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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CHRISTINE F. MCGINNIS and
STEVEN J. BAUER

Appeal 2019-006693
Application 14/948,768
Technology Center 3700

Before EDWARD A. BROWN, MICHAEL L. HOELTER, and
LEE L. STEPINA, *Administrative Patent Judges*.

HOELTER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner’s decision to reject claims 1–4, 7, 9–12, 14, 15, and 17–29, which constitute all the claims pending in this application. *See* Appeal Br. 4. “Claims 5–6, 8, 13, 16, and 30 have been cancelled.” Appeal Br. 4. We have jurisdiction under 35 U.S.C. § 6(b).

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. 2.

We AFFIRM the Examiner’s rejections of these claims.

CLAIMED SUBJECT MATTER

The disclosed subject matter “relates to a gas turbine engine and, more particularly, to a case therefore.” Spec. ¶2. Apparatus claims 1 and 15 are independent. Claim 1 is illustrative of the claims on appeal and is reproduced below.

1. A mid-turbine frame case for a gas turbine engine, comprising:
a cast case section comprising a multiple of cast features, said cast case section welded between a forged forward case section and a forged aft case section, said forged forward case section configured for containment of a high pressure turbine rotor stage, said forged aft case section configured for containment of a low pressure turbine rotor stage.

EVIDENCE

Name	Reference	Date
Burdgick et al. (“Burdgick”)	US 5,605,438	Feb. 25, 1997
Eleftheriou et al. (“Eleftheriou”)	US 2005/0022501 A1	Feb. 3, 2005
Hellgren et al. (“Hellgren”)	WO 2013/095202 A1	June 27, 2013

REJECTIONS²

Claims 1–4, 7, 9–12, 15, 17–19, 25, 26, 28, and 29 are rejected under 35 U.S.C. § 102(a)(1) as anticipated by Hellgren.³

Claims 14, 20, 21, and 27 are rejected under 35 U.S.C. § 103 as unpatentable over Hellgren and Eleftheriou.

Claims 22–24 are rejected under 35 U.S.C. § 103 as unpatentable over Hellgren and Burdgick.

ANALYSIS

The rejection of claims 1–4, 7, 9–12, 15, 17–19, 25, 26, 28, and 29 as anticipated by Hellgren

Appellant argues all these claims together. *See* Appeal Br. 8–13. We select independent claim 1 for review, with the remaining claims standing or falling with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Claim 1 recites a “cast case section . . . welded between a forged forward case section and a forged aft case section.” The Examiner references Figure 4 of Hellgren, and specifically “cast case section” 43 located “between a forged forward case section (44) and a[] forged aft case section (45).” Final Act. 5. The Examiner also identifies where Hellgren teaches that “[t]raditionally, supporting structures have been manufactured as one large casted component,” but that in order “[t]o reduce costs,” it has

² The rejection of claim 30 under 35 U.S.C. § 112(b) for being indefinite, and the double patenting objection of claim 30 for being a substantial duplicate of claim 27 (*see* Final Act. 3–4), are both moot in view of the cancellation of claim 30. *See* Appeal Br. 4, Response After Final dated December 31, 2018.

³ The Examiner also listed claim 16, but this claim had been earlier canceled. *See* Appeal Br. 4, Amendment dated July 3, 2018.

become “common to manufacture supporting structures by assembling of pre-fabricated parts, such as smaller casted, forged and sheet metal parts.” Final Act. 5 (referencing Hellgren 1:25–29). Hellgren further states that “[t]ypically, the parts are welded together.” Hellgren 1:29; *see also* Final Act. 5. Regarding the specific components of Hellgren relied upon by the Examiner, i.e., items 43, 44, and 45, the Examiner identifies where Hellgren states, “front case 43, front flange 44 and rear case 45 are produced by known means. All these main parts are welded together as to form the component 37.” Final Act. 5 (referencing Hellgren 7:27–29).

Appellant does not dispute these teachings of Hellgren. Instead, Appellant contends that “Hellgren does not even disclose a mid-*turbine* frame” because Hellgren’s item 37 is “located between the low pressure *compressor* 4 and the high pressure *compressor* 5 (shown as 37 in Fig. 1).” Appeal Br. 8 (emphasis added). Appellant contends that Hellgren’s “structure 37 is forward of the combustor 6 and thus is simply not applicable to the high temperature turbine region aft of the combustor 6.” Appeal Br. 8.

The Examiner disagrees explaining that “Hellgren explicitly states that the structure taught by Hellgren is suitable for use in a mid-turbine frame.” Ans. 4 (referencing Hellgren 5:18–6:27, 10:24–28).

Hellgren does indeed describe that supporting structure 37 is located between *compressor* sections as Appellant contends above. *See, e.g.*, Hellgren Fig. 1. However, Hellgren also teaches that “[t]he invention is not limited by the embodiments described above but can be modified in various ways within the scope of the claims.” Hellgren 10:4–5. More specifically, Hellgren states, “the invention is not limited to the ICC 37 exemplified above” but that “[i]t is also applicable to other supporting structures in a gas

turbine engine such as . . . a turbine rear frame (TRF).” Hellgren 10:24–27. Of importance is Hellgren’s correlation of the above cited “turbine rear frame (TRF)” to “rear supporting structure 27.” Hellgren 6:15–16. Of even greater importance is Hellgren’s disclosure that this rear supporting structure 27 is located between *turbine* sections (unlike exemplary structure 37). *See* Hellgren Fig. 1; *see also* Ans. 5 (referencing “adjacent structures 37, 27”).

In view of the above, Appellant’s contention that Hellgren’s supporting structures, and their manner of constructions, is limited solely for use between compressor sections is not a correct reading of the scope of Hellgren’s teachings. In other words, Appellant’s contention that “Hellgren does not even disclose a mid-turbine frame” does not take into account the portions of Hellgren discussed above and noted by the Examiner. Appeal Br. 8.

Claim 1 further recites, “said forged forward case section configured for containment of a high pressure turbine rotor stage, said forged aft case section configured for containment of a low pressure turbine rotor stage.” Appeal Br. 17 (Claims Appendix). Appellant contends, “the Hellgren component is [] not directed to a containment structure of any sort.” Appeal Br. 8. In other words, “Hellgren’s component is not arranged in any way outboard of the rotors, and thus does not provide containment” as understood by a person skilled in the art.⁴ Appeal Br. 8; *see also id.* at 12; Reply Br. 2.

⁴ “Appellant’s point is that ‘containment’ has a particular definition in the aerospace world.” Appeal Br. 9.

The Examiner disagrees, noting the use of different terms by Appellant and Hellgren to identify similar structure.⁵ Ans. 7. The Examiner states that “the forward and aft case sections disclosed in Hellgren are configured for containment of high and low pressure turbine rotor states as claimed.” Ans. 5–6 (referencing Hellgren Fig. 1 and “rotors 7, 8 adjacent structure 27”). “As such, the examiner maintains that the structure disclosed by Hellgren teaches a containment structure as claimed.” Ans. 6.

There is merit to the Examiner’s contentions, and especially as Appellant’s Specification acknowledges that a mid-turbine frame (i.e., “an inter-turbine frame”) of an engine “typically includes a plurality of hollow vanes,” i.e., that it is “a load bearing structure that provides rotor containment.” Spec. ¶¶ 3, 4. Appellant does not explain how Hellgren’s corresponding “rear supporting structure 27,” which is located intermediate high and low pressure turbines 7 and 8 (*see* Hellgren Fig. 1 illustrating the vanes thereof), and which is also expressed as being load bearing (*see* Hellgren 6:11–17), fails to provide the requisite containment, when Appellant’s similarly located structure does.

We further understand from Appellant that the Federal Aviation Administration, as well as the “DOT,” provide “regulations associated with blade containment structures” thereby giving credence to Appellant’s contention that “‘containment’ has a particular definition in the aerospace world.” Appeal Br. 9. However, Appellant does not explain how Hellgren’s

⁵ The Examiner contrasts Appellant’s “mid-turbine frame” with Hellgren’s “turbine mid-structure,” stating that this is merely “lexicographical” and that “Hellgren uses ‘turbine mid-structure’ within the context of supporting structures.” Ans. 7 (referencing Hellgren 10:24–28).

similarly situated structure runs afoul of these regulations or this understanding. Instead, Appellant contends that the Examiner's findings "stretch the teachings of Hellgren" and, as such, "simply cannot be supported." Reply Br. 3.

In view of the teachings above and the requisite regulatory requirements, Appellant's contentions above are not indicative that the Examiner erred when relying on Hellgren for disclosing a support structure that is constructed as recited, or which is configured to provide containment as recited.

Appellant also contends that "Hellgren provides a telescopic structure" and references tapered plate member 48 that fits into a cutout as support for this contention. Appeal Br. 10; *see also id.* at 11, Reply Br. 3. However, Appellant does not identify where Hellgren actually teaches that components 43, 44, and 45 move after being assembled together, nor does Appellant address Figures 2 and 3 of Hellgren which would dispel any concept that components 43, 44, and 45 are telescopic. Further, Appellant's contention that components 43, 44, and 45 move with respect to each other is contradicted by Hellgren's clear disclosure that they are, instead joined by welding. *See* Hellgren 7:27–29 (discussing items 43, 44, and 45 stating "[a]ll these main parts are welded together").

Accordingly, and based on the record presented, we are not informed of Examiner error when claims 1–4, 7, 9–12, 15, 17–19, 25, 26, 28, and 29 were rejected as being anticipated by Hellgren. We sustain their rejection.

*The rejection of claims 14, 20, 21, and 27
as unpatentable over Hellgren and Eleftheriou*

Appellant argues these claims together (*see* Appeal Br. 14) and provides further arguments regarding claim 27. We select claim 14 and claim 27 for review, with claims 20 and 21 standing or falling with their respectively grouped claim.⁶

Claim 14

Claim 14 depends directly from claim 1 and further recites “wherein said cast case section contains Inconel 718.” The Examiner acknowledges Hellgren’s failure to explicitly teach this specific material, and thus relies on Eleftheriou for such teaching. *See* Final Act. 11. The Examiner reasons that since “both Hellgren and Eleftheriou teach gas turbine engine casings and their methods of construction,” it therefore would have been obvious to provide a “case cast section [that] contains Inconel 718” because it is “a suitable material for the case assembly’s construction.” Final Act. 11. The Examiner states that it is within a skilled persons’ ability “to select a known material on the basis of its suitability . . . as a matter of obvious design choice.” Final Act. 11.

Appellant does not challenge Eleftheriou’s teaching of employing Inconel 718 in the manner recited, but instead, “respectfully submits that there is simply no motivation to manufacture the Hellgren component out of Inconel other than that disclosed by Appellant.” Appeal Br. 14. Appellant succinctly contends, “[t]his is hindsight.” Appeal Br. 14.

⁶ Regarding claim 20, Appellant refers to “the distinctions discussed above” regarding a discussion of all the claims. Appeal Br. 14. Appellant does not comment on claim 21.

We disagree with Appellant's assertion. The Examiner explains that the incorporation of Eleftheriou's material "into the structure of Hellgren was based upon prior art teachings," not Appellant's disclosure. Final Act. 10. Indeed, Eleftheriou teaches the use of strong material, like steel, in certain areas of the turbine "for containing blade-off events." Eleftheriou ¶ 3. Eleftheriou further teaches that while steel can be used, "a combination of materials may [also] be used (e.g. steel and Inconel, etc.)" as well. Eleftheriou ¶ 35; *see also id.* at 50, Final Act. 10. Thus, Appellant's contention of "hindsight" is not indicative that the Examiner erred when expressly relying on the teachings of Eleftheriou for the inclusion of Inconel into the case of Hellgren. We sustain the Examiner's rejection of claims 14 and 20 as being obvious over Hellgren and Eleftheriou.

Claim 27

Claim 27 depends indirectly from claim 1 and further recites the limitation "wherein the forward containment zone is operable to contain a blade-out incident." The Examiner relies on Eleftheriou for teaching the use of higher strength material "for protection from blade-out incidents." Final Act. 13 (referencing Eleftheriou ¶ 3). Appellant contends that "Hellgren simply has no such concern." Appeal Br. 14. Appellant's focus on Hellgren for concern of blade-out incidents does not accurately address the Examiner's rejection, which instead relies on Eleftheriou for discussing "blade-off events." Eleftheriou ¶ 3; *see also* Final Act. 13. Accordingly, there is no indication the Examiner erred with relying on the combination of Hellgren and Eleftheriou for such teachings.

Consequently, and based on the record presented, we sustain the Examiner's rejection of claims 14, 20, 21, and 27 as being obvious over Hellgren and Eleftheriou.

*The rejection of claims 22–24
as unpatentable over Hellgren and Burdgick*

Appellant presents arguments for claim 22, and then, with respect to claims 23 and 24, relies on “the reasons discussed above with regard to claim 22.” Appeal Br. 15. We select claim 22 for review, with claims 23 and 24 standing or falling with claim 22.

Regarding claim 22, Appellant contends that the recited “‘dummy’ feature” is “simply not an issue with regard to Hellgren” because Hellgren “is located in the relatively cool compressor section.” Appeal Br. 15. However, as indicated above, Hellgren is not silent regarding usage in higher-temperature locations, such as those associated with turbines. Regardless, Hellgren cautions that in some places, the temperature “may be too high for using easily machinable materials.” Hellgren 10:27–29. As such, this contention by Appellant is not indicative of Examiner error.

Further, and specifically regarding the claimed usage of a “‘dummy’ feature,” the Examiner relied on Burdgick for such teachings, not Hellgren. Hence, Appellant is not responding to the Examiner's rejection. As such, there is no indication the Examiner erred when relying on the combination of Hellgren and Burdgick for such teachings.

Accordingly, and based on the record presented, we sustain the Examiner's rejection of claims 22–24 as being obvious over Hellgren and Burdgick.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1-4, 7, 9-12, 15, 17-19, 25, 26, 28, 29	102(a)(1)	Hellgren	1-4, 7, 9-12, 15, 17-19, 25, 26, 28, 29	
14, 20, 21, 27	103	Hellgren, Eleftheriou	14, 20, 21, 27	
22-24	103	Hellgren, Burdgick	22-24	
Overall Outcome			1-4, 7, 9-12, 14, 15, 17-29	

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

AFFIRMED