

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 27

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte CURTIS C. COWAN and GEORGE F. LEBLANC

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Appeal No. 1999-1756  
Application No. 08/499,100

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ON BRIEF

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Before ABRAMS, STAAB and BAHR, Administrative Patent Judges.  
BAHR, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's refusal to allow claims 1-6, which are all of the claims pending in this application. Contrary to appellants' statement of the status of amendments, appellants filed two amendments (Paper Nos. 12 and 13) subsequent to the final rejection, with the second amendment being supplemental to the first amendment. The advisory action (Paper No. 14, mailed March 26, 1998) did not identify the amendment which the examiner approved for

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entry therein. In light of the examiner's comments on page 3 of the answer (Paper No. 19), we presume that the examiner has approved entry of both amendments after final.

BACKGROUND

The appellants' invention relates to seals for an exhaust nozzle with vectoring capabilities that is movable about multiple axes for a gas turbine engine (specification, p. 1). Claim 1 is exemplary and is reproduced in the appendix to appellants' first reply brief (Paper No. 20)<sup>1</sup>.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

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|--|-----------------------|----------|
| Silverwater<br>1988                    | 4,783,271             | Nov. 8,  |
| Herrick et al. (Herrick)<br>6, 1989    | 4,836,451             | Jun.     |
| Bachovchin et al. (Bachovchin)<br>1995 | 5,433,771             | Jul. 18, |
|  | (filed Apr. 25, 1994) |          |
| Beeman, Jr. (Beeman)<br>1996           | 5,480,162             | Jan. 2,  |
|  | (filed Sep. 8, 1993)  |          |

The following rejections are before us for review.

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<sup>1</sup> Both the appendix attached to appellants' brief (Paper No. 16) and the appendix filed April 20, 1998 (Paper No. 18) contained errors in the reproduction of claim 1.

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Claims 1 and 2 stand rejected under 35 U.S.C. § 103 as being unpatentable over Herrick in view of Beeman.

Claims 2-5<sup>2</sup> stand rejected under 35 U.S.C. § 103 as being unpatentable over Herrick in view of Beeman, as applied above to claims 1 and 2, and further in view of Bachovchin.

Claim 6 stands rejected under 35 U.S.C. § 103 as being unpatentable over Herrick in view of Beeman and Bachovchin, and further in view of Silverwater.

Reference is made to the brief, first reply brief and second reply brief (Paper Nos. 16, 20 and 22) and the final rejection, answer, first supplemental answer and second supplemental answer (Paper Nos. 9, 19, 21 and 24) for the respective positions of the appellants and the examiner with regard to the merits of these rejections.<sup>3</sup>

#### OPINION

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<sup>2</sup> While the examiner has applied this rejection against claims 2-5, it appears that the inclusion of claim 2 in this rejection was inadvertent.

<sup>3</sup> We recognize that 37 CFR § 1.193(b)(1), as amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53131, 53197 (Oct. 10, 1997), does not permit a supplemental examiner's answer unless the application has been remanded for such purpose by the Board. However, as appellants have not objected to the examiner's issuance of two supplemental answers and as appellants have filed two reply briefs, in the interest of fairness, we have considered all of the supplemental answers and reply briefs.

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In reaching our decision in this appeal, we have given careful consideration to the appellants' specification and claims, to the applied prior art references, and to the respective positions articulated by the appellants and the examiner. As a consequence of our review, we make the determinations which follow.

At the outset, we note that the preambles of the claims are directed to "seal means." However, a reading of the claims in their entirety reveals that the claims are in fact directed to a vectoring thrust nozzle of a gas turbine engine, the nozzle including a fixed collar having a spherical outer surface, a gimbal ring surrounding the collar, a pair of articulating clamshells pivotally "supported" [mounted] to said gimbal ring and a pair of seals between the collar and the clamshells.<sup>4</sup> Additionally, we note that claim 1 recites a spherical outer surface of the fixed collar and a spherical surface of each of the two clamshells. As we understand the claim, the "said spherical surface" referred to in line 10 of

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<sup>4</sup> While this inconsistency between the preamble and the body of the claims is deserving of correction in the event of further prosecution before the primary examiner, it is our opinion that the scope of the claims is clear.

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claim 1 (as reproduced in the appendix of Paper No. 20) is the spherical outer surface of the collar and the "spherical surfaces" referred to in line 12 of claim 1 are the spherical surfaces of the clamshells.

With this understanding of claim 1 in mind, we turn to the prior art relied upon by the examiner in rejecting claim 1. Herrick discloses a vectoring nozzle comprising a collar portion 14 having a spherical external surface, a gimbal ring 22 disposed about the collar and including two opposed gimbal pivots 24, 26 for supporting the gimbal ring relative to the nozzle static structure 28 and upper and lower clamshells 34, 36 supported on the gimbal ring for independent pivotal movement about a common axis 38 oriented both perpendicular to the gimbal axis 30 and transverse to the nozzle center line 40. The nozzle is provided with arcuate seals 72, 74 disposed between the clamshell spherical surfaces 68, 70 and the collar spherical surface 16 for preventing the flow of exhaust gas 6 therebetween. According to Herrick, the seals 72, 74 may be relatively simple in design, such as piston rings or spring seals (col. 3, lines 62-66).

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There is no dispute that Herrick discloses the subject matter of claim 1 with the exception of the particular type of seal (a brush seal having bristles) recited in claim 1. To overcome this deficiency, the examiner turns to the teachings of Beeman. Beeman teaches in the background (col. 1, lines 12-42) that radially mounted brush seals are known for use between a stationary part and a rotating part of machinery. Beeman also discloses provision of brush seals oriented axially at the interface between axially aligned parts of a gas turbine engine for transmitting axial loads created by expansion of one of the parts from heating by combustion gases. According to the examiner, it would have been obvious to one of ordinary skill in the art at the time of appellants' invention to have used a brush sealing device of the type taught by Beeman within the recess of the clamshells on Herrick's system to prevent leakages (final rejection, p. 3). Apparently recognizing that the seals of Herrick (piston rings or spring seals, for example) are provided by Herrick to prevent leakages of exhaust gas between the collar and clamshells, the examiner cites as the motivation for replacing the seals of Herrick with the brush seals of Beeman the fact

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that one of ordinary skill in the art would have looked for an improvement on how to prevent leakages in an aircraft system and contends that one improvement would be to use a brush seal because it is economical and it prevents leakages in many directions of movement (answer, p. 5).

Rejections based on 35 U.S.C. § 103 must rest on a factual basis. In making such a rejection, the examiner has the initial duty of supplying the requisite factual basis and may not, because of doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968).

In this instance, the examiner has not provided any evidence to establish that brush seals are more economical than piston rings or spring seals.<sup>5</sup> Likewise, the examiner has adduced no evidence to show that brush seals were recognized in the art at the time of appellants' invention as

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<sup>5</sup> We are not persuaded that the known use of bristles in many products, from toothbrushes to street cleaners to brooms, inherently means that either bristles or brush seals are economical to make or use, as urged by the examiner on page 1 of the first supplemental answer.

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being useful for preventing leakage in many directions of movement. In each of the applications of brush seals discussed by Beeman, the parts to be sealed move relative to one another along or about a single axis only. Accordingly, it is not apparent to us, without the benefit of appellants' disclosure, what in the teachings of Beeman would have led one skilled in the art to use brush seals in the multi-directional, multi-axial application of Herrick's nozzle.

In light of the above, we find ourselves in agreement with appellants that the combined teachings of Herrick and Beeman are insufficient to establish a prima facie case of obviousness of the modification proposed by the examiner to arrive at the claimed invention. Thus, we cannot sustain the examiner's rejection of claim 1, or claim 2 which depends from claim 1, as being unpatentable over Herrick in view of Beeman.

The deficiency in the combination of Herrick and Beeman with respect to the subject matter recited in claim 1 finds no cure in the Bachovchin and Silverwater patents applied to support the obviousness rejections of claims 2-6 which depend from claim 1. Accordingly, we also shall not sustain the examiner's rejections of claims 2-5 as being unpatentable over

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Herrick in view of Beeman and Bachovchin and of claim 6 as being unpatentable over Herrick in view of Beeman, Bachovchin and Silverwater.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1-6 under 35 U.S.C. § 103 is reversed.

REVERSED

|                             |   |                 |
|-----------------------------|---|-----------------|
| NEAL E. ABRAMS              | ) |                 |
| Administrative Patent Judge | ) |                 |
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|                             | ) | BOARD OF PATENT |
| LAWRENCE J. STAAB           | ) | APPEALS         |
| Administrative Patent Judge | ) | AND             |
|                             | ) | INTERFERENCES   |
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|                             | ) |                 |
| JENNIFER D. BAHR            | ) |                 |
| Administrative Patent Judge | ) |                 |

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