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**Datasheet for the decision  
of 1 February 2019**

**Case Number:** T 1438/17 - 3.2.01

**Application Number:** 11177611.8

**Publication Number:** 2423110

**IPC:** B64G1/28, G01C19/06

**Language of the proceedings:** EN

**Title of invention:**

Shell rotor assembly for use in a control moment gyroscope and method of making the same

**Applicant:**

Honeywell International Inc.

**Headword:**

**Relevant legal provisions:**

EPC Art. 123(2), 54, 56

**Keyword:**

Amendments - added subject-matter (yes) - Main request, first and second auxiliary request  
Novelty - auxiliary request (yes)  
Inventive step - auxiliary request (yes)

**Decisions cited:**

G 0002/10, G 0001/16

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

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Case Number: T 1438/17 - 3.2.01

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.01**  
**of 1 February 2019**

**Appellant:** Honeywell International Inc.  
(Applicant) 115 Tabor Road  
Morris Plains, NJ 07950 (US)

**Representative:** Houghton, Mark Phillip  
Patent Outsourcing Limited  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 30 November  
2016 refusing European patent application No.  
11177611.8 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** G. Pricolo  
**Members:** S. Fernández de Córdoba  
J. J. de Acha González

## Summary of Facts and Submissions

I. The appeal of the applicant lies against the decision of the Examining Division to refuse the above mentioned European patent application.

II. In its decision the Examining Division held that claim 1 of the sole request did not meet the requirements of Article 84 EPC and that its subject-matter was not new (Article 54 EPC) in view of:

D2: US 6044726 A.

During the examination proceedings reference was made to the following documents as well:

D1: US 3822602 A, and

D3: US 2003/0140479 A.

III. Oral proceedings were held before the Board on 1 February 2019.

IV. The appellant requested that the decision under appeal be set aside and that a patent be granted in accordance with one of the main request, first or second auxiliary requests as filed with the letter dated 31 December 2018, or replacement new fourth auxiliary request as filed during the oral proceedings.

V. Independent claims 1 and 9 of the main request read as follows (amendments with respect to claim 1 and 9 as originally filed underlined or struck through):

"1. A shell rotor assembly (40) for use in a control moment gyroscope, the shell rotor assembly (40) comprising:

a first shell member (44) having a first wall portion (45) and a first rim portion (48) formed integrally with one another;

a second shell member (46) having a second wall portion (47) and a second rim portion (50) formed integrally with one another, and

a shaft assembly (18) disposed at an approximate center of the shell rotor assembly (40) and extending between the first shell member (12) and second shell member (14),

wherein the first rim portion (48) and the second rim portion (50) are welded to one another whereby the weld, being where material has melted, is located over only a portion of lateral surfaces of first rim portion (48) and the second rim portion 50 (62), lateral being in a direction perpendicular to the shaft assembly."

"9. A method (70) for manufacturing a shell rotor assembly (40) for use in a control moment gyroscope, the method (70) comprising the steps of

heating (72) a first metal disc;

pressing (74) the first metal disc to form a first generally bowl shaped member;

removing (76) material from the first generally bowl shaped member to form a first shell member (44) having a ~~relatively thin~~ first wall (45) and a ~~relatively thick~~ first rim portion (48), the first rim portion being thicker than the first wall;

heating (82) a second metal disc;

pressing (84) the second metal disc to form a second generally bowl shaped member;

removing (86) material from the second generally bowl shaped member to form a second shell member (46) having a ~~relatively thin~~ second wall (47) and a ~~relatively thick~~ second rim portion (50);

aligning (92) the first shell member (44)

concentrically with the second shell member (46) such that the relatively thick first rim portion (48) engages the relatively thick second rim portion (50), the second rim portion being thicker than the second wall;  
providing a shaft assembly (18) disposed at an approximate center of the shell rotor assembly (40) and extending between the first shell member (12) and second shell member (14); and  
welding (96) the relatively thick first rim portion (40) to the relatively thick second rim portion (50) whereby the weld, being where material has melted, is located over only a portion of lateral surfaces of first rim portion (48) and the second rim portion 50 (62), lateral being in a direction perpendicular to the shaft assembly."

Independent claims 1 and 7 of the first auxiliary request correspond to claims 1 and 9 of the main request wherein each claim further includes the following additional feature at its end:

"wherein the first rim portion (48) including a first alignment feature (64) and wherein the second rim portion (50) including a second alignment feature (66) configured to engage the first alignment feature (64), whereby the second alignment feature (66) is engaged with the first alignment feature (64) and whereby the first shell member (44) and the second shell member (46) are arranged concentrically with one another as a result of engagement between the first alignment feature (64) and the second alignment feature (66)."

Independent claims 1 and 6 of the second auxiliary request correspond to claims 1 and 7 of the first

auxiliary request wherein each claim further includes the following additional feature at its end:

", and  
wherein the first alignment feature 64 serves as a backstop to limit the extent of the weld."

Independent claims 1 and 4 of the replacement new fourth auxiliary request read as follows (differences with respect to claim 1 and claim 6 of the second auxiliary request underlined or struck through):

"1. A shell rotor assembly (40) for use in a control moment gyroscope, the shell rotor assembly (40) comprising:  
a first shell member (44) having a first wall portion (45) and a first rim portion (48) formed integrally with one another;  
a second shell member (46) having a second wall portion (47) and a second rim portion (50) formed integrally with one another, and  
a shaft assembly (~~18~~56) disposed at an approximate center of the shell rotor assembly (40) and extending between the first shell member (~~12~~44) and second shell member (~~14~~46),  
wherein the first rim portion (48) and the second rim portion (50) are electron beam welded to one another, whereby the weld, being where material has melted, is located over only a portion of lateral surfaces of first rim portion (48) and the second rim portion (50) (~~62~~), lateral being in a direction perpendicular to the shaft assembly,  
wherein the first rim portion (48) including a first alignment feature (64) and wherein the second rim portion (50) including a second alignment feature (66) configured to engage the first alignment feature (64),

whereby the second alignment feature (66) is engaged with the first alignment feature (64) and whereby the first shell member (44) and the second shell member (46) are arranged concentrically with one another as a result of engagement between the first alignment feature (64) and the second alignment feature (66), and wherein the first alignment feature (64) serves as a backstop to limit the extent of the weld."

"4. A method (70) for manufacturing a shell rotor assembly (40) for use in a control moment gyroscope, the method (70) comprising the steps of heating (72) a first metal disc; pressing (74) the first metal disc to form a first generally bowl shaped member; removing (76) material from the first generally bowl shaped member to form a first shell member (44) having a first wall (45) and a first rim portion (48), the first rim portion being thicker than the first wall; heating (82) a second metal disc; pressing (84) the second metal disc to form a second generally bowl shaped member; removing (86) material from the second generally bowl shaped member to form a second shell member (46) having a second wall (47) and a second rim portion (50), the second rim portion being thicker than the second wall; aligning (92) the first shell member (44) concentrically with the second shell member (46) such that the relatively thick first rim portion (48) engages the relatively thick second rim portion (50), ~~the second rim portion being thicker than the second wall;~~ providing a shaft assembly (~~18~~56) disposed at an approximate center of the shell rotor assembly (40) and extending between the first shell member (~~12~~44) and second shell member (~~14~~46); and



electron beam welding (96) the relatively thick first rim portion (40) to the relatively thick second rim portion (50) whereby the weld, being where material has melted, is located over only a portion of lateral surfaces of first rim portion (48) and the second rim portion (50) ~~(62)~~, lateral being in a direction perpendicular to the shaft assembly, wherein the first rim portion (48) including a first alignment feature (64) and wherein the second rim portion (50) including a second alignment feature (66) configured to engage the first alignment feature (64), whereby the second alignment feature (66) is engaged with the first alignment feature (64) and whereby the first shell member (44) and the second shell member (46) are arranged concentrically with one another as a result of engagement between the first alignment feature (64) and the second alignment feature (66), and wherein the first alignment feature (64) serves as a backstop to limit the extent of the weld."

## **Reasons for the Decision**

1. Inadmissible extension - Article 123(2) EPC
  - 1.1 Each of the subject-matter of the independent claims of the main request, first and second auxiliary requests goes beyond the content of the application as originally filed (Article 123(2) EPC).
  - 1.2 The device and method independent claims of each of the main request, first and second auxiliary requests include the following feature:

- (i) the weld, being where material has melted, is located over only a portion of lateral surfaces of first rim portion and the second rim portion, lateral being in a direction perpendicular to the shaft assembly,

which is based on paragraph [0041] of the application as originally filed.

- 1.3 This feature is disclosed in the description in combination with other features. Accordingly, the amendment made consists in adding isolated features extracted from an originally disclosed combination. In accordance with the established case law of the Boards of Appeal, extracting an isolated feature from an originally disclosed combination and using it to delimit claimed subject-matter can only be allowed, having regard to Article 123(2) EPC, if there is no clearly recognisable functional or structural relationship among the features of the combination.
- 1.4 In particular, as regards the method claims of these requests (claims 9, 7 and 6 respectively), the application as filed discloses that the welding method used for obtaining such a weld is an electron beam welding (see paragraphs [0040], [0041] and [0050]). It is clear that there is a functional and structural relationship among this feature and feature (i), as the latter requires a particular weld configuration, namely that the weld be located over only a portion of lateral surfaces of the first rim portion and of the second rim portion, which is only disclosed in combination with, and is the result of, a specific welding method.

1.5 The appellant defended that it belonged to the skilled person's common general knowledge that other welding methods, such as laser beam welding, would provide the claimed weld. Limiting the scope of protection to an electron beam welding would result in an unfair burden to the applicant because the patent could be easily circumvented by employing any equivalent welding process.

1.6 However, according to the case law of the Boards of appeal the criteria to assess if the subject-matter of an amended claim meets the requirements of Article 123(2) EPC is the gold standard, namely whether the subject-matter is explicitly or implicitly, directly and unambiguously, disclosed to the skilled person using common general knowledge, in the application as filed (see e.g. G2/10, reasons points 4.3 and 4.5.1; G1/16, reasons points 17).

In the case at hand, no other alternatives welding methods which would provide the claimed weld are disclosed. The electron beam welding only is disclosed in combination with this weld. It might be that other welding methods are suitable for providing the weld but these are neither explicitly nor implicitly disclosed in the application as filed.

Consequently, the subject-matter of the independent method claims of the above mentioned requests goes beyond the application as filed because it has been generalized to any welding method for obtaining the particular weld configuration as claimed. For this reason alone these requests are not allowable.

1.7 As regards the device independent claims 1 of each of these requests, it is noted that the omission of the

electron beam welding also represents an inadmissible extension of subject-matter. Even though specifying an electron beam weld represents a product-by-process feature, it nevertheless limits the product claim because the specific method provides distinguishing features recognisable in the end product as compared to at least some other welding methods. A weld obtained using an electron beam has indeed a specific associated shape and microstructure of the welded material.

2. Replacement new fourth auxiliary request
- 2.1 Independent claims 1 and 4 are based on claims 1 and 4, and claim 9 as originally filed, respectively, together with paragraph [0041] of the description as originally filed. Its subject-matter meets thus the requirements of Article 123(2) EPC.
- 2.2 Furthermore, the subject-matter of claims 1 and 4 is new (Article 54 EPC) and involves an inventive step (Article 56 EPC) in view of the prior art available.
  - 2.2.1 None of the prior art at hand according to D1, D2 or D3 discloses a shell rotor assembly wherein the first rim portion and the second rim portion are electron beam welded to one another, whereby the weld is located over only a portion of lateral surfaces of first rim portion and the second rim portion, wherein the first alignment feature serves as a backstop to limit the extent of the weld.

Accordingly, the subject-matter of claims 1 and 4 is new (Article 54 EPC).
  - 2.2.2 The above-mentioned features have the technical effect of providing a robust connection for the shell rotor

assembly (see paragraph [0033] of the application as filed), in particular by means of a weld and a heat affected area being located only at a specific location (see paragraph [0041] of the application as filed).

The above-mentioned prior art does not disclose the above-mentioned features, nor does it contain any indication motivating the skilled person to modify the manner of joining any of the shell assemblies disclosed in D1, D2 or D3 such as to arrive at the shell rotor assembly of claim 1, and analogously at the method for manufacturing a shell rotor assembly according to claim 4.

The subject-matter of claims 1 and 4 thus involves an inventive step (Article 56 EPC).

- 2.3 The features of the dependent claims 2 and 3, as well as the features of dependent claim 5, represent preferred embodiments of the shell rotor assembly and of the method for manufacturing a shell rotor assembly according to the invention and are likewise allowable.
- 2.4 The set of claims 1 to 5 of this request, together with the description as filed during the oral proceedings and the figures as originally filed formed therefore a suitable basis for the grant of a European patent.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent in the following version:
  - claims 1 to 5 of the replacement new fourth auxiliary request as filed during the oral proceedings;
  - pages 1 to 10 of the description as filed during the oral proceedings;
  - figures 1 to 6 as originally filed.

The Registrar:

The Chairman:



A. Vottner

G. Pricolo

Decision electronically authenticated