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(54) **SLOT MOTORCYCLE**

(57) Slot racing motorcycle. It features a pickup shoe equipped with lateral stabilising extensions (9, 10), featuring supporting means at their ends. It is equipped with a servo motor (12) which is solidly attached to the chassis and the wheels, to a horizontal rotating spindle (13), essentially longitudinal to the direction of travel of the motorcycle (1) and whose output shaft (14) comprises at its front end a first slide (15) which moves along a vertical guide (16) which is solidly attached to the pickup shoe (6). Thus, the motorcycle may lean in towards the inside of a curve rounded by the same, due to the fact that starting from a vertical position of the motorcycle (1), a turn of the servo motor (12) brings about a downward movement of the first slide and a leaning of the upper part of the chassis-wheels assembly.

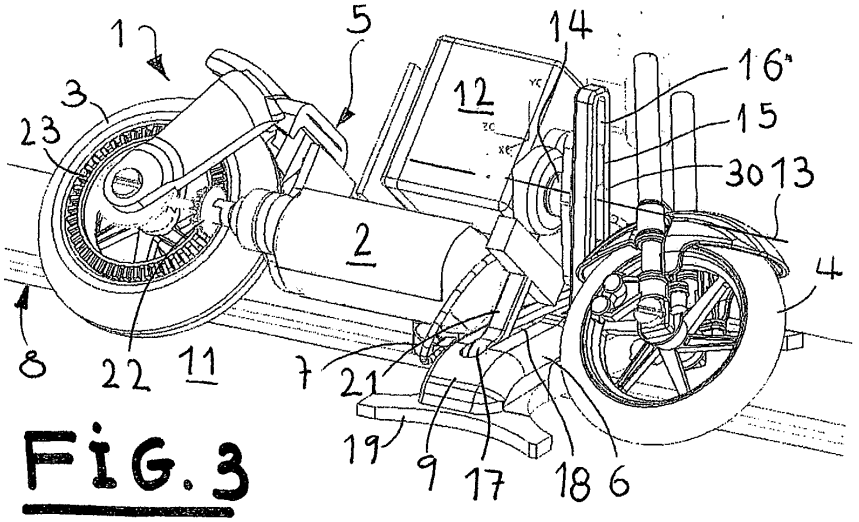

FIG. 3

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Description

Technical field of the invention

[0001] This invention relates to a slot racing motorcycle, equipped with an electric motor supported on a chassis, which actuates one of the wheels, and a pickup shoe featuring a central guide pin and brushes to make contact with the electrified slot of the track, the pickup shoe being equipped with lateral stabilising extensions which feature a means of support at their ends.

Background of the invention

[0002] Currently, games with scale model vehicles which race, guided by electrified slots which provide the motors of the vehicles with electrical power via brushes are very popular; these are remotely controlled by means of a throttle control. The vehicles or models for this game, commonly known as "slot racing", feature a guide pin which projects below the vehicle in a rotating shoe which supports the contact brushes.

[0003] Until now, only vehicles with at least four wheels, such as cars, have enjoyed popularity, as they are stable and are able to remain on the track even at high speeds. Although attempts have been made, two-wheeled slot racing vehicles, such as motorcycles for instance, have not been popular, due mainly to two reasons.

[0004] In the first place, the fact that it has only two wheels makes the motorcycle itself unstable and prone to overturning, mainly on curves, although this also occurs on the straights. Secondly, in the case of a real motorcycle, the rider causes the motorcycle-rider combination to lean towards the inside of the curve in order to compensate for the centrifugal force, while conversely in the case of slot racing motorcycles, the real centrifugal force will make the motorcycle tend to spin off on the outside of the curve.

[0005] The attempts to maintain stability have led to the motorcycle remaining upright, yielding an unrealistic and inconvenient effect.

[0006] A large number of documents are known which attempt to solve this drawback.

[0007] Thus, for example, the patent ES2067384 discloses a slot racing motorcycle, in accordance with the preface of claim 1, equipped with a motor which actuates one of the two wheels, supported on a chassis which also supports a pickup shoe featuring a central pin and brushes to make contact with the electrified slot in the track, the pickup shoe being equipped with lateral stabilising extensions. At their opposite ends, the stabilising extensions feature a means of support, consisting of supporting wheels. The motorcycle features a leaning means, as the link between the chassis and the pickup shoe whereon it travels round the track is executed in a tilting manner on both sides, due to the existence of one or more struts articulated at one or both parts, conferring a transversally movable pendulum effect, or a tilt towards the inside. However, this tilt is mechanically complex and is also unrealistic.

[0008] The patent GB2390982 discloses a slot racing motorcycle wherein this possibility of leaning is achieved by means of an arm which projects rearwards from the pickup shoe, and at whose end two transversally separated magnets are mounted; these collaborate with respective magnets located below the footrests of the motorcycle in order to keep it at a certain angle when it enters the curves. However, this system presents the problem that the leaning is very slight and very unstable.

[0009] With regard to the aforementioned supporting means, in the patent W02004009199 a motorcycle similar to that of GB2390982 is disclosed, but wherein said supporting means are constituted by respective skids at the ends of the stabilising extensions.

[0010] Finally, the patent US6626116 should be mentioned, wherein a slot racing motorcycle is disclosed wherein the front wheel and fork remain vertical on curves, while the chassis and the rider lean inwards, thus simulating that it is the complete motorcycle which leans. But the final effect is not as would be desired, as in real life the wheels also lean.

[0011] The object of this invention is a slot racing motorcycle of the type mentioned which features leaning means unhampered by the above problems.

Explanation of the invention

[0012] To this end, the object of this invention is a slot racing motorcycle, of a totally innovative concept and operation, which, in essence, is **characterised in that** it features a leaning means for the chassis and wheels assembly which comprises a servo motor which is solidly attached to the chassis and the wheels and to a horizontal rotating spindle, essentially longitudinal to the direction of the movement of the motorcycle, and whose output shaft comprises at its frontal free end a first slide which moves along a vertical guide which is solidly attached to the pickup shoe (6) in such a way that, starting from a vertical position of the motorcycle, a turn of the servo motor brings about a downward movement of the first slide and, therefore, a leaning of the upper part of the chassis-wheels assembly, towards the inside of a curve rounded by the motorcycle. Thus, the leaning-in performed by real motorcycles when rounding a curve is reproduced.

[0013] In accordance with another important characteristic of the present invention, the chassis comprises a second lower slide susceptible to being held by and to move along the interior of a transversal groove in the pickup shoe in order to force and to guide the movement of the lower part of the chassis-wheels assembly when the servo motor turns and the angle of lateral leaning is modified, the chassis and the pickup shoe being articulatedly linked by said second slide. In this way, it is achieved that the wheels are in permanent contact with

the track, as occurs in real life.

[0014] In accordance with another characteristic of the present invention, said transversal groove in the pickup shoe extends the complete width of said lateral stabilising extensions.

[0015] Preferably, the supporting means are constituted of skids at the ends, these being adapted to rest on the track.

[0016] It has been foreseen that the servo motor may be remotely controlled by several possible means. One of these could be radio control (RC) equipment. Another possible means could be via the electrified slots in the track and the contact brushes of the motorcycle.

[0017] Also preferably, the second lower slide features an upright for the supporting of the motor and the servo motor at its end.

Brief description of the drawings

[0018] A detailed description of a preferred, although not exclusive, embodiment of the slot racing motorcycle which is the object of this invention is made below. For the better understanding of the same, it is accompanied by a set of drawings wherein, as a non-limitative example, embodiments of this invention are portrayed. In said drawings:

Figure 1 is a front side perspective view of a slot racing motorcycle in accordance with the invention, said motorcycle being in a completely vertical position wherein it is travelling along a straight;

Figure 2 is a view of the motorcycle in Figure 1, in a completely vertical position, wherein it is travelling along a straight, but viewed from a sectional side perspective;

Figure 3 is a front lateral perspective view, analogous to that of Figure 1, but wherein the motorcycle is in a leaning position, rounding a curve; and;

Figure 4 is a view of the motorcycle in accordance with Figure 3, but viewed from a sectional side perspective.

Detailed description of the drawings

[0019] In said drawings, the operational makeup and mode of the slot racing motorcycle 1 of the present invention may be observed. For greater clarity, in the various drawings the bodywork, fairings and rider, as well as other ancillary elements such as, for example, the fuel tank, seat, footrests and handlebar have all been omitted.

[0020] The motorcycle 1 is provided with, in a manner already known, an electric motor 2 which is supported on a chassis 5 and which actuates the rear wheel 3 of the motorcycle by means of an assembly consisting of a pinion gear 22 and toothed crown wheel 23 (see Figures 1 and 2), where the pinion 22 is coaxial to the spindle of the motor 2 which, in this case, is arranged horizontally. The front wheel 4 may be freewheeling and, where convenient, may pivot on a shaft, this being either vertical or slightly angled from the vertical.

[0021] The motorcycle 1 comprises a pickup shoe 6 provided with a known central pin 7 and conventional brushes 24 (Figures 2 and 4) which make contact with the electrified slot 8 in the track 11. The pickup shoe 6 likewise is provided with lateral stabilising extensions 9 and 10, featuring respective skids 19 and 20 at their ends, constitutive of a means for resting on the track 11 and stabilising the pickup shoe 6 and, consequently, the motorcycle assembly 1.

[0022] The characteristic of the slot racing motorcycle 1 of this invention is that the assembly of the wheels 3, 4 and the chassis 5 and with the latter, the motor 2 and the remainder of the elements which are finally solidly attached to the chassis 5 (for example, the bodywork, fairing and rider, not portrayed) of the wheels 3, 4 may lean in when a curve is rounded. Specifically, the upper part of the aforementioned assembly leans towards the inside of the curve.

[0023] To do this, the motorcycle 1 features a leaning means which has a servo motor 12, solidly attached to the chassis 5 and to the wheels 3 and 4. The rotating spindle 13 of the servo motor 12 is horizontal, essentially longitudinal to the direction of movement of the motorcycle 1, and its output shaft 14 comprises at its front free end a first slide 15. The pickup shoe 6 features a column 30 which stretches upwards from the pickup shoe 6 to a sufficiently high position, wherein a vertical guide 16 is defined. The servo motor 12 is located to the rear of the column 30, and on the opposite side a first slide 15 is held, linked, with the possibility of turning freely, to the end of the shaft 14.

[0024] The first slide 15 moves with a degree of freedom, this being limited as will be explained below, throughout the length of the vertical guide 16, upwards and downwards, in such a way that starting from a vertical position of the motorcycle 1 (Figures 1 and 2), a turn of the servo motor brings about a downward movement of the first slide 15 and, therefore, a leaning of the upper part of the chassis-wheels assembly (Figures 3 and 4) towards the inside of a curve rounded by the motorcycle 1. This turn of the servo motor 12 shall be of the extent determined by the geometry of the system of the motorcycle 1, and is an instruction given by the slot racing game user him/herself via the push-button of the control.

[0025] The turn of the servo motor 12 and the descent of the first slide 15, and therefore the leaning of the motorcycle 1 are restricted by means of the following mechanism. The pickup shoe 6 features a transversal groove 18, along whose interior, in a direction perpendicular to that of the travel of the motorcycle, a second slide 17 moves; this is solidly attached to the chassis 5, in order to force and to guide the movement of the lower part of the chassis 5 and wheels 3, 4 assembly when the servo motor 12 turns. To do this, said second lower slide 17 is

equipped at its lower end with an upright 21 which supports and links the motor 2 and the servo motor 12. Thus, the chassis 5 and the pickup shoe 6 are solely articulatedly linked by said first slide 15 and second slide 17.

[0026] It may be observed in the drawings that the transversal groove 18 of the pickup shoe 6 stretches the full width of the lateral stabilising extensions 9, 10.

[0027] In a variant of the invention, the servo motor 12 is remotely activated by radio frequency, by radio control (RC) means of a conventional type, operated by means of a conventional type of slot racing throttle control. The servo motor 12 and, therefore, the leaning of the motorcycle 1 when rounding curves may be operated automatically in response to the signal from sensors which capture the speed of the motorcycle and the centripetal acceleration of the motorcycle itself. The conventional possibility of using cable-connected controls should be added to this possibility.

[0028] The nature of this invention having been sufficiently described herein, as well as the manner of putting the same into practice, let it be known that anything which does not alter, change or modify its basic principle may be subject to variations in detail.

Claims

1. A slot racing motorcycle, featuring an electric motor (2) supported on a chassis (5), which actuates one (3) of the wheels (3, 4), and a pickup shoe (6) featuring a central guide pin (7) and brushes to make contact with the electrified slot (8) in the track (11), the pickup shoe being equipped with lateral stabilising extensions (9, 10) which feature a supporting means at their ends, **characterised in that** it features a leaning means for the chassis (5) and wheels (3, 4) assembly which is comprised of a servo motor (12) which is solidly attached to the chassis and the wheels, to a horizontal rotating spindle (13), essentially longitudinal to the direction of travel of the motorcycle (1), and whose output shaft (14) comprises at its frontal free end a first slide (15) which moves along a vertical guide (16) which is solidly attached to the pickup shoe (6) in such a way that, starting from a vertical position of the motorcycle (1), a turn of the servo motor (12) brings about a downward movement of the first slide (15) and, therefore, a leaning of the upper part of the chassis-wheels assembly, towards the inside of a curve rounded by the motorcycle (1).

2. A slot racing motorcycle, as claimed in claim 1, **characterised in that** the chassis (5) comprises a second lower slide (17) susceptible to being held by and to move transversally along the interior of a transversal groove (18) in the pickup shoe (6), in order to force and to guide the movement of the lower part of the chassis (5) and wheels (3, 4) assembly when the servo motor (12) turns, the chassis (5) and the pickup shoe (6) being articulatedly linked by said second slide (17).

3. A slot racing motorcycle, as claimed in claim 2, **characterised in that** said transversal groove (18) in the pickup shoe (6) extends to the full width of said lateral stabilising extensions (9, 10).

4. A slot racing motorcycle, as claimed in claim 1 or 3, **characterised in that** said supporting means are constituted by outer skids (19, 20), adapted so as to rest on the track (11).

5. A slot racing motorcycle, as claimed in claim 1, **characterised in that** said servo motor (12) is remotely operated by radio control (RC) means.

6. A slot racing motorcycle, as claimed in claim 1, **characterised in that** said servo motor (12) is remotely operated via the electrified rails of the track (11).

7. A slot racing motorcycle, as claimed in claim 2, **characterised in that** said second lower slide (17) features at its end an upright (21) for the supporting of the motor (2) and the servo motor (12).

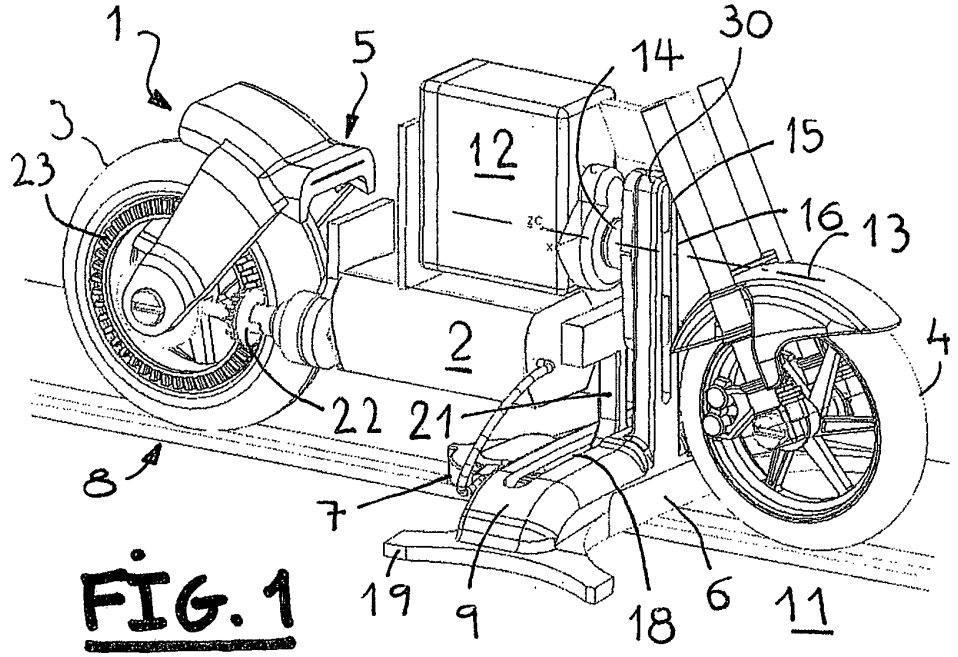
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FIG. 1

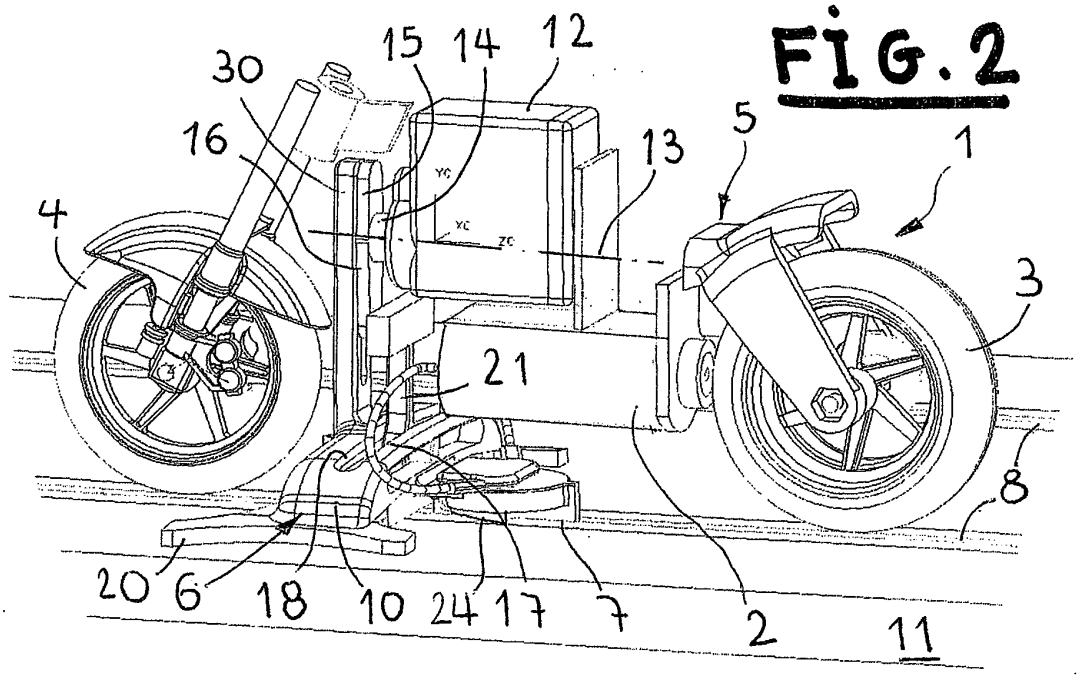
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FIG. 2

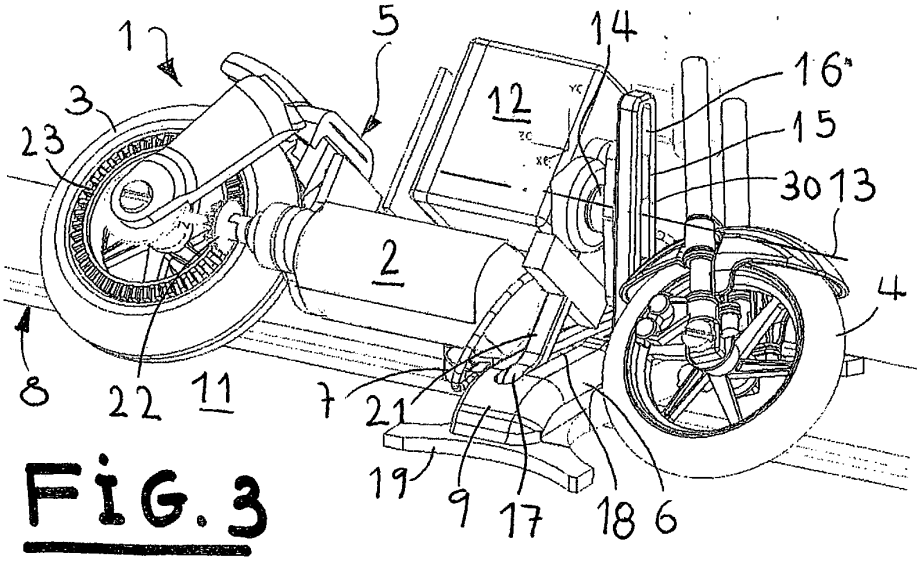
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FIG. 3

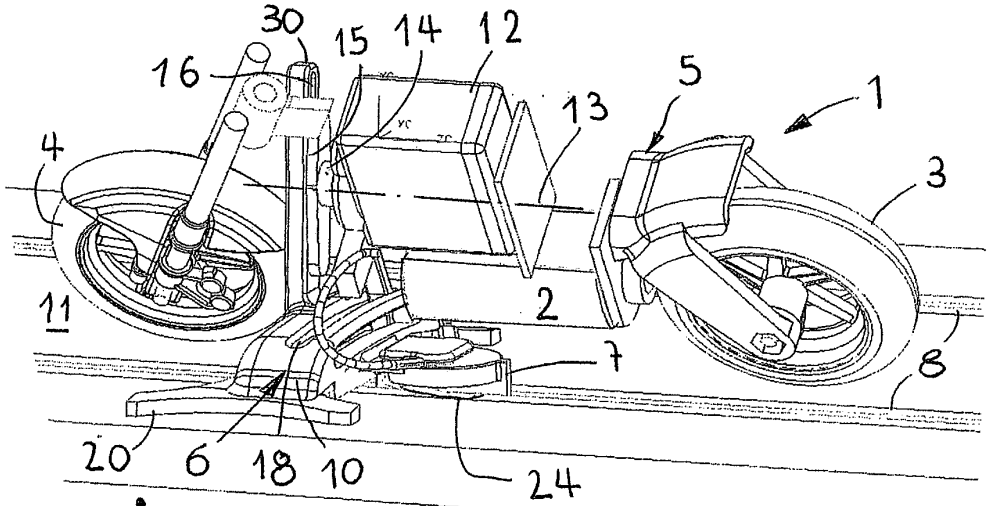
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FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2008/000183

A. CLASSIFICATION OF SUBJECT MATTER

see extra sheet
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
a63h

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

INVENES,EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2008011997 A (WIZ CO LTD) 24.01.2008, abstract; figures.	1,2,7
A	ES 2067384 A2 (PABLOS BAEZA CARLOS JESUS DE) 16.03.1995, column 2, line 47 - column 4, line 6; figures.	1,4
A	GB 2096905 A (CHERYCO CORP) 27.10.1982, page 1, line 84 - page 3, line 34; figures.	1,4
A	WO 2004009199 A1 (HORNBY HOBBIES LTD ; BUCHANAN JAMES MATTHEW) 29.01.2004, page 3, line 19 - page 5, line 34; figures.	1,4
A	GB 2408218 A (ROUTLEDGE THOMAS HENRY JAMES) 25.05.2005, the whole document.	1
A	GB 2390982 A (ALL STARS RACING LTD) 28.01.2004, page 4, line 36 - page 8, line 21; figures.	1

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
02.October.2008 (02.10.2008)	**(22/10/2008)**
Name and mailing address of the ISA/ O.E.P.M. Paseo de la Castellana, 75 28071 Madrid, España. Facsimile No. 34 91 3495304	Authorized officer Mª J. Cuenca González Telephone No. +34 91 349 30 74

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 2008/000183

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6095892 A (MOE et al.) 01.08.2000, column 5, line 62 - column 6, line 2; figures 4-6.	1

Form PCT/ISA/210 (continuation of second sheet) (July 2008)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ ES 2008/000183

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GB 2390982 A	28.01.2004	WO 2004009199 A AU 2003255725 A	29.01.2004 09.02.2004
US 6095892 A	01.08.2000	NONE	----------

Form PCT/ISA/210 (patent family annex) (July 2008)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ ES 2008/000183

CLASSIFICATION OF SUBJECT MATTER

A63H 17/21 (2006.01)
A63H 18/12 (2006.01)

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- ES 2067384 **[0007]**
- GB 2390982 A **[0008] [0009]**
- WO 2004009199 A **[0009]**
- US 6626116 B **[0010]**