disturbances, nothing more." *Id.* at 3.

These assertions, without more, do not inform us of error in the Examiner's rejections. The Examiner found that "mitigat[ing] a loss of an airflow stability margin" is a functional limitation (Final Act. 8), which is performed by Slater as "Slater discloses a control that performs an identical function of the claimed control, i.e. positioning an effector and coordinating the positioning with a fueling level in response to a thrust command" (Ans. 4; *see also* Final Act. 4, 7–8). Though Appellant states the Slater cannot perform the function of the claimed control, Appellant does not show why this is the case. For example, Appellant's arguments do not identify any structural differences in the control performed by Slater and that in the claims. Appellant merely points to the control itself. As another example, Appellant does not identify any specific function required by the claimed "mitigat[ing] the loss of an airflow stability margin" different from that taught by the prior art. Thus, we are not informed of error in the Examiner's rejection.

Claim 19

Dependent claim 19 includes "wherein said variable nozzle is positioned such that fan speed initially moves to be slower when thrust is increased, and the variable nozzle is positioned such that fan speed moves to initially be faster when thrust is decreased."

Appellant argues that in claim 19 "the fan acceleration is tied to structural features, namely, a control and a variable nozzle, which function

to effect fan acceleration in a certain manner, and which the Examiner has not identified in the prior art." Reply Br. 3; *see also* Appeal Br. 4.

Appellant's argument is not commensurate in scope to claim 19. Claim 19 is an apparatus claim that describes the physical positioning of the variable nozzle. Claim 19 does not require a control programmed or otherwise configured to position the variable nozzle as implied by Appellant's arguments. Thus, we are not informed of error in the Examiner's rejection.

35 U.S.C. § 103(a) – Pollak & Grabowski

Appellant argues that claims 2 and 3 are allowable for the same reasons as claim 1 over Pollak previously discussed. Appeal Br. 4. Thus, claims 2 and 3 fall with claim 1 for the reasons discussed above.

35 U.S.C. § 103(a) – Slater, Rowe, & Pollak

Appellant argues that claims 4, 5, and 20–22 are allowable for the same reasons as claim 1 over Slater previously discussed. Appeal Br. 5. Thus, claims 4, 5, and 20–22 fall with claim 1 for the reasons discussed above.

Appellant also separately argues the patentability of dependent claim 22. *Id.* Claim 22 includes "wherein a coordinated effect of the change in fueling level and the positioning of the effector is a weighted sum of the effects of the change in fueling level alone or positioning the variable nozzle alone."

Appellant argues that the Examiner is incorrect to assert that the added limitations of dependent claim 22 are functional, because: "the

function of a controller defines its structure. Slater does not disclose the claimed features. Claim 22 depends from claim 1, which recites a control. Therefore, the subject matter of claim 22 gives structure to the recited control." Appeal Br. 5.

Though it is true that "the function of a [programmed] controller defines its structure," Appellant's arguments do not identify error in the Examiner's rejection. Appellant has not provided sufficient discussion of this allegation, and it is not otherwise self-evident from the record that any additional structure is required.

The Examiner determined that the added limitation of claim 22 "constitutes neither a structural limitation or a function of the control" and that "[a]s the invention of Slater i.v. Rowe i.v. Pollak meets all preceding claim limitations, it is inherently capable of meeting the defined function." Final Act. 12. Appellant asserts that this is incorrect, but does not explain why there is an error in the Examiner's position.

DECISION

The Examiner's rejections of claims 1–6, 9, and 19–22 are affirmed.

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).

AFFIRMED