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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte GABRIEL L. SUCIU, JESSE M. CHANDLER, and WESLEY K. LORD

Appeal 2019-003886
Application 15/619,893
Technology Center 3600

Before JILL D. HILL, LEE L. STEPINA, and ARTHUR M. PESLAK, *Administrative Patent Judges.*

HILL, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–12 and 14–22. 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 Corp. Appeal Br. 1.

BACKGROUND

The claims are directed to an aft fan counter-rotating turbine engine. Claim 1, reproduced below, illustrates the claimed subject matter:

> 1. A boundary layer ingestion engine comprising:
> a gas generator;
> a turbine fluidly connected to the gas generator;
> a fan mechanically linked to the turbine via at least one shaft such that rotation of the turbine is translated to the fan;
> an exhaust duct fluidly connected to an outlet of the turbine, wherein the exhaust duct is positioned radially inward of the fan;
> a static structural frame disposed aft of said turbine and fore of said fan; and
> a cooling passage disposed radially outward of the exhaust duct and radially inward of the fan, and being at least partially defined at a forward end by a static structural frame, and being defined at least partially by a first rotating frame and a second rotating frame.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Mercier	US 2,477,637	Aug. 2, 1949
Stretton	US 2011/0268563 A1	Nov. 3, 2011
Mackie	US 2012/0023898 A1	Feb. 2, 2012
Becker	US 2017/0081035 A1	Mar. 23, 2017
Stieger	US 2017/0121031 A1	May 4, 2017

REJECTIONS

I. Claims 1–12, 14–18, and 22 stand rejected under 35 U.S.C. § 112(b) as being indefinite. Final Act. 3.

II. Claim 2 stands rejected under 35 U.S.C. § 112(d) as being of improper dependent form. Final Act. 4.

III. Claims 1–3, 5, 8, 10–12, 14, 15, 17–19, 21, and 22 stand rejected under 35 U.S.C. § 102(a)(1) as anticipated by Stretton. Final Act. 4.

IV. Claims 6 and 7 stand rejected under 35 U.S.C. § 103 as obvious over Stretton and Mercier. Final Act. 5.

V. Claims 4, 16, and 20 stand rejected under 35 U.S.C. § 103 as obvious over Stretton and Mackie. Final Act. 6.

VI. Claim 9 stands rejected under 35 U.S.C. § 103 as unpatentable over Stretton and Stieger. Final Act. 7.

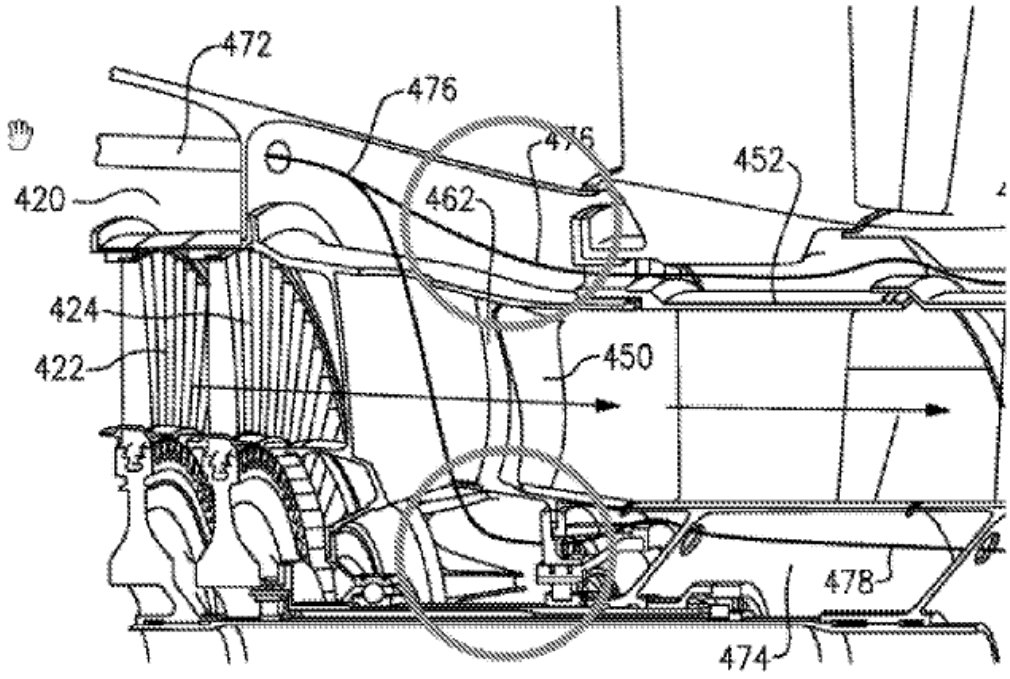
ANALYSIS

Rejection I – Indefiniteness

In rejecting claim 1 and its dependent claims as indefinite, the Examiner states that it is unclear whether "a static structural frame" in line 10 of claim 1 refers back to "a static structural frame" in line 8 or is an additional limitation. Final Act. 3. The Examiner also finds that claims 14–17 depend from a canceled claim, namely, claim 13.

As to the recited "structural frame," Appellant argues that "one of skill in the art having the benefit of the disclosure, and particularly of the Figures, would understand that the referenced static structural frame is the previously recited static structural frame and the claimed structure is clear." Appeal Br. 4.

In response, the Examiner provides an annotated version of Appellant's Figure 4 denoting inner and outer static structures, reproduced below. Ans. 4.



Annotated Fig. 4

Figure 4 schematically illustrates a zoomed in partial view of a free turbine and a corresponding fan section of a boundary layer ingestion engine, as annotated by the Examiner. Spec. ¶ 29. The Examiner states that, because there are two different structures defining flow paths, "the specific structural frame indicated by the second recitation thereof is not readily defined, and not obvious as the same structure as the first recitation, in light of the disclosure." Ans. 3. For the reasons discussed below, we agree with the Examiner.

Claim 1 recites a first instance of "a static structural frame," namely, "*a static structural frame* disposed aft of said turbine and fore of said fan." Claim 1 thereafter recites a second instance of "a static structural frame," namely, "a cooling passage disposed radially outward of the exhaust duct and radially inward of the fan, and being at least partially defined at a forward end by *a static structural frame*, and being defined at least partially

by a first rotating frame and a second rotating frame." Although the cooling passage defined by the static structural frame in the second instance of claim 1 places the frame between the exhaust duct and the fan, and corresponds to the outer static structure designated by the Examiner, Appellant does not dispute the Examiner's finding that there is also an inner structural frame that is aft of the turbine and fore of the fan that could be considered the static structural frame of the first instance. Accordingly, we agree with the Examiner that it is unclear whether the second instance of "a static structural frame" refers back to the first instance of its recitation.

Regarding the rejection of claims 14–17 as depending from a cancelled claim (Final Act. 3), Appellant does not argue the impropriety of this rejection, and rather proposes to correct the claim dependency. *See* Appeal Br. 4.

Because claim 1 is unclear for the reasons discussed above, and because Appellant does not point to Examiner error for claims 14–17, we sustain the Examiner's indefiniteness rejection.

Rejection II – Improper Dependent Form

The Examiner finds that, because the position of the fan and turbine are implicit in claim 1, claim 2 defining the relative locations does not further limit claim 1. Final Act. 4. Appellant does not argue the rejection and instead offers to cancel claim 2.

Because Appellant does not point out Examiner error, we sustain the rejection of claim 2 as being in improper dependent form.

Rejection III – Anticipation by Stretton

Claims 1–3, 5, 8, 10–12, 14, 15, 17, 18, and 22

Appellant argues, *inter alia*, that Stretton cannot be anticipatory because "the fans in Stretton are positioned directly radially outward of the portion of the turbine that rotates the corresponding fan, and it would be impossible for a portion of the duct to be simultaneously aft of the turbine and fore of the fan." Appeal Br. 6.

The Examiner responds that Appellant improperly "appears to equate the inner fan workings (generally marked by 19) as a 'turbine.' . . . These components are . . . considered as part of the fan, to enable the fan to operate via the main fluid flow (40), rather than as part of the prior turbine stage." Ans. 5.

Appellant replies that Stretton discloses "[t]he engine 10 also comprises two contra-rotating propellers 23, 24 attached to and driven by the free power turbine 19, which comprises contra-rotating blade arrays 25, 26." Reply Br. 4 (citing Stretton ¶ 20) (boldface omitted). According to Appellant, Stretton's free power turbine is not inner workings of the fan, as the Examiner suggests, but is a distinct turbine that drives the fans. *Id.* Appellant asserts that because only Stretton's free power turbine 19 (and not elements 17, 18) is *mechanically linked* to the fan as required by the claim, Stretton does not include a static structural frame disposed aft of the turbine 19 and fore of the fan 23, 24, Stretton is not anticipatory. *Id.*

Appellant's arguments are persuasive. Claim 1 requires "a fan mechanically linked to the turbine via at least one shaft such that rotation of the turbine is translated to the fan." In rejecting claim 1 as anticipated, the Examiner relies on paragraphs 20 and 38 of Stretton and finds that Stretton discloses "turbine (17, 18) and fan (23, 24)." Final Act. 4. In the portions of Stretton relied on the by the Examiner, Stretton discloses that the engine

comprises "a high-pressure turbine 17 (HPT), a low pressure turbine 18 (LPT), a free power turbine 19 (FPT) and a core exhaust nozzle 20. . . . The engine 10 also comprises two contra-rotating propellers 23, 24 *attached to and driven by the free power turbine 19*, which comprises contra-rotating blade arrays 25, 26." Stretton ¶ 20 (emphasis added). Based on this disclosure, we agree with Appellant that propellers 23, 24 (fan) are attached (mechanically linked) to turbine 19.

The Examiner does not point to any portion of Stretton that discloses that turbine 17 or 18 is "mechanically linked" to the fan, as required by claim 1. *See* Ans. 5. Even if the Examiner were to rely on turbine 19 as the turbine that is mechanically linked to the fan, we agree with Appellant that the claim 1 limitation "a static structural frame disposed aft of said turbine and fore of said fan," is not met by using turbine 19.

The Examiner has not established adequately that Stretton discloses both a turbine mechanically linked to the fan, and a static structural frame disposed aft of that turbine and fore of the fan, as required by claim 1.

Because the Examiner's findings are not supported by a preponderance of the evidence, anticipation has not been established. For these reasons, we do not sustain the rejection of claim 1 as anticipated by Stretton. Claims 2, 3, 5, 8, 10–12, 14, 15, 17, 18, and 22 depend directly or indirectly from claim 1, containing all of the limitations thereof. We do not sustain the rejection of these dependent claims for the same reasons.

Claims 19 and 21

Independent claim 19 requires, "driving rotation of a fan, aft of the turbine, via at least one shaft connecting the turbine to the fan," and the Examiner relies on the same findings for claim 19, namely, that turbines 17

and 18 meet the claimed turbine. *See* Final Act. 4–5. However, unlike claim 1, claim 19 does not recite the location of the static frame with respect to the turbine and fan. Rather, claim 19 requires "a cooling passage disposed radially outward of an exhaust duct and radially inward of the fan, wherein a radially inner edge of the cooling passage is defined at least partially by a static structural frame, a first rotating frame and a second rotating frame." Appeal Br. 13 (Claims App.). Appellant argues that the Examiner's reliance on annotated Figure 1 of Stretton, above, is not sufficient to anticipate claim 19, because "the only part of the duct that is between the turbines and the fans of Stretton is the rotating duct which is not static." Appeal Br. 7.

Appellant's argument is not persuasive, because claim 19 does not require the duct to be between the turbine and the fan, and we decline to read such a limitation from the Specification into claim 19. Claim 19 only requires a cooling passage disposed radially outward of an exhaust duct and radially inward of the fan. Stretton's cooling passage (for cooling flow 145) is radially outward of duct for flow 140 and radially inward of the fan. *See* Stretton, Fig. 2. Unlike claim 1, there is no fore and aft requirement for the duct. Figure 1 of Stretton, as annotated by the Examiner, also depicts a radially inner edge of the cooling passage defined at least partially by a static structural frame (inside the oval), a first rotating frame and a second rotating frame (frames of rotating fans 23, 24).

Because Appellant's argument relies on limitations that are not recited in claim 19, Appellant does not apprise us of Examiner error. Accordingly, we sustain the rejection of claim 19 as anticipated by Stretton. Appellant

does not provide separate arguments for claim 21, which depends from claim 19, and we sustain the rejection of the claim 21 for the same reasons.

Rejections IV–VI – Obviousness

Claims 4, 6, 7, 9, and 16

Claims 4, 6, 7, 9, and 16 depend directly or indirectly from claim 1. The Examiner does not find or conclude that any of Mercier, Mackie, or Stieger cures the deficiency of Stretton by disclosing the claimed turbine connected to the fan. We, therefore, do not sustain the rejection of claims 4, 6, 7, 9, and 16 for reasons set forth above.

Claim 20

Claim 20 depends from claim 19. Claim 20 recites, "driving rotation of a first turbine section and a second fan stage in a first direction, and driving rotation of a second turbine section and a first fan stage in a second direction, such that the first turbine section and the second turbine section are counter rotating." Appeal Br. 13 (Claims App.).

The Examiner finds that "Mackie teaches an engine having counter-rotating fans driven by respective turbines via concentric shafts (as seen in Fig. 2, fan 44 is driven by turbine 50 via shaft 55 while fan 43 is driven by turbine 49 via shaft 54)." Final Act. 6. The Examiner considers that it would have been obvious to have modified Stretton to use turbines as taught by Mackie to have fewer components and for increased compactness. *Id.*

Appellant does not refute the Examiner's findings as to Mackie, except to allege that the rejection is "insufficient." Appeal Br. 8. Appellant, however, alleges no erroneous finding, and provides no explanation why the

arrangement of Mackie is improper for incorporation into Stretton's structure in the manner proposed by the Examiner. Because we are not persuaded by Appellant's conclusory arguments, we sustain the rejection of claim 20.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)Basis	Affirmed	Reversed
1–12, 14–18, 22	112(b)	Indefiniteness	1–12, 14–18, 22	
2	112(d)	Improper Dependency	2	
1–3, 5, 8, 10–12, 14, 15, 17–19, 21, 22	102(a)(1)	Stretton	19, 21	1–3, 5, 8, 10–12, 14, 15, 17, 18, 22
6, 7	103	Stretton, Mercier		6, 7
4, 16, 20	103	Stretton, Mackie	20	4, 16
9	103	Stretton, Stieger		9
Overall Outcome			1–12, 14–22	

TIME PERIOD FOR RESPONSE

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