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(54) BALL-COLLECTING DEVICE WITH BALL-COLLECTING MODULE

(57) A ball-collecting device with ball-collecting module that includes a collecting component (10) and one or more collecting module (20) is disclosed. The collecting component has a compartment for accommodating one or more sports ball in which sports balls can be collected into the compartment by rotating the collecting component. The ball-collecting module is pin-jointed on the collecting component, thus forming an angle between the collecting component and its rotation axis (X), wherein the angle is smaller than or equal to 90 degrees. A constant distance is maintained between the ball-collecting module and the flat surface when the device of the present invention collects the sports balls.

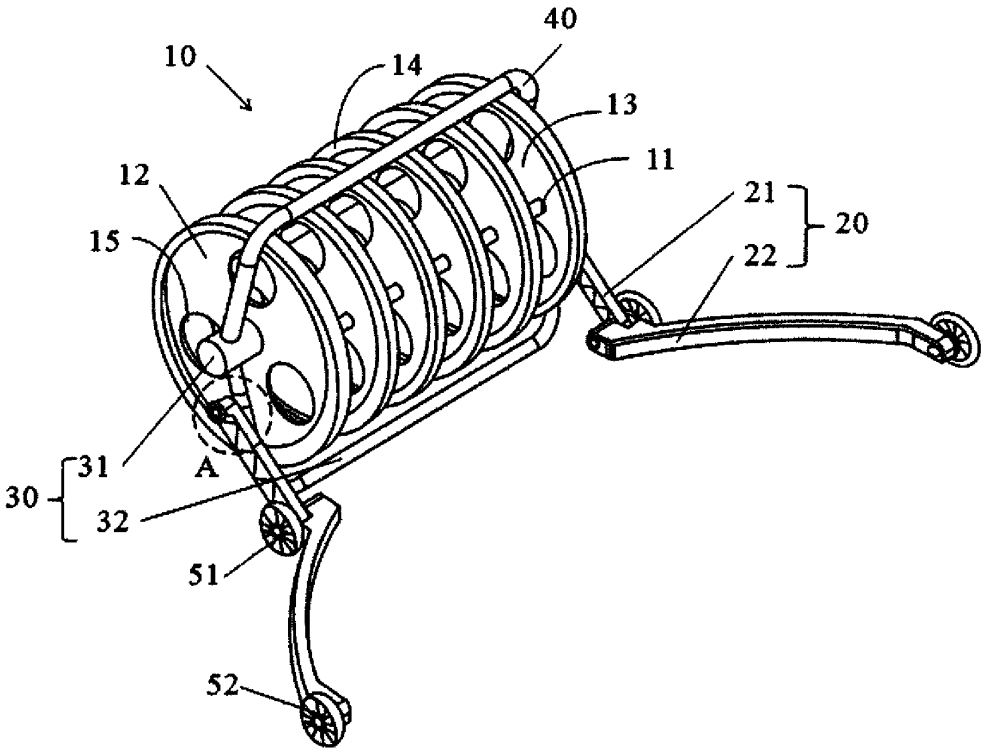

Fig. 1

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Description

CLAIM OF PRIORITY AND CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of priority to Taiwan Patent Application No. 104144807, filed on December 31, 2015, and is incorporated herein by reference in its entirety.

Field of the Invention

[0002] This invention relates to a ball-collecting device, in particular a ball-collecting device with ball-collecting module.

Description of Related Art

[0003] With the rising of living standards and emphasis on living healthily, ball games such as golf, tennis, table tennis, baseball are popular leisure activities. However, players need to pick up the balls scattered around the arena and put them back into the container after every competition, training and practice session. As a result, athletes have to put extra effort in picking up the sports balls, which is time-consuming and affects the efficiency of training. Repeated movements of ball-collecting might lead to muscle injuries.

[0004] Although various rotating ball collector apparatuses have been put into use in prior arts, the existing methods are limited by the size of the apparatus and can only collect the sports balls within a certain range. It is necessary for the user to scroll the apparatus back and forth many times in order to collect all sports balls, which is time-and-energy-consuming.

SUMMARY OF THE INVENTION

[0005] The present disclosure generally provides a ball-collecting device with ball-collecting module. It could overcome the aforementioned problem that existing apparatuses collect the sports ball ineffectively due to limitation of apparatuses' sizes.

[0006] The invention of the ball-collecting device with ball-collecting module is composed of the following: the collecting component and collecting module. The collecting component has a compartment for accommodating at least one sports ball in which sports balls can be collected into the compartment by rotating the collecting component. The ball-collecting module is pin-jointed on the collecting component, thus forming an angle between the collecting component and its rotation axis, wherein the angle is smaller than or equal to 90 degrees. A constant distance is maintained between the ball collecting module and the flat surface when the device of the present invention collects the sports balls.

[0007] The collecting component includes one or more rod, a first cover and a second cover that are positioned on the two sides of a rod respectively, one or more ring-shaped body that is positioned at a predetermined distance between the first cover and the second cover, thus forming the abovementioned compartment.

[0008] The ball-collecting device with ball-collecting module in the present invention further contains a supporting and connecting module. The module incorporates at least one connecting unit that is located on one side of the collecting module; at least one supporting module where one tip of the module is connected to the connecting unit and the other tip is discretionally supported on the flat surface. Besides, the ball collecting device in the present invention includes a control module which is connected to the connecting unit.

[0009] The aforesaid ball-collecting device contains two ball-collecting modules and they are pin-jointed on the corresponding sides of the collecting component.

[0010] The ball-collecting module includes: one or more first ball-collecting unit that is pin-jointed on the supporting module and is detachable from the module; and one or more second ball-collecting unit which is pin-jointed on the first ball-connecting unit. The first ball-collecting unit is perpendicular to the rotation axis of the collecting component, and an angle is formed between the second ball-collecting unit and the rotation axis of the collecting component.

[0011] The aforesaid first ball-collecting unit is pin-jointed on the supporting module by coupling with a bearing, and the second ball-collecting module is pin-jointed on the first ball-collecting unit by using another bearing.

[0012] The disclosed ball-collecting device also includes multiple rollers that are positioned on the two separate sides of the second ball-collecting unit. When the ball-collecting device collects the sports balls, the constant distance previously mentioned in [0006] would be the same as the radius of the rollers.

[0013] The first cover, second cover and/ or ring-shaped body before mentioned each contains at least one hollow carved section. The hollow carved section would adjust its diameter according to the diameter of one or more sports balls, thus allowing one or more sports balls to pass through the hollow carved section.

[0014] Elastic components are present in the edges of one side of the first and second cover, and the two sides of the ring-shaped body. These elastic components extend along the rotation axis which is parallel to the collecting component.

[0015] The advantages of the present invention, a ball-collecting device with ball-collecting module are as follows:

(a) In this invention, the ball-collecting module is located on the side of the ball-collecting device. When comparing to the prior arts that do not possess the ball-collecting module, this device is more effective when collecting the sports balls as it is not limited by the size of the collecting component, and the ball-collecting module could increase the ball collection

area.

(b) In the present invention, a constant distance is maintained between the ball-collecting module and a flat surface. Therefore, the ball-collecting device would not fail to catch the sports balls from the gap formed between the ball-collecting module and the surface.

(c) The disclosed device could also bring convenience. In the present disclosure, the sports balls can easily pass through the hollow carved section by adjusting the diameter of hollow carved section in the first cover, second cover, and/ or ring-shaped body, sports balls could then move within the device or being removed by a user effortlessly..

(d) In the present invention, the elastic components are located on the edges of one side of the first and second cover, and two sides of the ring-shaped body is advantageous in capturing the sports balls into the compartment and preventing the spheres from slipping out of the collecting component.

[0016] In order to comprehend the present disclosure in detail and its practicability, a more particular description and embodiments of this invention would be presented herein.

[Brief Description of the Drawings]

[0017]

FIG. 1 is the perspective view of the first embodiment of the present invention, a ball collecting device with ball collecting module.

FIG. 2 is an enlarged view of Section A illustrated in FIG. 1.

FIG. 3 is a top plan view of the first embodiment of the disclosed ball-collecting device with ball-collecting module.

FIG. 4 is an enlarged view of Section B illustrated in FIG. 3.

FIG. 5 is a side view of the first embodiment of this invention, a ball-collecting device with ball-collecting module.

FIG. 6 is a diagram illustrating the operation of the present invention, a ball-collecting device with ball-collecting module.

FIG. 7 is a side view of the second embodiment of the disclosed ball-collecting device with ball-collecting module.

[Detailed Description]

[0018] The present invention will now be described in detail with reference to the following figures and detailed description of the embodiments. The use of the same reference symbols in different drawings indicates identical component or unit in the embodiments.

[0019] In FIG. 1 to FIG. 4, FIG. 1 is a perspective view of the first embodiment of this invention; FIG. 2 is an enlarged view of Section A shown in FIG. 1; FIG. 3 is a top plan view of the first embodiment of this invention; FIG. 4 is an enlarged view of Section B shown in FIG. 3.

[0020] Referring to FIG. 1 and FIG. 3, the ball-collecting device with ball-collecting module of this invention includes a collecting component 10 and a ball-collecting module 20. Collecting component 10 has a compartment for accommodating at least one sports ball, and the balls would be collected into the compartment by rotating collecting component 10. For instance, collecting component 10 in this embodiment may include one or more rod 11, first cover 12, second cover 13 and ring-shaped body 14, where first cover 12 and second cover 13 are positioned on the two sides of rod 11 respectively. Ring-shaped body 14 is placed at predetermined intervals between first cover 12 and second cover 13, consequently forming a compartment for accommodating one or more sports ball. The structure of collecting component 10 is not limited to the example mentioned above. To expand the ball collection area, ball-collecting module 20 is pin-jointed on the collecting component 10, forming an angle θ between the collecting component 10 and its rotation axis, wherein the angle is smaller than or equal to 90 degrees. When comparing to prior arts that are without the collecting component, the disclosed device is not limited by the size of collecting component 10. By coupling with ball-collecting module 20, the ball collection area is expanded and significantly increases the efficiency for collecting balls. Moreover, ball-collecting module 20 is detachable from the device, making the device more convenient to store in a compact size. Besides, ring-shaped body 14 is positioned on rod 11, and the predetermined intervals on rod 11 can match with the diameter of sports ball 80. User can choose a suitable ball-collecting device according to the diameter of sports ball 80. This specification sets 3 as an example for the quantity of rod 11 (See FIG.3) and is not meant to imply any limitation on the present embodiments.

[0021] When the disclosed ball-collecting device collects sports balls, ball-collecting module would keep a constant distance from flat surface P (would be further explained in FIG. 6). In order to avoid the sports ball from passing through the gap between ball-collecting module and flat surface P, the constant distance is shorter than the diameter of sports ball 80. In the specification of the present invention, flat surface P is the ground.

[0022] First cover 12, second cover 13 and/ or ring-shaped body 14 each contains at least one hollow carved section 15. The diameter of the hollow carved section 15

could be adjusted according to the diameter of the sports balls 80, and allow sports ball 80 to pass through the hollow carved section. Besides, first cover 12, second cover 13 and/ or ring-shaped body 14 in collecting component 10 may separately have a double-layered structure. The double-layered structure is assembled by overlapping two ring-shaped plates (not illustrated) that contain same number of hollow carved section 15 and are in the same position. By rotating the ring-shaped plate, multiple hollow carved sections 15 will stagger and enclose the hollow carved sections ("close mode"), or the sections 15 will match correspondingly to open up the hollow carved sections ("open mode"). When the hollow carved section 15 is in the open mode and the size of holes in hollow carved section 15 is larger than the diameter of sports ball 80, user can remove sports ball 80 from the hollow carved section 15. When the hollow carved section 15 is in the close mode or the size of holes in hollow carved section 15 is smaller than the diameter of sports ball 80, the user cannot remove sport balls 80 from hollow carved section 15. Apart from that, hollow carved section 15 can adjust the size of hollow carved section 15 by using adjustment devices that have similar structure as shutters or camera shutters (not illustrated). In addition, user can adjust the size of holes in hollow carved section 15 according to the diameter of the desired ball.

[0023] The ball-collecting device with the ball-collecting module in the present invention contains supporting and connecting module 30. Supporting and connecting module 30 includes one or more connecting unit 31, and one or more supporting module 32. Connecting unit 31 is located on one side of the collecting module 10. For supporting module 32, one tip of module 32 is connected to the connecting unit 31, and the other tip is discretionally supported on the flat surface. The disclosed ball-collecting device can further include control module 40 which is connected to the connecting unit 31. User can determine the direction of ball collection by operating control module 40. The drawings of the present invention illustrate the example of having two connecting units 31, where the two connecting units 31 are positioned on the two opposite sides of rotation axis X in collecting component 10. The two ends of supporting module 32 and control module 40 are connected to the two connecting units 31 respectively. This setting allows supporting module 32 stably come into contact with flat surface P when the ball-collecting device is not collecting sports balls. As a result, the ball-collecting device can stand in an upright position (see Fig. 5). The quantity of connecting unit 31 and supporting module 32 are not limited by the aforementioned embodiments; users can adjust the quantity according to their needs.

[0024] For example, the present disclose may include two ball-collecting modules 20, and they are pin-jointed on the corresponding sides of the collecting component 10. Furthermore, ball-collecting module 20 includes: one or more first ball-collecting unit 21 and one or more second ball-collecting unit 22, where first ball-collecting unit 21 can be removed from supporting module 32, and second ball-collecting unit 22 is pin-jointed on first ball-connecting unit 21. Besides, first ball-collecting unit 21 is perpendicular to the rotation axis X, and an angle θ is formed between second ball-collecting unit 22 and rotation axis X (See Fig. 3).

[0025] Referring to FIG.2 and FIG.4, first ball-collecting unit 21 is pin-jointed on the supporting module 32 by coupling with bearing 70, and second ball-collecting module 22 is pin-jointed on first ball-collecting unit 21 by using bearing 72. The function of bearing 70 and 72 is to reduce the friction between first ball-collecting unit 21 and supporting module 32, and the friction between second ball-collecting unit 22 and first ball-collecting unit 21, which is advantageous for units to orbit around. Other than that, first ball-collecting unit 32 may be pin-jointed on supporting module 32 with a removable C-shaped ring. Methods of pin-jointing first ball-collecting unit 21 and second ball-collecting unit 22 are not limited to the methods described above.

[0026] Furthermore, the disclosed ball-collecting device includes one or more rollers 51 and 52, which are positioned on the two separate sides of second ball-collecting unit 22. When the ball-collecting device collects the sports balls, the constant distance previously mentioned is the radius of rollers 51 and 52 (see FIG. 5). Second ball-collecting unit 22 can maintain a constant distance from flat surface P through using its own weight or a spring. Therefore, rollers 51 and 52 make contact with flat surface P all the time and would not fail to catch sports ball 80 from the gap formed between second ball-collecting unit 22 and flat surface P.

[0027] FIG. 6 is a diagram illustrating the operation of the present invention, a ball-collecting device with ball-collecting module. When users operate the ball-collecting device, second ball-collecting unit 22 in ball-collecting module 20 maintains a constant distance from flat surface P. Even though users have varied heights, ball-collecting module 20 keeps a constant distance from flat surface P. As a result, the disclosed device is suitable for users with different heights. Apart from that, when users collect sports ball at a fixed spot by back and forth motion, second ball-collecting unit 22 maintains a constant distance from flat surface P. Therefore, the ball-collecting device in the present invention is suitable for users with different usage habits.

[0028] FIG. 7 is a side view of the second embodiment of the disclosed ball-collecting device with ball-collecting module. In the second embodiment of the present disclosure, elastic components 60 are present in the edges of one side of first cover 12 and second cover 13, and the two sides of ring-shaped body 14. These elastic components 60 extend along the rotation axis X which is parallel to the collecting component. The material of elastic component 60 may be made of flexible materials such as rubber, silicone, and plastic. When sports ball 80 makes contact with collecting component 10, shape of

elastic component 60 will change due to the downward pressure caused by rotation of balls, thus allowing sport ball 80 to enter the compartment between first cover 12 and ring-shaped body 14, compartment between two ring-shaped bodies 14 or compartment between second cover 13 and ring-shaped body 14. Moreover, the gap between two ring-shaped bodies 14 is smaller than the diameter of sports ball 80. This may prevent sports ball 80 from slipping out of the collecting component 10.

[0029] As such, the ball-collecting device with ball-collecting module in present disclosure can enhance the efficiency of collecting sports balls, facilitate an effortless way to pick up and dispense the balls. The disclosed device is also suitable for users with different heights and different usage habits.

[0030] While the disclosure has been described with reference to exemplary embodiments, it is intended that the present disclosure not be limited to the particular exemplary embodiments disclosed for carrying out the present disclosure. It is therefore intended that the following appended claims hereafter introduced are interpreted to include all such modifications, permutations, additions, and sub-combinations to embodiments as are within the true spirit and scope of the present invention.

[Description of Drawing Symbols]

[0031]

10: Collecting component
11: Rod
12: First cover
13: Second cover
14: Ring-shaped body
15: Hollow carved section
20: Ball-collecting module
21: First ball-collecting unit
22: Second ball-collecting unit
30: Supporting and connecting module
31: Connecting unit
32: Supporting module
40: Controlling module
51, 52: Roller
60: Elastic component
70, 72: Bearing
A, B: Section
X: Rotation axis
θ: Angle
P: Flat surface

Claims

1. A ball-collecting device with ball-collecting module includes:

   a collecting component that has a space for accommodating at least one sports ball and can collect the sports balls into the compartment by rotating the collecting component;
   a ball-collecting module that is pin-jointed on the collecting component, thus forming an angle between the collecting component and its rotation axis, wherein the angle is smaller than or equal to 90 degrees;
   a constant distance is maintained between the ball collecting module and the flat surface when the device of present invention collects the sports balls.

2. The ball-collecting device with ball-collecting module of claim 1, wherein the collecting component comprises:

   one or more rod;
   a first cover and a second cover that are positioned on the two sides of a rod respectively; and
   one or more ring-shaped body that is positioned at a predetermined distance between the first cover and the second cover, thus forming the abovementioned compartment.

3. The ball-collecting device with ball-collecting module of claim 1 further includes a supporting and connecting module, which comprises:

   one or more connecting unit that is located on one side of the collecting module;
   one or more supporting module where one tip of the module is connected to the connecting unit and the other tip is discretionally supported on the flat surface.

4. The ball-collecting device with ball-collecting module of claim 3 further contains a control module which is connected to the connecting unit.

5. The ball-collecting device with ball-collecting module of claim 1, wherein the quantity of ball-collecting module is two, and they are pin-jointed on the corresponding sides of the collecting component.

6. The ball-collecting device with ball-collecting module of claim 3, wherein the ball-collecting module comprises:

   one or more first ball-collecting unit that is pin-jointed on the supporting module and is detachable from the module; and
   one or more second ball-collecting unit which is pin-jointed on the first ball-connecting unit;

   the first ball-collecting unit is perpendicular to the rotation axis of the collecting component, and an angle is formed between the second ball-collecting unit and the rotation axis of the collecting component.

7. The ball-collecting device with ball-collecting module of claim 6, wherein the first ball-collecting unit is pin-jointed on the supporting module by coupling with a bearing, and the second ball-collecting module is pin-jointed on the first ball-collecting unit by using another bearing.

8. The ball-collecting device with ball-collecting module of claim 6, wherein the disclosed ball-collecting device also includes multiple rollers that are positioned on the two separate sides of the second ball-collecting unit. When the ball-collecting device collects the sports balls, the constant distance would be the same as the radius of the rollers.

9. The ball-collecting device with ball-collecting module of claim 2, wherein the first cover, second cover and/or ring-shaped each contains at least one hollow carved section. The hollow carved section would adjust its diameter according to the diameter of one or more sports balls, thus allowing the one or more sports balls to pass through the hollow carved section.

10. The ball-collecting device with ball-collecting module of claim 2, wherein elastic components are present in the edges of one side of the first and second cover, and the two sides of the ring-shaped body. These elastic components extend along the rotation axis which is parallel to the collecting component.

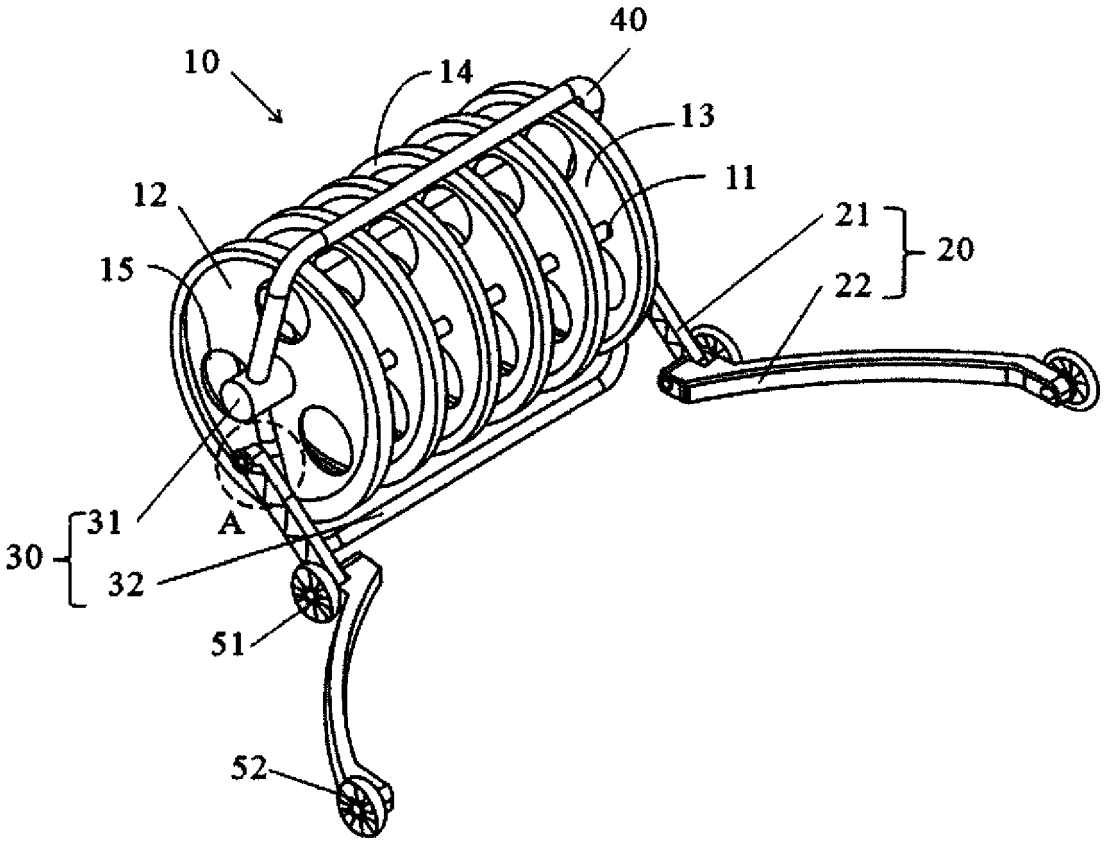

Fig. 1

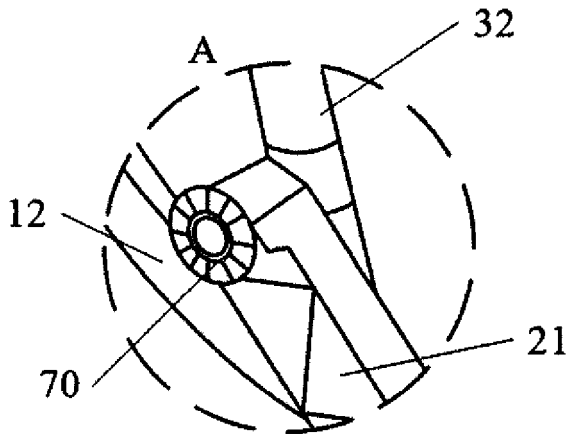

Fig. 2

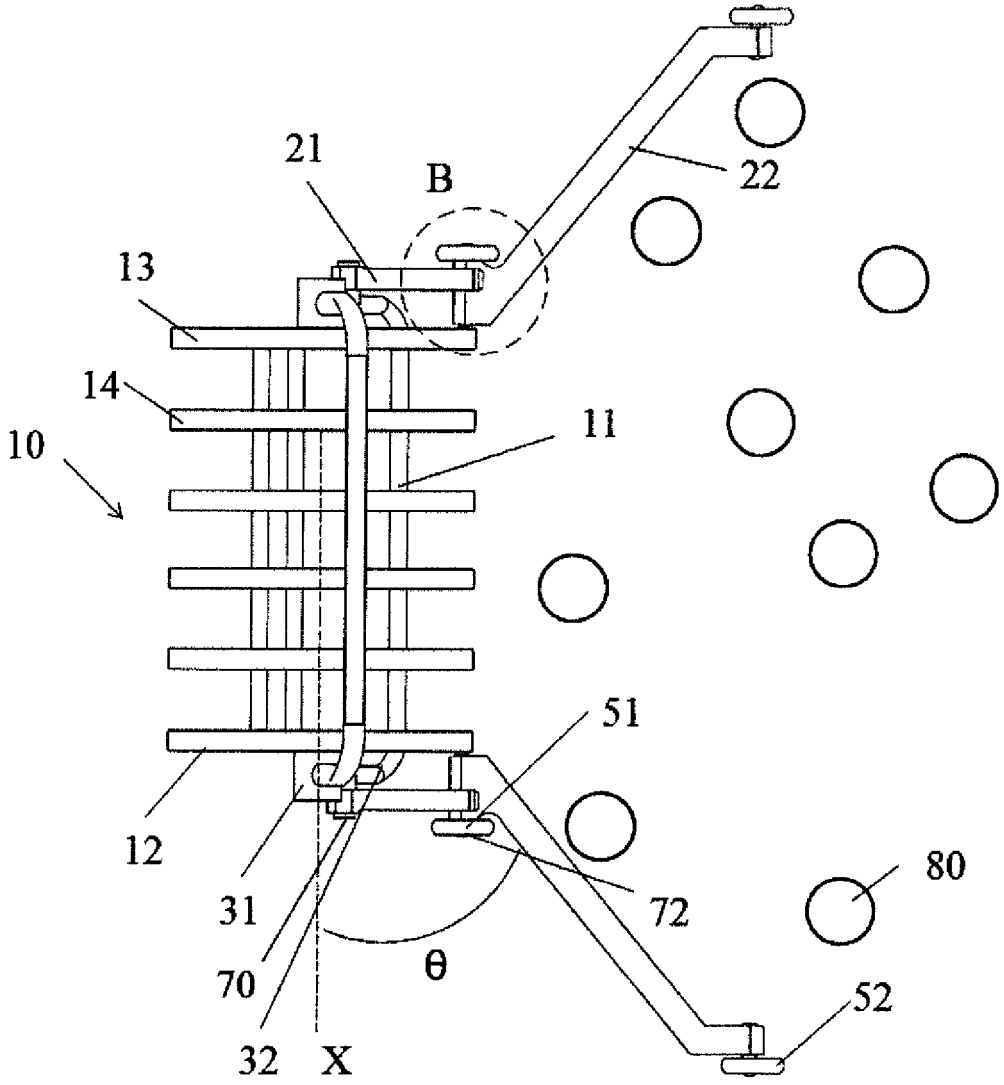

Fig. 3

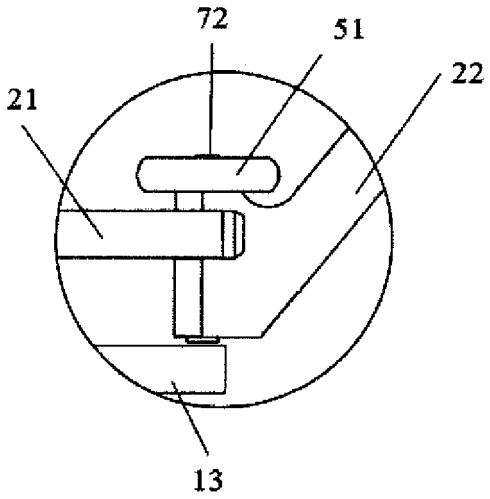

Fig. 4

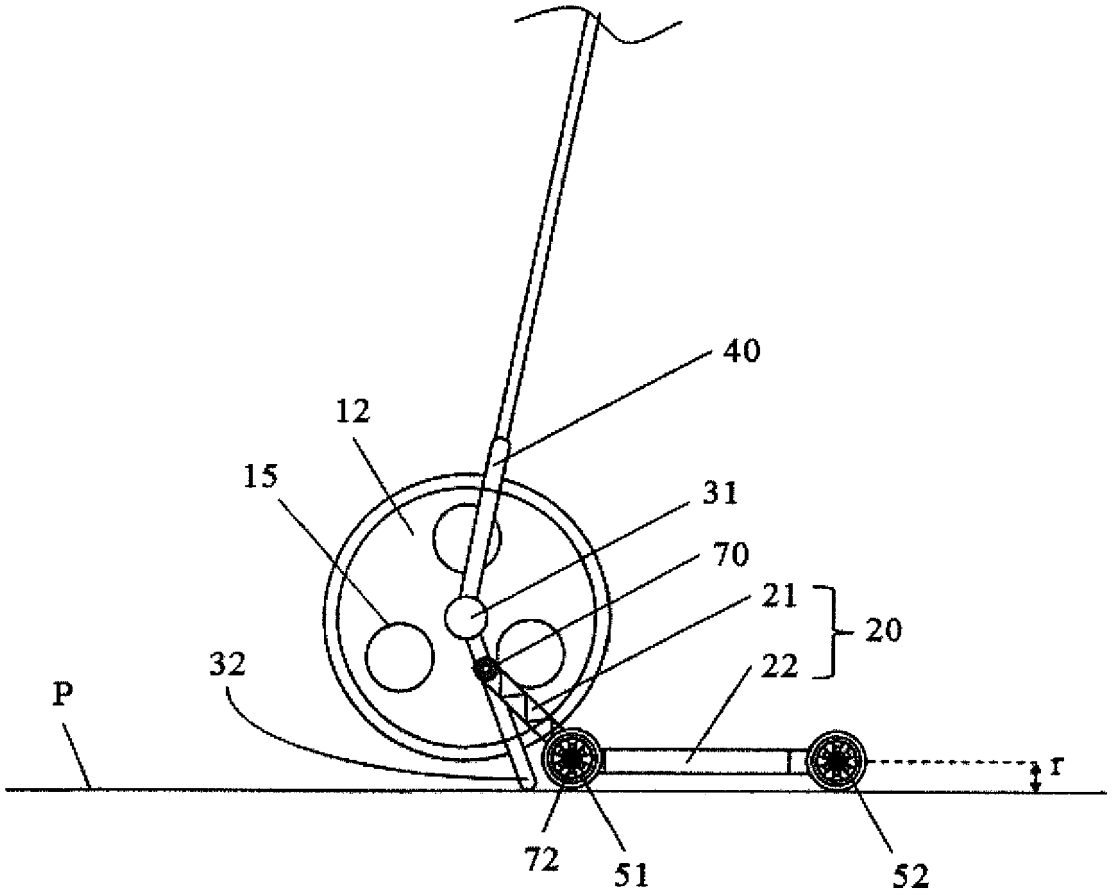

Fig. 5

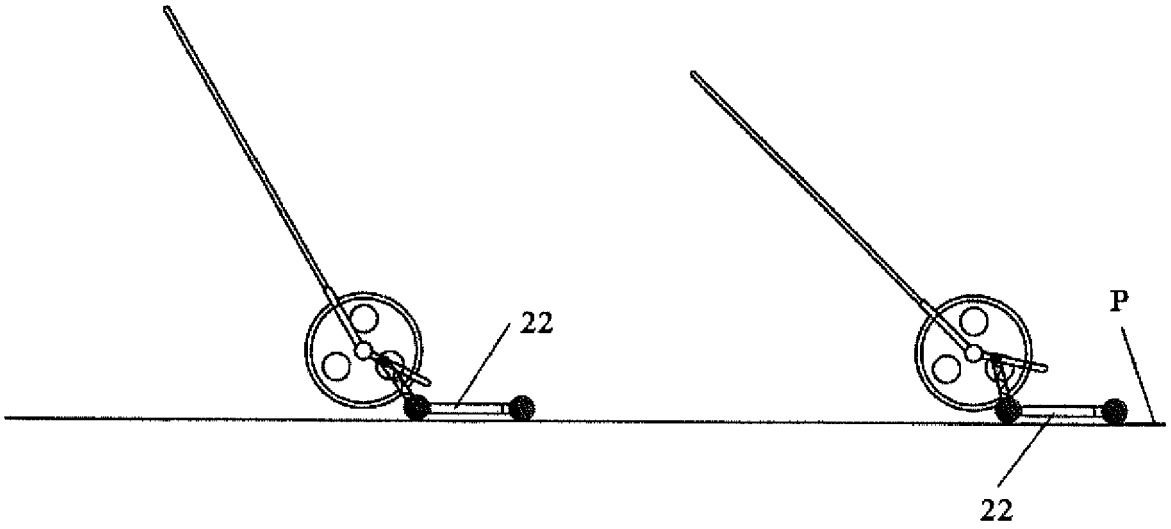

Fig. 6

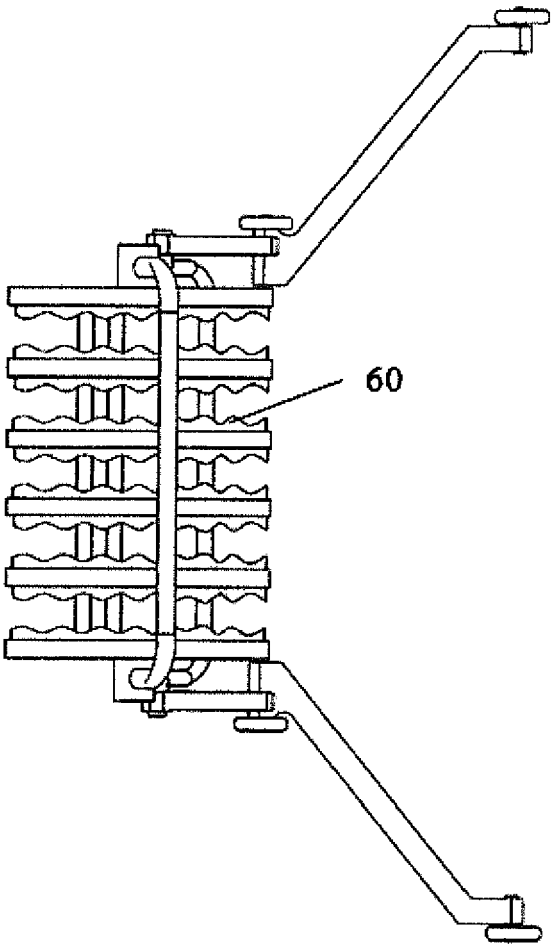

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 16 20 6202

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	DE 39 34 490 A1 (GAECHTER ROBERT E [CH]) 18 April 1991 (1991-04-18)	1,5	INV. A63B47/02
Y	* claims; figures *	2-4,6-10	ADD.

Y	EP 2 145 655 A1 (UNIV FAR EAST [TW]) 20 January 2010 (2010-01-20) * claims; figures *	2-4,6-10	A63B102/32 A63B102/02 A63B102/16 A63B102/18

Y	US 4 593 519 A (KIMBALL JEROME W [US]) 10 June 1986 (1986-06-10) * column 2, lines 52-55; figures *	3	

X	DE 197 15 886 A1 (PIROTH ANTON [DE]; LOERSCH MICHAEL [DE]) 4 December 1997 (1997-12-04)	1,2,5	
Y	* claims; figures *	3,4,6-10	

X	DE 39 21 915 A1 (PIROTH ANTON [DE]) 17 January 1991 (1991-01-17)	1,2,5	
Y	* claims; figures *	3,4,6-10	
	-----		TECHNICAL FIELDS SEARCHED (IPC)
X	DE 102 56 313 A1 (LANG RUDOLF [DE]) 15 July 2004 (2004-07-15)	1,4,5	A63B
Y	* claims; figures *	2,3,6-10	

X	JP H06 7760 U (UNKNOWN) 1 February 1994 (1994-02-01) * figures *	1,5	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 May 2017	Herry, Manuel

CATEGORY OF CITED DOCUMENTS

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08-05-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3934490 A1	18-04-1991	NONE	
EP 2145655 A1	20-01-2010	AT 523227 T	15-09-2011
		EP 2145655 A1	20-01-2010
		JP 5306085 B2	02-10-2013
		JP 2010022824 A	04-02-2010
		KR 20100008347 A	25-01-2010
		TW 201019992 A	01-06-2010
		US 2010016102 A1	21-01-2010
US 4593519 A	10-06-1986	NONE	
DE 19715886 A1	04-12-1997	NONE	
DE 3921915 A1	17-01-1991	NONE	
DE 10256313 A1	15-07-2004	NONE	
JP H067760 U	01-02-1994	NONE	

EPO FORM P0459

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

- TW 104144807 **[0001]**