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D E C I S I O N
of 27 January 2004

Case Number: T 0969/01 - 3.2.7

Application Number: 94914144.4

Publication Number: 0696242

IPC: B25J 21/00

Language of the proceedings: EN

Title of invention:
Articulated arm transfer device

Patentee:
BROOKS AUTOMATION, INC.

Opponent:
Institute of Technological Information, Inc.

Headword:
-

Relevant legal provisions:
EPC Art. 56, 123(3)

Keyword:
"Inventive step (yes)"
"Scope of protection extended (no)"

Decisions cited:
-

Catchword:
-



Case Number: T 0969/01 - 3.2.7

D E C I S I O N
of the Technical Board of Appeal 3.2.7
of 27 January 2004

Appellant: Institute of Technological Information, Inc.
(Opponent) 2-2, Kitikata 2-chome
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Saitama-ken 351-0036 (JP)

Representative: Furlong, Christopher Heinrich
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Respondent: BROOKS AUTOMATION, INC.
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Representative: Beetz & Partner
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
19 June 2001 concerning maintenance of European
patent No. 0696242 in amended form.

Composition of the Board:

Chairman: A. Burkhardt
Members: K. Poalas
E. Lachacinski

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the interlocutory decision of the opposition division to maintain European patent No. 0 696 242 in amended form.

Opposition was filed against the patent as a whole based on Article 100(a) EPC (lack of novelty and lack of inventive step), Article 100(b) EPC (lack of enabling disclosure), Article 100(c) EPC (extension beyond the content of the application as filed).

II. Oral Proceedings before the board of appeal took place on 27 January 2004.

(a) The appellant requested that the decision under appeal be set aside and the patent revoked.

(b) The respondent requested that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the following documents:

claims: 1 to 19 as submitted on 27 January 2004,

description: pages 2, 2a, 3 and 4 as submitted on 27 January 2004,

Figures: 1 to 7 as granted.

III. Independent claim 1 of the patent in suit as amended during the oral proceedings on 27 January 2004 reads as follows:

"A transport apparatus having a movable arm assembly (51,52) and a drive mechanism driven by two motors, the drive mechanism comprising:
a casing (17) attached to a vacuum chamber, the casing (17) comprising a first and a second housing (16,36);
two electro-magnetic stators (8,10) at different heights relative to the vacuum chamber, the stators being located outside of the chamber;
two rotors (7,9); and
two drive shafts (4,5) located partially in the vacuum chamber, the two shafts being two independently rotatable coaxial shafts (4,5), a first inner shaft (5) extending coaxially through a second outer shaft (4), each shaft (4,5) having a rotor (7,9) that is aligned with a separate one of the electro-magnetic stators, characterized in that
the motors are brushless DC motors,
the stators (8,10) are stationarily connected to a respective housing (16,36)."

IV. During the oral proceedings the appellant referred to the following prior art documents:

E4: EP 0 512 516 A,

E7: EP 0 363 073 A,

E8: US 4 641 066 A,

E9: Expert reports of Mr A.C. Theokas and Mr D.M. Yerkes,

E10: Google (Internet search of "set of one or more"),

E11: Miller, T.J.E. "Brushless Permanent-Magnet and Reluctance Motor Drives", Clarendon Press, Oxford, 1989, pages 1 to 19 and 54 to 58.

V. The appellant argued essentially as follows:

V.1 Article 123(3) EPC

The skilled person reading in claim 1 as granted that "each shaft has a set of rotors" understands that claim 1 as granted confers protection on a transport apparatus having two drive shafts with at least two rotors each. Amended claim 1 confers protection on a transport apparatus wherein each shaft has "a rotor", that is a single rotor, thereby extending the scope of protection conferred by claim 1 as granted.

V.2 Article 56 EPC

The subject-matter of claim 1 differs from the apparatus shown in Figure 7 of document E4 in that: the motors are brushless DC motors, and the stators are stationarily connected to a respective housing.

A person skilled in the art, starting from the closest prior art disclosed in document E4, would have considered that the simplest specific motor which only requires a stator and a rotor, as in document E4, is a brushless motor as disclosed in one of documents E7, E8, or E11. Document E11, page 55, last sentence of the third complete paragraph, states that the performance of brushless motors is not unduly sensitive to the airgap between stator and rotor.

Furthermore, the skilled person recognises immediately that if an axial displacement of rotors 2, 3 in document E4 is not required, as is the case in claim 1 of the patent in suit, an axially movable housing would not be required either, such that the stators according to document E4 could then be easily affixed to the casing (which houses rotors 2, 3) which they surround.

Thus, the differentiating features with respect to the disclosure of document E4 are obvious to the person skilled in the art, and therefore the subject-matter of claim 1 of the patent in suit lacks inventive step.

VI. The respondent argued essentially as follows:

VI.1 Article 123(3) EPC

The wordings "a rotor" (in claim 1 as amended) and "a set of rotors" (in claim 1 as granted) have the same meaning, because both expressions designate the same subject-matter, namely one or more rotors. The submitted expert opinions (document E9) and internet printouts referred to "set + of one + or more" (document 10) verify that "a set of (items)" may comprise only one of said items, when considered both under general linguistic or mathematical aspects and as commonly used and understood. This common understanding applies in various contexts (everyday life, business language, industry and scientific contexts, mathematical contexts) as shown by said expert opinions together with their annexes and separately provided internet printouts. Since the two wordings have the same meaning, they render the same scope, and thus the

replacement of one phrase by the other does not broaden the scope of claim 1 as granted.

Therefore, the replacement of the expression "set of rotors" by the expression "a rotor" does not violate the requirements of Article 123(3) EPC.

VI.2 Article 56 EPC

Document E4 fails to make any mention whatsoever that the motors are brushless DC motors. Document E4 fails to show that the stators are stationarily affixed to the housing. Figure 7 of document E4 shows that the stators are separated from the rotors by a first gap (inside wall 1c), wall 1c and an outside gap.

Whereas the patent in suit tries to improve the handling quality, document E4 intends to downsize the device and to increase its torque. Therefore, the technical motivation underlying document E4 does not prompt a skilled person to consider the distinguishing features of the invention.

None of documents E7, E8 and E11 mentions the use of brushless DC motors in substrate manufacturing systems. None of said documents discloses a gap, a housing wall and another gap. Therefore, there is nothing in said documents to make the use of brushless DC motors in the apparatus known from document E4 obvious.

As regards the stationarily affixed stators, this feature is not known from any of the citations.

Reasons for the Decision

1. *Article 123(3) EPC*

The evidence presented by documents E9 and E10 persuades the board that "a set of (items)" as commonly used and understood may comprise only one of said items. Furthermore, the skilled person reading claim 1 as granted in combination with the description and the drawings obtains no information about the technical feasibility of co-operation between two or more rotors positioned on the same shaft and a single stator located outside the vacuum chamber. By interpreting the wording "a set of rotors" of claim 1 as granted in the light of the originally filed application, the skilled person inevitably comes to the conclusion that in practice only one rotor can be meant by said wording.

Therefore, the replacement of the wording "a set of rotors" of claim 1 as granted by the wording "a rotor" in amended claim 1 does not, in the present case, violate the requirements of Article 123(3) EPC.

2. *Inventive step*

2.1 Closest prior art

The closest prior art is undisputedly represented by document E4, Figure 7, disclosing a transport apparatus having a movable arm assembly and a drive mechanism driven by two motors, the drive mechanism comprising: a casing attached to a vacuum chamber, the casing comprising a first and a second housing 1b, 1c;

two electro-magnetic stators 61b, 62b at different heights relative to the vacuum chamber, the stators being located outside the chamber; two rotors 61a, 62a; and two drive shafts 2, 3 located partially in the vacuum chamber, the two shafts being two independently rotatable coaxial shafts, a first inner shaft 3 extending coaxially through a second outer shaft 2, each shaft having a rotor 61a, 62a that is aligned with a separate one of the electro-magnetic stators.

2.2 Problem underlying the invention

The problem underlying the invention of the patent in suit is to provide the apparatus known from Figure 7 of document E4 with a suitable kind of motors and to arrange said motors adequately in respect to this apparatus.

2.3 Solution

In accordance with claim 1 of the patent in suit the above-mentioned problem is solved in that the two motors are brushless DC motors and in that the two stators of said motors are stationarily connected to a respective housing, said two housings being parts of the casing.

2.4 The above mentioned solution is not rendered obvious by the documents under consideration for the following reasons:

Even accepting the argumentation of the appellant that the person skilled in the art would be led by the teaching of document E7, E8 or E11 to use brushless DC

motors, the skilled person would not arrive at the subject-matter of claim 1 of the patent in suit, since he would find nothing in the prior art to suggest a stationary connection between each of the two stators and the respective housing, ie the respective part of the casing.

According to document E4, column 10, lines 50 to 57, the two stators 61b and 62b are axially movable along the lower housings 1c. A stationary fixation of the stators 61b and 62b to the housings 1b and 1c as required in claim 1 of the patent in suit would not allow any axial movement of the stators with respect to the housings. The question of whether the skilled person seeking to solve the above-mentioned problem would affix the stators 61b and 62b stationarily to the housings 1b and 1c can only be answered negatively since, firstly, there is no incentive in document E4 for an immobilisation of the stators with respect to the housings and, secondly, such an immobilisation of the stators goes against the teaching of document E4. In view of the explicit teaching of document E4, the appellant's allegation that, in the case of an axial immovability of the rotors and the stators, the stators in document E4 could be stationarily affixed to the casing which they surround, must be disregarded as resulting from an ex post facto analysis. Therefore, the teaching of document E4 does not render obvious such a stationary fixation.

- 2.5 For the above-mentioned reasons, the subject-matter of claim 1 of the patent in suit involves an inventive step within the meaning of Article 56 EPC.

2.6 Dependent claims 2 to 19 concern particular embodiments of the apparatus claimed in claim 1 and likewise involve an inventive step.

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 maintain the patent in amended form on the basis of the following documents:
 - claims 1 to 19 as submitted on 27 January 2004,
 - description pages 2, 2a, 3 and 4 as submitted on 27 January 2004,
 - Figures 1 to 7 as granted.

The Registrar:

The Chairman:

D. Spigarelli

A. Burkhart