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**Datasheet for the decision
of 3 November 2014**

Case Number: T 1368/13 - 3.2.08

Application Number: 09176174.2

Publication Number: 2186984

IPC: E05F15/10, E05F15/12

Language of the proceedings: EN

Title of invention:

Drive member for a door or main door

Applicant:

King Gates S.r.l.

Headword:

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - (yes)

Decisions cited:

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 1368/13 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 3 November 2014

Appellant: King Gates S.r.l.
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 11 January 2013
refusing European patent application No.
09176174.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman T. Kriner
Members: M. Foulger
D. T. Keeling

Summary of Facts and Submissions

- I. The appellant (applicant) lodged an appeal against the decision of the Examining Division to refuse the European patent application no. 09176174.2. The Examining Division held that the subject-matter of claim 1, as filed on 13 February 2013, did not involve an inventive step in the sense of Article 56 EPC.
- II. The following documents were referred to in the decision under appeal:
D1: GB 1 057 063 A
D2: US 3 874 117 A
D3: US 2007/295136 A1
- III. The appellant requested that the decision under appeal be set aside and a patent granted on the basis of claims 1,2 and description pages 1-8 filed with the fax dated 15 October 2014, as well as drawing sheets 1/3-3/3 filed with the fax dated 11 August 2014. Oral proceedings were only requested in the event that the Board would refuse to grant the patent.
- IV. Claim 1 under consideration reads as follows:
"Drive member for a door or main door, comprising at least drive means (13) able to generate a motion having a determinate torque and a determinate speed, and reducing means (15) able to be connected on one side to the output of said drive means (13) and, on the other side, to said door (11), in order to vary in a desired manner the values of torque and speed of the motion generated by said drive means (13), so as to determine the correct movement of said door (11), wherein said drive means (13) comprise an electric motor (16) having a drive shaft (17) able to transmit said motion, and a first reduction kinematism (19) directly connected

mechanically to said drive shaft (17) and able to determine a first variation in the ratios of torque and speed of the motion, in order to transmit them to an associated first transmission shaft (22), wherein said reducing means (15) comprise:

- a second transmission shaft (23) mechanically connected and coaxial to said first transmission shaft (22);
- a second reduction kinematism (26) mechanically connected to said second transmission shaft (23), and able to determine a second variation in the ratios of torque and speed of the motion;
- a third reduction kinematism (30) kinematically connected to said second reduction kinematism (26), and able to determine a third variation in the ratios of torque and speed of the motion;
- a third transmission shaft (33) mechanically connected to said third reduction kinematism (30);
- a fourth reduction kinematism (35) mechanically connected to said third transmission shaft (33), and able to determine a fourth variation in the ratios of torque and speed of the motion; and
- a fourth transmission shaft (39), mechanically connected to said fourth reduction kinematism (35), and to which said door (11) is able to be mechanically connected;

wherein the fourth transmission shaft (39) is located in an intermediate position between the second transmission shaft (23) and the third transmission shaft (33);

and the fourth transmission shaft (39) is parallel to the third transmission shaft that is parallel to the second transmission shaft (23) and to the first transmission shaft (22),

wherein said second reduction kinematism (26) comprises a grooved profile (27) made directly on said second

transmission shaft (23), and a coordinated toothed wheel (29) engaging with said grooved profile (27) and mounted idly on said fourth transmission shaft (39), and wherein said third reduction kinematism (30) comprises at least a first toothed wheel (31) coaxially and angularly constrained to said toothed wheel (29) of the second reduction kinematism (26) and mounted idly on said fourth transmission shaft (39), and a coordinated second toothed wheel (32) engaging with the relative first toothed wheel (31) and keyed onto said third transmission shaft (33), wherein said first reduction kinematism (19) comprises at least a screw element (20) keyed coaxially to said drive shaft (17), and a coordinated pulley (21) engaging with said screw element (20) and keyed coaxially onto said first transmission shaft (22), and wherein said drive shaft (17) is disposed substantially orthogonally to said first transmission shaft (22) whereby said electric motor (16) is disposed substantially orthogonally to said second transmission shaft (23), third transmission shaft (33) and fourth transmission shaft (39), and wherein said fourth kinematism (35) comprises a grooved profile (36) made directly on said third transmission shaft (33), and a coordinated toothed wheel (37) engaging with said grooved profile (36) and keyed onto said fourth transmission shaft (39)."

Reasons for the Decision

1. The appeal is admissible.
2. The subject-matter of independent claim 1 is based on claims 1,8,4,5,3,7,6 together with §48 (that the grooved profile is made directly on said second

transmission shaft) and §42 (that the screw element is keyed coaxially to the drive shaft) of the description as originally filed. Claim 2 corresponds to claim 2 as originally filed. The description has been modified to bring it into accordance with the amended claims and to rectify obvious errors. The amendments therefore comply with the requirements of Article 123(2) EPC.

3. D1 is regarded as being the most relevant prior art and discloses:

a drive member for a door or main door, comprising at least drive means (M) able to generate a motion having a determinate torque and a determinate speed, and reducing means (P) able to be connected on one side to the output of said drive means (M) and, on the other side, to said door (see p.1, l.40-42), in order to vary in a desired manner the values of torque and speed of the motion generated by said drive means (M), so as to determine the correct movement of said door, wherein said drive means (M) comprise an electric motor (p.3, l. 41-56) having a drive shaft (2/3) able to transmit said motion, and a first reduction kinematism (4/9) directly connected mechanically to said drive shaft (3) and able to determine a first variation in the ratios of torque and speed of the motion, in order to transmit them to an associated first transmission shaft (7), wherein said reducing means (P) comprise:

- a second transmission shaft (which is one-piece with the first transmission shaft) (7) coaxial to said first transmission shaft;

- a second reduction kinematism (10/13) mechanically connected to said second transmission shaft (7), and able to determine a second variation in the ratios of torque and speed of the motion;

- a third reduction kinematism (12/14) kinematically connected to said second reduction kinematism (10/13),

and able to determine a third variation in the ratios of torque and speed of the motion; and

- a third transmission shaft (8) mechanically connected to said third reduction kinematism (12/14);
- a fourth reduction kinematism (14/15) mechanically connected to said third transmission shaft (8), and able to determine a fourth variation in the ratios of torque and speed of the motion; and
- a fourth transmission shaft (5), mechanically connected to said fourth reduction kinematism (14/15), and to which said door is able to be mechanically connected;

wherein the fourth transmission shaft (5) is located in an intermediate position between the second transmission shaft (7) and the third transmission shaft (8);

and the fourth transmission shaft (5) is parallel to the third transmission shaft (8) that is parallel to the second transmission shaft (7) and to the first transmission shaft (7),

and

wherein said drive shaft (2/3) is disposed substantially orthogonally to said first transmission shaft (7) whereby said electric motor is disposed substantially orthogonally to said second transmission (7) shaft, third transmission shaft (8) and fourth transmission shaft (5) (see Figure 1).

4. From which the subject-matter of claim 1 differs in that:
said second reduction kinematism comprises a grooved profile made directly on said second transmission shaft, and a coordinated toothed wheel engaging with said grooved profile and mounted idly on said fourth transmission shaft,
wherein said third reduction kinematism comprises at

least a first toothed wheel coaxially and angularly constrained to said toothed wheel of the second reduction kinematism and mounted idly on said fourth transmission shaft, and a coordinated second toothed wheel engaging with the relative first toothed wheel and keyed onto said third transmission shaft, wherein said first reduction kinematism comprises at least a screw element keyed coaxially to said drive shaft, and a coordinated pulley engaging with said screw element and keyed coaxially onto said first transmission shaft, and wherein said fourth kinematism comprises a grooved profile made directly on said third transmission shaft, and a coordinated toothed wheel engaging with said grooved profile and keyed onto said fourth transmission shaft.

Moreover, the subject-matter of claim 1 differs from the drive member according to D1 in that the second transmission shaft is mechanically connected to said first transmission shaft since this feature requires that there are two distinct shafts.

5. The problem to be solved may be regarded as being to provide a more compact drive member for a door.

6. This problem is solved by the above features which together contribute to reducing the size of the drive member whilst still allowing the required torque transmission. In particular having the grooved profile made directly on the transmission shaft and also the third transmission shaft as claimed allows the separate gearwheels of the prior art to be dispensed with and thus the required space to be reduced. Moreover the arrangement with the screw element and "coordinated pulley" (worm gear) also leads to a more compact

- arrangement than that of D1.
7. The above solution is not obvious from the cited prior art because although the skilled person would perhaps incorporate aspects of the claimed solution in the drive member of D1 either through common general knowledge or motivated by D2; the total amount of modifications required is such that the skilled person would require inventive skill to carry them out.
 8. The claimed screw/pulley arrangement cannot be considered as an equivalent of the two bevel gears of D1 and cannot be interchanged with these where circumstances make it desirable. As worm gears are often irreversible and more compact than plain spur gears then they cannot be regarded as an equivalent of the reversible bevel gears of D1. Moreover the screw element of D2 is not keyed to the shaft as claimed but appears to be fastened using a grub screw, see D2, Fig. 5. Thus the combination of the teaching of D2 with the drive train of D1 does not lead directly to the feature of claim 1 whereby the "first reduction kinematism (19) comprises at least a screw element (20) keyed coaxially to said drive shaft (17), and a coordinated pulley (21) engaging with said screw element (20) and keyed coaxially onto said first transmission shaft (22)" nor does it do so in a way which could be merely considered "equivalent" as argued in the impugned decision.
 9. Furthermore the skilled person would not consider D3 when searching for a solution for the above problem because D3 relates to a anti-backlash mechanical positioning system for radio telescopes which cannot be considered to be a technical field closely related to that of the current application. D3 is also not concerned with the problem of the current application.

Thus the feature that "said fourth kinematism (35) comprises a grooved profile (36) made directly on said third transmission shaft (33)" is not made obvious from D3.

10. Given the above, the subject-matter of claim 1 involves an inventive step in the sense of Article 56 EPC.

Order

For these reasons it is decided that:

The decision under appeal is set aside.

The case is remitted to the department of first instance with the order to grant a patent in the following version:

Description:

Pages 1-8 as filed with the fax dated 15 October 2014.

Claims:

Nos. 1,2 as filed with the fax dated 15 October 2014.

Drawings:

Sheets 1/3-3/3 as filed with the fax dated 11 August 2014.

The Registrar:

The Chairman:



V. Commare

T. Kriner

Decision electronically authenticated