



(12) **EUROPEAN PATENT APPLICATION**  
 published in accordance with Art. 153(4) EPC

(43) Date of publication:  
**31.10.2018 Bulletin 2018/44**

(51) Int Cl.:  
**A63H 18/02 (2006.01) A63H 33/08 (2006.01)**

(21) Application number: **16908064.5**

(86) International application number:  
**PCT/CN2016/112321**

(22) Date of filing: **27.12.2016**

(87) International publication number:  
**WO 2018/006560 (11.01.2018 Gazette 2018/02)**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**  
 Designated Extension States:  
**BA ME**  
 Designated Validation States:  
**MA MD**

(71) Applicant: **Luo, Yunzhang**  
**Chengdu, Sichuan 610399 (CN)**

(72) Inventor: **Luo, Yunzhang**  
**Chengdu, Sichuan 610399 (CN)**

(74) Representative: **Berkkam, Ayfer**  
**Berkkam Patent Consulting**  
**Büklüm Sokak, No. 5/16-3**  
**06680 Kavaklıdere Ankara (TR)**

(30) Priority: **06.07.2016 CN 201610529347**

(54) **CONNECTING PIECE FOR TOY TRACK AND TOY TRACK**

(57) The present invention pertains to a connecting piece for toy track and a toy track. The toy track includes a supporting piece and the connecting piece for toy track. The connecting piece for toy track includes a flexible tube, a first connector, and a second connector. The first connector and the second connector are respectively connected to two ends of the flexible tube and coaxially arranged with respect to the flexible tube. The first connector is provided with a plug-in groove, and the second connector is provided with a plug-in convex part matched with the plug-in groove. The flexible tube has a first an-

nular outer diameter, the first connector has a second annular outer diameter, and the second connector has a third annular outer diameter. The first annular outer diameter, the second annular outer diameter, and the third annular outer diameter are equal to each other, so that the surface of the flexible tube, the surface of the first connector, and the surface of the second connector are on the same annular surface after the plug-in convex part is plugged into the plug-in groove, so as to ensure that the ball or roller coaster can slide on the tracks smoothly.

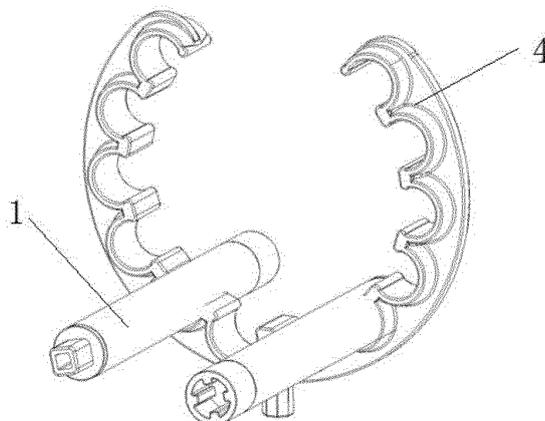


FIG. 11

## Description

### Technical Field

**[0001]** The present invention relates to the field of toys for children, in particular to a toy track and a connecting piece thereof.

### Background

**[0002]** Currently, the ability to think independently and the hands-on skill are getting seriously in the process of teaching children to learn for more and more parents and schools. Toy tracks (especially the tracks for various kinds of balls or roller coasters) are suitable toys for children to exercise their hands-on skills and promote brain development. Various types of toy tracks can be assembled by combining flexible tubelike items. The toy tracks may also be used in combination with plug-in building blocks, so they are flexible, and a toy can be played with in a variety of ways. As a result, children's psychology of creativity i.e. designing the route for balls or roller coasters according to their ideas, can be completely satisfying. Compared with simple plug-in building blocks available in the current market, the toy tracks can activate children's creativity and create a strong desire to play.

**[0003]** Most toy tracks available include flexible tube structures and supporting pieces. As shown in FIG. 1, the flexible tube structure includes flexible tube 1, first connector 2, and second connector 3. First connector 2 and second connector 3 are respectively arranged at two ends of flexible tube 1. First connector 2 is provided with plug-in groove 21 and plug-in body 22. Second connector 3 is provided with plug-in groove 31 and plug-in body 32. Plug-in groove 31 is matched with plug-in body 22, and plug-in body 32 is matched with plug-in groove 21. As a result of such design, not only can different flexible tubes be connected to each other in plug-in manner, but also connector 2 and connector 3 can be connected to each other in a plug-in manner on the basis that plug-in groove 31 is matched with plug-in body 22, and plug-in body 32 is matched with plug-in groove 21 on the same flexible tube. In addition, the flexible tube structures are mostly supported by supporting piece 4 as shown in FIG. 2 when assembled into a track. Main body 41 of supporting piece 4 has a convex type shape in the middle thereof and flat at two sides. Two ends of the main body 41 are respectively provided with semicircular concave holes 42, 43 to clamp flexible tube 1. Plug-in ridge 44 is arranged at the middle of the bottom of supporting piece 4. The flexible tubes 1 can be assembled into a track through supporting piece 4. Plug-in ridge 44 is used to plug the assembled track into the plug-in building blocks. As shown in FIG. 3, sphere 5 (i.e., ball) consists of two hemispherical Pingo type building blocks can roll on the track. However, since the outer diameters of first connector 2 and second connector 3 are different than the outer diameter of flexible tube 1, when first connector 2,

second connector 3, and flexible tube 1 are coaxially connected together in a plug type manner, the outer annular surfaces of first connector 2 and second connector 3 and the outer annular surface of flexible tube 1 are on different annular surfaces. As a result, the assembled toy track would affect the sliding of the ball, such that the ball cannot slide smoothly. In addition, since supporting piece 4 is only provided with two semicircular concave holes, and a part of the body located between semicircular concave hole 42 and semicircular concave hole 43 is flat, it can be difficult to meet the requirements of arbitrarily adjusting the position of the tracks and sliding the ball on a winding track.

### Summary

**[0004]** In view of the above-mentioned drawbacks of the prior art, the technical problem to be solved by the present invention is to provide a connecting piece for toy track so as to ensure the smooth sliding of balls or roller coasters on the track.

**[0005]** In order to achieve the above-mentioned objectives, the connecting piece for toy track provided by the present invention includes a flexible tube, a first connector, and a second connector, wherein the first connector and the second connector are respectively connected to two ends of the flexible tube and coaxially arranged with respect to the flexible tube. The first connector is provided with a plug-in groove, the second connector is provided with a plug-in convex part matched with the plug-in groove. The flexible tube has a first annular outer diameter, the first connector has a second annular outer diameter, and the second connector has a third annular outer diameter. The first annular outer diameter, the second annular outer diameter, and the third annular outer diameter are equal to each other, so that the surface of the flexible tube, the surface of the first connector, and the surface of the second connector are on the same annular surface after the plug-in convex part is plugged into the plug-in groove.

**[0006]** According to the above-mentioned connecting piece for toy track, a cross section of the plug-in convex part is circular or polygonal, a cross section of the first connector is annular, and an inner wall of the first connector protrudes inward to form a convex rib to fasten the plug-in convex part.

**[0007]** According to the above-mentioned connecting pieces for toy track, the flexible tube is a hollow flexible tube, the first connector is connected to the hollow flexible tube through a first convex column, and the second connector is connected to the hollow flexible tube through a second convex column.

**[0008]** According to the above-mentioned connecting piece for toy track, a bendable metal wire is arranged inside the flexible tube. One end of the metal wire is connected to the first convex column and the other end is connected to the second convex column.

**[0009]** Further, a toy track provided by the present in-

vention includes a supporting piece and the above-mentioned connecting piece for toy track. A plurality of clamping grooves with intervals are arranged on the supporting piece, and the size of each clamping groove is matched with the first annular outer diameter.

**[0010]** According to the above-mentioned toy track, the supporting piece includes a circular body/elliptical body, and the clamping grooves are arranged on an inner wall of the circular body/elliptical body.

**[0011]** According to the above-mentioned toy track, a plurality of clamping grooves are uniformly distributed on the inner wall of the circular body/elliptical body. According to the above-mentioned toy track, the supporting piece includes an arc-shaped body with an opening, the arc-shaped body is an elastomer, so the arc-shaped body can be opened or closed relative to the opening, and the clamping grooves are arranged on the inner wall of the arc-shaped body.

**[0012]** According to the above-mentioned toy track, a plurality of clamping grooves are uniformly distributed from one end of the arc-shaped body to the other end of the arc-shaped body along the arc-shaped body on the inner wall of the arc-shaped body.

**[0013]** According to the above-mentioned toy track, the outer wall of the arc-shaped body is provided with a plug-in ridge to be connected to a building block in a plug-in type manner.

**[0014]** The present invention has the following advantages. Since the first annular outer diameter, the second annular outer diameter, and the third annular outer diameter of the connecting piece for toy track are equal to each other, the surface of the flexible tube, the surface of the first connector, and the surface of the second connector are on the same annular surface after the plug-in convex part is plugged into the plug-in groove, so that the balls or roller coasters can slide smoothly over the tracks.

**[0015]** Further, a plurality of clamping grooves are arranged on the supporting piece of the toy track, so the requirement of adjusting the position of the track can be satisfied.

**[0016]** Moreover, the supporting piece includes a circular body/elliptical body or an arc-shaped body with an opening, which can meet the requirement of sliding balls or roller coasters on winding tracks compared with a flat body.

**[0017]** Hereinafter, the conception, specific structure, and technical effect of the present invention will be further explained with reference to the drawings for a full understanding of the objectives, characteristics, and effects of the present invention.

### Brief Description of the Drawings

**[0018]**

FIG. 1 is a schematic view of the flexible tube structure of the toy track in the prior art;

FIG. 2 is a schematic view of the supporting piece of the toy track in the prior art;

FIG. 3 is a schematic view showing the ball sliding on a part of the toy track in the prior art;

5 FIG. 4 is a structural view of the connecting piece for toy track of the present invention;

FIG. 5 is a sectional view of the connecting piece for toy track according to the first embodiment of the present invention;

10 FIG. 6 is a sectional view of the first connector of the connecting piece for toy track in FIG. 4;

FIG. 7 is a sectional view of the connecting piece for toy track according to the second embodiment of the present invention;

15 FIG. 8 is a schematic view showing a way of combination of the connecting piece for toy track of the present invention;

FIG. 9 is a schematic view showing another way of combination the connecting piece for toy track of the present invention;

20 FIG. 10 is a perspective view of the supporting piece of the present invention;

FIG. 11 is a schematic view showing a way to assemble the connecting piece for toy track and the supporting piece of the present invention;

25 FIG. 12 is a schematic view showing another way to assemble the connecting piece for toy track and the supporting piece of the present invention;

FIG. 13 is a schematic view showing another way to assemble the connecting piece for toy track and the supporting piece of the present invention;

30 FIG. 14 is a schematic view showing yet another way to assemble the connecting piece for toy track and the supporting piece of the present invention;

FIG. 15 is a view showing a way to combine the toy track with the plug-in building blocks in use according to the present invention.

35

**[0019]** In the drawings, reference numerals are referred to as follows. 1-flexible tube, 2-first connector, 21-plug-in groove, 22- plug-in body, 23-first convex column, 24-convex rib, 3-second connector, 31- plug-in groove, 32- plug-in body, 33-plug-in convex column, 34-second convex column, 4-supporting piece, 41- main body, 411-opening, 42, 43-semicircular concave hole, 44-plug-in ridge, 45-clamping groove, 5-sphere, 6-metal wire, D1-first annular outer diameter, D2-second annular outer diameter, D3-third annular outer diameter.

### 50 Detailed Description

**[0020]** Referring to FIGs. 4-6, the connecting piece for toy track of the present invention includes flexible tube 1, first connector 2, and second connector 3. First connector 2 and second connector 3 are respectively connected to two ends of flexible tube 1 and coaxially arranged with respect to flexible tube 1 (the coaxial arrangement here is not required to be absolutely coaxial,

55

and a deviation of coaxiality is acceptable). First connector 2 is provided with first plug-in groove 21, and second connector 3 is provided with plug-in convex part 33 matched with first plug-in groove 21. Flexible tube 1 has a first annular outer diameter D1, first connector 2 has a second annular outer diameter D2, and second connector 3 has a third annular outer diameter D3. First annular outer diameter D1, second annular outer diameter D2, and third annular outer diameter D3 are equal to each other so that the surface of flexible tube 1, the surface of first connector 2, and the surface of second connector 3 are on the same annular surface after plug-in convex part 33 is plugged into first plug-in groove 21. Based on the design, after first connector 2 and second connector 3 are seamlessly connected together, the assembled track is smooth and flat, so the balls can slide smoothly.

**[0021]** In order to ensure the reliability of the plug-in connection, the cross section of plug-in convex part 33 is square-shaped, the cross section of first connector 2 is annulus-shaped, and the inner wall of first connector 2 protrudes inward to form convex rib 24 to fasten plug-in convex part 33. The cross section of plug-in convex part 33 is not limited to a square shape but may be a circle or other polygonal shape also.

**[0022]** Further referring to FIG. 5, flexible tube 1 is a hollow flexible tube, first connector 2 is connected to hollow flexible tube 1 through first convex column 23, and second connector 3 is connected to hollow flexible tube 1 through second convex column 34.

**[0023]** Referring to FIG. 7, in order to facilitate shaping, bendable metal wire 6 may be provided inside flexible tube 1. One end of metal wire 6 is connected to first convex column 23 and the other end of metal wire 6 is connected to second convex column 34.

**[0024]** In the use of the connecting piece for toy track of the present invention, second connector 3 and first connector 2 on different flexible tubes 1 may be connected to each other to form an extension track (as shown in FIG. 8), or second connector 3 and first connector 2 on the same flexible tube 1 may be connected to each other in a plug-in manner to form an annular track (as shown in FIG. 9).

**[0025]** Referring to FIG. 10, supporting piece 4 of the present invention is provided with a plurality of clamping grooves 45 with intervals. The size of each clamping groove 45 is matched with first annular outer diameter D1. Clamping grooves 45 may be semicircular concave holes. Supporting piece 4 includes an arc-shaped body 41 with opening 411. Arc-shaped body 41 is an elastomer which can be opened or closed relative to opening 411, and a plurality of clamping grooves 45 are arranged on the inner wall of arc-shaped body 41. A plurality of clamping grooves 45 are uniformly distributed from one end of the arc-shaped body to the other end of the arc-shaped body along the arc-shaped body on the inner wall of arc-shaped body 41. The outer wall of arc-shaped body 41 is provided with plug-in ridge 44 which can be plugged into the building blocks. The position of plug-in ridge 44

may be relatively located in the middle of arc-shaped body 41 or other positions.

**[0026]** It should be noted that supporting piece 4 is not limited to the structure shown in FIG. 10, and its main body 41 may be closed. That is to say, the supporting piece includes a circular body/elliptical body, and clamping grooves 45 are provided on the inner wall of the circular body/elliptical body. Moreover, a plurality of clamping grooves 45 are uniformly distributed on the inner wall of the circular body/elliptical body. Referring to FIGs. 11-14; flexible tube 1 can be embedded in any desired clamping groove when being assembled into a track. Therefore, the present invention can satisfy the requirement of adjusting the position of the track based on a plurality of clamping grooves 45 arranged with intervals on supporting piece 4. Further, since supporting piece 4 includes arc-shaped body 41 with an opening, compared with the flat body, the arrangement of the arc-shaped body can meet the requirements of sliding balls or roller coaster on winding tracks.

**[0027]** Referring to FIG. 15, in the use of the present invention, the assembled track can be connected to the plug-in building blocks in a plug-in manner, so various kinds of balls can be rolled along the track. A plurality of connecting pieces for toy track and other matched various kinds of building block components can be arbitrarily connected to each other in a plug-in manner by the supporting piece, so there are several types of combinations possible, and the plug-in connection of the components is convenient and fast.

**[0028]** The preferred embodiment of the present invention has been described in detail above. It should be understood that many modifications and changes can be derived by those skilled in the art according to the conception of the present invention without creative effort. Therefore, any technical solution that can be obtained by those skilled in the art through logical analysis, reasoning, or limited experiments on the basis of the prior art according to the conception of the present invention shall fall within the scope defined by the appended claims.

## Claims

1. A connecting piece for toy track, comprising: a flexible tube, a first connector, and a second connector, wherein the first connector and the second connector are respectively connected to two ends of the flexible tube and coaxially arranged with respect to the flexible tube, the first connector is provided with a plug-in groove, the second connector is provided with a plug-in convex part matched with the plug-in groove, the flexible tube has a first annular outer diameter, the first connector has a second annular outer diameter, the second connector has a third annular outer diameter, the first annular outer diameter, the second annular outer diameter, and the third annular outer

diameter are equal to each other, so that a surface of the flexible tube, a surface of the first connector, and a surface of the second connector are on a same annular surface after the plug-in convex part is plugged into the plug-in groove.

5

2. The connecting piece for toy track according to claim 1, wherein that a cross section of the plug-in convex part is circular or polygonal, a cross section of the first connector is annular, and an inner wall of the first connector protrudes inward to form a convex rib to fasten the plug-in convex part. 10
3. The connecting piece for toy track according to claim 1, wherein that the flexible tube is a hollow flexible tube, the first connector is connected to the hollow flexible tube through a first convex column, and the second connector is connected to the hollow flexible tube through a second convex column. 15  
20
4. The connecting piece for toy track according to claim 3, **characterized in that** a bendable metal wire is arranged inside the flexible tube, an end of the metal wire is connected to the first convex column and another end of the metal wire is connected to the second convex column. 25
5. A toy track, comprising a supporting piece and the connecting piece for toy track according to any of claims 1-4, wherein a plurality of clamping grooves with intervals are arranged on the supporting piece, and the size of each of the clamping grooves is matched with the first annular outer diameter. 30
6. The toy track according to claim 5, wherein the supporting piece comprises a circular body/elliptical body, and the clamping grooves are arranged on an inner wall of the circular body/elliptical body. 35
7. The toy track according to claim 6, wherein the plurality of the clamping grooves are uniformly distributed on the inner wall of the circular body/elliptical body. 40
8. The toy track according to claim 5, wherein the supporting piece comprises an arc-shaped body with an opening, the arc-shaped body is an elastomer, so the arc-shaped body is opened or closed relative to the opening, and the clamping grooves are arranged on an inner wall of the arc-shaped body. 45  
50
9. The toy track according to claim 8, wherein the plurality of the clamping grooves are uniformly distributed from an end of the arc-shaped body to another end of the arc-shaped body along the arc-shaped body on the inner wall of the arc-shaped body. 55
10. The toy track according to claim 6 or 8, an outer wall

of an arc-shaped body is provided with a plug-in ridge to be connected to building blocks in a plug-in type manner.

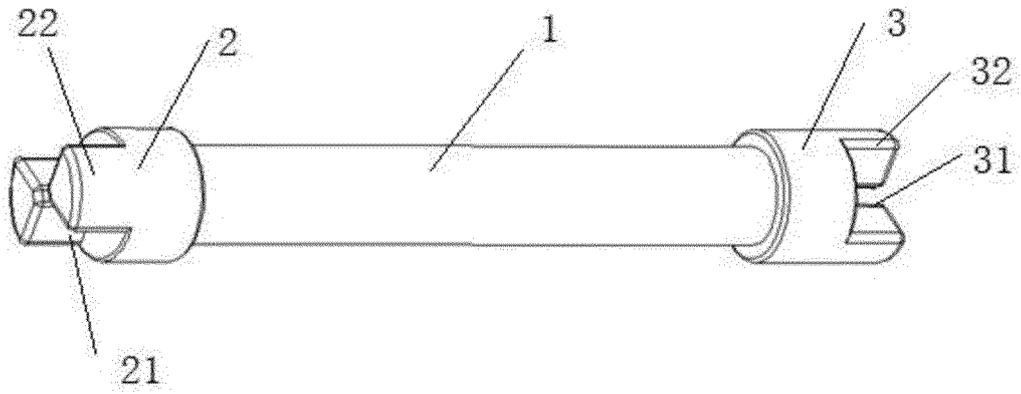


FIG. 1

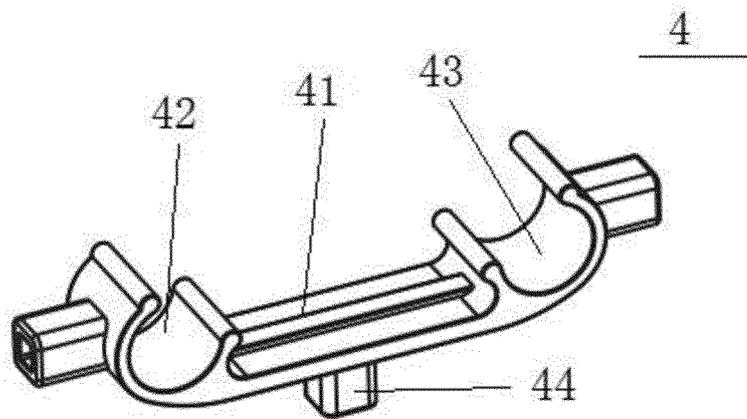


FIG. 2

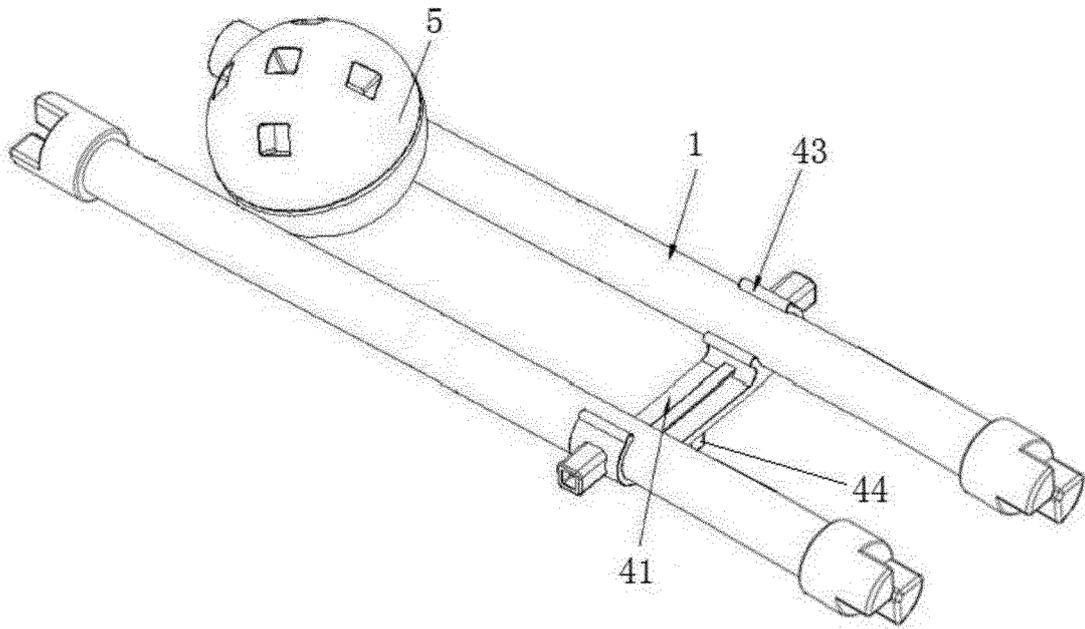


FIG. 3

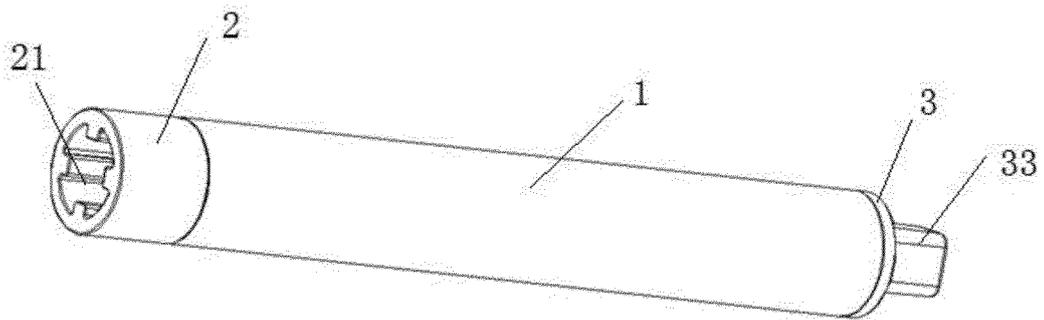


FIG. 4

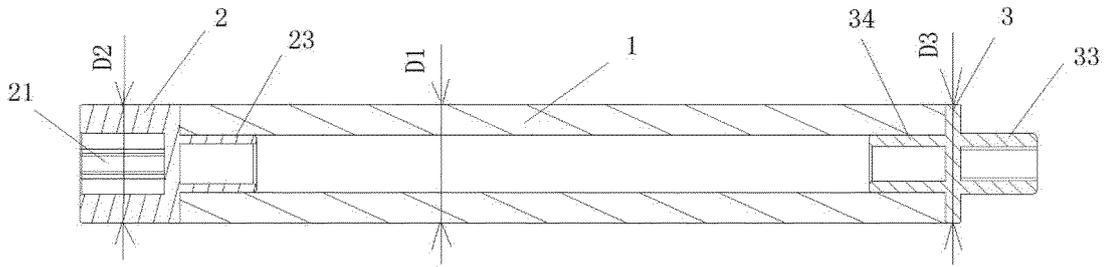


FIG. 5

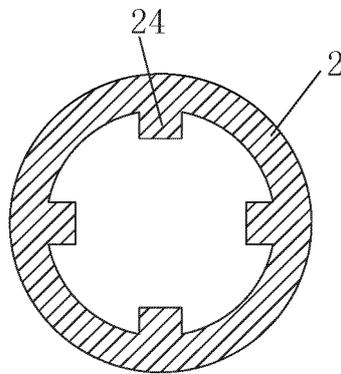


FIG. 6

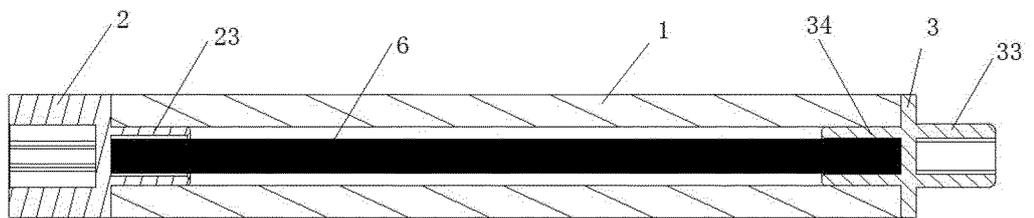


FIG. 7

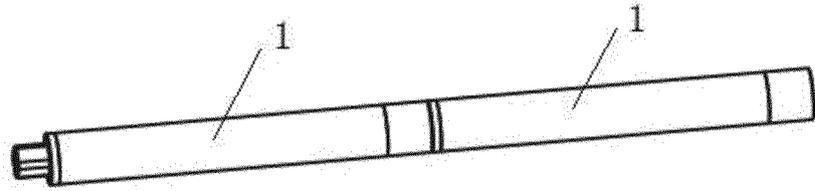


FIG. 8

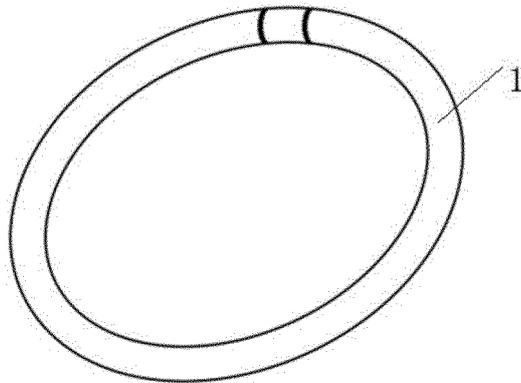


FIG. 9

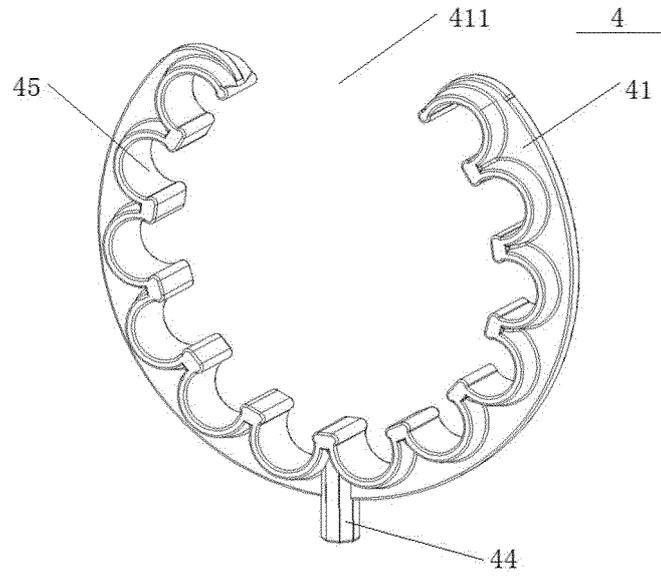


FIG. 10

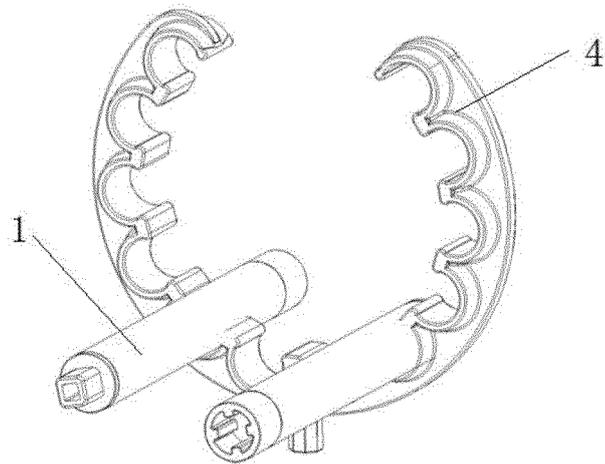


FIG. 11

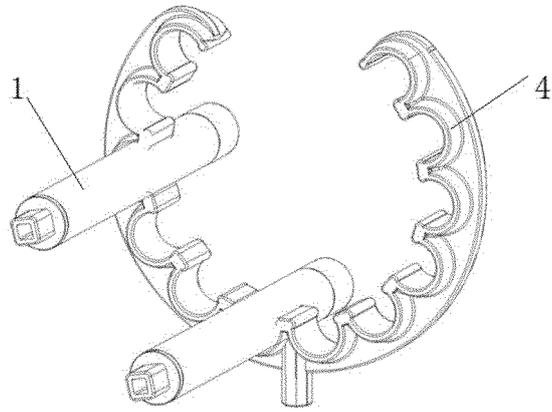


FIG. 12

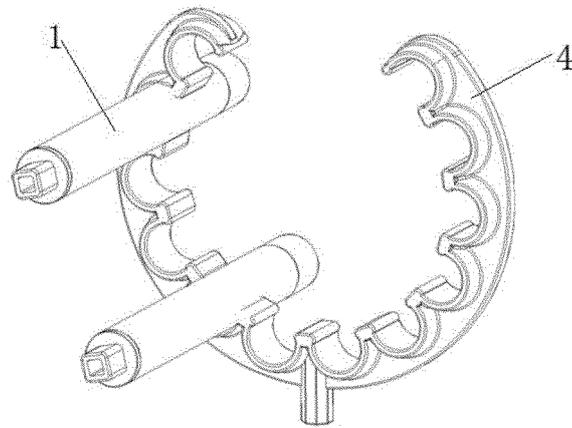


FIG. 13

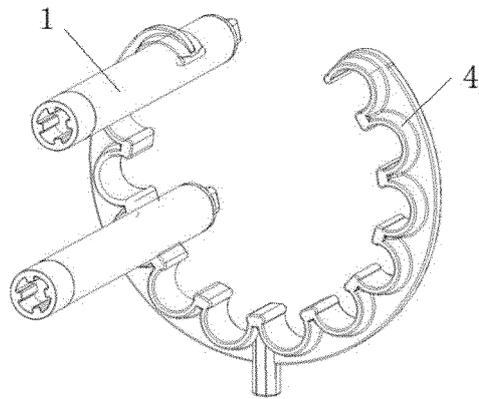


FIG. 14

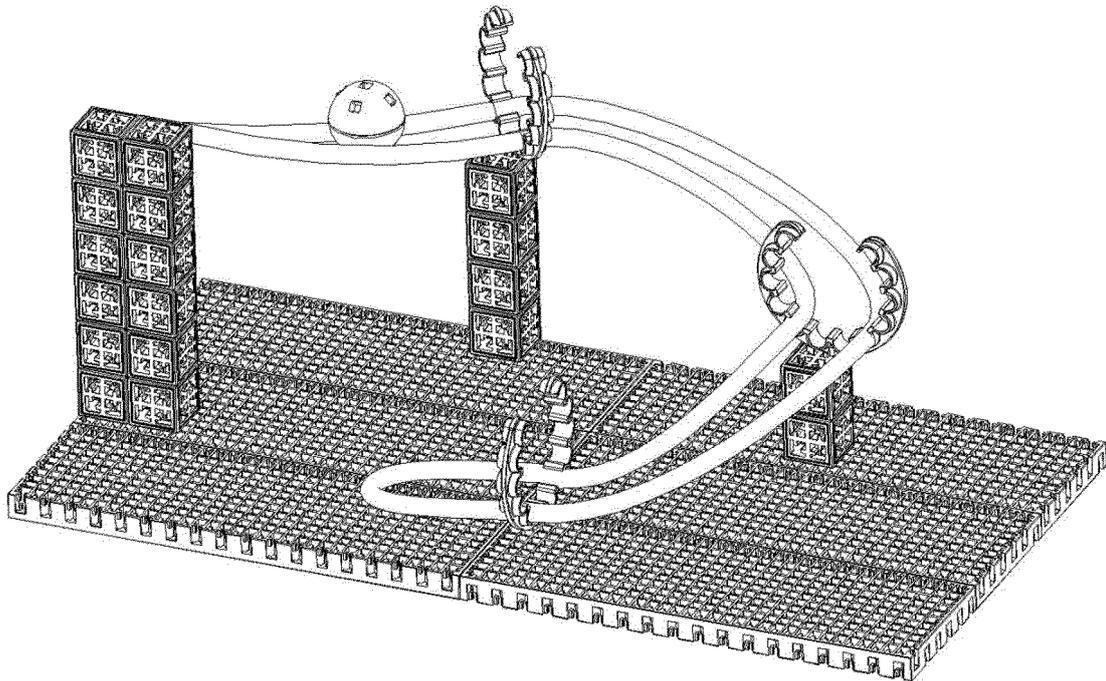


FIG. 15

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2016/112321

|    |   |  |                       |
|----|---|--|-----------------------|
| 5  | <b>A. CLASSIFICATION OF SUBJECT MATTER</b>  |  |                       |
|    | A63H 18/02 (2006.01) i; A63H 33/08 (2006.01) i  |  |                       |
|    | According to International Patent Classification (IPC) or to both national classification and IPC   |  |                       |
| 10 | <b>B. FIELDS SEARCHED</b>   |  |                       |
|    | Minimum documentation searched (classification system followed by classification symbols)   |  |                       |
|    | A63H  |  |                       |
| 15 | 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)  |  |                       |
| 20 | CNPAT; WPI; EPODOC: soft, tube, pipe, hose, flexib+, elastic, resilience, insert+, socket, slot, groove, chute, depress+, sunken, concave, dented, protrusion, projection, raised, buldge                     |  |                       |
|    | <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>   |  |                       |
|    | Category*   | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
| 25 | X   | CN 205182193 U (LUO, Yunzhang) 27 April 2016 (27.04.2016) description, paragraphs [0002]-[0030], and figures 1-11  | 1-10                  |
|    | PX  | CN 105903208 A (LUO, Yunzhang) 31 August 2016 (31.08.2016) description, paragraphs [0057]-[0064], and figures 1-15   | 1-10                  |
|    | A   | CN 205252537 U (EVER VICTORY TECHNOLOGY LIMITED) 25 May 2016 (25.05.2016) the whole document   | 1-10                  |
| 30 | A   | US 2013244530 A1 (RENFRO JOHN) 19 September 2013 (19.09.2013) the whole document   | 1-10                  |
|    | A   | US 3927489 A (BERNSTEIN LAWRENCE A) 23 December 1975 (23.12.1975) the whole document   | 1-10                  |
|    | A   | CA 2097240 A1 (MARCU MIHAIL I) 28 November 1994 (28.11.1994) the whole document  | 1-10                  |
|    | A   | JP 2004298531 A (OPTONICA KOBO K.K.) 28 October 2004 (28.10.2004) the whole document   | 1-10                  |
| 35 | <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.   |  |                       |
|    | * Special categories of cited documents:  |  |                       |
| 40 | “A” document defining the general state of the art which is not considered to be of particular relevance  | “T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  |                       |
|    | “E” earlier application or patent but published on or after the international filing date   | “X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone   |                       |
| 45 | “L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)                                       | “Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |                       |
|    | “O” document referring to an oral disclosure, use, exhibition or other means  | “&” document member of the same patent family  |                       |
|    | “P” document published prior to the international filing date but later than the priority date claimed  |  |                       |
| 50 | Date of the actual completion of the international search   | Date of mailing of the international search report   |                       |
|    | 07 March 2017   | 05 April 2017  |                       |
| 55 | Name and mailing address of the ISA<br>State Intellectual Property Office of the P. R. China<br>No. 6, Xitucheng Road, Jimenqiao<br>Haidian District, Beijing 100088, China<br>Facsimile No. (86-10) 62019451 | Authorized officer   | GU, Xiaoyan           |
|    |   | Telephone No. (86-10) 62084873   |                       |

Form PCT/ISA/210 (second sheet) (July 2009)

**INTERNATIONAL SEARCH REPORT**

International application No.  
PCT/CN2016/112321

5  
10  
15  
20  
25  
30  
35  
40  
45  
50  
55

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|-----------|--|-----------------------|
| A         | CN 204864985 U (JIN, Zhong) 16 December 2015 (16.12.2015) the whole document         | 1-10                  |
| A         | GB 2301540 A (WILLIAMS KEVIN DAVID) 01 December 1996 (01.12.1996) the whole document | 1-10                  |

**INTERNATIONAL SEARCH REPORT**  
 Information on patent family members

 International application No.  
 PCT/CN2016/112321

5

10

15

20

25

30

35

40

45

50

| Patent Documents referred<br>in the Report | Publication Date  | Patent Family    | Publication Date |
|--|-------------------|------------------|------------------|
| CN 205182193 U                             | 27 April 2016     | None             |                  |
| CN 105903208 A                             | 31 August 2016    | None             |                  |
| CN 205252537 U                             | 25 May 2016       | HK 1209265 A2    | 24 March 2016    |
|  |                   | US 2016220915 A1 | 04 August 2016   |
|  |                   | CN 105833535 A   | 10 August 2016   |
| US 2013244530 A1                           | 19 September 2013 | None             |                  |
| US 3927489 A                               | 23 December 1975  | None             |                  |
| CA 2097240 A1                              | 28 November 1994  | None             |                  |
| JP 2004298531 A                            | 28 October 2004   | None             |                  |
| CN 204864985 U                             | 16 December 2015  | None             |                  |
| GB 2301540 A                               | 11 December 1996  | GB 9510806 D0    | 19 July 1995     |

55