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**Datasheet for the decision  
of 20 March 2007**

**Case Number:** T 1142/06 - 3.2.01

**Application Number:** 03257475.8

**Publication Number:** 1424518

**IPC:** F16J 15/32

**Language of the proceedings:** EN

**Title of invention:**  
Brush seal with adjustable clearance

**Applicant:**  
UNITED TECHNOLOGIES CORPORATION

**Opponent:**  
-

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 54, 56

**Keyword:**  
"Novelty (yes)"  
"Inventive step (yes)"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 1142/06 - 3.2.01

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.01  
of 20 March 2007

**Appellant:** UNITED TECHNOLOGIES CORPORATION  
United Technologies Building  
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Hartford, CT 06101 (US)

**Representative:** Leckey, David Herbert  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 22 February 2006  
refusing European application No. 03257475.8  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** S. Crane  
**Members:** C. Narcisi  
T. Karamanli

## Summary of Facts and Submissions

- I. The European patent application Nr. 03 257 475.8 was refused by the examining division with the decision posted on 22 February 2006. The application was refused on the ground of lack of novelty of the subject-matter of claims 1 and 10 with regard to EP-A-357 536 (D1). An appeal against this decision was lodged by the applicant on 3 May 2006 and the appeal fee was paid at the same time of filing the notice of appeal. The statement of grounds of appeal was filed on 29 June 2006.
- II. Oral proceedings took place on 20 March 2007. The appellant withdrew its request for reimbursement of the appeal fee and requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims according to its request filed with letter dated 20 February 2007.

Claim 1 of the request reads as follows:

"A brush seal, comprising:  
a bristle arrangement (205) comprising a plurality of bristles secured together by a joint and having a retention section;  
a pair of plates (201,203) flanking said bristle arrangement and having a clamping section to frictionally engage said retention section such that said bristle arrangement extends beyond said plates;  
wherein said clamping section allows movement of said retention section so as to adjust the amount by which the bristle arrangement extends beyond the plates before said plates (201,203) are secured together and

prevents movement of and frictionally retains said retention section after said plates are secured together."

Claim 2 of the request is directed to a "brush seal segment" comprising the same features as the "brush seal" of above claim 1.

Claim 10 of the request reads as follows:

"A method of manufacturing a brush seal, comprising the steps of:

providing a pair of plates (201,203);

providing a bristle arrangement (205) comprising a plurality of bristles secured together by a joint, said bristle arrangement locatable between said plates at a plurality of positions, in each position the bristle arrangement extending beyond the plates by a different amount;

selectively locating said bristle arrangement (205) at a desired one of said positions so that said bristle arrangement extends past the plates by a desired amount;

securing said plates (201,203) together to retain said bristle arrangement at said desired position by virtue of frictional engagement of said bristle arrangement with said plates."

III. The appellant's arguments may be summarized as follows:

The subject-matter of claims 1 and 2 is clearly novel over D1 since the brush seal disclosed in D1 (EP-A-357 536) does not have the feature of plates flanking the bristle arrangement and having a clamping section frictionally engage the retention section of

the bristle arrangement as required by these claims. D1 does not disclose the features of independent claim 10 either, since claim 10 specifies that the bristle arrangement is maintained in the desired position by frictional engagement of the bristle arrangement with the plates. This is not the case in document D1 where the bristles are maintained in position by joining, e.g. welding, the rings (20,22) and the bristles together (D1, Fig. 1; column 3, line 62-column 4, line 6).

With reference to document D2 (EP-A-1 241 384) it is likewise submitted that this document is not relevant to any of claims 1,2 and 10. D2 discloses a brush seal in which a bundle of bristles 4 is provided with a mounting portion 3 which is sandwiched between connecting portions 5 formed in a back plate portion 6 and retaining plate portion 10. According to paragraph (0019) and column 5, lines 44-47 of D2 it is clear that the mounting portion 3 and the bristles 4 form an integral assembly. Since the mounting portion 3 is closely received within the connecting portions 5 of the plates this construction obviously does not allow movement of the retention section so as to adjust the amount by which the bristle arrangement extends beyond the plates. There is also nothing in D2 which would lead the skilled person to modify the brush seal assembly such that an adjustment became possible.

## **Reasons for the Decision**

1. The appeal is admissible since it meets the requirements of Articles 106 to 108 EPC in conjunction with Rules 1(1) and 64 EPC.

2. The amendments introduced in the independent claims 1,2 and 10 do not extend beyond the content of the application as originally filed (Article 123(2) EPC). As to claims 1 and 2, the amendments made here are based on paragraphs (0021) and (0026) to (0029) of the published patent application. The amendments in method claim 10 are based on paragraphs (0021) and (0025) to (0029) of the published patent application.
  
3. The subject-matter of claims 1 and 2 is new over prior art D1 since this document does not show "a pair of plates flanking said bristle arrangement and having a clamping section to frictionally engage said retention section". In fact, in fig. 1 of D1 there is shown the brush seal during its assembling phase in which the flanking plates 20,22 are forced together by the clamping action of the holding members 18,24, which are however removed (column 4, lines 34-39) after the flanking plates 20,22 and the bristles 16 are permanently secured together, e.g. by welding or fusing these parts together (column 4, lines 3-6). Consequently, in the finished brush seal disclosed in D1 there is no frictional engagement between the flanking plates and the bristle arrangement as is the case in the finished brush seal according to the invention.
  
4. The subject-matter of claims 1 and 2 is likewise new over prior art D2, since this document discloses a retention section formed by the mounting portion 3 being integrally connected to the bristles 4 on both sides of their outer peripheral end portion (fig. 2, column 5, lines 44-47). This retention section is

precisely and tightly mounted within a recess formed by connecting portions 5, such that the bristles extend beyond the plates by a predetermined distance and no possibility of varying this distance exists.

5. From the above considerations under point 4 it already results that the subject matter of claim 10 is new over D2. As to D1 there is no disclosure in this document of a method of arranging the bristles at a desired position such that the bristles extend beyond the plates by a selected amount.

In conclusion the subject-matter of independent claims 1,2 and 10 is therefore new (Article 54 EPC).

6. It follows from the foregoing discussion that neither D1 nor D2 provides the possibility of adjusting and varying the amount by which the bristle arrangement extends beyond the flanking plates at any desired time if need be. This is so, since according to D1 the bristle arrangement is permanently connected to the flanking plates, whereas in D2 the bristle arrangement is secured with the mounting portion to the flanking plates at one predetermined position only. Moreover, there is no suggestion in the prior art for the skilled person to arrive at the respective combination of the features of each of claims 1,2 and 10, let alone a suggestion hinting at permitting the said amount to be adjusted at any time, even after assembling the brush seal. Thus, the subject-matter of claims 1,2 and 10 also makes an inventive contribution over the prior art (Article 56 EPC).

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent in the following version:
  - Claims 1 to 15 as filed with letter of 20 February 2007;
  - Description, pages 1-7 as presented at the oral proceedings;
  - Drawings as originally filed.

The Registrar:

The Chairman:

A. Vottner

S. Crane