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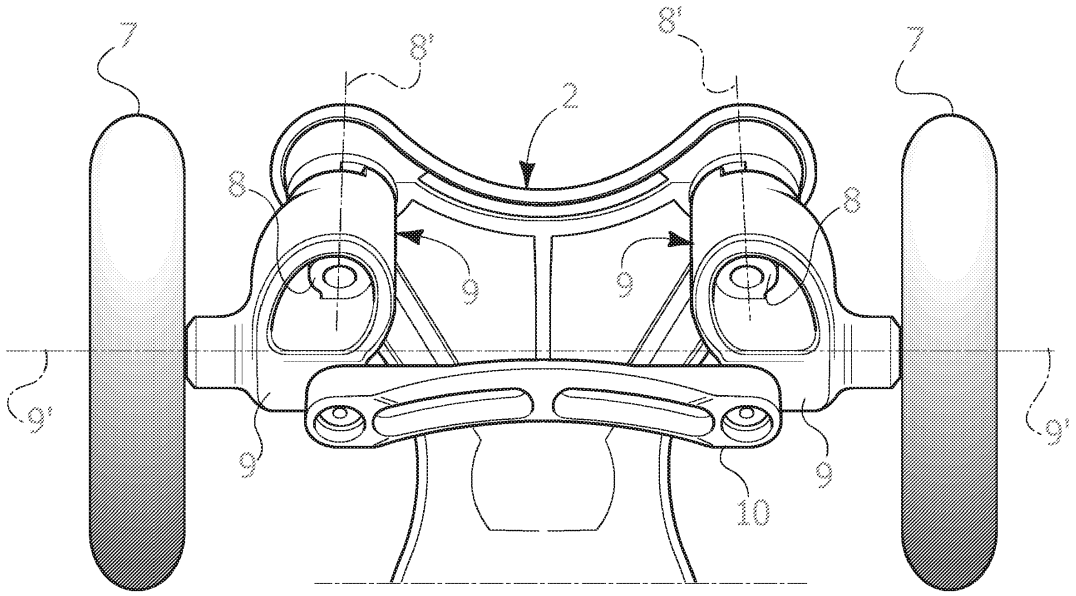
(54) **Scooter**

(57) A vehicle comprising:
- a resting board (2) for the feet of a user;
- a first wheel support (9) and a second wheel support (9) for a pair of front and/or rear wheels;
wherein said first wheel support (9) is mounted on said board so that it can turn about a first steering axis (8') and defines a first axis of rotation of the wheel (9'), and wherein said second wheel support (9) is mounted on said board so that it can turn about a second steering axis (8') and defines a second axis of rotation of the wheel (9');
- elastic means operatively connected to said first and second supports for bringing said first and second supports into a reciprocal arrangement, which is designed to determine, in operation, a motion of advance of the vehicle that is substantially rectilinear. The vehicle is characterized in that it comprises a torsion spring (13) arranged with its axis coinciding with one of said first and second steering axes.

FIG. 2



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Description

[0001] The present invention relates to a vehicle of the type comprising:

- a resting board for the feet of a user;
- a first wheel support and a second wheel support for a pair of front and/or rear wheels, wherein the first wheel support is mounted on the board so that it can turn about a first steering axis and defines a first axis of rotation of the wheel, and wherein the second wheel support is mounted on the board so that it can turn about a second steering axis and defines a second axis of rotation of the wheel;
- elastic means operatively connected to the first and second supports for bringing said first and second supports in a reciprocal arrangement, which is designed to determine, in operation, a motion of advance of the vehicle that is substantially rectilinear.

[0002] A vehicle of this sort falls within the class of vehicles referred to as "scooters".

[0003] This type of scooter has the peculiarity of envisaging a system for steering the front wheels, which increases the manoeuvrability of the vehicle and hence the possibility of amusement for the user.

[0004] The document No. WO 00/03773 describes a scooter of the type referred to above.

[0005] The scooter described in said document is far from suited to being designed for use by children.

[0006] In said scooter, the steering system referred to above has, in fact, various exposed mobile parts, with which the child could get hurt, for example when attempting to dismantle said parts or else after dismantling them for playing. In particular, the springs with which said system is provided constitute the most dangerous parts for the safety of the child, and also these are completely exposed and are, on the other hand, also the ones easiest to dismantle.

[0007] Another aspect that renders the scooter described in said document far from suited for children lies in the fact that said steering system bestows upon the means an excessive mobility for a child to control.

[0008] The object of the present invention is to overcome the drawbacks referred to above by providing a scooter particularly suited for use by children. The scooter described herein can in any case be used also by adults, both at an amateur level and for sports competitions.

[0009] According to the invention, the aforesaid object is achieved thanks to a vehicle having the characteristics recalled in the ensuing claims.

[0010] The claims form an integral part of the technical teaching provided herein in relation to the invention.

[0011] The invention will now be described, purely by way of non-limiting example, with reference to the annexed representations, wherein:

- Figure 1 is a perspective view of an embodiment;
- Figure 2 is a perspective view of an embodiment;
- Figure 3 is a perspective view of an embodiment;
- Figure 4 is a perspective view of an embodiment;
- Figure 5 is an exploded view of an embodiment.

[0012] Illustrated in the ensuing description are various specific details aimed at an in-depth understanding of the embodiments. The embodiments can be obtained without one or more of the specific details, or with other methods, components, materials, etc. In other cases, known structures, materials, or operations are not illustrated or described in detail so that various aspects of the embodiments will not be obscured.

[0013] Reference to "an embodiment" or "one embodiment" in the framework of this description is meant to indicate that a particular configuration, structure, or characteristic described in relation to the embodiment is comprised in at least one embodiment. Hence, phrases such as "in an embodiment" or "in one embodiment" that may be present in different points of this description do not necessarily refer to one and the same embodiment. Furthermore, particular conformations, structures, or characteristics can be combined adequately in one or more embodiments.

[0014] The references used herein are provided merely for convenience and hence do not define the sphere of protection or the scope of the embodiments.

[0015] In Figure 1, the reference number 1 designates a scooter according to one embodiment of the present invention.

[0016] It comprises a board 2 for resting of the feet of a user.

[0017] The board 2 has a preferential direction of extension, corresponding, in operation, to the direction of the rectilinear motion of advance of the scooter. The board 2 moreover has one front end 2a mounted on which is a handlebar shaft 3. In the example illustrated in the figures, a tubular seat 4, fixed at the end 2a, is designed to receive the handlebar shaft 3, which is inserted by snap action within said seat. A pushbutton 5 enables decoupling of the handlebar shaft 3 from the seat 4.

[0018] The board 2 has a rear end 2b that identifies two longitudinal and substantially parallel arms 2c, which support in a freely rotatable way the rear wheel 6 set between them.

[0019] Mounted instead at the end 2a is a pair of front wheels 7.

[0020] In particular, the end 2a has a generic half-shell conformation that identifies an inclined surface 2d, with a profile descending in a direction moving away from the rear end of the board 2. On said surface, pins 8 project from the underside of the board 2. The pins 8 define two steering axes 8' of the scooter and rotatably mounted thereon are the wheel supports 9. The steering axes 8' are inclined by an angle other than 90° with respect to the longitudinal direction of the board 2 so as to facilitate the manoeuvres for steering the means.

[0021] In various embodiments, a connecting bar 10 is hinged, at its opposite ends, to each of the wheel supports 9, in order to connect the movements of rotation of the two supports.

[0022] The supports 9 define respective axes 9' of rotation of the wheels 7.

[0023] The front wheels 7 are governed in a reciprocal position, which, when the scooter is being used, determines a substantially rectilinear motion of advance. In particular, the steering system described above comprises, for said purpose, elastic means operatively connected to the wheel supports.

[0024] In the aforesaid governed position, the supports 9 are oriented with respect to one another with their axes of rotation 9' substantially aligned to one another or else that deviate from a condition of mutual alignment for small angles of convergence or camber.

[0025] In various embodiments, said elastic means comprise a torsion spring coaxially arranged on each of the two steering axes 8'.

[0026] In various embodiments, a torsion spring is coaxially arranged on each of the two steering axes 8'.

[0027] With particular reference to Figures 3, 4, and 5, a first sleeve 11 is set around the pin 8, fixed on a base 17, and has a substantially circular cross section such as to obtain an annular space between its internal walls and the pin 8 itself.

[0028] The wheel support 9 defines a second sleeve 12 with substantially circular cross section, which can be fixed to the pin 8 so as to be freely rotatable with respect to said pin. The second sleeve 12 has an internal undercut portion designed to define an annular space between its walls and the pin 8 itself.

[0029] The sleeves 11 and 12, in the condition of reciprocal coupling, define, around the pin 8, an annular space with an axis substantially coinciding with the steering axis 8'. A torsion spring 13 is housed within said space so as to be almost completely closed from outside, by said sleeves 11 and 12.

[0030] The spring 13 has two end portions 13', which extend in a direction parallel to the axial direction of the spring and in senses opposite to one another. The internal walls of the sleeves 11 and 12 each have a seat for housing one of the opposite ends 13' of the spring 13.

[0031] The relative arrangement between sleeves 11 and 12 and the spring 13 is such that the resting condition of the spring is made to correspond with a neutral position between the sleeves 11 and 12, which defines the aforesaid governed position of the supports 9 (see Figure 2). When the sleeves are displaced from their neutral position, the spring 13 intervenes according to an action that tends to bring the two sleeves back into said position.

[0032] In various embodiments, the sleeves 11 and 12 are coupled together at their opposed end edges so that they can turn with respect to one another between two angular end positions. As will be seen in what follows, said end positions determine the limits of the rotations that the supports 9 can perform with respect to the board 2.

[0033] In various embodiments, the sleeve 11 comprises at its end edge an axial notch 11' extending for a given angular interval and delimited by two opposed radial walls 11a.

[0034] The sleeve 12 has, instead, at the end edge a tooth 12', which, in the mounted condition of the two sleeves, sets itself in the notch 11', within which it is mobile. The opposed walls 11a constitute contrast surfaces upon which the tooth 12' bears and consequently determine the aforesaid angular end positions of the sleeves 11 and 12.

[0035] In the neutral position of the sleeves, the tooth 12' is located at one and the same angular distance from both of the opposed walls 11a so as to define angular intervals of rotation of the sleeves, which are substantially the same for both of the directions of rotation.

[0036] As emerges from the foregoing, the relative rotation that can be obtained between the sleeves 11 and 12 corresponds to the relative rotation that the support 9 can perform with respect to the board 2, and consequently the limits defined by said sleeves for their reciprocal rotation also constitute the limits for rotation of the support 9 with respect to the board 2.

[0037] Said limits render the scooter easier to control and hence less dangerous.

[0038] In use, in fact, to carry out steering of the scooter, the board 2 must be inclined on the side towards which it is intended to curve. The inclination of the board means that the friction of the wheel against the ground produces a reaction torque on the supports 9 such as to cause rotation thereof with respect to the pin 8 and, hence, with respect to the board 2. The limitation obtained by the sleeves 11 and 12 on the degree of rotation of the support 9, with respect to the board 2, hence makes it possible to limit the inclination that the board 2 can assume with respect to the ground, and consequently reduce the risk of the user, when curving, losing his balance.

[0039] In various embodiments, a first sleeve and a second sleeve are coupled to respective end edges so that they can turn with respect to one another, and surround the pin that defines said first or second steering axis, thus obtaining an annular space with an axis substantially coinciding with said first or second axis, within which said torsion spring is housed.

[0040] In various embodiments, the first and second sleeves can turn with respect to one another between two angular end positions.

[0041] In various embodiments, the first sleeve comprises at its end edge an axial notch extending for a given angular interval and delimited by two opposed radial walls, and the second sleeve has at its end edge a tooth, which is mobile within said notch, the opposed radial walls of the notch identifying the aforesaid angular end positions of the sleeves.

[0042] Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary, even significantly, with respect to what

has been illustrated herein purely by way of non-limiting example, without thereby departing from the scope of the invention, as defined by the annexed claims.

Claims

1. A vehicle comprising:

- a resting board (2) for the feet of a user;
- a first wheel support (9) and a second wheel support (9) for a pair of front and/or rear wheels, wherein said first wheel support (9) is mounted on said board so that it can turn about a first steering axis (8') and defines a first axis of rotation of the wheel (9'), and wherein said second wheel support (9) is mounted on said board so that it can turn about a second steering axis (8') and defines a second axis of rotation of the wheel (9');
- elastic means operatively connected to the first and second supports for bringing said first and second supports in a reciprocal arrangement, which is designed to determine, in operation, a motion of advance of the vehicle that is substantially rectilinear,

said vehicle being **characterized in that** said elastic means comprise a torsion spring (13) arranged with its axis coinciding with one of said first and second steering axes.

2. The vehicle according to Claim 1, wherein a connection element (10) joins said first and second supports in rotation.

3. The vehicle according to Claim 1, wherein a first sleeve (11) and a second sleeve (12) are coupled at respective end edges so that they can turn with respect to one another, and surround the pin (8) that defines said first or second steering axis (8'), thus obtaining an annular space with an axis substantially coinciding with said first or second steering axis, within which said torsion spring (13) is housed.

4. The vehicle according to Claim 3, wherein said first and second sleeves can turn with respect to one another between two angular end positions.

5. The vehicle according to Claim 4, wherein said first sleeve (11) comprises at its end edge an axial notch (11') extending for a given angular interval and delimited by two opposed radial walls (11a), and wherein said second sleeve (12) has at its end edge a tooth (12'), which is mobile within said notch, said opposed radial walls of said notch identifying said end positions of the sleeves.

6. The vehicle according to any one of Claims 3 to 5, wherein the internal walls of said first and second sleeves each have a seat for housing one of the opposite ends of said spring.

7. The vehicle according to any one of the preceding claims, wherein a torsion spring is coaxially arranged on each of said first and second steering axes.

FIG. 1

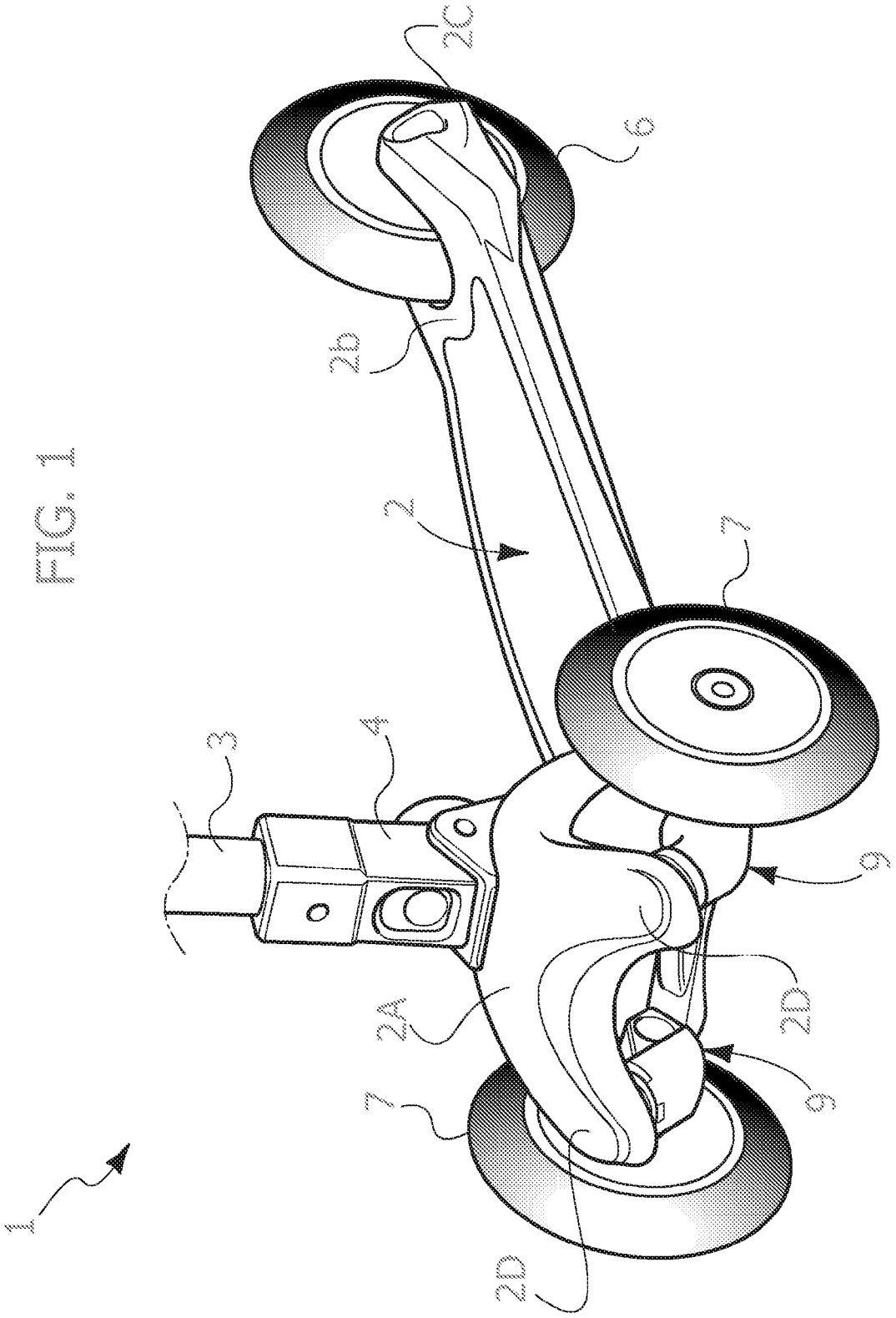
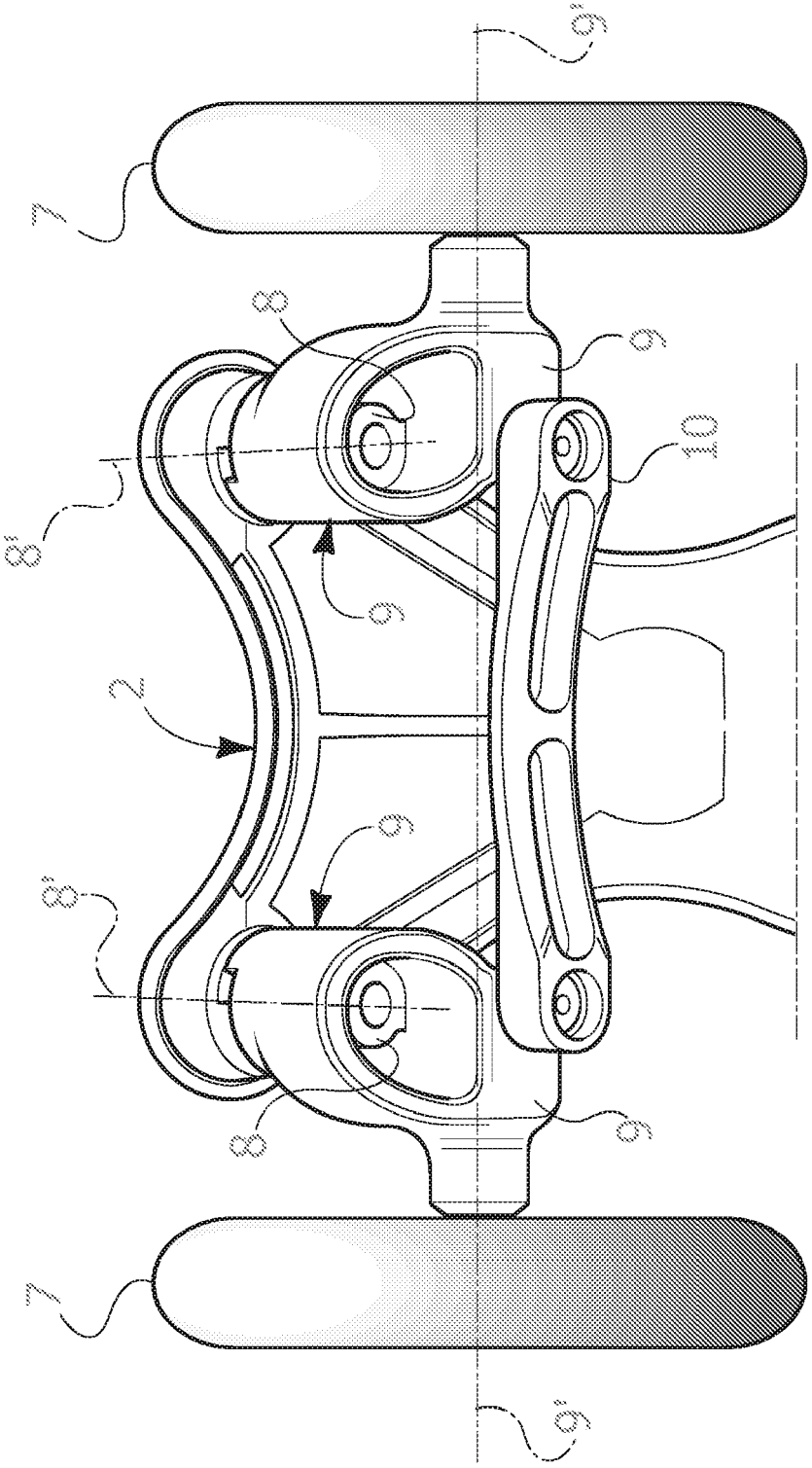


FIG. 2



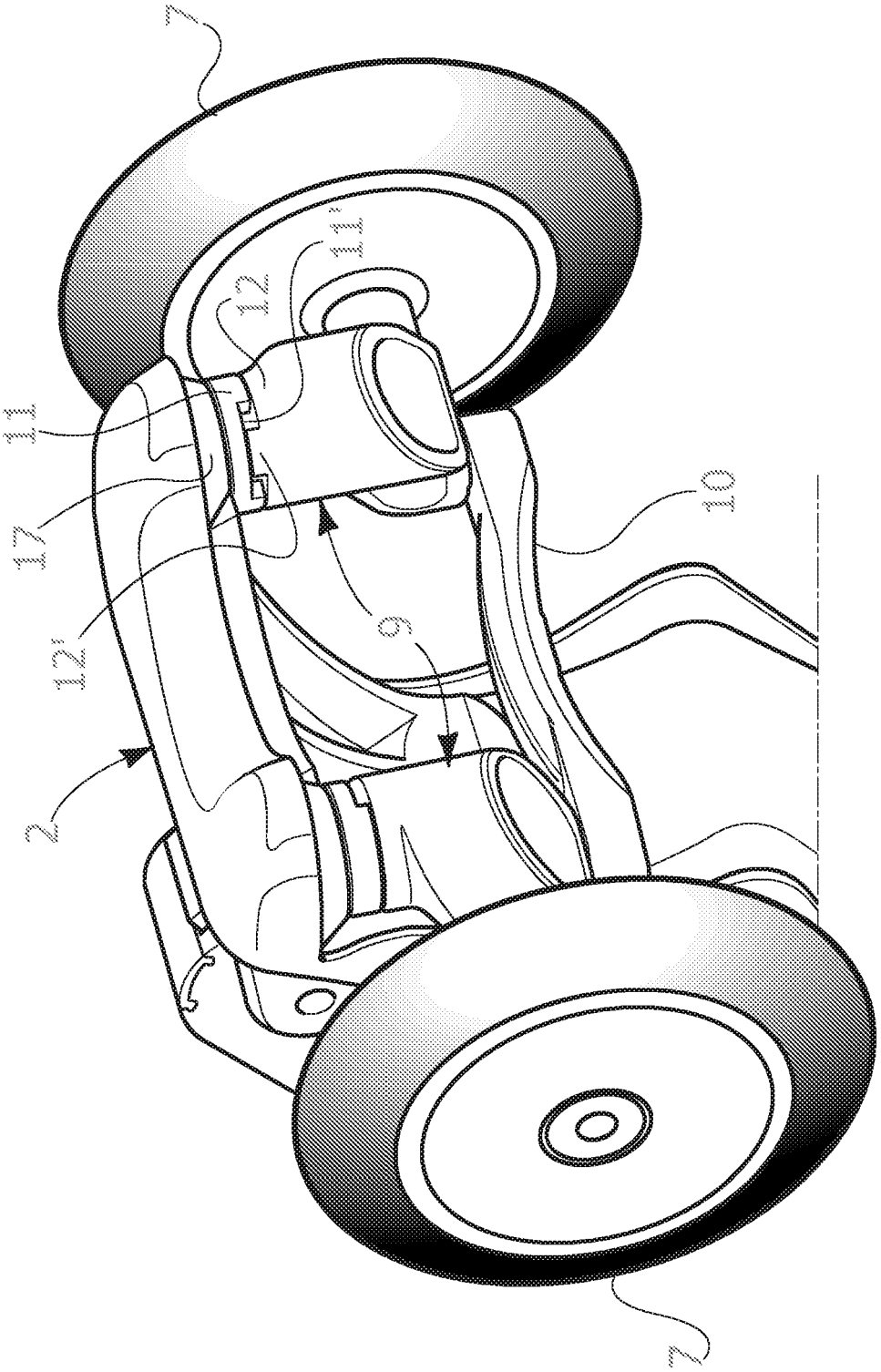


FIG. 3

FIG. 4

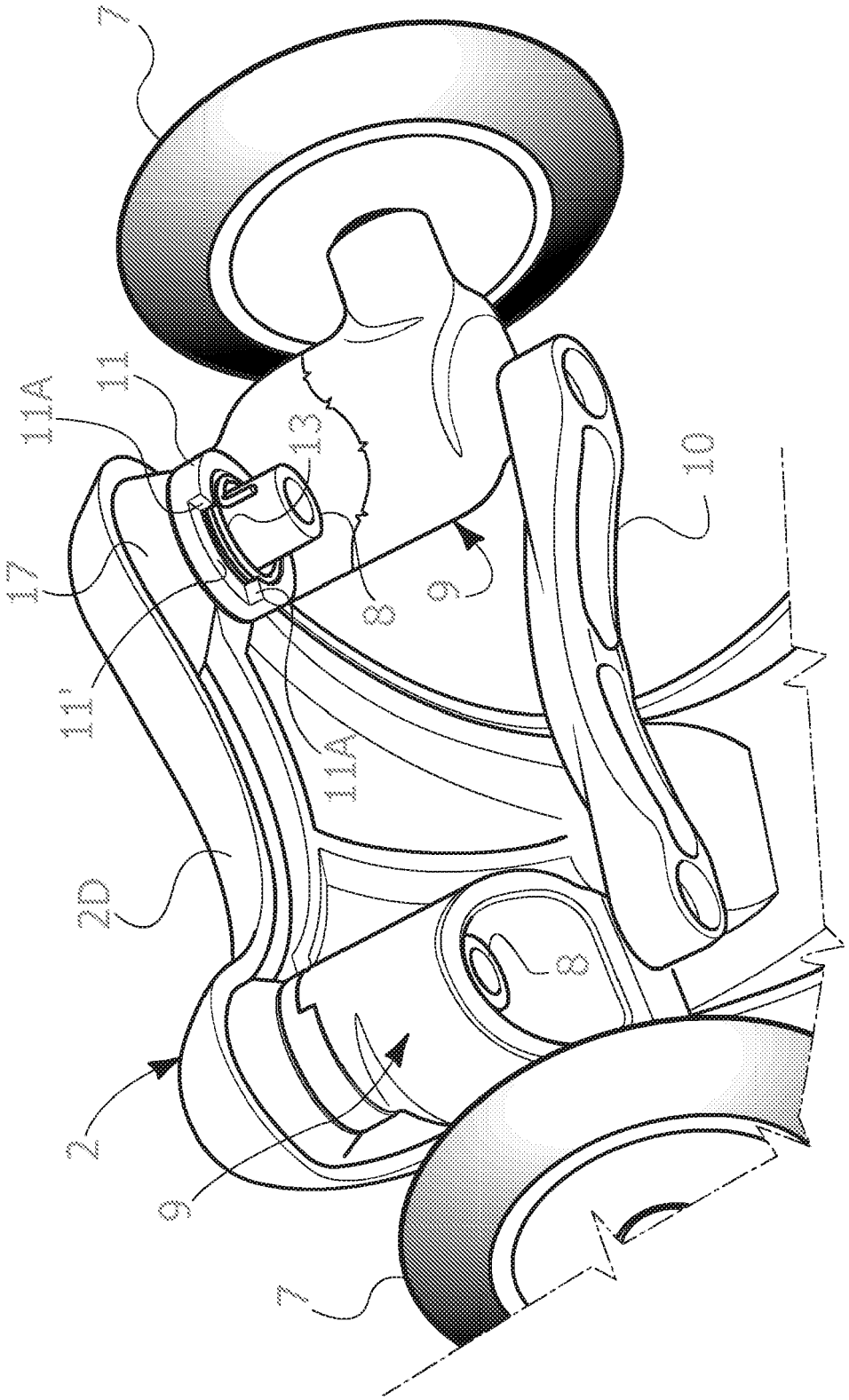
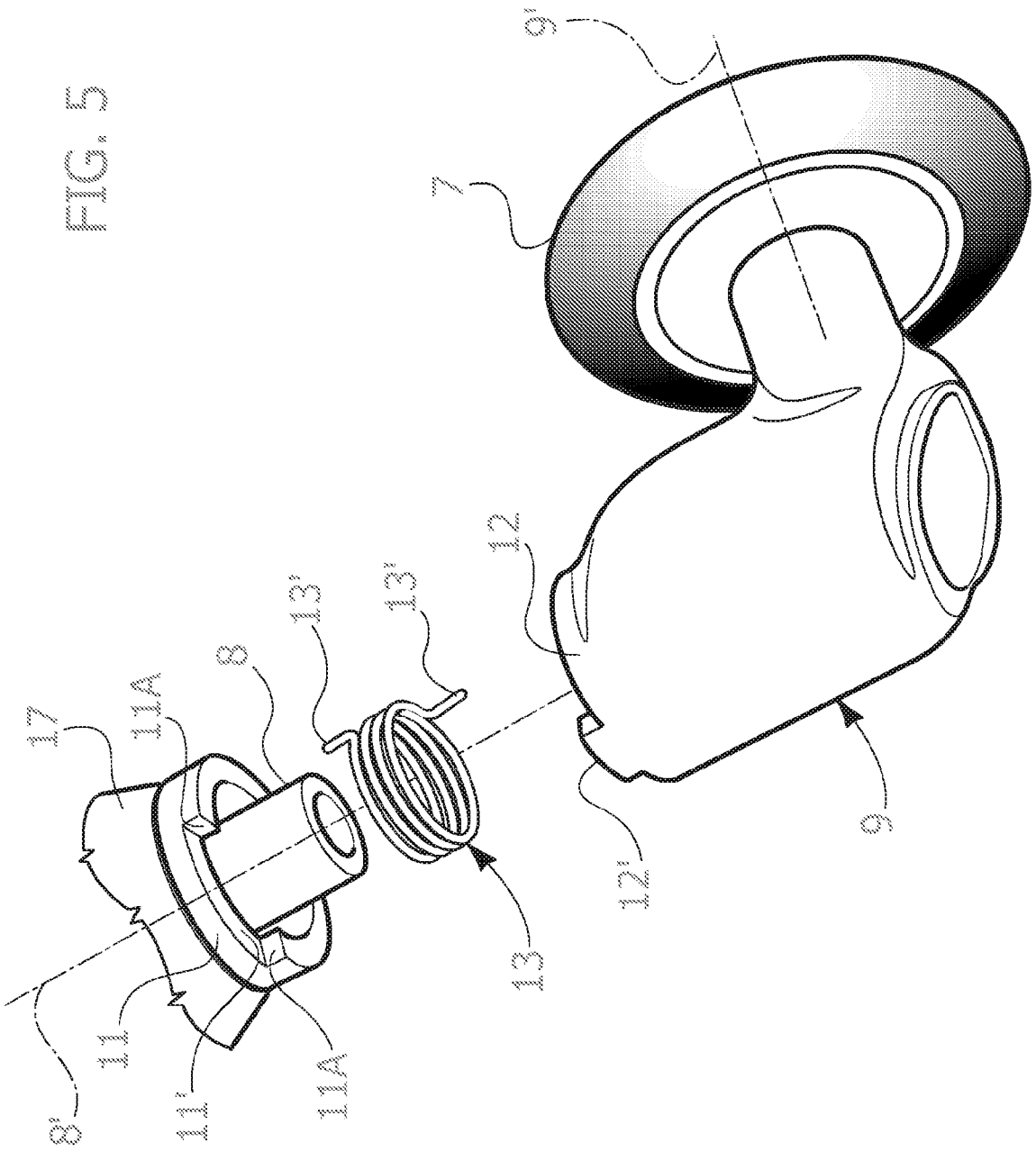


FIG. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 11 15 9898

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X,D	WO 00/03773 A1 (MICRO MOBILITY SYSTEMS AG [CH]) 27 January 2000 (2000-01-27) * the whole document *	1-7	INV. A63C17/01
X	US 6 382 646 B1 (SHAW ATHONY [TW]) 7 May 2002 (2002-05-07) * columns 2-4; figure * *	1-7	
X	DE 10 2008 006242 A1 (HUDORA GMBH [DE]) 30 July 2009 (2009-07-30) * the whole document *	1-7	
X	DE 201 00 372 U1 (LIN HENKEL [TW]) 29 March 2001 (2001-03-29) * pages 1-7; figures 1-5 *	1-7	

TECHNICAL FIELDS SEARCHED (IPC)

A63C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 July 2011	Haller, E

CATEGORY OF CITED DOCUMENTS

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12-07-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0003773 A1	27-01-2000	AU 4598199 A	07-02-2000
		DE 29923692 U1	18-01-2001
		DE 29923693 U1	18-01-2001
		EP 1096979 A1	09-05-2001
US 6382646 B1	07-05-2002	NONE	
DE 102008006242 A1	30-07-2009	CN 101492083 A	29-07-2009
DE 20100372 U1	29-03-2001	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 0003773 A **[0004]**