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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ALAN H. EPSTEIN, GABRIEL L. SUCIU, and
JESSE M. CHANDLER

Appeal 2019-000774
Application 14/789,295
Technology Center 3700

Before BIBHU R. MOHANTY, PHILIP J. HOFFMANN, and
BRADLEY B. BAYAT, *Administrative Patent Judges*.

MOHANTY, *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 and 5–16. We have jurisdiction under 35 U.S.C. § 6(b).

SUMMARY OF THE DECISION

We AFFIRM.

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

CLAIMED SUBJECT MATTER

The Appellants' claimed invention relates to a tip shrouded compressor stage and compressor blades with a high aspect ratio (Spec., para. 1). Claim 1, reproduced below, is representative of the subject matter on appeal.

1. A gas turbine engine compressor stage comprising:
a rotor;
compressor blades supported by the rotor, the blades include an inner flow path surface each supporting an airfoil that has a chord extending radially along a span to a tip, a shroud supported at the tip and providing an outer flow path surface, wherein the shroud provides a noncontiguous ring about the compressor stage, wherein the airfoils have an aspect ratio corresponding to the airfoil span to the airfoil chord, the shroud extends the full chord, wherein the aspect ratio is in a range of 1.6 to 2.8.

THE REJECTIONS

The following rejections are before us for review:

1. Claims 1 and 7–9 are rejected under 35 U.S.C. § 103as unpatentable over Ortolano (US 3,279,751 A1, iss. Oct. 18, 1966), Dennis, *The Gas Turbine Handbook*, The American Society of Mechanical Engineers (2006), and Smith, *Nasa/GE Fan and Compressor Research Accomplishments*, International Gas Turbine and Aeroengine Congress and Exposition, May 1993 meeting.
2. Claims 5 and 6 are rejected under 35 U.S.C. § 103(a) as unpatentable over Ortolano, Dennis, Smith, and Krueger (US 5,037,273, pub. Aug. 6, 1991).

3. Claims 10–14 and 16 are rejected under 35 U.S.C. § 103(a) as unpatentable over Elaini (US 5,522,705, pub. June 4, 1996) Krueger, Dennis, and Smith.

4. Claims 14 and 15 are rejected under 35 U.S.C. § 103(a) as unpatentable over Elaini, Krueger, Dennis, Smith, and Ortolano as evidenced by Evans (US Patent 5,211,540), issued May 18, 1993.

FINDINGS OF FACT

We have determined that the findings of fact in the Analysis section below are supported at least by a preponderance of the evidence².

ANALYSIS

Rejection under 35 U.S.C. § 103(a)

The Appellant argue the rejection of claim 1 under 35 U.S.C. § 103 as unpatentable over Ortolano, Dennis, and Smith is improper (App. Br. 4–7, Reply Br. 1–3).

In contrast, the Examiner has determined that the rejection is proper (Final Act. 4, 5, Ans. 3–9).

We agree with the Examiner. The Appellant has argued that Ortolano does not disclose the claimed airfoils having an “aspect ratio [that is] in the range of 1.6 to 2.8,” and that Dennis teaches away from these claimed features (Appeal Br. 4-7). The Appellant also argues that a person of ordinary skill in the art would be discouraged from using a shroud in the

² See *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Patent Office).

combination of references (App. Br. 6). We determine the Appellant's arguments are unpersuasive and agree with and adopt the Examiners rationale for the rejection set forth in the Answer. The Examiner has acknowledged that Ortolano does not disclose an aspect ratio of 1.6 to 2.8, but notes that the Specification indicates at paragraph 3 that the current state of the art for such aspect ratios is 1.2 to 1.4 (Ans. 7). The Examiner cites that Dennis at page 163 and Table 3 discloses that the thrust/weight ratio is increased by higher aspect ratios, and further that the trend in the industry is to have increasing aspect ratios (Ans. 6). We agree with the Examiner's rationale that the cited modification of references to include the claimed range for the aspect ratio would have been obvious to increase thrust weight ratio, as set forth in the Final Action and Answer. The Appellant in the Appeal Brief at page 5 argues that Dennis teaches that a high ratio aspect 9 is risky, but the claimed range is only 1.6 to 2.8. The Appellant argues shrouds should not be used with low aspect ratios, but here in the rejection of record we agree with the Examiner's rationale that in the combination of references that the shroud increases safety. For these reasons, the rejection of record of claim 1 is adopted and sustained. The Appellant has provided the same arguments for claims 7–9, and the rejection of these claims is sustained as well.

The Appellant has not provided separate arguments for claims 5 and 6, and the rejection of record for these claims is adopted and sustained.

With regard to the rejection of claims 10–16 the Appellant argues that Elaini teaches away from using a shroud in the combinations (App. Br. 7). These arguments are not persuasive and we agree with and adopt the Examiner's findings and rationale in the rejection of record. The Appellant

argues the reference piecemeal when the rejection of record is based on a combination of the references. Here, in the cited combination the addition of a shroud is considered to have been an obvious modification to increase safety. Accordingly, the rejection of these claims is sustained as well.

CONCLUSIONS OF LAW

We conclude that Appellants have not shown that the Examiner erred in rejecting the claims under 35 U.S.C. § 103(a) as listed in the Rejections section above.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 7-9	103	Ortolano, Dennis, Smith	1, 7-9	
5, 6	103	Ortolano, Dennis, Smith, Krueger	5, 6	
10-14, 16	103	Elaini, Krueger, Dennis, Smith	10-14, 16	
14, 15	103	Elaini, Krueger, Dennis, Smith, Ortolano	14, 15	
Overall Outcome			1, 5-16	

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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