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Spiral Lifter for Liftable Toy Balls

Abstract

The present disclosure provides a spiral lifter for liftable toy balls, comprising a base, a lifting assembly, a recovery assembly, and an external rail. The external rail comprises a rail assembly, which is provided with a rail channel communicating with the recovery conduit. The rail assembly comprises at least one rail unit, wherein at least one rail unit is provided with a rail outlet, and at least one rail unit is provided with a rail inlet. The rail inlet is used to receive and guide toy balls into the rail channel, and the rail outlet is used to guide toy balls out of the rail channel.

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Background/Summary

[0001] This application is a continuation-in-part of the application titled “Spiral Lifter for Liftable Toy Balls” filed on Aug. 22, 2023, with an application number of U.S. Ser. No. 18/236418, the content of which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to the technical field of children's toys, and particularly to a spiral lifter for liftable toy balls.

BACKGROUND

[0003] Infant and children's toys are well-known and continuously improved and reconfigured to provide greater interest and entertainment. Among them, the spiral lifter is widely loved for its ability to enhance hands-on skills and expand thinking abilities.

[0004] Existing examples include U.S. Pat. Nos. 9,925,471 and 9,457,284, both of which propose toys utilizing object lifting mechanisms. However, the toys disclosed in these patents, as well as some spiral lifters on the market, only allow toy balls to perform linear reciprocating motion within pre-installed enclosed recovery conduits. This results in repetitive use of the toy balls, and the unidirectional cycle mechanism leads to high repetitiveness and unchangeable paths. After a plurality of operations, children may lose interest due to a lack of novelty, thereby affecting the long-term playability of the product.

SUMMARY

[0005] The present disclosure provides a spiral lifter for liftable toy balls to address the issues raised in the background.

[0006] To achieve the above inventive object, the present disclosure adopts the following technical solutions:

[0007] A spiral lifter for liftable toy balls comprises a base, a lifting assembly, a recovery assembly, and an external rail.

[0008] The base comprises a base housing, and the base housing is provided with a first opening and a second opening; and the lifting assembly comprises a lifting conduit and a lifting inlet and a lifting outlet provided on the lifting conduit, wherein the lifting assembly is arranged in the first opening; and the recovery assembly comprises a recovery conduit and a recovery inlet and a recovery outlet provided on the recovery conduit, wherein the recovery assembly is arranged in the second opening; and the external rail comprises a rail assembly, which is provided with a rail channel communicating with the recovery conduit, and the rail assembly comprises at least one rail unit, wherein at least one rail unit is provided with a rail outlet, and at least one rail unit is provided with a rail inlet; and the rail inlet is configured to receive and guide toy balls into the rail channel, and the rail outlet is configured to guide toy balls out of the rail channel.

[0009] A spiral lifter for liftable toy balls comprises a base, a lifting assembly, a recovery assembly, and an external rail. The base comprises a base housing, and the base housing is provided with a first opening and a second opening; and the lifting assembly comprises a lifting conduit and a lifting inlet and a lifting outlet arranged on the lifting conduit, wherein the lifting assembly is arranged in the first opening; and the recovery assembly comprises a recovery conduit and a recovery inlet and a recovery outlet arranged on the recovery conduit, wherein the recovery assembly is arranged in the second opening; and the external rail comprises a rail assembly, which is provided with a rail channel communicating with the recovery conduit, and the rail assembly comprises at least one rail unit, wherein at least one rail unit is provided with a rail outlet, and at least one rail unit is provided with a rail inlet; and the rail inlet is configured to receive and guide toy balls into the rail channel, and the rail outlet is configured to guide toy balls out of the rail channel; and the rail unit is composed of a plurality of rail columns stacked in combination.

[0010] Beneficial effects: when toy balls enter the rail channel through the rail inlet, they can move out of the recovery conduit and return to the recovery conduit after a certain distance for re-lifting,

enhancing the product's fun factor; meanwhile, the external rail can be freely assembled by users into rail channels of different strokes, providing DIY gameplay.

Description

BRIEF DESCRIPTION OF DRAWINGS

[0011] The drawings, which form part of this application, are provided to further illustrate the present disclosure. The illustrative embodiments and descriptions thereof are intended to explain the present disclosure and do not constitute undue limitations. In the drawings:

[0012] FIG. **1** is a schematic diagram of the lifting assembly and recovery assembly in the present disclosure;

[0013] FIG. **2** is an exploded structural diagram of the base;

[0014] FIG. **3** is a schematic diagram of the components in the drive assembly;

[0015] FIG. **4** is a schematic diagram of the position of the motor housing in the base;

[0016] FIG. **5** is a schematic diagram of the positions of the battery slot and battery cover;

[0017] FIG. **6** is a schematic diagram of the position of the gear torsion member;

[0018] FIG. **7** is a schematic diagram of the position of the switch;

[0019] FIG. **8** is a structural diagram of the switch;

[0020] FIG. **9** is a cross-sectional structural diagram of the base and the upper conduit section;

[0021] FIG. **10** is a schematic diagram of the position of the protrusion block;

[0022] FIG. **11** is a cross-sectional structural diagram of the lifting assembly;

[0023] FIG. **12** is a schematic diagram of the structure of the spiral rod;

[0024] FIG. **13** shows the positional schematic of the flange plate;

[0025] FIG. **14** shows the structural schematic of the lifting conduit unit;

[0026] FIG. **15** shows the cross-sectional schematic of the limit block and external connection part;

[0027] FIG. **16** shows the structural schematic of the recovery assembly;

[0028] FIG. **17** shows the structural schematic of the recovery conduit unit;

[0029] FIG. **18** shows the schematic of the chute;

[0030] FIG. **19** shows the structural schematic of the present disclosure;

[0031] FIG. **20** shows the structural schematic of the protrusion column in FIG. **19**;

[0032] FIG. **21** shows Schematic **1** of the external inlet in FIG. **19**;

[0033] FIG. **22** shows Schematic **2** of the external inlet in FIG. **19**.

[0034] Reference signs: Base (**1000**); Base housing (**1100**); Drive assembly (**1200**); Switch (**1300**); Motor housing (**1500**); First opening (**1110**); Second opening (**1120**); Battery slot (**1210**); Battery cover (**1211**); Motor (**1220**); Gear set (**1230**); Gear torsion member (**1240**); Slider (**1310**); Fixed base (**1320**); Lifting assembly (**2000**); Spiral mechanism (**2100**); Lifting conduit (**2200**); Lifting inlet (**2300**); Lifting outlet (**2400**); Limit block (**2600**); External connection part (**2700**); Spiral rod (**2110**); Central axis (**2111**); Spiral guide rail (**2112**); Connection slot (**2113**); Triangular pin (**2120**); Flange plate (**2130**); Lifting conduit unit (**2210**);

[0035] Main body section (**2211**); Accommodation section (**2212**); Connector (**2213**); Protrusion block (**2214**); Recovery assembly (**3000**); Recovery conduit (**3100**); Recovery inlet (**3110**); Recovery outlet (**3120**); Connector (**3111**); Recovery conduit unit (**3200**); Chute (**4000**); External rail (**5000**); Rail assembly (**5100**); Rail channel (**5200**); Rail unit (**5110**); Rail inlet (**5120**); Rail outlet (**5130**); Rail column (**5111**); External inlet (**5112**); Cover body (**5113**); Base seat (**5114**); Groove (**5115**); Rotating wind wheel (**5116**); Protrusion column (**5117**).

DESCRIPTION OF EMBODIMENTS

[0036] The technical solution in the embodiment of the present disclosure will be clearly and completely described below with reference to the drawings. Obviously, the described embodiment is part of, rather than all of the embodiments of the present disclosure. The following description of

at least one exemplary embodiment is illustrative in nature and is in no way intended to limit the present disclosure, its application or uses. Based on the embodiments in the present disclosure, all other embodiments obtained by those skilled in the art without creative work belong to the scope of protection of the present disclosure.

[0037] It should be noted that the terminology used here is only for describing specific embodiments, and is not intended to limit exemplary embodiments according to the present application. As used herein, the singular form is also intended to include the plural form unless the context clearly indicates otherwise. Furthermore, it should be appreciated that when the terms "comprising" and/or "including" are used in this specification, they specify the presence of features, steps, operations, devices, components and/or combinations thereof.

[0038] Unless otherwise specified, the relative arrangement of components and steps, numerical expressions and numerical values set forth in these embodiments do not limit the scope of the present disclosure. At the same time, it should be appreciated that for the convenience of description, the dimensions of various parts shown in the drawings are not drawn according to the actual scale relationship. Techniques, methods and equipment known to those skilled in the art may not be discussed in detail, but in appropriate cases, they should be regarded as part of the authorization specification. In all the examples shown and discussed herein, any specific values should be interpreted as illustrative, and not as limiting. Therefore, other examples of exemplary embodiments may have different values. It should be noted that similar numbers and letters indicate similar items in the following drawings, therefore once an item is defined in one drawing, it does not need to be further discussed in subsequent drawings.

[0039] The present disclosure provides a spiral lifter for liftable toy balls. As shown in FIGS. **1** and **19**, the spiral lifter for liftable toy balls includes a base **1000**, a lifting assembly **2000**, a recovery assembly **3000**, and an external rail **5000**.

[0040] As shown in FIGS. **2** and **3**, the base **1000** includes a base housing **1100** and a drive assembly **1200**. The base housing **1100** is provided with a first opening **1110** and a second opening **1120**. In this embodiment, the drive assembly **1200** includes a battery slot **1210**, a motor **1220**, and a gear set **1230**. In this embodiment (as shown in FIG. **4**), a motor housing **1500** is arranged inside the base housing **1100**. The motor housing **1500** encloses the motor **1220** and the gear set **1230**. The motor housing **1500** is fixed to the base housing **1100** by plugging, and the upper and lower parts of the motor housing **1500** are fixedly connected by screws. Further (as shown in FIG. **5**), the battery slot **1210** is also provided with a battery cover **1211**. The battery cover **1211** is detachably connected to the battery slot **1210** by screws. The battery slot can accommodate three 1.5V batteries, which provide power for the entire spiral lifter. (As shown in FIG. **6**), torque is transmitted between the motor **1220** and the gear set **1230** through a gear torsion member **1240**. The gear end of the gear torsion member **1240** is connected to the gear set via meshing of gear teeth, while the other end of the gear torsion member **1240** is plugged into the motor.

[0041] As shown in FIG. **7**, in this embodiment, the outer surface of the base housing **1100** is also provided with a switch **1300**. (As shown in FIG. **8**), the switch **1300** includes a slider **1310** and a fixed base **1320**. The fixed base **1320** is fixedly connected to the bottom of the base housing **1100** by plugging. The base housing **1100** is also provided with screw fixing posts **1400**, which secure the upper and lower parts of the base housing **1100** to prevent separation.

[0042] As shown in FIG. **9**, in this embodiment, both the first opening **1110** and the second opening **1120** are configured as vertically extending conduits. The first opening **1110** encloses the lower end of the lifting conduit, while the second opening **1120** is inserted into the lower end of the recovery conduit **3100**, forming a sealed conduit structure. Additionally (as shown in FIG. **10**), the inner wall of the first opening **1110** is also equipped with a protrusion block **2214**, enhancing safety by preventing consumers from inserting fingers during incomplete assembly and avoiding pinching injuries.

[0043] In other embodiments (not shown), the drive assembly **1200** may also take the form of built-

in batteries, external power supply, or purely mechanical rack-driven mechanisms.
[0044] As shown in FIG. **11**, the lifting assembly **2000** includes a spiral mechanism **2100**, a lifting conduit **2200**, and a lifting inlet **2300** and lifting outlet **2400** arranged on the lifting conduit **2200**. The lifting assembly **2000** is installed in the first opening **1110**. The spiral mechanism **2100** consists of a plurality of sections of spiral rods **2110** (as shown in FIG. **12**). Each spiral rod **2110** includes a central axis **2111**, a spiral guide rail **2112** arranged around the central axis **2111**, and a connection slot **2113** at the end of the spiral rod **2110**. The spiral mechanism **2100** also includes triangular pins **2120**. Every two adjacent spiral rods **2110** are connected via a triangular pin **2120** to form a transmission linkage. The two ends of each triangular pin **2120** extend into the connection slots **2113** of the adjacent spiral rods **2110**, allowing the ends of the two adjacent spiral rods **2110** to contact each other. This design achieves a solid structure for the spiral mechanism **2100**, improving the equipment's service life. Additionally (as shown in FIG. **13**), the bottom of the spiral mechanism **2100** is connected to the drive assembly **1200** via a flange plate **2130**.
[0045] Furthermore, in this embodiment, the lifting inlet **2300** is arranged at the bottom of the lifting conduit **2200**, while the lifting outlet **2400** is arranged at the top of the lifting conduit **2200**. The lifting conduit **2200** encloses the entire spiral mechanism **2100**. As shown in FIG.
[0046] **14**, the lifting conduit **2200** is formed by connecting a plurality of lifting conduit units **2210**.
[0047] Each lifting conduit unit **2210** consists of a main body section **2211** and an accommodation section **2212**. One end of each lifting conduit unit **2210** is equipped with a connector **2213**, and the inner wall of the connector **2213** has a protrusion block **2214** that can secure another lifting conduit unit **2210**, enabling the lifting conduit units **2210** to engage with each other. The pipeline connection method is simple, allowing consumers to assemble or reassemble it themselves during use.
[0048] As shown in FIG. **15**, in this embodiment, a limit block **2600** is arranged at the top of the spiral mechanism **2100**. The limit block **2600** is designed with an upper cylindrical shape and a lower inverted conical shape. The maximum height to which toy balls rise within the lifting conduit **2200** is the position of the limit block **2600**. Furthermore, an external connection part **2700** is installed above the limit block **2600**, with its lower portion extending into the limit block **2600**, enabling the external connection part **2700** to rotate synchronously with the spiral mechanism **2100**. The external connection part **2700** is a decorative object with light-emitting or sound-producing functions, such as a rotating figurine. In other embodiments (not shown), it could also be a decorative panel with illustrations or a music-playing device that plays different tunes under varying environmental conditions to achieve diverse experiential effects.
[0049] As shown in FIG. **16**, the recovery assembly **3000** includes a recovery conduit **3100**, along with a recovery inlet **3110** and a recovery outlet **3120** arranged on the recovery conduit **3100**. The lower part of the recovery conduit **3100** is sleeved onto the second opening **1120**.
[0050] The recovery conduit **3100** consists of a plurality of recovery conduit units **3200**, with both the bottommost and topmost recovery conduit units **3200** being provided with openings through which toy balls can be placed into the recovery conduit **3100** (as shown in FIG. **17**). Each recovery conduit unit **3200** is equipped with a connector **3111** at one end. The inner wall of the connector **3111** is a smooth arc surface, while the outer wall is enveloped by a plurality of rectangular surfaces. The diameter of the connector **3111** is smaller than that of the other end of the recovery conduit unit **3200**, allowing a plurality of recovery conduit units **3200** to be engaged with each other.
[0051] In this embodiment, the recovery conduit **3100** is vertically positioned. The longitudinal height of the recovery inlet **3110** does not exceed that of the lifting outlet **2400**, and the longitudinal height of the recovery outlet **3120** is not lower than that of the lifting inlet **2300**. In other possible embodiments (not shown), the recovery conduit **3100** may also be placed at a certain angle to the ground or at a vertical angle relative to the lifting conduit **2200**.
[0052] As shown in FIG. **18**, in this embodiment, the lifting assembly **2000** and the recovery

assembly **3000** are connected by two chutes **4000**. The two chutes **4000** are respectively positioned between the recovery outlet **3120** and the lifting inlet **2300**, as well as between the recovery inlet **3110** and the lifting outlet **2400**. The chutes **4000** are designed as semi-enclosed chutes with open upper ends. The chute **4000** between the recovery outlet **3120** and the lifting inlet **2300** is installed inside the base housing **1100**, allowing toy balls to pass through the chutes **4000** between the lifting assembly **2000** and the recovery assembly **3000**.

[0053] In this embodiment, the recovery conduit **3100** and the lifting conduit **2200** are arranged horizontally in the vertical direction. In other embodiments (not shown), the arrangement of the recovery conduit **3100** and the lifting conduit **2200** can vary. For example, the longitudinal height of the recovery inlet **3110** may be set lower than that of the lifting outlet **2400**, while the longitudinal height of the recovery outlet **3120** may be set higher than that of the lifting inlet **2300**. However, when the recovery conduit **3100** and the lifting conduit **2200** adopt a double-helix arrangement, the structure appears more aesthetically pleasing.

[0054] As shown in FIGS. **9**, **19**, and **20**, in other embodiments, the external rail **5000** includes a rail assembly **5100**, which features a rail channel **5200** communicating with the recovery conduit **3100**. The rail assembly **5100** includes at least one rail unit **5110**, where at least one rail unit **5110** is equipped with a rail outlet **5130**, and at least one rail unit **5110** is equipped with a rail inlet **5120**. The rail inlet **5120** is located inside the recovery conduit **3100** and below the recovery inlet **3110**. The rail inlet **5120** is designed to receive and guide toy balls into the rail channel **5200**, while the rail outlet **5130** guides toy balls out of the rail channel **5200**. When a toy ball enters the rail channel via the rail inlet **5120**, it can move out of the recovery conduit **3100** and, after a certain distance, return to the recovery conduit **3100** for re-lifting, enhancing the product's fun factor. Additionally, users can freely assemble the external rail into rail channels of varying strokes, offering DIY play possibilities.

[0055] As shown in FIGS. **19** and **20**, in other embodiments, the rail unit **5110** is formed by stacking several rail columns **5111**, allowing users to determine the overall height of the rail unit, thereby increasing the product's flexibility.

[0056] Meanwhile, traditional toy tracks require additional installation of separate conduits and support frames, resulting in complex structures and cumbersome assembly. In this device, however, the rail unit **5110** forms an enclosed channel directly through the stacking of rail columns **5111**, eliminating the need for external frameworks. The rail columns **5111** serve both as structural supports and as boundaries for the ball's movement path.

[0057] As shown in FIGS. **19** to **22**, in other embodiments, at least one rail unit **5110** is equipped with an external inlet **5112**, located on the topmost rail column **5111**. The external inlet **5112** communicates with the rail channel **5200**, enabling users to provide an additional entry point for adding toy balls to the device.

[0058] As shown in FIGS. **19** and **20**, in other embodiments, at least one rail unit **5110** is fitted with a cover body **5113** that connects to the top. The cover body **5113** is provided with an opening communicating with the external inlet **5112**, facilitating the placement of toy balls by users.

[0059] As shown in FIGS. **19** and **20**, in other embodiments, at least one set of rail units **5110** is provided with a base seat **5114** at its bottom. The rail column **5111** is mounted on the base seat **5114**, and the base seat **5114** has a groove **5115** communicating with the rail outlet **5130**. The groove **5115** is used to accommodate toy balls exiting from the connected rail outlet **5130**.

[0060] As shown in FIGS. **19** and **20**, in other embodiments, at least one rail channel **5200**

[0061] is equipped with a rotating wind wheel **5116**, and at least one rail channel **5200** is provided with a plurality of protrusion columns **5117**. When a toy ball rolls over and collides with the protrusion columns **5117** or the rotating wind wheel, dynamic feedback is provided, thereby enhancing the game's sense of surprise and engagement.

[0062] As shown in FIGS. **19** and **20**, in other embodiments, when a plurality of rail units

[0063] **5110** are arranged, their heights decrease sequentially. This allows the toy balls to roll along

the rail channel **5200** relying on its own gravity.
[0064] In the description of the present disclosure, it should be appreciated that directional terms such as “front, rear, up, down, left, right”, “horizontal, vertical, perpendicular, horizontal” and “top, bottom” etc. indicate the orientation or positional relationship based on the orientation or positional relationship shown in the drawings, and are only for the convenience of describing the present disclosure and simplifying the description. In the absence of a contrary explanation, these directional terms do not indicate or imply that the device or element referred to must have a specific orientation or be constructed and operated in a specific orientation, and therefore should not be understood as limiting the scope of protection of the present disclosure; the directional terms “inside, outside” refer to the inside and outside relative to the contour of each component itself.
[0065] For the convenience of description, spatial relative terms such as “on . . . ”, “above . . . ”, “on the upper surface of . . . ”, “upper” etc. may be used here to describe the spatial positional relationship of a device or feature with other devices or features as shown in the drawings. It should be appreciated that spatial relative terms are intended to encompass different orientations of the device in use or operation other than the orientation described in the drawings. For example, if the device in the drawing is inverted, the device described as “above other devices or structures” or “on other devices or structures” will subsequently be positioned as “below other devices or structures” or “under other devices or structures”. Thus, the exemplary term “above” can include both “above” and “below” orientations. The device can also be positioned in other different ways (rotated 90 degrees or in other orientations), and the spatial relative descriptions used here should be interpreted accordingly.
[0066] In addition, it should be noted that the use of terms such as “first”, “second” etc. to define components is for the convenience of distinguishing the corresponding components.
[0067] Unless otherwise stated, the above terms have no special meaning, and therefore should not be understood as limiting the scope of protection of the present disclosure.
[0068] The above description is only a preferred embodiment of the present disclosure and is not intended to limit the present disclosure. For those skilled in the art, the present disclosure can have various modifications and changes. Any modifications, equivalent replacements, improvements etc. made within the spirit and principles of the present disclosure should be included within the scope of protection of the present disclosure.

Claims

1. A spiral lifter for liftable toy balls, comprising a base, a lifting assembly, a recovery assembly, and an external rail, wherein the base comprises a base housing, and the base housing is provided with a first opening and a second opening; and the lifting assembly comprises a lifting conduit and a lifting inlet and a lifting outlet provided on the lifting conduit, wherein the lifting assembly is arranged in the first opening; and the recovery assembly comprises a recovery conduit and a recovery inlet and a recovery outlet provided on the recovery conduit, wherein the recovery assembly is arranged in the second opening; and the external rail comprises a rail assembly, which is provided with a rail channel communicating with the recovery conduit, and the rail assembly comprises at least one rail unit, wherein at least one rail unit is provided with a rail outlet, and at least one rail unit is provided with a rail inlet; and the rail inlet is configured to receive and guide toy balls into the rail channel, and the rail outlet is configured to guide toy balls out of the rail channel.
2. The spiral lifter for liftable toy balls according to claim 1, wherein the rail unit is composed of a plurality of rail columns stacked in combination.
3. The spiral lifter for liftable toy balls according to claim 2, wherein at least one of the rail units is provided with an external inlet, the external inlet is located on a topmost rail column, and the external communicates with the rail channel.

4. The spiral lifter for liftable toy balls according to claim 1, wherein at least one of the rail units is provided with a cover body connected to a top portion, and the cover body is provided with an opening communicating with the external inlet.
5. The spiral lifter for liftable toy balls according to claim 2, wherein a bottom of at least one set of the rail units is provided with a base seat, the rail columns are arranged on the base seat, and the base seat is provided with a groove communicating with the rail outlet, wherein the groove is configured to accommodate toy balls exiting from the connected rail outlet.
6. The spiral lifter for liftable toy balls according to claim 1, wherein the rail channels on at least two of the rail units communicate with an interior of the recovery conduit.
7. The spiral lifter for liftable toy balls according to claim 1, wherein at least one of the rail channels is provided with a rotating wind wheel.
8. The spiral lifter for liftable toy balls according to claim 1, wherein at least one of the rail channels is provided with a plurality of protrusion columns.
9. The spiral lifter for liftable toy balls according to claim 2, wherein when a plurality of rail units are arranged, heights of the rail units decrease sequentially.
10. The spiral lifter for liftable toy balls according to claim 1, wherein the rail channel is located between the recovery inlet and recovery outlet.
11. The spiral lifter for liftable toy balls according to claim 1, wherein the base further comprises a drive assembly; and the drive assembly comprises a battery slot, a motor, and a gear set.
12. The spiral lifter for liftable toy balls according to claim 11, wherein the battery slot is further provided with a battery cover, which is detachably connected to the battery slot via screws.
13. The spiral lifter for liftable toy balls according to claim 11, wherein the lifting assembly further comprises a spiral mechanism coupled to the drive assembly, with the lifting conduit enclosing the entire spiral mechanism; and when the spiral mechanism is driven by the drive assembly, the spiral mechanism is capable of lifting toy balls entering through the lifting inlet and transporting the balls to the lifting outlet.
14. The spiral lifter for liftable toy balls according to claim 13, wherein the spiral mechanism consists of a plurality of spiral rods, each comprising a central axis, a spiral guide rail arranged around the central axis, and a connection slot at an end of the spiral rod.
15. The spiral lifter for liftable toy balls according to claim 14, wherein the spiral mechanism further comprises triangular pins, with every two adjacent spiral rods forming a transmission connection via the triangular pins, wherein both ends of each triangular pin extend into the connection slots of adjacent spiral rods, allowing the ends of adjacent spiral rods to contact each other, thereby achieving a solid structural design.
16. The spiral lifter for liftable toy balls according to claim 1, wherein a longitudinal height of the recovery inlet is not higher than a longitudinal height of the lifting outlet, and a longitudinal height of the recovery outlet is not lower than a longitudinal height of the lifting inlet.
17. The spiral lifter for liftable toy balls according to claim 1, wherein the recovery inlet is arranged at a top of the recovery conduit, and the recovery outlet is arranged at a bottom of the recovery conduit.
18. A spiral lifter for liftable toy balls, comprising a base, a lifting assembly, a recovery assembly, and an external rail, wherein the base comprises a base housing, and the base housing is provided with a first opening and a second opening; and the lifting assembly comprises a lifting conduit and a lifting inlet and a lifting outlet arranged on the lifting conduit, wherein the lifting assembly is arranged in the first opening; and the recovery assembly comprises a recovery conduit and a recovery inlet and a recovery outlet arranged on the recovery conduit, wherein the recovery assembly is arranged in the second opening; and the external rail comprises a rail assembly, which is provided with a rail channel communicating with the recovery conduit, and the rail assembly comprises at least one rail unit, wherein at least one rail unit is provided with a rail outlet, and at least one rail unit is provided with a rail inlet; and the rail inlet is configured to receive and guide

toy balls into the rail channel, and the rail outlet is configured to guide toy balls out of the rail channel; and the rail unit is composed of a plurality of rail columns stacked in combination.

19. The spiral lifter for liftable toy balls according to claim 18, wherein at least one of the rail units is provided with an external inlet, the external inlet is located on the topmost rail column, and the external communicates with the rail channel.

20. The spiral lifter for liftable toy balls according to claim 18, wherein at least one of the rail channels is provided with a rotating wind wheel, and at least one of the rail channels is provided with a plurality of protrusion columns.