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(54) MULTI-DIRECTIONAL LAUNCHER

MULTIDIREKTIONALER WERFER

LANCEUR MULTIDIRECTIONNEL

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(56) References cited:
CN-U- 202 410 138
CN-U- 208 809 446
CN-Y- 2 569 859
CN-Y- 201 279 388
JP-A- 2014 090 952
US-A- 3 701 216
US-A- 6 089 946
US-A1- 2008 176 483
US-A1- 2012 088 433
US-A1- 2016 175 721

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Description

FIELD

[0001] The present disclosure relates to the technical field of tops, and more particularly to a multi-directional launcher.

BACKGROUND

[0002] At present, launchers of popular tops accelerate the tops mainly by manually pulling racks or using ropes, and then launch the tops. However, since high-speed launchers require a relatively large pulling force to start, it is difficult for children to pull; moreover, one launcher cannot be compatible with multiple launching speeds, and cannot launch the tops in a reverse direction.

[0003] In the related art, launchers of tops include launchers for tops with racks, launchers with one-time energy storage, and launchers having racks. Tops are accelerated directly by the racks, but it is laborious to pull the high-speed launchers; or tops are accelerated by the force of torsion springs alone or using launchers with repeated energy storage, but the tops are not fast and competitive enough; or tops are accelerated by continuously pulling the ropes, but the tops cannot freely fall vertically, and landing points are uncontrollable. After tops are installed, no external force can be used to turn the tops, making the toys less interesting.

[0004] In most toys, an end point of the top is not in a cone shape, and it can not spin steadily. Moreover, the design of the device in the related art can only handle one top at a time, which is not attractive at all. In order to overcome the above problem and to provide a launcher which can control more than one top at one time, US 6 089 946 A discloses a spinning top including a driving device and a series of tops. The driving device includes a motor driving a clutch, and each top has a seat for temporary engagement with the clutch which drives the top to spin. The driving device comprises a control switch which links the power to the motor and the linking mechanisms to the clutch. By adjusting the control switch, the motor is started, which drives the clutch to spin. Pressing the control switch further disengages the top from the clutch so that the top will spin itself. Further, the top portion of the top is shaped with a concave portion for receiving another top stacked thereon, by engaging the concave portion with the seat of another top. However, as mentioned above the spinning top the tops is not fast and competitive enough, making the toys less interesting.

SUMMARY

[0005] The present disclosure aims to solve at least one of the problems existing in the related art.

[0006] To this end, the present disclosure provides a multi-directional launcher that is more interesting to play.

[0007] The invention provides a multi-directional launcher for a toy top according to claim 1.

[0008] With the multi-directional launcher according to the embodiments of the present disclosure, since the launcher body is movably arranged on the hand-held portion, and the rotating body of the launcher body can freely rotate on the launcher body, the launcher head assembly can be flipped up and down relative to the hand-held portion, realizing two flipping modes. The direction-changing driver drives the launcher body to switch between the first launch position and the second launch position, realizing operations of connecting and launching the object to be launched. The launcher head assembly cooperates with the direction-changing driver to realize the launch of the object to be launched in the upward and downward directions, which brings a surprising experience to the players and enhances the fun of playing with this toy.

[0009] According to an embodiment of the present disclosure, the launcher body is rotatably arranged on the hand-held portion; in one of the first launch position and the second launch position, the retaining member is located at a lower part of the multi-directional launcher; in the other of the first launch position and the second launch position, the retaining member is located at an upper part of the multi-directional launcher.

[0010] According to another embodiment of the present disclosure, the launcher body is rotatably arranged on the hand-held portion that is in a shape of a handle; two horizontal sides of the hand-held portion are a thumb gripping side and a four-finger gripping side; the direction-changing driver includes a flip button provided on the thumb gripping side; when the flip button is triggered, the launcher head assembly turns from the first launch position to the second launch position along a direction towards the four-finger gripping side.

[0011] According to still another embodiment of the present disclosure, the launcher body is rotatably arranged on the hand-held portion; the direction-changing driver includes a flip elastic member and a flip button; the flip elastic member is connected between the hand-held portion and the launcher body, and configured to accumulate energy when the launcher body turns toward the first launch position and release energy when the launcher body turns toward the second launch position; the flip button is movably arranged on the hand-held portion, and the flip button is movable between a first position where the launcher body is locked and a second position where the launcher body is released.

[0012] According to an optional example of the present disclosure, the launcher body is provided with a protruding shaft that extends into the hand-held portion, and the flip elastic member is fitted over or wound on the protruding shaft.

[0013] According to another optional example of the present disclosure, the direction-changing driver includes: a mating flange arranged on an outer periphery of the protruding shaft; a retarding disc rotatably fitted over the protruding shaft; and a retarding elastic member

configured to drive the mating flange to abut against the retarding disc.

[0014] According to still another optional example of the present disclosure, respective surfaces of the mating flange and the retarding disc facing each other are toothed surfaces.

[0015] According to optional embodiments of the present disclosure, the multi-directional launcher further includes a launching driver arranged on the launcher body. The launching driver is configured to cooperate with the rotating body and drive the rotating body to rotate when triggered and configured to be disengaged from the rotating body when released.

[0016] Optionally, the launching driver includes: a unidirectional transmission that includes a drive end gear, a passive end gear, and a cycloidal gear. The drive end gear is spaced apart from the passive end gear and arranged on the launcher body; the passive end gear is connected to the rotating body; the drive end gear always meshes with the cycloidal gear; a rotating shaft of the cycloidal gear is swingable along a set track; the cycloidal gear meshes with and drives the passive end gear when in one end of the set track; and the cycloidal gear disengages from the passive end gear when in the other end of the set track.

[0017] Optionally, the launching driver includes: a rope winding portion connected to the drive end gear; a rope body wound on the rope winding portion and having an inner end connected to the rope winding portion; and an energy accumulator connected to the drive end gear and the launcher body, and configured to accumulate energy when the cycloidal gear meshes with and drives the passive end gear and release energy when the passive end gear is disengaged from the cycloidal gear.

[0018] Additional aspects and advantages of embodiments of the present disclosure will be given in part in the following descriptions, become apparent in part from the following descriptions, or be learned from the practice of the embodiments of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The above and/or additional aspects and advantages of the present disclosure will become apparent and more readily appreciated from the following description of embodiments with reference to the drawings, in which:

FIG. 1 is a state diagram of a launcher and an object to be launched according to an embodiment of the present disclosure;

FIG. 2 is an exploded view of a launcher and an object to be launched according to an embodiment of the present disclosure;

FIG. 3 is a partial structural diagram of a launcher according to an embodiment of the present disclosure;

FIG. 4 is a schematic diagram of an internal structure of a launcher according to an embodiment of the present disclosure;

FIG. 5 is a schematic diagram of an internal structure of a launcher according to an embodiment of the present disclosure from another angle of view;

FIG. 6 is a schematic diagram of a launcher body of a launcher according to an embodiment of the present disclosure;

FIG. 7 is a partial structural diagram of a launcher according to another embodiment of the present disclosure;

FIG. 8 is a schematic diagram of a unidirectional driver of a launcher according to an embodiment of the present disclosure;

FIG. 9 is a partial structural diagram of a launching driver of a launcher according to an embodiment of the present disclosure;

FIG. 10 is a sectional view of a launcher and an object to be launched according to an embodiment of the present disclosure;

FIG. 11 is a partial structural diagram of a launcher and an object to be launched according to an embodiment of the present disclosure;

FIG. 12 is a partial structural diagram of a launcher according to an embodiment of the present disclosure;

FIG. 13 is a sectional view of a partial structure of a launcher according to an embodiment of the present disclosure;

FIG. 14 is a schematic diagram of a launch button of a launcher according to an embodiment of the present disclosure;

FIG. 15 is a schematic diagram of a launch button of a launcher according to another embodiment of the present disclosure;

FIG. 16 is a schematic diagram of a transmission rod of a launcher according to another embodiment of the present disclosure;

FIG. 17 is a partial structural diagram of a launcher and an object to be launched according to another embodiment of the present disclosure;

FIG. 18 is a perspective view of a suction cup module of a launcher according to an embodiment of the present disclosure;

FIG. 19 is an exploded view of a suction cup module of a launcher according to an embodiment of the present disclosure;

FIG. 20 is a perspective view of an object to be launched by a launcher according to an embodiment of the present disclosure;

FIG. 21 is a sectional view of an object to be launched by a launcher according to an embodiment of the present disclosure;

FIG. 22 is a perspective view of a body of an object to be launched according to an embodiment of the present disclosure;

FIG. 23 is a perspective view of a tip connecting body of an object to be launched according to an embod-

iment of the present disclosure.

Reference numerals:

[0020]

launcher 1000;
hand-held portion 100, thumb gripping side 110, four-finger gripping side 120, limiting plate 130;
launcher body 200, protruding shaft 210, mating flange 211, retarding disc 220, retarding elastic member 230, limiting block 240;
direction-changing driver 400, flip button 410, flip elastic member 420;
unidirectional transmission 510, drive end gear 511, passive end gear 512, cycloidal gear 513, rotating shaft 5131, rope winding portion 520, rope body 530, pull ring 531, energy accumulator 540;
ejector pin 610, ejector sleeve 612, terminal tapered surface 6121, retractable elastic member 620, launch button 630, bump 631, swing rod 632, transmission rod 640, horizontal rod section 641, vertical rod section 642, bearing 650;
suction cup module 700, suction cup housing 710, snap-lock groove 710a, mating opening 710b, suction cup outer cover 711, half cover 7111, inner liner 712, inner liner opening 712a, inner liner flange 7121, magnetic assembly 720, suction cup magnetically attracting member 721, magnetically insulated sleeve 722, fastener 730, fastener groove 730a, fastener foot 731, fastener shaft 732, snap-lock elastic member 733, snap-lock protrusion 734, extension foot 735, extension surface 7351;
top 800, top body 810, connecting hole 811, connecting groove 812, top tip structure 820, magnetic top tip 821, snap slot 8211, snap protrusion 8212, tip casing 822, top tip magnetically attracting member 8221, tip connecting body 823, connecting portion 8231, tip cap body 824, brim 8241, tip cylinder 8242, clamping block 8243.

DETAILED DESCRIPTION OF EMBODIMENTS

[0021] Embodiments of the present disclosure will be described in detail below, and the examples of the embodiments will be illustrated in the drawings. The same or similar elements and the elements having same or similar functions are denoted by like reference numerals throughout the description. The embodiments described herein with reference to the drawings are illustrative and used to generally understand the present disclosure. The embodiments shall not be construed to limit the present disclosure.

[0022] A multi-directional launcher 1000 according to embodiment of the present disclosure will be described with reference to FIGS. 1 to 23.

[0023] As shown in FIGS. 1 and 2, the multi-directional launcher 1000 according to embodiments of the present disclosure includes a hand-held portion 100, a launcher body 200, a launcher head assembly, and a direction-changing driver 400.

[0024] The launcher body 200 is movably arranged to the hand-held portion 100, that is, the launcher body 200 is movable relative to the hand-held portion 100 (for example, it can slide or rotate relative to hand-held portion). The launcher body 200 at least has a first launch position and a second launch position. That is, the launcher body 200 has at least two launch positions, i.e., the first launch position and the second launch position. For example, the first launch position is a downward launch position, while the second launch position is an upward launch position. The launcher body 200 can also have other launch positions (which may be launch positions in other directions, such as a forward launch position), which is not specifically limited in the present disclosure. The fact that the launcher body 200 has multiple launch positions can raise players' interest in this toy and avoid too simple gameplay.

[0025] Specifically, the launcher head assembly includes a rotating body and a retaining member. The rotating body is freely rotatably arranged on the launcher body 200, and the retaining member is arranged on the rotating body. It can be understood that the rotating body can freely rotate relative to the launcher body 200. When the launcher body 200 is in the second launch position (for example, the upward launch position), the rotating body and the retaining member are also in a state of facing upwards. During playing, the rotating body rotates freely in an upward direction. When the launcher body 200 is in the first launch position (for example, the downward launch position), the rotating body and the retaining member are in a state of facing downwards, and the rotating body freely rotates in a downward direction. The rotating body is used to rotate freely on the launcher body 200, and the retaining member is used to retain and release an object to be launched.

[0026] The rotating body can drive the object to be launched to rotate when the retaining member retains the object to be launched. When a speed of the object to be launched reaches a preset speed, the object to be launched can detach itself from the retaining member due to a high-speed centrifugal force. Certainly, the object to be launched can also be separated from the retaining member by triggering a release assembly. That is, when the rotating body is in an upward state, the retaining member retains the object to be launched, and the rotating body brings the object to be launched into rotation, so that the object to be launched has a certain speed, and then the launcher head assembly launches the object to be launched upwards. Similarly, after the launcher body 200 switches from the second launch position to the first launch position, when the rotating body rotates freely in the downward direction, the launcher head assembly launches the object to be launched downwards. Hence, the object to be launched can be launched upwards or downwards, that is, the object to be launched

can be launched from multiple directions of the multi-directional launcher 1000, which brings a surprising experience to players.

[0027] Further, the direction-changing driver 400 is connected between the hand-held portion 100 and the launcher body 200. After the direction-changing driver 400 is triggered, the launcher body 200 can be driven to change from the first launch position to the second launch position. For example, the first launch position is a downward launch position, while the second launch position is an upward launch position. That is, in a normal state, the launcher body 200 is in an upward launching state. After the direction-changing driver 400 is triggered, the launcher body 200 switches from the second launch position to the first launch position, that is, the launcher body 200 switches from the upward launch position to the downward launch position. Thus, the direction-changing driver 400 has a function of driving the launcher body 200 to switch between the launch positions. The launch position of the launcher body 200 can be switched by controlling the direction-changing driver, which can make operations easier and more convenient for children to play alone.

[0028] With the multi-directional launcher 1000 according to the embodiments of the present disclosure, since the launcher body 200 is movably arranged on the hand-held portion 100, and the rotating body of the launcher body 200 can freely rotate on the launcher body 200, the launcher head assembly can be flipped up and down relative to the hand-held portion 100, realizing two flipping modes. The direction-changing driver 400 drives the launcher body 200 to switch between the first launch position and the second launch position, realizing operations of connecting and launching the object to be launched. The launcher head assembly cooperates with the direction-changing driver 400 to realize the launch of the object to be launched in the upward and downward directions, which brings a surprising experience to the players and enhances the fun of playing with this toy.

[0029] As shown in FIG. 1, according to an embodiment of the present disclosure, the launcher body 200 is rotatably arranged on the hand-held portion 100. It can be understood that the launcher body 200 can rotate around the hand-held portion 100. In one of the first launch position and the second launch position, the retaining member is located at a lower part of the multi-directional launcher 1000. For example, when the first launch position is the downward launch position, the retaining member is also in the state of facing downwards. In the other of the first launch position and the second launch position, the retaining member is located at an upper part of the multi-directional launcher 1000. For example, when the second launch position is the upward launch position, the retaining member is also in the state of facing upwards. That is, the position of the retaining member keeps consistent with the position of the launcher body 200.

[0030] As an example where the first launch position is the downward launch position and the second launch position is the upward launch position, if the launcher body 200 is in the first launch position, the object to be launched retained on the retaining member also faces downwards. After the retaining member releases the object to be launched, the object to be launched is launched downwards. If the launcher body 200 is in the second launch position, the object to be launched retained on the retaining member also faces upwards. After the retaining member releases the object to be launched, the object to be launched is launched upwards. Thus, the retaining member can release the object to be launched in different directions, which enhances the fun of playing with the multi-directional launcher 1000.

[0031] Referring to FIG. 1, according to another embodiment of the present disclosure, the launcher body 200 is rotatably arranged on the hand-held portion 100. The hand-held portion 100 is in the shape of a handle. Two horizontal sides of the hand-held portion 100 are a thumb gripping side 110 and a four-finger gripping side 120. For example, when the hand-held portion 100 in FIG. 1 is held by a left hand, with the thumb gripping side 110 being a side towards a player and the four-finger gripping side 120 being a side away from the player, the palm and the thumb face the thumb gripping side 110, and the four fingers fit with the four-finger gripping side 120, which can make a gripping action of the player more comfortable.

[0032] Further, the direction-changing driver 400 includes a flip button 410 provided on the thumb gripping side 110. As shown in FIG. 1, when the player holds the hand-held portion 100 with the left hand, the thumb exactly faces the flip button 410, and the thumb can toggle the flip button 410. When the flip button 410 is triggered, the launcher head assembly turns from the first launch position to the second launch position along a direction towards the four-finger gripping side 120. As an example where the first launch position is the downward launch position and the second launch position is the upward launch position, when the player triggers the flip button 410, for instance, by toggling the flip button 410 backwards, the launcher head assembly turns from the upward position to the downward position along the side away from the player (that is, the launcher head assembly turns outwards relative to the player). Moreover, when returning to the second launch position from the first launch position, the launcher head assembly turns from the downward position to the upward position along a direction towards the four-finger gripping side 120.

[0033] In this way, when the player holds the multi-directional launcher 1000, flip is performed in this direction so that a direction where the launcher head assembly turns and generates force is directed towards the front of a child, to prevent the object to be launched on the launcher head assembly from suddenly detaching from the multi-directional launcher 1000 and hitting the child's body and face, so as to ensure safety and reliability when the child is playing.

[0034] As shown in FIG. 3, according to another embodiment of the present disclosure, the launcher body 200 is rotatably arranged on the hand-held portion 100, and the direction-changing driver 400 includes a flip elastic member 420 and a flip button 410. The flip elastic member 420 is connected between the hand-held portion 100 and the launcher body 200, and the flip elastic member 420 is configured to accumulate energy when the launcher body 200 turns toward the first launch position and release energy when the launcher body 200 turns toward the second launch position. For example, the second launch position is the upward launch position, and the first launch position is the downward launch position. When the launcher head assembly is in an upward launch state, the flip elastic member 420 is in a state of not accumulating energy. When the launcher body 200 turns downward to the downward launch position, the flip elastic member 420 accumulates energy, and if there is no other stopping structure, the launcher body 200 will automatically turn upwards under the drive of the flip elastic member 420 to return to the upward launch position.

[0035] As shown in FIG. 3, the flip button 410 is toggled backward, the launcher head assembly is flipped by 180 degrees under a force of the flip elastic member 420, and at this time, the launcher head assembly can be reset by manually twisting the launcher head assembly in a reverse direction.

[0036] Before playing, a rotation direction of the launcher body 200 is carried out according to a handle state as shown in FIG. 1. The player holds the multi-directional launcher 1000 in FIG. 1 with his/her left hand, and turns the launcher body 200 clockwise by his/her right hand to make the launcher body 200 rotates by 180 degrees from the upward launch position to the downward launch position (i.e., the second launch position to the first launch position). At this time, the flip elastic member 420 accumulates energy. The launcher body 200 rotates in a counterclockwise direction, and can rotate by 180 degrees from the downward launch position to return to the upward launch position from, during which process the flip elastic member 420 releases energy.

[0037] The flip button 410 is movably arranged on the hand-held portion 100. The flip button 410 can slide back and forth on the hand-held portion 100, and is movable between a first position where the launcher body 200 is locked and a second position where the launcher body 200 is released. Specifically, when the launcher body 200 is rotating toward the first launch position (downward rotation), the flip elastic member 420 accumulates energy; after the launcher body 200 rotates to the first launch position (the launcher body 200 faces downward), the flip button 410 extends into the launcher body 200 and locks the launcher body 200, such that the launcher body 200 is retained and positioned in the first launch position. When the flip button 410 is toggled backwards, the launcher body 200 will be released, and the launcher body 200 automatically rotates back to the second launch position under the drive of the flip elastic member 420. By means of the flip button 410, the launcher body 200 can be positioned at a preset launch position and the launcher body 200 can be released to rotate by itself.

[0038] As shown in FIG. 3, according to an optional example of the present disclosure, the launcher body 200 is provided with a protruding shaft 210. The protruding shaft 210 extends into the hand-held portion 100 and is connected between the launcher body 200 and the hand-held portion 100. The flip elastic member 420 is fitted over or wound on the protruding shaft 210, and the flip elastic member 420 is located in the hand-held portion 100. For example, the flip elastic member 420 may be a torsion spring. When the launcher body 200 faces upward, the flip elastic member 420 is in a natural state (a state of not accumulating energy). When the launcher body 200 is manually turned downwards, the flip elastic member 420 twists and accumulates energy until the launcher body 200 is in a downward state and the flip elastic member 420 has maximum energy accumulation, in which case, the flip elastic member 420 has a tendency to return to the natural state and thus has a tendency to drive the launcher body 200 to rotate upwards.

[0039] During playing, the launcher body 200 is rotated manually, and a rotation direction of the launcher body 200 is in accordance with a state of the hand-held portion 100 in FIG. 1. The launcher body 200 is rotated clockwise (counterclockwise rotation is limited by a limiting block 240 and a limiting plate 130 and thus cannot be realized), and at this time, a torsion spring 52 accumulates energy. When the launcher body 200 rotates by 180° downward, the flip button 410 extends into the launcher body 200 to make the launcher body 200 get stuck and hence positioned in the downward state. After the object to be launched is first launched downward (as shown in FIG. 2) and slows down, the object to be launched is connected to the multi-directional launcher 1000 by the retaining member. Then, the flip button 410 is toggled backwards, and the launcher body 200 drives the object to be launched to rotate by 180° counterclockwise (to avoid sudden detachment of the object to be launched from the launcher 1000 and avoid hitting the child's body), so that the object to be launched turns into the upward launch state.

[0040] As shown in FIGS. 3 and 4, according to another optional example of the present disclosure, the direction-changing driver 400 includes a mating flange 211, a retarding disc 220, and a retarding elastic member 230. The mating flange 211 is arranged on an outer periphery of the protruding shaft 210. The retarding disc 220 is rotatably fitted over the protruding shaft 210 and fixed in the hand-held portion 100. The retarding elastic member 230 is used to drive the mating flange 211 to abut against the retarding disc 220. When the launcher body 200 rotates, the mating flange 211 and the retarding disc 220 move relative to each other, which can generate sound effects to improve the player's sensory experience on the one hand, and can reduce a flipping speed of the launcher body 200 due to the mutual cooperation be-

tween the mating flange 211 and the retarding disc 220 on the other hand.

[0041] Further, respective surfaces of the mating flange 211 and the retarding disc 220 facing each other are toothed surfaces. That is, a side of the mating flange 211 facing the retarding disc 220 is formed as a toothed surface, and a side of the retarding disc 220 facing the mating flange 211 is formed as a toothed surface. The two toothed surfaces mesh with each other, so that when the mating flange 211 and the retarding disc 220 move relative to each other, a sound effect of rotation will be generated. Meanwhile, due to a meshing effect between the toothed surface of the mating flange 211 and the toothed surface of the retarding disc 220, the flipping speed of the launcher body 200 is reduced to a certain extent, so as to lower the probability of throwing out the object to be launched and ensure the reliability of the multi-directional launcher 1000 during playing.

[0042] According to an optional embodiment of the present disclosure, the multi-directional launcher 1000 further includes a launching driver 500 provided on the launcher body 200. The launching driver 500 is configured to cooperate with the rotating body and drive the rotating body to rotate, when triggered. The launching driver 500 is disengaged from the rotating body when released.

[0043] Specifically, when the launching driver 500 is released, the launching driver 500 is disengaged from the rotating body. When the launching driver 500 is triggered, the launching driver 500 will cooperate with and be connected to the rotating body (for example, meshing with each other through gears), and meanwhile, the launching driver 500 rotates and drives the rotating body to rotate, so that the rotating body rotates at a certain speed. The launching driver 500 is used to provide power for the rotation of the rotating body and can allow the rotating body to rotate at a high speed.

[0044] As shown in FIGS. 7 and 8, optionally, the launching driver 500 includes a unidirectional transmission 510. The unidirectional transmission 510 includes a drive end gear 511, a passive end gear 512, and a cycloidal gear 513. The drive end gear 511 is spaced apart from the passive end gear 512 and arranged on the launcher body 200. The passive end gear 512 is connected to the rotating body. The drive end gear 511 always meshes with the cycloidal gear 513. A rotating shaft 5131 of the cycloidal gear 513 can swing along a set track. The cycloidal gear 513 meshes with and drives the passive end gear 512 when in one end of the set track; and the cycloidal gear 513 disengages from the passive end gear 512 when in the other end of the set track.

[0045] It can be understood that the cycloidal gear 513 is located between the drive end gear 511 and the passive end gear 512. For example, when the drive end gear 511 rotates clockwise, the cycloidal gear 513 is driven to rotate counterclockwise, the rotating shaft 5131 of the cycloidal gear 513 swings to an end towards the passive end gear 512, and the cycloidal gear 513 meshes with the passive end gear 512. Through the meshing transmission between the cycloidal gear 513 and the passive end gear 512, the passive end gear 512 is driven to rotate clockwise, and the rotating body rotates synchronously with the passive end gear 512. When the rotating shaft 5131 of the cycloidal gear 513 swings to another end away from the passive end gear 512, the passive end gear 512 is disengaged from the cycloidal gear 513. The meshing with and disengagement from the passive end gear 512 can be achieved through a swing track of the cycloidal gear 513, and hence the rotating body can be driven to rotate.

[0046] Optionally, the launching driver 500 includes a rope winding portion 520, a rope body 530, and an energy accumulator 540. The rope winding portion 520 is connected to the drive end gear 511. The rope body 530 is wound on the rope winding portion 520 and has an inner end connected to the rope winding portion 520. The energy accumulator 540 is connected to the drive end gear 511 and the launcher body 200. The energy accumulator 540 is configured to accumulate energy during the meshing transmission of the passive end gear 512 and the cycloidal gear 513. The passive end gear 512 is disengaged from the cycloidal gear 513 when the energy accumulator 540 releases the energy.

[0047] Specifically, the rope body 530 is pulled outwards and withdrawn outwards. The rope body 530 drives the drive end gear 511 to rotate clockwise (taking the clockwise rotation of the drive end gear 511 as an example), and then drives the cycloidal gear 513 to rotate counterclockwise. At the same time, the cycloidal gear 513 swings to an end towards the passive end gear 512, and the cycloidal gear 513 meshes with the passive end gear 512 and drives the passive end gear 512 to rotate, during which process, the energy accumulator 540 accumulates energy. When the rope body 530 is pulled to the end and released, the energy accumulator 540 releases the energy, the drive end gear 511 rotates counterclockwise, and the rope body 530 retracts onto the rope winding portion 520 by itself, in which case the passive end gear 512 and the cycloidal gear 513 are in a separated state. If the rope body 530 is pulled repeatedly, the passive end gear and the rotating body can rotate at a high speed, thereby providing a higher rotation speed for the object to be launched.

[0048] It can be understood that a pull ring 531 can be connected to a tail end of the rope body 530, which can make it convenient for children to pull the rope body 530 when playing.

[0049] During playing, the object to be launched (such as a top 800) is first mounted on the multi-directional launcher 1000, and the rope body 530 is pulled out repeatedly to make the object to be launched rotate at a high speed under the drive of the rotating body, such that the object to be launched can be thrown out at a high speed or an energy releasing assembly is triggered, and the object to be launched is launched onto a battle disk. The multi-directional launcher 1000 is moved so that the

retaining member of the multi-direction launcher 1000 is aligned with the object to be launched, and the object to be launched is fixed in the launcher head assembly. At this time, the object to be launched can continue to rotate on the launcher head assembly. The flip button 410 is toggled backwards to flip the launcher head assembly by 180 degrees. The rope body 530 is pulled out repeatedly, so that the object to be launched rotates at a high speed under the drive of the rotating body. The energy releasing assembly is triggered, so that the object to be launched is launched upward. Thus, the object to be launched is launched onto the battle disk. The launcher head assembly is flipped manually to be reset. In such a way, a round is completed.

[0050] A collision launcher 1000 according to another embodiment of the present disclosure will be described below with reference to FIGS. 1, 2, and 10-16.

[0051] The collision launcher 1000 according to the embodiment of the present disclosure includes a launcher body 200, a launcher head assembly, and a release assembly. The launcher head assembly includes a rotating body and a retaining member. The rotating body is freely rotatably arranged on the launcher body 200, and the retaining member is arranged on the rotating body. It can be understood that the rotating body can freely rotate relative to the launcher body 200, the object to be launched is connected to the retaining member, and the retaining member is connected to the rotating body and can rotate synchronously with the rotating body.

[0052] Referring to FIGS. 10 and 11, optionally, the release assembly includes an ejector pin 610 and a retractable elastic member 620. The ejector pin 610 is arranged on the launcher body 200 and slidable between an ejected position and a retracted position. The retractable elastic member 620 is fitted over the ejector pin 610, and used to drive the ejector pin 610 to slide toward the retracted position. The ejector pin 610 slides toward the ejected position after being triggered. When the ejector pin 610 is in the retracted position, the object to be launched can be fitted in the retaining member. When the ejector pin 610 slides toward the ejected position, the object to be launched will be knocked off the retaining member.

[0053] Specifically, when the object to be launched is fitted in the retaining member, the ejector pin 610 is located in the retracted position under an elastic action of the retractable elastic element 620. As the rotating body rotates to drive the object to be launched to rotate, a rotation speed of the object to be launched is increased. After being triggered, the ejector pin 610 slides toward the ejected position. At this time, the retractable elastic member 620 is compressed, the object to be launched on the retaining member is knocked off by the ejector pin 610, and the object to be launched is separated from the retaining member. The retractable elastic member 620 tends to restore its original shape, and the ejector pin 610 slides to the retracted position under the action of the retractable elastic member 620.

[0054] As shown in FIG. 11, the retractable elastic member 620 is fitted over an upper part of the ejector pin 610. In a normal state, the ejector pin 610 is located in the retracted position under the action of the retractable elastic member 620, and the object to be launched is fitted in the retaining member. After being triggered, the ejector pin 610 slides down (the ejected position is below the retracted position), so that the object to be launched is knocked downwards off the retaining member and is launched downwards.

[0055] Therefore, through the cooperation between the ejector pin 610 on the release assembly and the retractable elastic member 620, the ejector pin 610 slides between the retracted position and the ejected position, and the object to be launched on the retaining member can be knocked off by the ejector pin 610, to control the launch of the object to be launched. This toy has a simple structure and control operation, and it is easy to realize a launch function of the object to be launched.

[0056] As shown in FIG. 11, according to an embodiment of the present disclosure, the release assembly includes a launch button 630 and a transmission rod 640. The launch button 630 is movably arranged on the launcher body 200, and the transmission rod 640 is connected between the launch button 630 and the ejector pin 610. The launch button 630 is arranged on a lateral portion of the launcher body 200. A first end (for example, a left end) of the transmission rod 640 is connected to the launch button 630, and a second end (for example, a right end) of the transmission rod 640 is connected to a head of the ejector pin 610. The launch button 630 can be pressed manually, and the launch button 630 moves inward and drives the transmission rod 640 which in turn triggers the ejector pin 610 to slide from the retracted position to the ejected position. The launch button 630 and the transmission rod 640 act as triggering members of the ejector pin 610 and can serve to trigger the ejector pin 610 to slide from the retracted position to the ejected position.

[0057] As shown in FIGS. 14 and 15, according to an optional example of the present disclosure, a plurality of the launch buttons 630 can be provided at different positions on the launcher body 200. Each launch button 630 is connected to the ejector pin 610 through the transmission rod 640. For example, two launch buttons 630 are provided on both sides of the launcher body 200. When the two launch buttons 630 are pressed at the same time, the two launch buttons 630 move from the two sides of the launcher body 200 from the outside to the inside and can jointly drive the transmission rod 640 to move and in turn trigger the ejector pin 610 to slide from the retracted position to the ejected position. Certainly, the number of the launch buttons 630 in the present disclosure is not limited to two, but can be four and etc.

[0058] Referring to FIG. 14, according to another optional example of the present disclosure, the launch button 630 is slidably connected to the launcher body 200.

For example, the launch button 630 includes a pressing portion and a bump 631 connected to the pressing portion. The bump 631 is located in the launcher body 200. Two launch buttons 630 are arranged oppositely on both sides of the launcher body 200, and a pressing elastic member is connected between the two launch buttons 630. That is, in a normal state, the pressing elastic member is in a natural state. When the launch buttons 630 are pressed, the pressing portions move toward the interior of the launcher 1000, the pressing elastic member is compressed, and the bumps 631 move toward each other, pushing the transmission rod 640 (which can be pushed upwards or pushed in a direction of the ejector pin 610) and in turn triggering the ejector pin 610 to slide.

[0059] As shown in FIG. 15, alternatively, the launch button 630 is swingably connected to the launcher body 200. The launch button 630 includes a pressing portion and a swing rod 632. The launcher body 200 is provided with a rotating shaft therein. The swing rod 632 is connected to the rotating shaft, and the pressing portion is arranged at an end of the swing rod 632. The two launch buttons 630 are respectively arranged on both sides of the launcher body 200. When the launch buttons 630 are pressed, the pressing portions move toward the interior of the launcher body 200, and the swing rods 632 swing toward each other around the rotating shaft, which can push the transmission rod 640 and in turn trigger the ejector pin 610 to slide.

[0060] Referring to FIGS. 11 and 16, according to another optional example of the present disclosure, the transmission rod 640 is slidably connected to the launcher body 200. After being pressed, the launch button 630 pushes the transmission rod 640 in the direction of the ejector pin 610, and the transmission rod 640 triggers the ejector pin 610 to slide and knock the object to be launched off the retaining member.

[0061] Alternatively, the transmission rod 640 is swingably connected to the launcher body 200. That is, the launcher body 200 is provided with a rotating shaft that can, for example, be horizontally arranged on the launcher body 200, and the transmission rod 640 can swing around the rotating shaft. When the launch button 630 is pressed, the launch button 630 pushes up a first end of the transmission rod 640, and a second end of the transmission rod 640 swings downwards around the rotating shaft, thereby triggering the ejector pin 610, that is, pressing the ejector pin 610 to slide down.

[0062] Referring to FIG. 16, according to another optional example of the present disclosure, the transmission rod 640 includes a horizontal rod section 641 and a vertical rod section 642. The horizontal rod section 641 is rotatably connected to the launcher body 200, that is, the horizontal rod section 641 is connected to the rotating shaft 5131. The vertical rod section 642 is connected to one end of the horizontal rod section 641 and cooperates with the launch button 630, and the other end of the vertical rod section 642 cooperates with the ejector pin 610.

[0063] Specifically, both ends of the vertical bar section 642 can swing on both sides of the horizontal bar section 641. After being pressed, the ejector pin 610 is controlled to move downward by using the principle of lever rotation. When the launch button 630 is pressed, the launch button 630 pushes up a first end of the vertical rod section 642 (a left end of the vertical rod section 642 in FIG. 16), while a second end of the vertical rod section 642 (a right end of the vertical rod section 642 in FIG. 16) swings downwards. Since the ejector pin 610 is connected to a lower surface of the second end of the vertical rod section 642, the ejector pin 610 is then triggered to slide down and knock off the object to be launched on the retaining member.

[0064] According to another optional example of the present disclosure, the transmission rod 640 is slidably arranged on the launcher body 200. One end of the ejector pin 610 is provided with a starting end fitting, an end surface of the starting end fitting forms a starting end tapered surface, and the transmission rod 640 is fitted on the starting end tapered surface. When the launch button 630 is toggled rightwards, the transmission rod 640 is driven to move rightwards. The starting end tapered surface is arranged between the transmission rod 640 and the ejector pin 610, so the transmission rod 640 can press the ejector pin 610 downward, and the ejector pin 610 will push the object to be launched downward and make it separated from the launcher head assembly. That is, the object to be launched will be launched.

[0065] According to another embodiment of the present disclosure, the rotating body is annular, and the rotating body is fitted over the ejector pin 610 and spaced apart from the ejector pin 610 in a radial direction. The rotating body rotates around the ejector pin 610 to drive the object to be launched to rotate synchronously. After being triggered, the ejector pin 610 will knock off the object to be launched and make it fall freely.

[0066] According to another embodiment of the present disclosure, an ejector sleeve 612 is fitted over the ejector pin 610 and arranged at a lower end portion of the ejector pin 610. An end surface of the ejector sleeve 612 is formed as a terminal tapered surface 6121 that cooperates with an upper end surface of a component on the retaining member. During the downward sliding of the ejector pin 610, the terminal tapered surface 6121 pushes the part retaining the object to be launched on the retaining member to move outward, thereby releasing and launching the object to be launched.

[0067] Further, the retractable elastic member 620 is a retractable spring that is fitted over the ejector pin 610. A first end of the retractable spring (an upper end of the retractable spring in FIG. 11) stops against the ejector pin 610, and a second end of the retractable spring (a lower end of the retractable spring in FIG. 11) stops against the rotating body. When the ejector pin 610 slides down, the retractable spring will be compressed. When the ejector pin 610 knocks off the object to be launched, the retractable spring will resume deformation and bring the ejector pin 610 back to an initial position. The ejector

pin 610 can be driven to slide back to the initial position by the retractable elastic member 620.

[0068] A suction cup module 700 of the launcher 1000 according to another embodiment of the present disclosure will be described below with reference to FIGS. 17-19. That is, the launcher head assembly is described by taking the suction cup module 700 as an example. In this embodiment, the object to be launched is elaborated by taking a top 800 as an example.

[0069] As shown in FIGS. 18 and 19, the suction cup module 700 of the launcher 1000 according to the embodiment of the present disclosure includes a suction cup housing 710, a magnetic assembly 720, and a fastener 730.

[0070] The suction cup housing 710 can act as the rotating body, and the magnetic assembly 720 can act as the retaining member. The magnetic assembly 720 can retain the object to be launched (such as the top 800) on the rotating body, that is, the magnetic assembly 720 can keep connected to the object to be launched by magnetic attraction. During rotation, the suction cup housing 710 will drive the object to be launched to rotate, so as to accelerate the object to be launched. For example, after being separated from the launcher 1000, the top 800 rotates freely, and a rotation speed of the top 800 will gradually decrease or even the top 800 will stop. At this time, the launcher head assembly is aligned with the top 800, and the magnetic assembly 720 magnetically attracts the top 800 onto the launcher head assembly. Meanwhile, since the suction cup housing 710 rotates at a high speed under the drive of the launching driver 500, the top 800 can be driven to rotate at a high speed.

[0071] When the top 800 is retained on the launcher head assembly, and the fastener 730 is connected to the top 800 by clamping, the soundness of connection between the top 800 and the launcher head assembly can be further enhanced, ensuring that the top 800 will not easily separate from the launcher head assembly when rotating at a high speed under the drive of the launching driver 500. At the same time, the top 800 flips along with the flip of the launcher body 200, and for example, flips downwards from a state of the launcher body 200 facing upwards, that is, the top 800 flips from being located above the launcher body 200 to being located below the launcher body 200. During the flip of the launcher body, the top 800 has a large inertia force and is easily thrown out, but by providing the fastener 730, the connection with the top 800 becomes more reliable, which can avoid that the launcher body 200 causes the top 800 to be thrown out due to the inertia during the flip, and ensure the safety and reliability when the child is playing.

[0072] Specifically, the magnetic assembly 720 is arranged on the suction cup housing 710 and used to magnetically attract the top 800 to retain the top 800 on the launcher head assembly. The fastener 730 is movably arranged on the suction cup housing 710, and for example, the fastener 730 can rotate on the suction cup housing 710. The fastener 730 is provided with a fastener foot 731, and the fastener foot 731 is movable between a locking position and an unlocking position. When the fastener foot 731 is in the locking position, the fastener foot 731 is suitable to be fastened on the top 800 to avoid the risk of the top 800 being thrown out when the launcher body 200 is flipped. When the fastener foot 731 is in the unlocking position, the fastener foot 731 is suitable to separate from the top 800.

[0073] In a normal state, the fastener foot 731 is in the locking position, and the fastener foot 731 locks the top 800. When the fastener 730 is triggered, the fastener foot 731 switches from the locking position to the unlocking position, and the top 800 is released. At this time, the top 800 is disengaged from the fastener foot 731 and falls freely. Therefore, through the movement of the fastener foot 731 between the locking position and the unlocking position, the top 800 can be locked or released.

[0074] For the suction cup module 700 of the launcher 1000 according to the embodiment of the present disclosure, by arranging the magnetic assembly 720 in the suction cup housing 710, and providing the suction cup housing 710 with the movable fastener 730, the top 800 can be retained in the suction cup housing 710 by magnetic attraction. Further, through a snapping action of the fastener 730 on the top 800, it is possible to avoid a phenomenon that the top 800 is thrown out due to the inertia when the launcher body 200 is flipped. That is, the fastener 730 can lock and release the top 800. When the suction cup module 700 magnetically attracts the top 800, the top 800 is fastened by the fastener foot 731. When the launcher body 200 is flipped, the top 800 is reliably connected to the launcher head assembly and will not be easily thrown out. When the fastener 730 is triggered, the fastener 730 will release the top 800 and make it fall freely.

[0075] Referring to FIG. 19, according to an embodiment of the present disclosure, the suction cup housing 710 includes a suction cup outer cover 711 and an inner liner 712. The magnetic assembly 720 and the fastener 730 are arranged outside the suction cup housing 710, while the inner liner 712 is arranged inside the suction cup outer cover 711. The suction cup outer cover 711 has a protective effect on inner liner 712. The suction cup outer cover 711 is located on the outermost side of the suction cup module 700, which can have a protective function for the internal components on the one hand, and can make the suction cup module 700 form a whole on the other hand, thereby driving the top 800 to rotate to increase the rotation speed of the top 800 when the suction cup housing 710 rotates under the drive of the launching driver 500.

[0076] As shown in FIG. 19, according to an optional example of the present disclosure, the suction cup outer cover 711 and the inner liner 712 are spaced apart, and the fastener 730 is rotatably arranged between the suction cup outer cover 711 and the inner liner 712. The fastener 730 has a fastener shaft 732 connected to the inner liner 712. The fastener foot 731 is located at an end

of the fastener shaft 732. The fastener foot 731 is retractable when the fastener 730 rotates around the fastener shaft 732. For example, three fasteners 730 are provided between the inner liner 712 and the suction cup outer cover 711 and arranged at intervals around the inner liner 712. The fastener feet 731 are located at an upstream end of the fasteners 730 in a clockwise direction around the inner liner 712. When the fasteners 730 rotate around respective fastener shafts 732 (for example, when the fasteners 730 rotate clockwise around the fastener shafts 732), the fastener feet 731 retract into the inner liner 712. When the fastener feet 731 rotate counterclockwise around the fastener shafts 732, the fastener feet 731 extend out of the inner liner 712.

[0077] Specifically, in a normal state, the fastener foot 731 retracts into the inner liner 712 to lock the top 800. When the fastener 730 is triggered, the fastener foot 731 rotates counterclockwise around the fastener shaft 732, that is, the fastener foot 731 rotates outward of the inner liner 712, thereby releasing the top 800.

[0078] Further, the suction cup module 700 further includes a snap-lock elastic member 733 connected between the fastener 730 and the suction cup housing 710. The snap-lock elastic member 733 is in a normally compressed state. The snap-lock elastic member 733 and the fastener foot 731 are located on both sides of the fastener shaft 732, respectively. The snap-lock elastic member 733 is used to drive the fastener foot 731 to rotate toward the locking position. In a normal state, due to an elastic restoring force of the snap-lock elastic member 733, the fastener 730 tends to rotate clockwise around the fastener shaft 732. An end of the fastener shaft 732 provided with the snap-lock elastic member 733 rotates outwards, and in turn the fastener foot 731 rotates to the locking position. In this way, the fastener foot 731 can be kept in the locking position by the snap-lock elastic member 733.

[0079] As shown in FIG. 19, according to another optional example of the present disclosure, the snap-lock elastic member 733 is fitted on the fastener 730. The snap-lock elastic member 733 and the fastener foot 731 are located at both ends of the fastener shaft 732. The fastener 730 is provided with a fastener groove 730a configured to cooperate with the snap-lock elastic member 733. That is, a first end of the snap-lock elastic member 733 is connected to an outer wall of the inner liner 712, and a second end of the snap-lock elastic member 733 is connected in the fastener groove 730a. Thus, the snap-lock elastic member 733 can be fixed in the fastener groove 730a, the connection between the inner liner 712 and the fastener 730 can be reliable, and the fastener foot 731 can be normally kept in the locking position.

[0080] According to another optional example of the present disclosure, the fastener 730 is provided with a snap-lock protrusion 734. The suction cup outer cover 711 or the inner liner 712 is provided with a snap-lock groove 710a corresponding to the snap-lock protrusion 734. Specifically, when the fastener 730 is in the locking position, the snap-lock protrusion 734 is fitted in the snap-lock groove 710a. The snap-lock bump 631 and the fastener foot 731 are located at both ends of the fastener shaft 732, so that the snap-lock protrusion 734 is fitted in the snap-lock groove 710a, that is, the snap-lock protrusion 734 at a first end of the fastener shaft 732 is snapped in the snap-lock groove 710a, and hence the fastener foot 731 at a second end of the fastener shaft 732 can fasten the top 800 to prevent the top 800 from falling off.

[0081] Specifically, when the suction cup module 700 rotates at a high speed, due to a centrifugal force, the snap-lock bump 631 on the fastener 730 is snapped in the snap-lock groove 710a, so as to prevent the first end of the locking shaft 732 from continuing to rotate outward, and then the fastener foot 731 at the second end of the fastener shaft 732 can fasten the top 800 firmly.

[0082] As shown in FIG. 19, according to yet another optional example of the present disclosure, an inner liner opening 712a is provided in a peripheral wall of the inner liner 712. The fastener foot 731 can extend into or exit from the inner liner 712 through the inner liner opening 712a when rotating. An end of the inner liner 712 (an upper end of the inner liner 712 as shown in FIG. 19) is provided with an inner liner flange 7121. An end of the fastener shaft 732 (e.g., an upper end of the fastener shaft 732) cooperates with the inner liner flange 7121 to increase a surface area of the upper end of the inner liner 712, and can be used to connect with an inner wall of the suction cup outer cover 711 at the same time.

[0083] Normally, the fastener foot 731 extends into the inner liner 712 through the inner liner opening 712a. At this time, the fastener foot 731 is in the locking position and is used to fasten the top 800. When the fastener 730 is triggered, the fastener foot 731 exits from the inner liner 712 through the inner liner opening 712a. The fastener foot 731 rotates outward relative to the inner liner 712 to release the top 800, and the top 800 separates from the suction cup module 700 and falls freely.

[0084] As shown in FIG. 19, according to another embodiment of the present disclosure, the fastener 730 is provided with an extension foot 735. The extension foot 735 and the fastener foot 731 are located at the same end of the fastener shaft 732. An end of the extension foot 735 is provided with an inclined extension surface 7351. When a force is exerted on the extension surface 7351, the fastener foot 731 moves toward the unlocking position. In a normal state, the fastener 730 on the inner liner 712 extends into the inner liner 712 through the inner liner opening 712a, and the end of the extension foot 735 of the fastener 730 is located at the center of the inner liner 712. When a downward force is exerted on the extension surface 7351, the extension foot 735 is pushed to rotate from the inner liner opening 712a to the outside of the inner liner 712, and meanwhile the fastener foot 731 also exits from the inner liner 712 through the inner liner opening 712a and moves toward the unlocking position, thereby releasing the top 800. In this way, by ex-

erting action on the extension surface 7351 of the extension foot 735, the release of the top 800 by the fastener foot 731 can be realized.

[0085] As shown in FIG. 19, according to another optional example of the present disclosure, the suction cup outer cover 711 includes two detachable half covers 7111. The two half covers 7111 enclose the outside of the inner liner 712. By configuring the suction cup outer cover 711 as a structure consisting of two half covers 7111, the disassembly is easy, which brings convenience to maintenance and replacement of the suction cup module 700 in future. That is, when maintenance and replacement are needed, the two half covers 7111 can be directly disassembled. After completion, the two half covers 7111 can be directly assembled and closed.

[0086] As shown in FIG. 18, according to another embodiment of the present disclosure, the suction cup housing 710 has a mating opening 710b suitable for the top 800 to extend in. The magnetic assembly 720 is arranged inside the suction cup housing 710. The magnetic assembly 720 in FIG. 19 is located inside the inner liner 712. The magnetic assembly 720 includes a suction cup magnetically attracting member 721 and a magnetically insulated sleeve 722. The magnetically insulated sleeve 722 is wrapped around the suction cup magnetically attracting member 721. The magnetically insulated sleeve 722 is open on a side facing the mating opening 710b.

[0087] Further, the suction cup magnetically attracting member 721 includes a first magnetically attracting member and a second magnetically attracting member. The first magnetically attracting member is located above the second magnetically attracting member. The first magnetically attracting member and the magnetically insulated sleeve 722 can cooperate to generate an effect of magnetic insulation, to avoid magnetizing a bearing 650 disposed above the suction cup module 700. The second magnetically attracting member can magnetically attract the top 800 to retain the top 800 on the launcher head assembly.

[0088] Specifically, when the rotation speed of the top 800 decreases or the top 800 stops, the suction cup module 700 of the launcher 1000 approaches the top 800, and the top 800 can be magnetically attracted and connected to the suction cup module 700 through the second magnetically attracting member.

[0089] As shown in FIG. 19, according to still another embodiment of the present disclosure, the suction cup housing 710 is formed into a cylindrical shape with two open ends. The magnetic assembly 720 and the fastener 730 are both arranged inside the suction cup housing 710. A plurality of fasteners 730 are provided and spaced apart along a circumferential wall of the suction cup housing 710. For example, three fasteners 730 are provided in a circumferential direction of the suction cup housing 710, and extension feet 735 of the three fasteners 730 are arranged facing each other (e.g., all concentrated at the center of the inner liner 712). At this time, the three fastener feet 731 fasten the top 800. When the downward force is applied to three extension surfaces 7351 simultaneously, the three extension feet 735 rotate toward the outside of the inner liner 712 simultaneously, and the three fastener feet 731 also rotate outward of the inner liner 712, thereby releasing the top 800.

[0090] A launcher 1000 according to embodiments of a second aspect of the present disclosure includes the suction cup module 700 described in the above embodiments.

[0091] For the launcher 1000 according to the embodiments of the present disclosure, by arranging the magnetic assembly 720 in the suction cup housing 710, and providing the suction cup housing 710 with the movable fastener 730, the top 800 can be retained in the suction cup housing 710 by magnetic attraction. Further, through a snapping action of the fastener 730 on the top 800, it is possible to avoid a phenomenon that the top 800 is thrown out due to the inertia when the launcher body 200 is flipped. That is, the fastener 730 can lock and release the top 800. When the suction cup module 700 magnetically attracts the top 800, the top 800 is fastened by the fastener foot 731. When the launcher body 200 is flipped, the top 800 is reliably connected to the launcher head assembly and will not be easily thrown out. When the fastener 730 is triggered, the fastener 730 will release the top 800 and make it fall freely.

[0092] A top 800 of the launcher 1000 according to yet another embodiment of the present disclosure will be described below with reference to FIGS. 1, 2, and 20-23.

[0093] The top 800 according to the embodiment of the present disclosure includes a top body 810 and two top tip structures 820. The two top tip structures 820 are provided at an upper end and a lower end of the top body 810, so that no matter which end of the top 800 falls on the ground, the top 800 can rotate at a high speed.

[0094] In addition, at least one top tip structure 820 is a magnetic top tip 821 provided with a top tip magnetically attracting member 8221. For example, one of the top tip structures 820 is a magnetic top tip 821, or upper and lower tip structures 820 are both magnetic top tips 821. Therefore, the top 800 can be magnetically attracted to the launcher 1000 by the magnetic top tip 821. Children do not need to manually install the top 800 on the launcher 1000 when playing. Moreover, when the rotation speed of the top 800 decreases or the top 800 stops, the top 800 can be magnetically attracted to the launcher 1000 as long as the launcher 1000 is aligned with the magnetic top tip 821 of the top 800, which enhances the fun.

[0095] For the top 800 according to the embodiment of the present disclosure, by configuring at least one of the top tip structures 820 as the magnetic top tip 821, when the rotation speed of the top 800 decreases or the top 800 stops, the top 800 can be magnetically attracted to the launcher 1000 as long as the launcher 1000 is aligned with the magnetic top tip 821 of the top 800, which makes it more interesting and surprising.

[0096] As shown in FIG. 21, according to an embodiment of the present disclosure, the magnetic top tip 821

is detachably connected to the top body 810. For example, the magnetic top tip 821 is connected to the top body 810 by a snap. The magnetic top tip 821 can be connected to the top body 810 through a connector, as long as the detachable connection between the magnetic top tip 821 and the top body 810 can be realized, which will not be specifically limited in the present disclosure. Through the detachable connection between the magnetic top tip 821 and the top body 810, it is convenient to disassemble and assemble the magnetic top tip 821 and the top body 810, and it is also convenient to replace the magnetic top tip 821.

[0097] As shown in FIG. 20, according to another embodiment of the present disclosure, a snap slot 8211 is provided in an outer peripheral wall of the magnetic top tip 821. The snap slot 8211 is used to cooperate with the launcher 1000. The snap slot 8211 has an annular shape arranged around an axis of rotation. By providing the snap slot 8211 in the outer peripheral wall of the magnetic top tip 821, the launcher 1000 can be snapped in the snap slot 8211, realizing the cooperation between the launcher 1000 and the magnetic top tip 821. Moreover, when the magnetic top tip 821 is fitted in the launcher 1000, and a rotation speed of the magnetic top tip 821 is increased, the cooperation between the launcher 1000 and the magnetic top tip 821 is reliable during rotation, and the magnetic top tip 821 will not easily slip off the launcher 1000. Thus, it is possible to avoid any damage to children due to the slip off of the top 800 while playing.

[0098] Referring to FIG. 20, according to still another embodiment of the present disclosure, a tip end of the magnetic top tip 821 is formed as a frustum, and a cross section of the frustum gradually decreases in a direction away from the top body 810, that is, a cross section of an end of the magnetic top tip 821 facing the launcher 1000 gradually decreases. As a result, the end of the magnetic top tip 821 can easily extend into the launcher 1000, cooperate with and be connected to the launcher 1000. Especially when the top 800 rotates, the launcher 1000 can be aligned with the magnetic top tip 821, and the magnetic top tip 821 can fit in the launcher 1000.

[0099] As shown in FIG. 20, according to yet another embodiment of the present disclosure, a plurality of snap protrusions 8212 are provided on the outer peripheral wall of the magnetic top tip 821. The snap protrusions 8212 are used to cooperate with the launcher 1000, and the plurality of snap protrusions 8212 are arranged at intervals around the axis of rotation. By providing the protrusions 8212 on the outer wall of the magnetic top tip 821, the magnetic top tip can cooperate with a corresponding part of the rotating body (a lower end of the suction cup housing 710), such that when the rotating body rotates, the corresponding part of the rotating body can drive the snap protrusions 8212 to rotate accordingly, and in turn the top 800 can rotate synchronously with the rotating body, so as to prevent the rotating body from rotating idly due to relative sliding between the rotating body and the top 800.

[0100] Further, the plurality of snap protrusions 8212 extend vertically in the same direction in an axial direction and are provided on a step surface of the magnetic top tip 821, and each snap protrusion 8212 extends along the vertical direction. Compared with the frustum structure of the tip end of the magnetic top tip 821, a contact area between the magnetic top tip 821 and the rotating body can be enlarged. Moreover, through the snap protrusions 8212 on the magnetic top tip 821, the magnetic top tip can be fitted in a corresponding position of the rotating body. The rotating body drives the snap protrusions 8212, thereby realizing the synchronous rotation of the top 800 and the rotating body, so as to prevent the rotating body from rotating idly due to the sliding of the magnetic top tip 821 relative to the rotating body, and improve the reliability of the synchronous rotation of the rotating body and the top 800.

[0101] As shown in FIG. 20, according to still another embodiment of the present disclosure, the magnetic top tip 821 includes a tip casing 822, a tip connecting body 823, and a tip cap body 824. The tip casing 822 is adapted to be connected to the launcher 1000, and one end of the tip casing 822 (e.g., a lower end of the tip casing 822) is open. The top tip magnetically attracting member 8221 is arranged in the tip casing 822. In this way, when the launcher 1000 and the magnetic top tip 821 of the top 800 are close, there is mutual attraction between the magnetic top tip 821 and the launcher 1000, and the magnetic top tip 821 and the launcher 1000 can be attracted to each other tightly.

[0102] The tip connecting body 823 is connected to the open end of the tip casing 822 (e.g., the lower end of the tip casing 822). The tip connecting body 823 is provided with a connecting portion 8231, and the connecting portion 8231 is used to connect the top body 810, i.e., connected between the top body 810 and the tip casing 822. The tip cap body 824 is clamped between the tip casing 822 and the tip connecting body 823. An outer peripheral wall of the tip cap body 824 is provided with a brim 8241 extending radially outwards. When the magnetic top tip 821 of the top 800 is fitted in the launcher 1000, a lower end of the launcher 1000 abuts on the brim 8241 of the tip cap body 824 to prevent the magnetic top tip 821 from extending too much into the launcher 1000 due to the magnetic attraction, and make the cooperation between the launcher 1000 and the top 800 more reliable and stable.

[0103] As shown in FIG. 21, according to an optional example of the present disclosure, the tip cap body 824 includes a tip cylinder 8242 and a clamping block 8243. The clamping block 8243 is arranged on an inner wall of the tip cylinder 8242, and the brim 8241 is arranged on an outer circumferential wall of the tip cylinder. The clamping block 8243 is fitted over the tip casing 822 and clamped between the tip casing 822 and the tip connecting body 823. When the magnetic top tip 821 extends into the launcher 1000, a part of the tip cap body 824 extends into the launcher 1000, and a lower end surface

of the launcher 1000 abuts on an upper surface of the brim 8241. The clamping block 8243 has a fixation function between the tip casing 822 and the tip connecting body 823, to make the cooperation between the tip casing 822 and the tip connecting body 823 reliable and stable.

[0104] As shown in FIG. 22, according to another optional example of the present disclosure, the top body 810 is provided with a connecting hole 811, and an inner wall of the connecting hole 811 is provided with a plurality of connecting grooves 812 spaced apart from each other. A plurality of the connecting portions 8231 are provided on the tip connecting body 823 and spaced apart from each other along a peripheral direction. After the tip connecting body 823 is inserted into the connecting hole 811, the plurality of connecting portions 8231 are rotated and inserted into the plurality of connecting grooves 812, that is, the connecting grooves 812 and the connecting portions 8231 are arranged in one-to-one correspondence. Thus, through the cooperation of the connecting grooves 812 and the corresponding connecting portions 8231, the connection between the magnetic top tip 821 and the top body 810 is very reliable, and the two will not be easily separated but form an integral structure.

[0105] The magnetic top tip 821 of the top 800 according to embodiments of the second aspect of the present disclosure includes the tip casing 822, the top tip magnetically attracting member 8221, the tip connecting body 823, and the tip cap body 824. The tip casing 822 is adapted to be connected to the launcher 1000 and has an open end. The top tip magnetically attracting member 8221 is arranged in the tip casing 822. By arranging the top tip magnetically attracting member 8221 in the tip casing 822, the magnetic top tip 821 and the launcher 1000 are attracted to each other. The tip connecting body 823 is connected to the open end of the tip casing 822 and provided with a connecting portion 8231 suitable for connecting the top body 810. The tip connecting body 823 is used to connect the top body 810 and the tip casing 822. The tip cap body 824 is clamped between the tip casing 822 and the tip connecting body 823. The outer peripheral wall of the tip cap body 824 is provided with the brim 8241 extending radially outwards. When the launcher 1000 cooperates with the magnetic top tip 821, the lower end surface of the launcher 1000 abuts on the brim 8241 of the tip cap body 824. Thus, the cooperation between the launcher 1000 and the magnetic top tip 821 can be reliable, stable and tight.

[0106] With the magnetic top tip 821 of the top 800 according to the embodiments of the present disclosure, when the rotation speed of the top 800 decreases or the top 800 stops, the top 800 can be magnetically attracted to the launcher 1000 as long as the launcher 1000 is aligned with the magnetic top tip 821 of the top 800, which makes it more interesting and surprising.

[0107] The launcher 1000 and the playing process thereof according to embodiments of the present disclosure will be described in detail below with reference to FIGS. 1-23, in which a magnetic top 800 is taken as an example of the object to be launched for illustration.

[0108] As shown in FIG. 1, specifically, the launcher 1000 includes a hand-held portion 100, a launcher body 200, a direction-changing driver 400, a launching driver 500, a release assembly, and a suction cup module 700.

[0109] The launcher body 200 is movably arranged on the hand-held portion 100. The launcher body 200 has a first launch position and a second launch position. For example, the first launch position is a downward launch position, and the second launch position is an upward launch position. An end of the launcher body 200 is connected to the hand-held portion 100. The hand-held portion 100 is provided with a thumb gripping side 110 and a four-finger gripping side 120, in which the thumb gripping side 110 is a side towards a child and the four-finger gripping side 120 is a side away from the child. A flip button 410 capable of sliding back and forth is provided on the thumb gripping side 110. A protruding shaft 210 is provided between the launcher body 200 and the hand-held portion 100. The protruding shaft 210 extends into the hand-held portion 100 to realize rotation relative to the hand-held portion 100. The protruding shaft 210 is provided with a mating flange 211. A flip elastic member 420 is fitted over the protruding shaft 210. A first end of the flip elastic member 420 is fixedly connected to the protruding shaft 210, and a second end thereof is fixedly connected to the hand-held portion 100. The flip elastic member 420 is in a natural state (a state of not accumulating energy) when the launcher body 200 is in the second launch position. When the flip elastic member 420 is flipped from the second launch position to the first launch position, the flip elastic member 420 is in a state of accumulating energy. The protruding shaft 210 is provided with a limiting block 240, and the hand-held portion 100 is provided with a limiting plate 130. Further, a retarding disc 220 is fitted over the protruding shaft 210, and the retarding disc 220 cooperates with the mating flange 211 through a retarding elastic member 230.

[0110] Optionally, a launch button 630 is provided on each of both sides of the launcher body 200. An ejector pin 610 is provided on a head of the launcher body 200. A transmission rod 640 is connected between the launch button 630 and the ejector pin 610. When the launch button 630 is pressed, a vertical rod section 642 of the transmission rod 640 swings around a horizontal rod section 641, and in turn triggers the ejector pin 610 to move up and down between a retracted position and an ejected position. The ejector pin 610 is provided with a retractable elastic member 620 and an ejector sleeve 612.

[0111] The launcher body 200 is provided with a launching driver 500. The launching driver 500 includes a unidirectional transmission 510, a rope winding portion 520, a rope body 530, and an energy accumulator 540. The unidirectional driver includes a drive end gear 511, a passive end gear 512, and a cycloidal gear 513. When the rope body 530 is pulled outward, the energy accumulator 540 accumulates energy. The drive end gear 511 drives the cycloidal gear 513 to rotate. Meanwhile, the

cycloidal gear 513 is driven to move along a swing track to mesh with the passive end gear 512, and the passive end gear 512 is driven to rotate. When the energy accumulator 540 releases the energy, the passive end gear 512 and the cycloidal gear 513 are disengaged.

[0112] The suction cup module 700 is connected to a position where the head of the launcher body 200 faces upward or downward. The suction cup module 700 rotates synchronously with the passive end gear 512. The suction cup module 700 includes a suction cup housing 710, a magnetic assembly 720, and a fastener 730. A suction cup outer cover 711 of the suction cup housing 710 covers an inner liner 712. The magnetic assembly 720 is located inside the inner liner 712. A plurality of fasteners 730 are arranged at intervals along a peripheral direction of the inner liner 712 and in a corresponding inner liner opening 712a. An extension foot 735 and a fastener foot 731 of the fastener 730 are located on a first side of the fastener shaft 732. Extension feet 735 of the plurality of fasteners 730 extend above the inner liner 712 and converge towards an axis. A fastener groove 730a is provided on a second side of the fastener shaft 732. A snap-lock elastic member 733 is connected between the fastener groove 730a and an outer wall of the inner liner 712. A snap-lock protrusion 734 is provided on the same side as the fastener groove 730a.

[0113] In the description of the present disclosure, the term "a plurality of" means two or more.

[0114] When the suction cup module 700 rotates at a high speed, the fastener 730 rotates under the action of a centrifugal force and a pressure spring, to make the snap-lock bump 631 extend out of a mating opening 710b of the suction cup outer cover 711, so that the fastener foot 731 at the other end of the fastener 730 fastens the top 800. The magnetic assembly 720 can be used for the magnetic top 800. The top 800 is retained on the suction cup housing 710 under the action of magnetic attraction. It is possible to ensure the secure connection between the top 800 and the suction cup module 700 under a fastening action of the fastener 730, to avoid danger that the top 800 is thrown out when the launcher body 200 is flipped.

[0115] The top 800 is magnetically attracted to the suction cup module 700. The top 800 includes a top body 810 and a top tip structure 820. At least one of two top tip structures 820 is a magnetic top tip 821. A snap slot 8211 and a snap protrusion 8212 are provided on an outer peripheral wall of the magnetic top tip 821. Since the snap slot 8211 and the snap protrusion 8212 cooperate with the launcher 1000, a tip end of the magnetic top tip 821 is formed as a frustum, and has a cross section gradually decreased in a direction away from the top body 810. The magnetic top tip 821 includes a tip casing 822, a top tip magnetically attracting member 8221, a tip connecting body 823, and a tip cap body 824. The tip casing 822 is connected to the launcher 1000, and has an open end. The top tip magnetically attracting member 8221 is arranged in the tip casing 822. The tip connecting body 823 is connected between the top body 810 and the tip casing 822. The tip cap body 824 cooperates with a lower end surface of the launcher 1000.

[0116] During playing, the hand-held portion 100 is held manually according to FIG. 1, that is, a thumb faces the thumb gripping side 110, and four fingers face the four-finger gripping side 120. First, the magnetic top 800 is mounted on the suction cup module 700 of the launcher 1000. Then, the rope body 530 is pulled out repeatedly (the rope body 530 is provided with a pull ring 531) to allow the energy accumulator 540 to accumulate energy repeatedly. The drive end gear 511 is driven repeatedly to drive the cycloidal gear 513 to swing to mesh with the passive end gear 512 and drive the passive end gear 512 to rotate at a high speed. At the same time, the suction cup module 700 also rotates at a high speed, thereby driving the magnetic top 800 to rotate at a high speed.

[0117] Next, the launch button 630 on the launcher body 200 is pressed. The launch button 630 forces the transmission rod 640 to rotate clockwise, and in turn the transmission rod 640 forces the ejector pin 610 to move downwards. The ejector sleeve 612 and the ejector pin 610 move downwards simultaneously. The ejector sleeve 612 presses the top 800 to make it separated from the suction cup module 700 and fall freely. Specifically, the ejector pin 610 is pressed to move from the retracted position to the ejected position, and in turn applies force to the extension foot 735 on the suction cup module 700, pushing the extension foot 735 and the fastener foot 731 to rotate outward of the inner liner 712. Thus, the fastener foot 731 releases the magnetic top 800, and the magnetic top 800 is launched on a battle disk.

[0118] Then, the launcher 1000 is moved in such a way that the suction cup module 700 of the launcher 1000 is aligned with the magnetic top 800. Due to the mutual attraction of the magnetic assembly 720 in the suction cup module 700 and the top tip magnetically attracting member 8221 in the tip casing 822 of the top 800, the magnetic top 800 is attracted back into the suction cup module 700 of the launcher 1000, so that the top 800 is retained in the suction cup module 700, and at this time the magnetic top 800 can continue to rotate on the launcher 1000.

[0119] Afterwards, the thumb toggles the flip button 410 backwards, and the flip button 410 releases a limiting action on the launcher body 200, so that the launcher body 200 is flipped by 180 degrees under the action of the flip elastic member 420. That is, the flip elastic member 420 is in the state of accumulating energy. The launcher body 200 can automatically flip upwards counterclockwise (i.e., rotate in a direction away from the child's body, and only the rotation in this direction can be achieved through the cooperation of the limiting block 240 and the limiting plate 130). The rope body 530 is pulled outward repeatedly to make the top 800 rotate at a high speed. Then, the launch button 630 is pressed to eject the magnetic top 800 upward. Finally, the magnetic top 800 is launched in the battle disk. The launcher body

200 is manually flipped to be reset. For example, when the flip elastic member 420 is in the state of not accumulating energy, the launcher body 200 is in an upward launching state. When the launcher body 200 rotates clockwise (i.e., in the direction away from the child's body), the flip elastic member 420 accumulates energy. When the launcher body 200 rotates by 180 degrees and faces downward, the flip button 410 is inserted into the launcher body 200 to make the launcher body 200 get stuck and positioned in a downward state. Thus, a round is completed.

[0120] Further, respective surfaces of the mating flange 211 and the retarding disc 220 facing each other are toothed surfaces. The retarding disc 220 keeps meshing with the mating flange 211 under the action of the retarding elastic member 230, and the retarding disc 220 is fixed on the hand-held portion 100. Thus, when the launcher body 200 rotates, the mating flange 211 and the retarding disc 220 move relative to each other, thereby generating a sound effect. At the same time, due to the meshing of the mating flange 211 and the retarding disc 220, the flip acceleration of the launcher body 200 can be reduced to lower the probability of throwing out the top 800.

[0121] As shown in FIG. 11, when the ejector pin 610 is pressed down, the ejector sleeve 612 and the ejector pin 610 are simultaneously pressed downwards. At this time, the ejector sleeve 612 forces the extension feet 735 of the three fasteners 730 to rotate outward. That is, the fastener feet 731 rotate outward, thereby releasing and unlocking the top 800. After the top 800 is launched, the launch button 630 is released; the ejector pin 610 and the ejector sleeve 612 are reset upward under the action of the retractable elastic member 620; and the three fasteners 730 rotate to be reset under the action of the snap-lock elastic member 733, to allow the top 800 to be assembled next time.

[0122] Although embodiments of the present disclosure have been shown and described, it would be appreciated by those skilled in the art that changes, modifications, alternatives and variations can be made in the embodiments without departing from principles and purposes of the present disclosure. The scope of the present invention is defined by the appended claims.

Claims

1. A multi-directional launcher (1000) for a toy top, comprising:

   a hand-held portion (100);
   a launcher body (200); and
   a launcher head assembly comprising: a rotating body freely rotatably arranged on the launcher body (200), and a retaining member arranged on the rotating body and configured to retain and release, in use, the toy top to be launched;

   characterized in that, the launcher body (200) is movably arranged on the hand-held portion (100), and at least has a first launch position and a second launch position, and the multi-directional launcher (1000) for the toy top further comprises a direction-changing driver (400) connected between the hand-held portion (100) and the launcher body (200), and configured to drive the launcher body (200) to change from the first launch position to the second launch position after the direction-changing driver (400) is triggered.

2. The multi-directional launcher (1000) according to claim 1, wherein the launcher body (200) is rotatably arranged on the hand-held portion (100); in one of the first launch position and the second launch position, the retaining member is located at a lower part of the multi-directional launcher (1000); in the other of the first launch position and the second launch position, the retaining member is located at an upper part of the multi-directional launcher (1000).

3. The multi-directional launcher (1000) according to claim 1, wherein the launcher body (200) is rotatably arranged on the hand-held portion (100) that is in a shape of a handle; two horizontal sides of the hand-held portion (100) are a thumb gripping side (110) and a four-finger gripping side (120); the direction-changing driver (400) comprises a flip button (410) provided on the thumb gripping side (110); when the flip button (410) is triggered, the launcher head assembly turns from the first launch position to the second launch position along a direction towards the four-finger gripping side (120).

4. The multi-directional launcher (1000) according to claim 1, wherein the launcher body (200) is rotatably arranged on the hand-held portion (100);
   the direction-changing driver (400) comprises a flip elastic member (420) and a flip button (410); the flip elastic member (420) is connected between the hand-held portion (100) and the launcher body (200), and configured to accumulate energy when the launcher body (200) turns toward the first launch position and release energy when the launcher body (200) turns toward the second launch position; the flip button (410) is movably arranged on the hand-held portion (100), and the flip button (410) is movable between a first position where the launcher body (200) is locked and a second position where the launcher body (200) is released.

5. The multi-directional launcher (1000) according to claim 4, wherein the launcher body (200) is provided with a protruding shaft (210) that extends into the hand-held portion (100), and the flip elastic member (420) is fitted over or wound on the protruding shaft

(210).

6. The multi-directional launcher (1000) according to claim 5, wherein the direction-changing driver (400) comprises:

a mating flange (211) arranged on an outer periphery of the protruding shaft (210);
a retarding disc (220) rotatably fitted over the protruding shaft (210); and
a retarding elastic member (230) configured to drive the mating flange (211) to abut against the retarding disc (220).

7. The multi-directional launcher (1000) according to claim 6, wherein respective surfaces of the mating flange (211) and the retarding disc (220) facing each other are toothed surfaces.

8. The multi-directional launcher (1000) according to any one of claims 1 to 7, further comprising a launching driver arranged on the launcher body (200), wherein the launching driver is configured to cooperate with the rotating body and drive the rotating body to rotate when triggered and configured to be disengaged from the rotating body when released.

9. The multi-directional launcher (1000) according to claim 8, wherein the launching driver comprises:
a unidirectional transmission (510) that comprises a drive end gear (511), a passive end gear (512), and a cycloidal gear (513); the drive end gear (511) is spaced apart from the passive end gear (512) and arranged on the launcher body (200); the passive end gear (512) is connected to the rotating body; the drive end gear (511) always meshes with the cycloidal gear (513); a rotating shaft (5131) of the cycloidal gear (513) is swingable along a set track; the cycloidal gear (513) meshes with and drives the passive end gear (512) when in one end of the set track; and the cycloidal gear (513) disengages from the passive end gear (512) when in the other end of the set track.

10. The multi-directional launcher (1000) according to claim 9, wherein the launching driver comprises:

a rope winding portion (520) connected to the drive end gear (511);
a rope body (530) wound on the rope winding portion (520) and having an inner end connected to the rope winding portion (520); and
an energy accumulator (540) connected to the drive end gear (511) and the launcher body (200), and configured to accumulate energy when the cycloidal gear (513) meshes with and drives the passive end gear (512) and release energy when the passive end gear (512) is disengaged from the cycloidal gear (513).

Patentansprüche

1. Ein multidirektionales Startgerät (1000) für einen Spielzeugkreisel, das folgende Merkmale aufweist:

einen handgehaltenen Abschnitt (100);
einen Startgerätekörper (200); und
eine Startgerätekopfanordnung, die Folgendes aufweist: einen Drehkörper, der frei drehbar auf dem Startgerätekörper (200) angeordnet ist, und ein Zurückhaltungsbauglied, das auf dem Drehkörper angeordnet ist, und dazu konfiguriert ist, bei Nutzung den zu startenden Spielzeugkreisel zurückzuhalten und freizugeben;
dadurch gekennzeichnet, dass der Startgerätekörper (200) beweglich auf dem handgehaltenen Abschnitt (100) angeordnet ist und zumindest eine erste Startposition und eine zweite Startposition aufweist, und das multidirektionale Startgerät (1000) für den Spielzeugkreisel ferner einen Richtungsänderungstreiber (400) aufweist, der zwischen dem handgehaltenen Abschnitt (100) und dem Startgerätekörper (200) eingefügt ist und dazu konfiguriert ist, den Startgerätekörper (200) dahingehend anzutreiben, von der ersten Startposition zu der zweiten Startposition zu wechseln, nachdem der Richtungsänderungstreiber (400) ausgelöst wird.

2. Das multidirektionale Startgerät (1000) gemäß Anspruch 1, wobei der Startgerätekörper (200) drehbar auf dem handgehaltenen Abschnitt (100) angeordnet ist; wobei, in einer der ersten Startposition und der zweiten Startposition, sich das Zurückhaltungsbauglied an einem unteren Teil des multidirektionalen Startgeräts (1000) befindet; wobei, in der anderen der ersten Startposition und der zweiten Startposition, sich das Zurückhaltungsbauglied an einem oberen Teil des multidirektionalen Startgeräts (1000) befindet.

3. Das multidirektionale Startgerät (1000) gemäß Anspruch 1, wobei der Startgerätekörper (200) drehbar auf dem handgehaltenen Abschnitt (100) angeordnet ist, der eine Form eines Griffs aufweist; wobei zwei horizontale Seiten des handgehaltenen Abschnitts (100) eine Daumengreifseite (110) und eine Vierfingergreifseite (120) sind; wobei der Richtungsänderungstreiber (400) einen Umschaltknopf (410) aufweist, der auf der Daumengreifseite (110) angeordnet ist; wobei dann, wenn der Umschaltknopf (410) ausgelöst wird, die Startgerätekopfanordnung von der ersten Startposition zu der zweiten Startposition entlang einer Richtung hin zu der Vierfingergreifseite (120) wechselt.

4. Das multidirektionale Startgerät (1000) gemäß Anspruch 1, wobei der Startgerätekörper (200) drehbar

auf dem handgehaltenen Abschnitt (100) angeordnet ist;
wobei der Richtungsänderungstreiber (400) ein elastisches Umdrehbauglied (420) und eine Umschalttaste (410) aufweist; wobei das elastische Umdrehbauglied (420) zwischen dem handgehaltenen Abschnitt (100) und dem Startgerätekörper (200) eingefügt ist und dazu konfiguriert ist, Energie zu akkumulieren, wenn der Startgerätekörper (200) hin zu der ersten Startposition wechselt, und Energie freizugeben, wenn der Startgerätekörper (200) hin zu der zweiten Startposition wechselt; wobei die Umschalttaste (410) beweglich auf dem handgehaltenen Abschnitt (100) angeordnet ist und die Umschalttaste (410) beweglich ist zwischen einer ersten Position, in der der Startgerätekörper (200) verriegelt ist, und einer zweiten Position, in der der Startgerätekörper (200) freigegeben ist.

5. Das multidirektionale Startgerät (1000) gemäß Anspruch 4, wobei der Startgerätekörper (200) mit einer hervorstehenden Welle (210) versehen ist, die sich in den handgehaltenen Abschnitt (100) erstreckt, und das elastische Umdrehbauglied (420) über die hervorstehende Welle (210) gepasst ist oder um auf dieselbe gewickelt ist.

6. Das multidirektionale Startgerät (1000) gemäß Anspruch 5, wobei der Richtungsänderungstreiber (400) folgende Merkmale aufweist:

einen Passflansch (211), der auf einem äußeren Umfang der hervorstehenden Welle (210) angeordnet ist;
eine Verzögerungsscheibe (220), die drehbar über die hervorstehende Welle (210) gepasst ist; und
ein elastisches Verzögerungsbauglied (230), das dazu konfiguriert ist, den Passflansch (211) dahingehend anzutreiben, gegen die Verzögerungsscheibe (220) anzustoßen.

7. Das multidirektionale Startgerät (1000) gemäß Anspruch 6, wobei jeweilige Oberflächen des Passflansches (211) und der Verzögerungsscheibe (220), die einander zugewandt sind, mit Zähnen versehene Oberflächen sind.

8. Das multidirektionale Startgerät (1000) gemäß einem der Ansprüche 1 bis 7, das ferner einen Starttreiber aufweist, der auf dem Startgerätekörper (200) angeordnet ist, wobei der Starttreiber dazu konfiguriert ist, mit dem Drehkörper zusammenzuwirken und den Drehkörper dahingehend anzutreiben, sich zu drehen, wenn derselbe ausgelöst wird, und dazu konfiguriert ist, bei Freigabe von dem rotierenden Körper gelöst zu werden.

9. Das multidirektionale Startgerät (1000) gemäß Anspruch 8, wobei der Starttreiber folgende Merkmale aufweist:
ein unidirektionales Getriebe (510), das ein Antriebsendrad (511), ein passives Endrad (512) und ein Zykloiden-Rad (513) aufweist; wobei das Antriebsendrad (511) von dem passiven Endrad (512) beabstandet ist und auf dem Startgerätekörper (200) angeordnet ist; wobei das passive Endrad (512) mit dem Drehkörper verbunden ist; wobei das Antriebsendrad (511) immer mit dem Zykloiden-Rad (513) in Eingriff steht; wobei eine Drehwelle (5131) des Zykloiden-Rad (513) entlang einer festgelegten Bahn schwingbar ist; wobei das Zykloiden-Rad (513) mit dem passiven Endrad (512) in Eingriff steht und dasselbe antreibt, wenn es an einem Ende der festgelegten Bahn ist; und wobei das Zykloiden-Rad (513) sich von dem passiven Endrad (512) trennt, wenn es an dem anderen Ende der festgelegten Bahn ist.

10. Das multidirektionale Startgerät (1000) gemäß Anspruch 9, wobei der Starttreiber folgende Merkmale aufweist:

einen Seilwickelabschnitt (520), der mit dem Antriebsendrad (511) verbunden ist;
einen Seilkörper (530), der auf den Seilwicklungsabschnitt (520) gewickelt ist und bei dem ein inneres Ende mit dem Seilwicklungsabschnitt (520) verbunden ist; und
einen Energieakkumulator (540), der mit dem Antriebsendrad (511) und dem Startgerätekörper (200) verbunden ist und dazu konfiguriert ist, Energie zu akkumulieren, wenn das Zykloiden-Rad (513) mit dem passiven Endrad (512) in Eingriff steht und dasselbe antreibt, und Energie freizugeben, wenn das passive Endrad (512) von dem Zykloiden-Rad (513) getrennt ist.

Revendications

1. Lanceur multidirectionnel (1000) pour une toupie de jouet, comprenant :

une partie tenue en main (100);
un corps de lanceur (200); et
un ensemble de tête de lanceur comprenant: un corps rotatif disposé de manière à pouvoir tourner librement sur le corps de lanceur (200), et un élément de retenue disposé sur le corps rotatif et configuré pour retenir et libérer, lors de l'utilisation, la partie supérieure du jouet à lancer;
caractérisé par le fait que le corps de lanceur (200) est disposé de manière déplaçable sur la partie tenue en main (100), et présente au moins

une première position de lancement et une deuxième position de lancement, et que le lanceur multidirectionnel (1000) pour la partie supérieure du jouet comprend par ailleurs un moyen d'entraînement de changement de direction (400) connecté entre la partie tenue en main (100) et le corps de lanceur (200), et configuré pour entraîner le corps de lanceur (200) pour changer de la première position de lancement à la deuxième position de lancement après que soit déclenché le moyen d'entraînement de changement de direction (400).

2. Lanceur multidirectionnel (1000) selon la revendication 1, dans lequel le corps de lanceur (200) est disposé de manière à pouvoir tourner sur la partie tenue en main (100); dans l'une parmi la première position de lancement et la deuxième position de lancement, l'élément de retenue est situé au niveau d'une partie inférieure du lanceur multidirectionnel (1000); dans l'autre parmi la première position de lancement et la deuxième position de lancement, l'élément de retenue est situé au niveau d'une partie supérieure du lanceur multidirectionnel (1000).

3. Lanceur multidirectionnel (1000) selon la revendication 1, dans lequel le corps de lanceur (200) est disposé de manière à pouvoir tourner sur la partie tenue en main (100) qui présente la forme d'une poignée; deux côtés horizontaux de la partie tenue en main (100) sont un côté de préhension pour le pouce (110) et un côté de préhension pour quatre doigts (120); le moyen d'entraînement de changement de direction (400) comprend un bouton de basculement (410) prévu sur le côté de préhension pour le pouce (110); lorsque le bouton de basculement (410) est déclenché, l'ensemble de tête de lanceur tourne de la première position de lancement à la deuxième position de lancement dans une direction vers le côté de préhension pour quatre doigts (120).

4. Lanceur multidirectionnel (1000) selon la revendication 1, dans lequel le corps du lanceur (200) est disposé de manière à pouvoir tourner sur la partie tenue en main (100);
le moyen d'entraînement de changement de direction (400) comprend un élément élastique de basculement (420) et un bouton de basculement (410); l'élément élastique de basculement (420) est connecté entre la partie tenue en main (100) et le corps de lanceur (200), et configuré pour accumuler de l'énergie lorsque le corps de lanceur (200) tourne vers la première position de lancement et pour libérer de l'énergie lorsque le corps de lanceur (200) tourne vers la deuxième position de lancement; le bouton de basculement (410) est disposé de manière déplaçable sur la partie tenue en main (100), et le bouton de basculement (410) est déplaçable entre une première position où le corps de lanceur (200) est verrouillé et une deuxième position où le corps de lanceur (200) est relâché.

5. Lanceur multidirectionnel (1000) selon la revendication 4, dans lequel le corps de lanceur (200) est pourvu d'un arbre en saillie (210) qui s'étend dans la partie tenue en main (100), et l'élément élastique de basculement (420) est monté sur ou enroulé sur l'arbre en saillie (210).

6. Lanceur multidirectionnel (1000) selon la revendication 5, dans lequel le moyen d'entraînement de changement de direction (400) comprend:

une bride de raccordement (211) disposée sur une périphérie extérieure de l'arbre en saillie (210);
un disque de retardement (220) monté de manière à pouvoir tourner sur l'arbre en saillie (210); et
un élément élastique de retardement (230) configuré pour entraîner la bride de raccordement (211) de manière à venir en butée contre le disque de retardement (220).

7. Lanceur multidirectionnel (1000) selon la revendication 6, dans lequel les surfaces respectives de la bride de raccordement (211) et du disque de retardement (220) se faisant face sont des surfaces dentées.

8. Lanceur multidirectionnel (1000) selon l'une quelconque des revendications 1 à 7, comprenant par ailleurs un moyen d'entraînement de lancement disposé sur le corps de lanceur (200), dans lequel le moyen d'entraînement de lancement est configuré pour coopérer avec le corps rotatif et pour entraîner le corps rotatif en rotation lorsqu'il est déclenché et configuré pour être dégagé du corps rotatif lorsqu'il est relâché.

9. Lanceur multidirectionnel (1000) selon la revendication 8, dans lequel le moyen d'entraînement de lancement comprend:
une transmission unidirectionnelle (510) qui comprend un engrenage d'extrémité d'entraînement (511), un engrenage d'extrémité passif (512) et un engrenage cycloïdal (513); l'engrenage d'extrémité d'entraînement (511) est espacé de l'engrenage d'extrémité passif (512) et disposé sur le corps de lanceur (200); l'engrenage d'extrémité passif (512) est connecté au corps rotatif; l'engrenage d'extrémité d'entraînement (511) engrène toujours avec l'engrenage cycloïdal (513); un arbre rotatif (5131) de l'engrenage cycloïdal (513) peut pivoter le long d'une piste établie; l'engrenage cycloïdal (513) engrène avec et entraîne l'engrenage d'extrémité passif (512)

lorsqu'il se trouve à une extrémité de la piste établie; et l'engrenage cycloïdal (513) se dégage de l'engrenage d'extrémité passif (512) lorsqu'il se trouve à l'autre extrémité de la piste établie.

10. Lanceur multidirectionnel (1000) selon la revendication 9, dans lequel le moyen d'entraînement de lancement comprend:

une partie d'enroulement de câble (520) connectée à l'engrenage d'extrémité d'entraînement (511);
un corps de corde (530) enroulé sur la partie d'enroulement de corde (520) et présentant une extrémité intérieure connectée à la partie d'enroulement de corde (520); et
un accumulateur d'énergie (540) connecté à l'engrenage d'extrémité d'entraînement (511) et au corps de lanceur (200), et configuré pour accumuler de l'énergie lorsque l'engrenage cycloïdal (513) engrène avec et entraîne l'engrenage d'extrémité passif (512) et libère de l'énergie lorsque l'engrenage d'extrémité passif (512) est dégagé de l'engrenage cycloïdal (513).

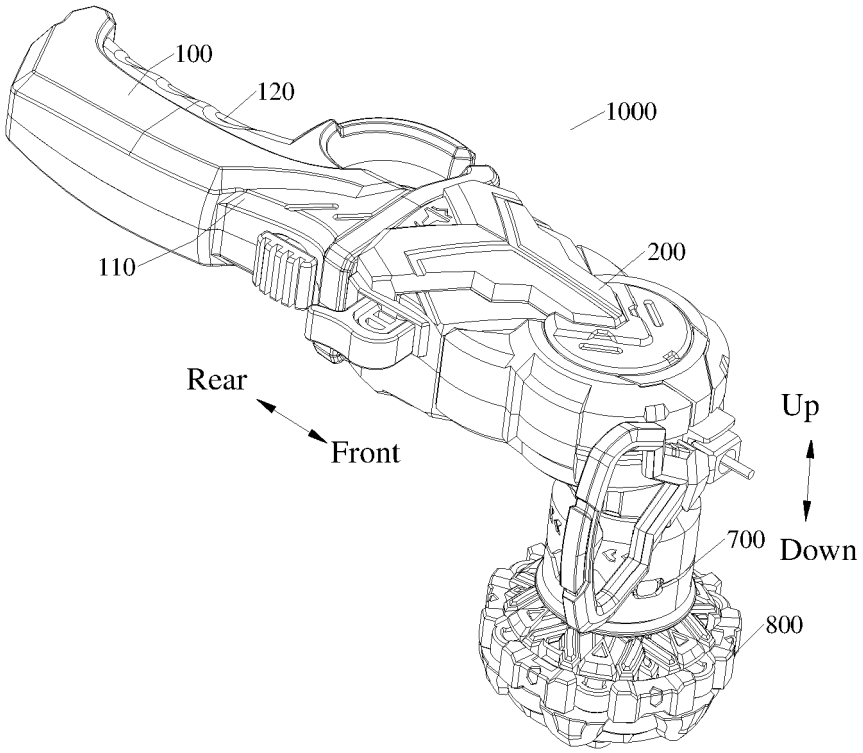
100
120
1000
110
200
Rear
Front
Up
Down
700
800

FIG. 1

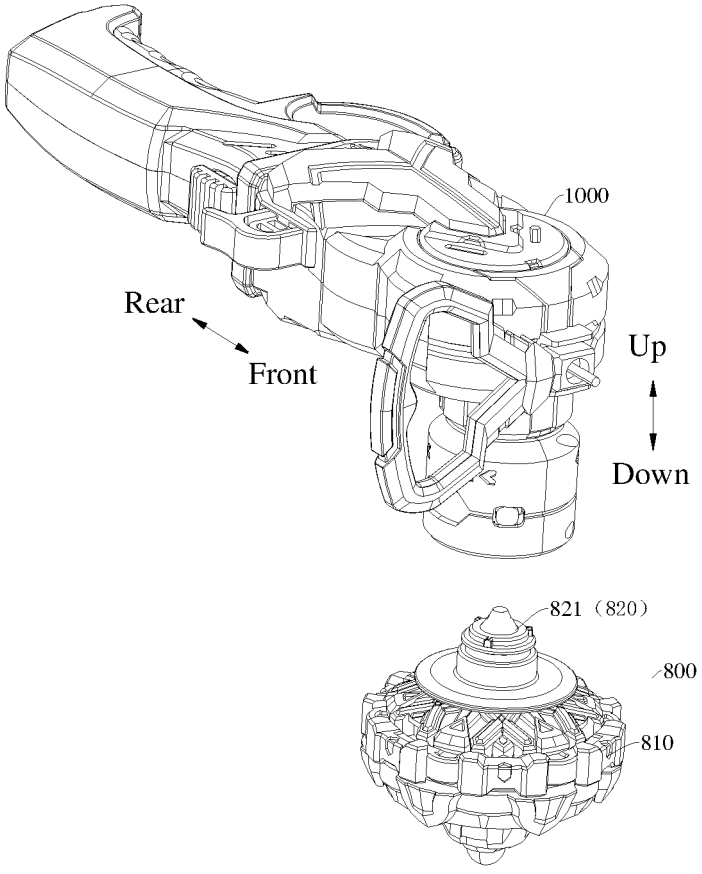
1000
Rear
Front
Up
Down
821 (820)
800
810

FIG. 2

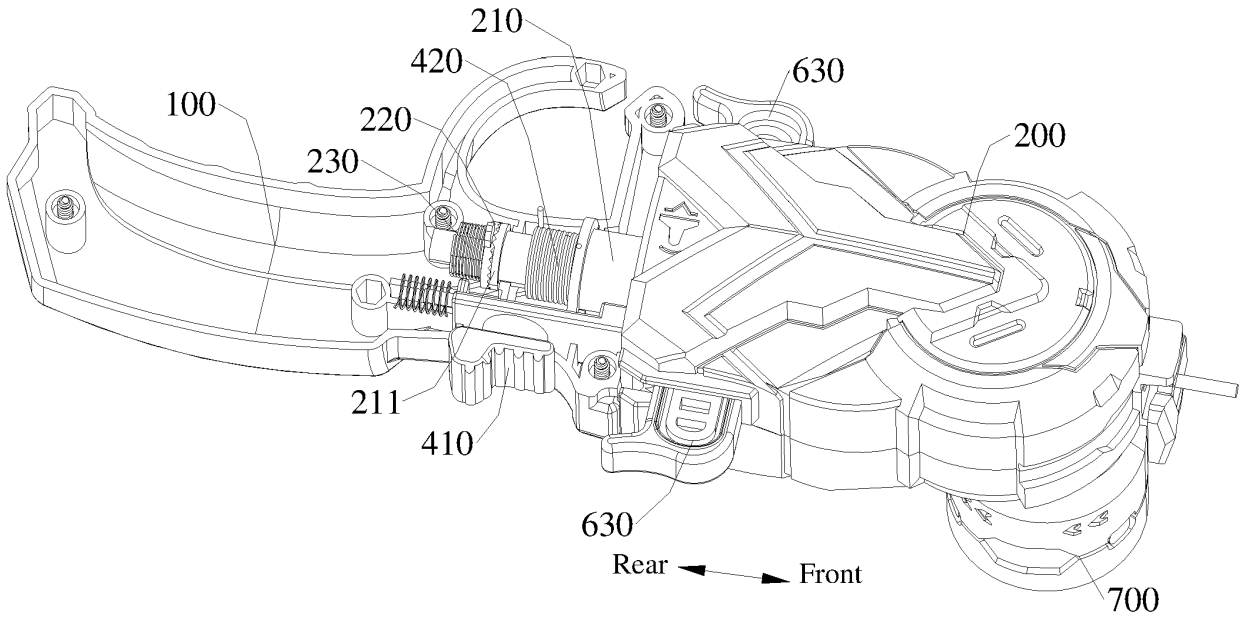

FIG. 3

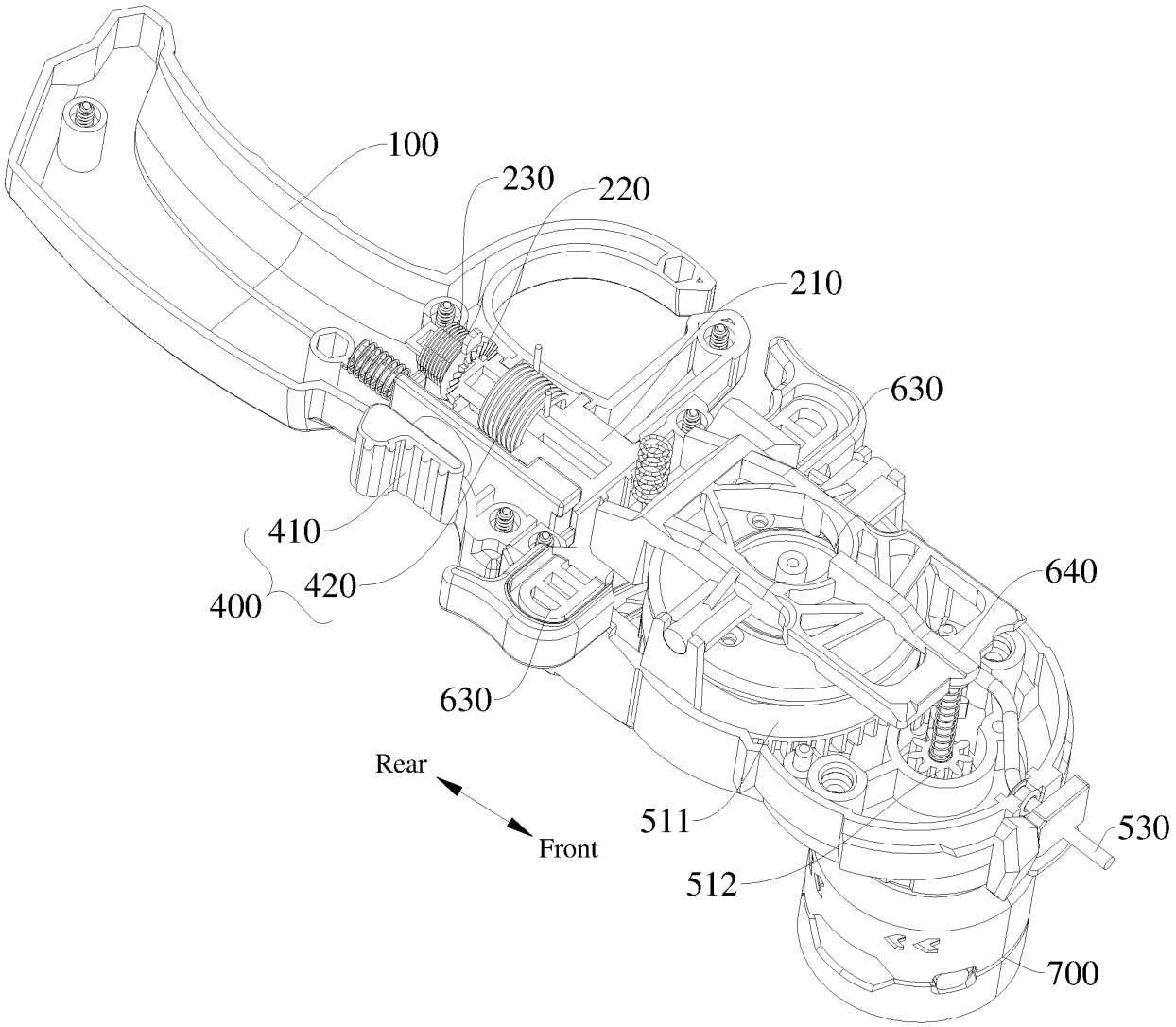
100
230
220
210
630
410
420
400
640
630
Rear
Front
511
530
512
700

FIG. 4

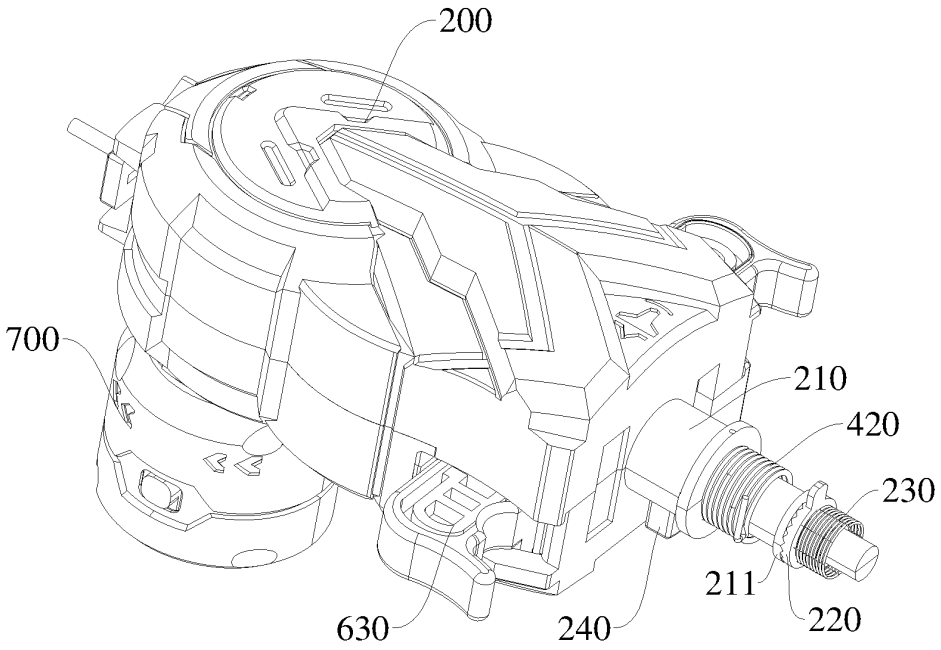
200
700
210
420
230
211
220
630
240

FIG. 5

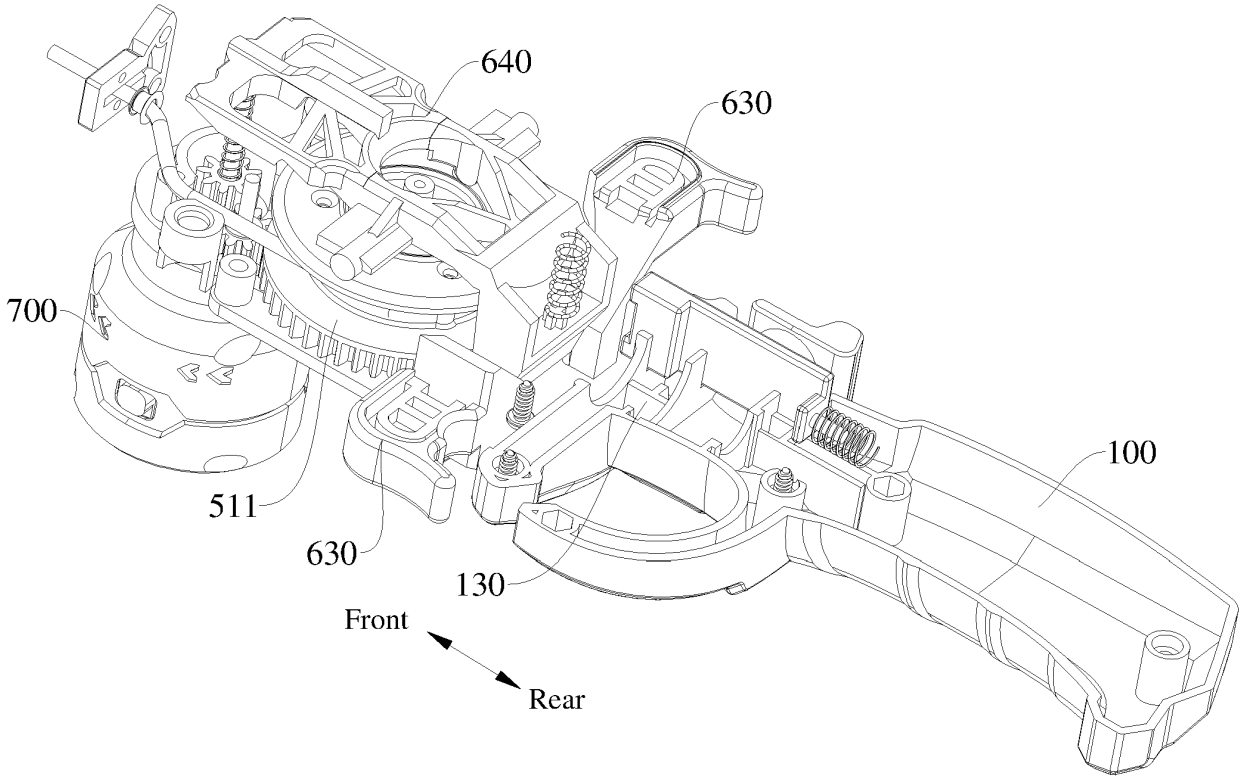
640
630
700
100
511
630
130
Front
Rear

FIG. 6

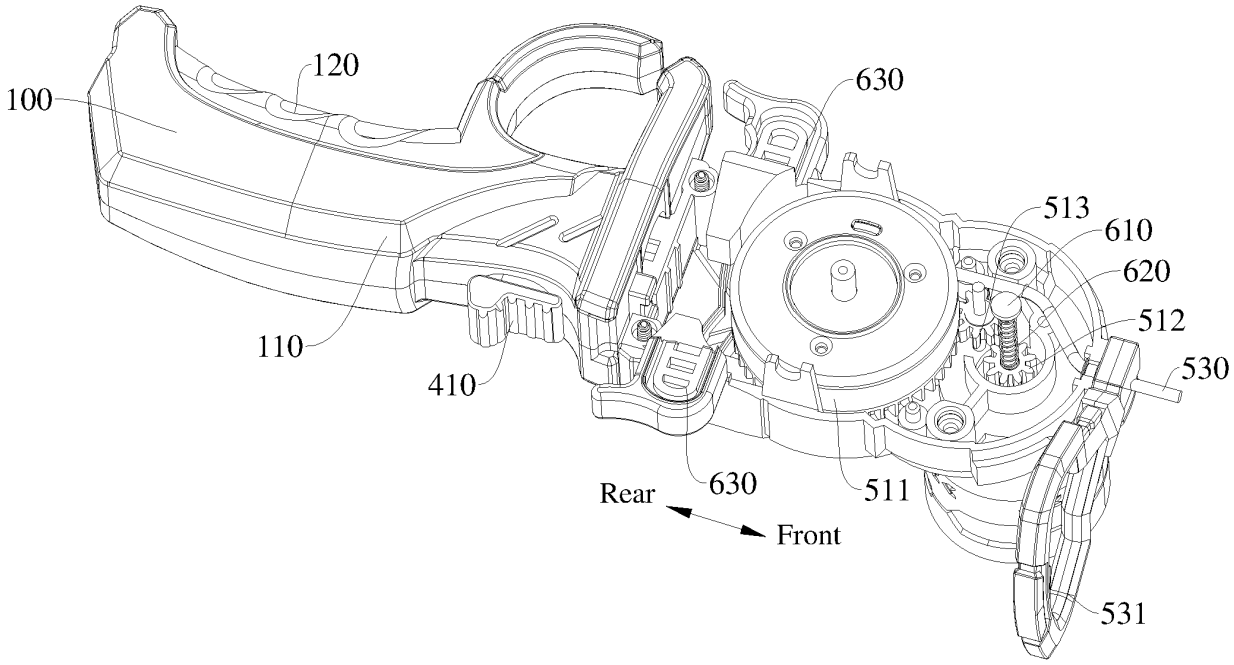
100
120
630
513
610
620
512
530
110
410
630
511
Rear
Front
531

FIG. 7

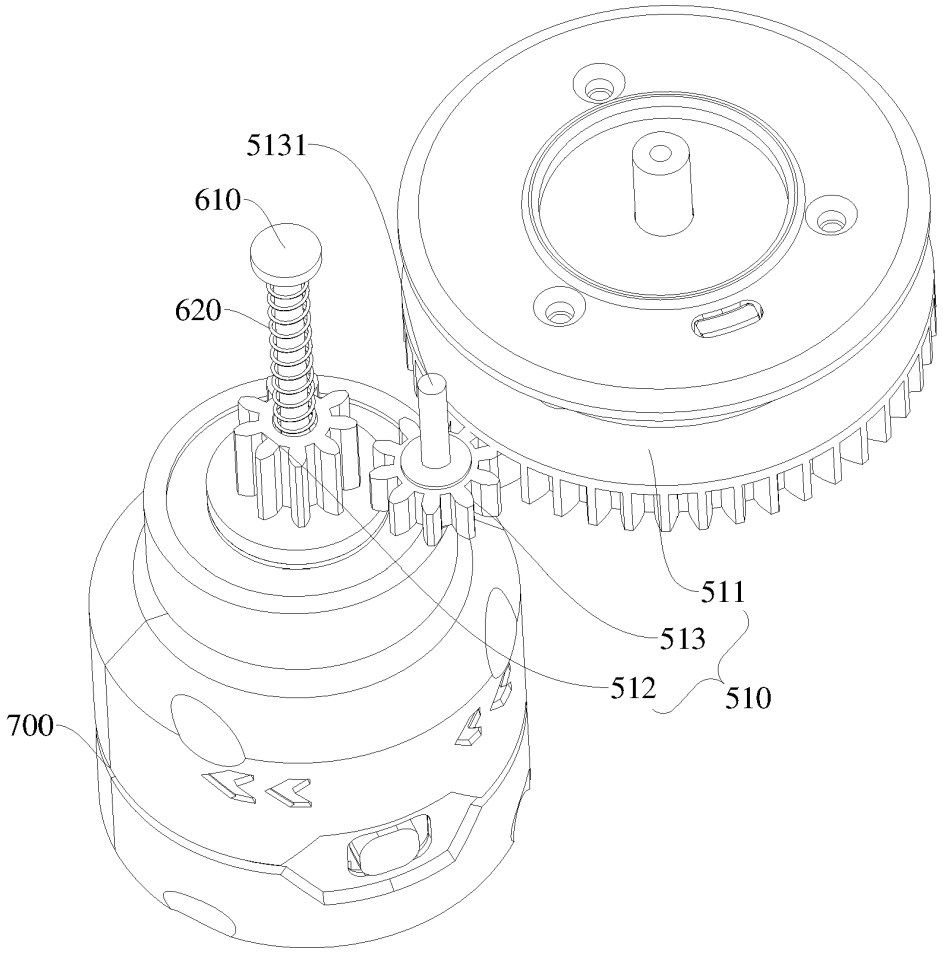
5131
610
620
511
513
512
510
700

FIG. 8

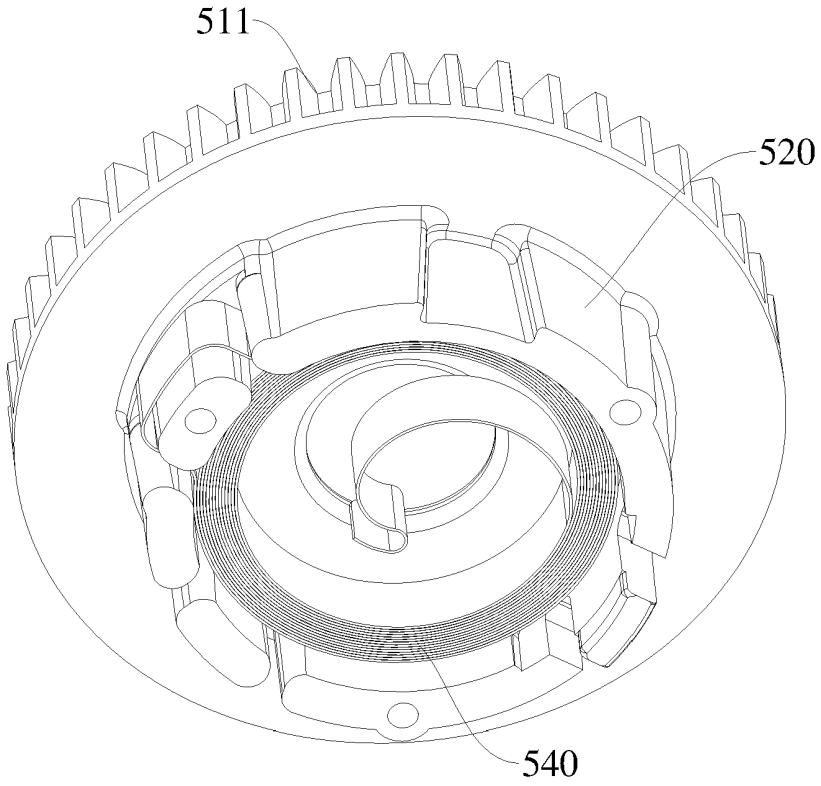

FIG. 9

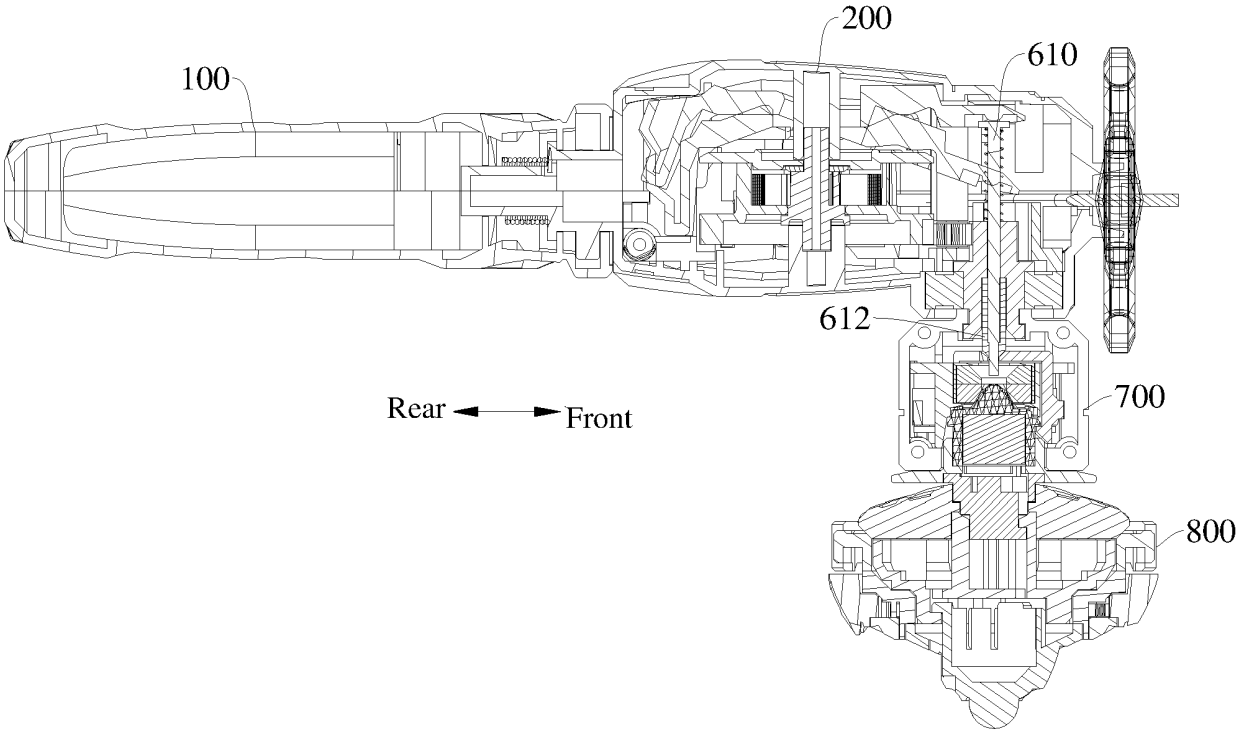

FIG. 10

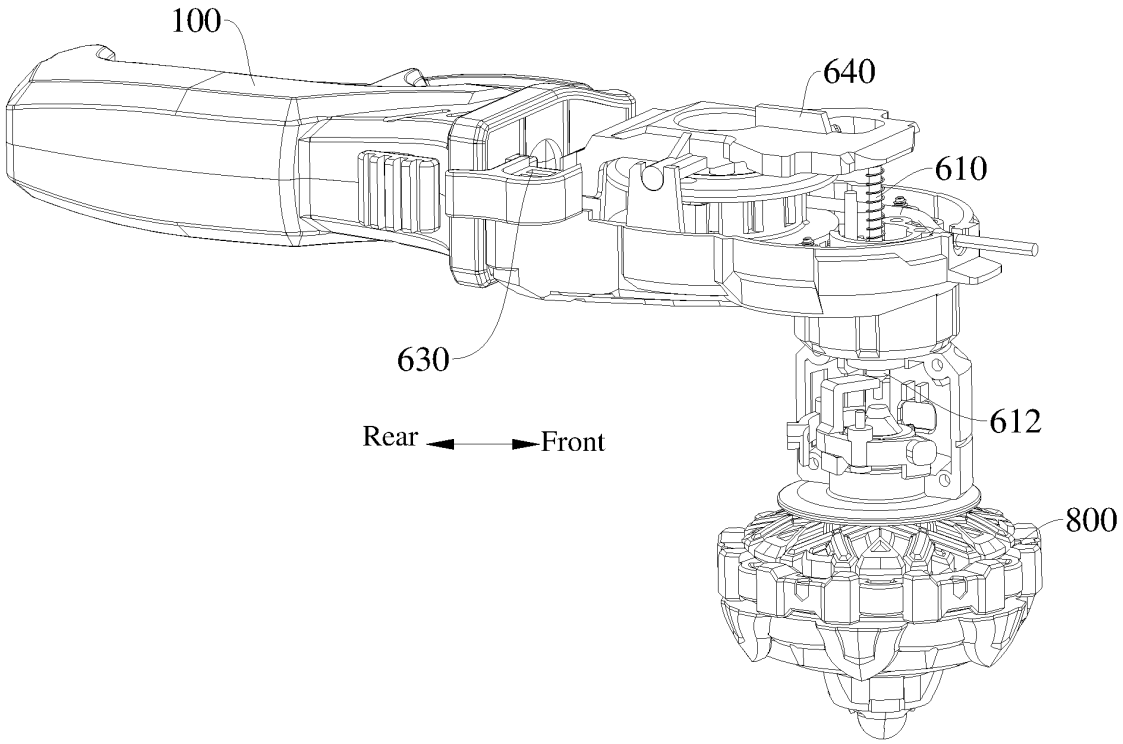

FIG. 11

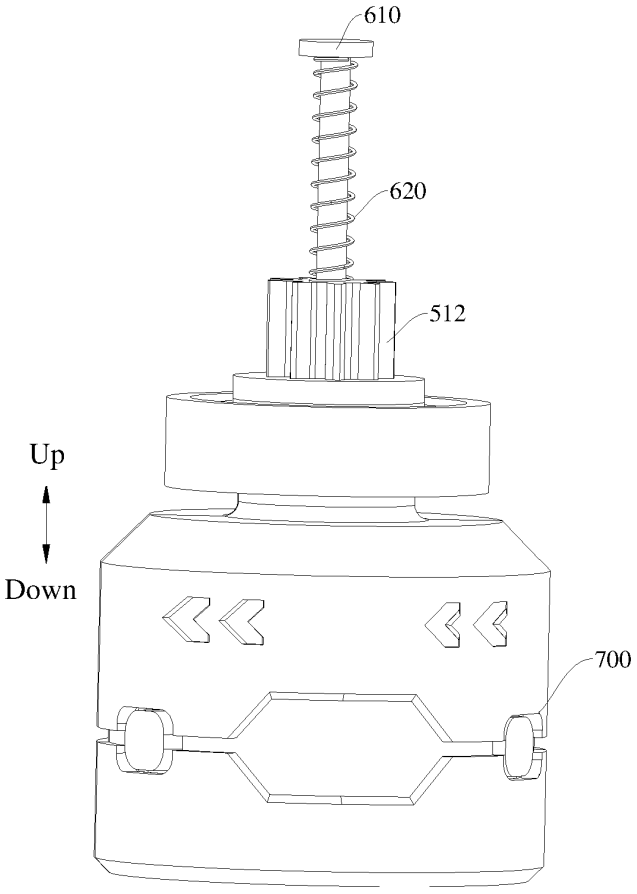

FIG. 12

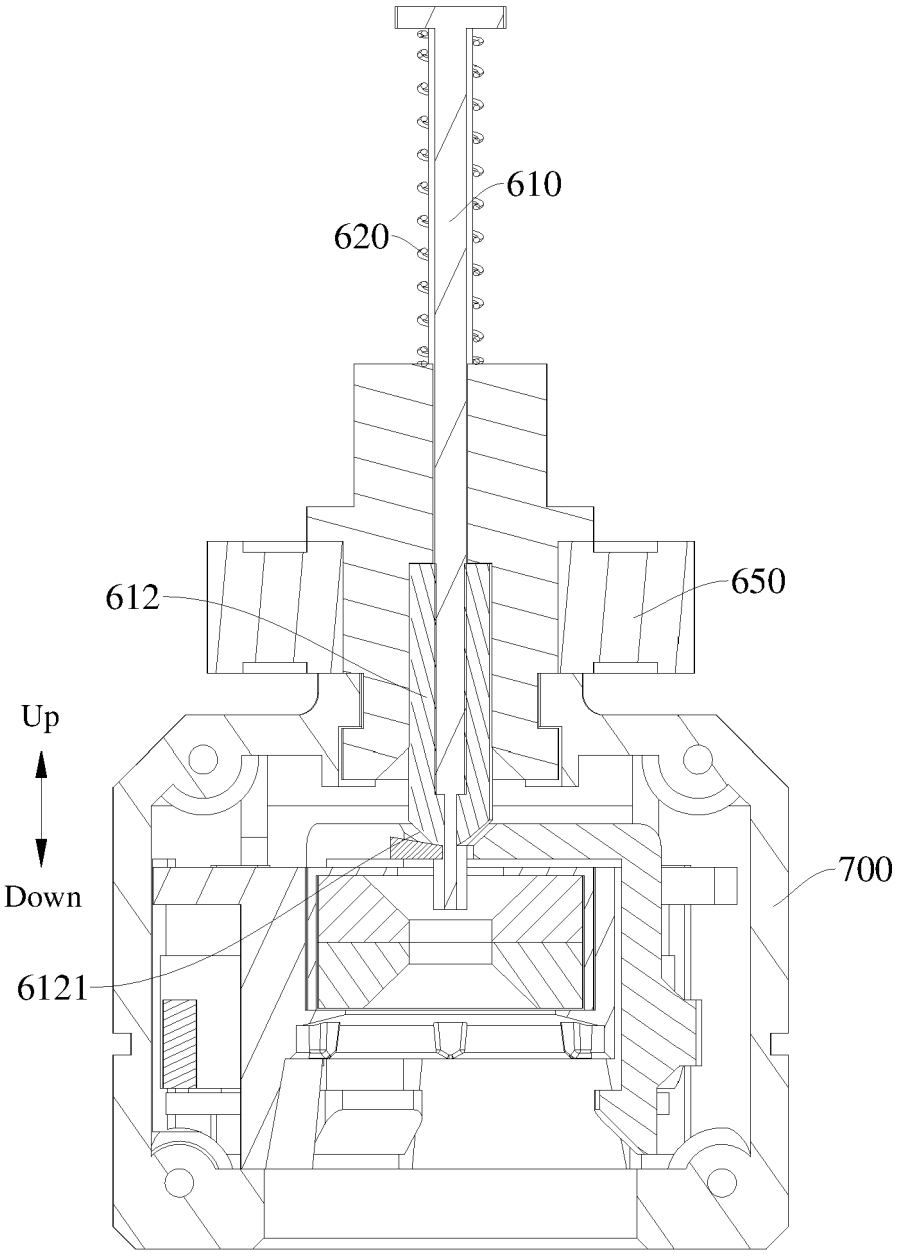

FIG. 13

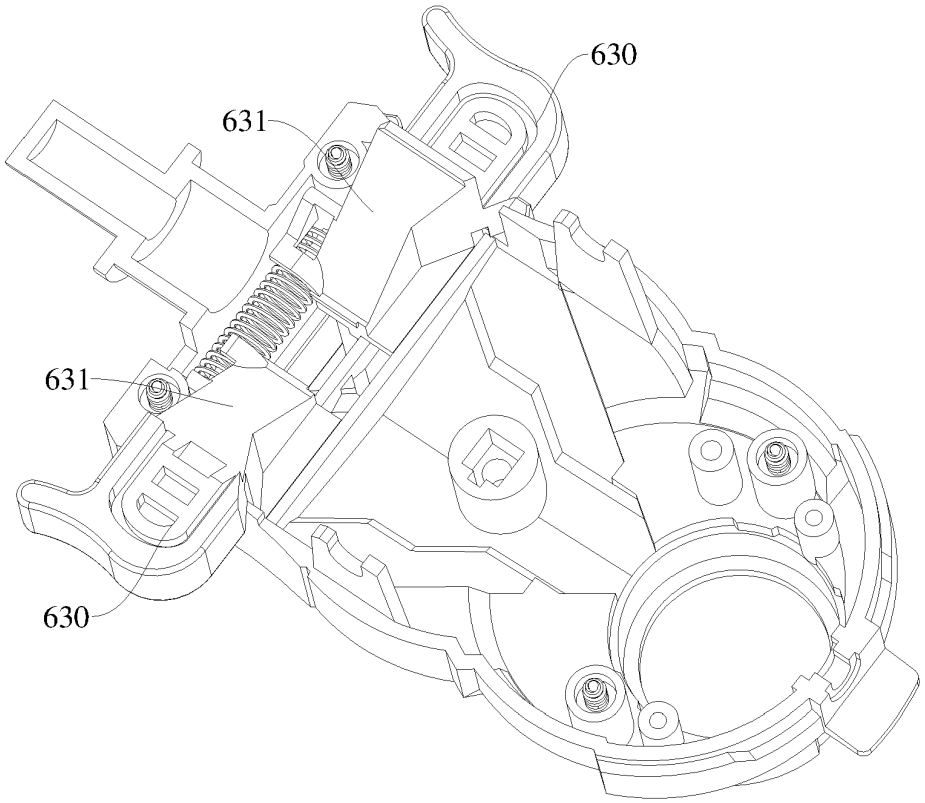

FIG. 14

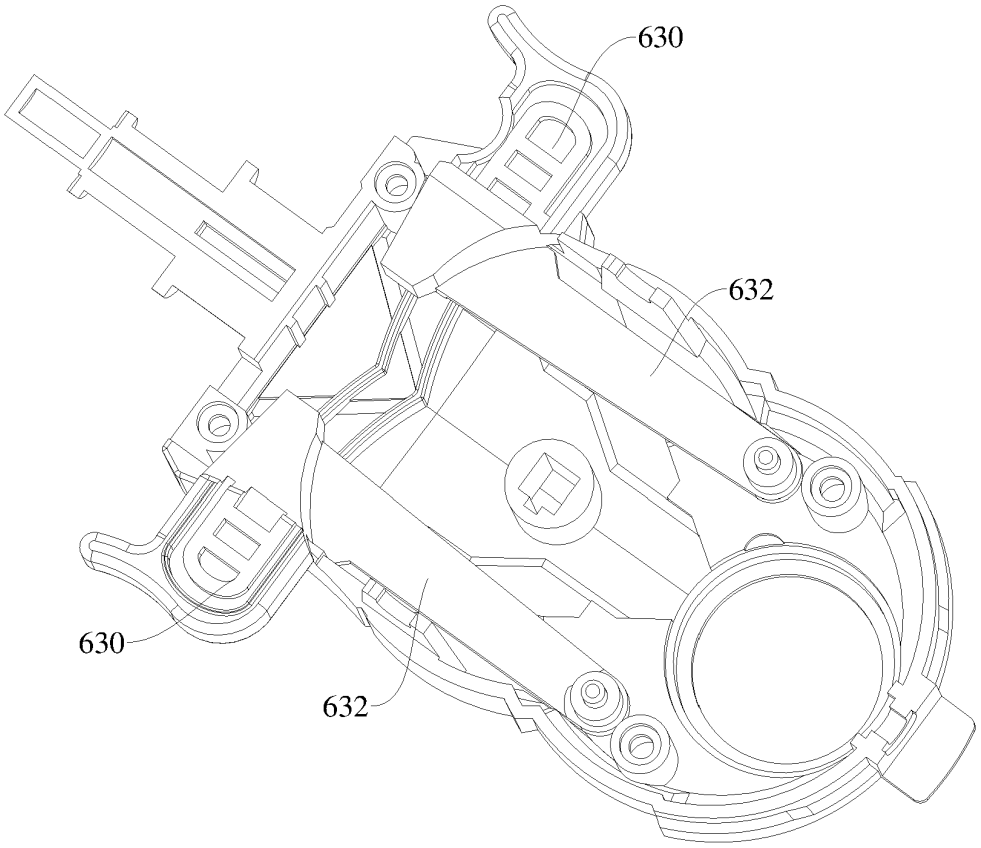

FIG. 15

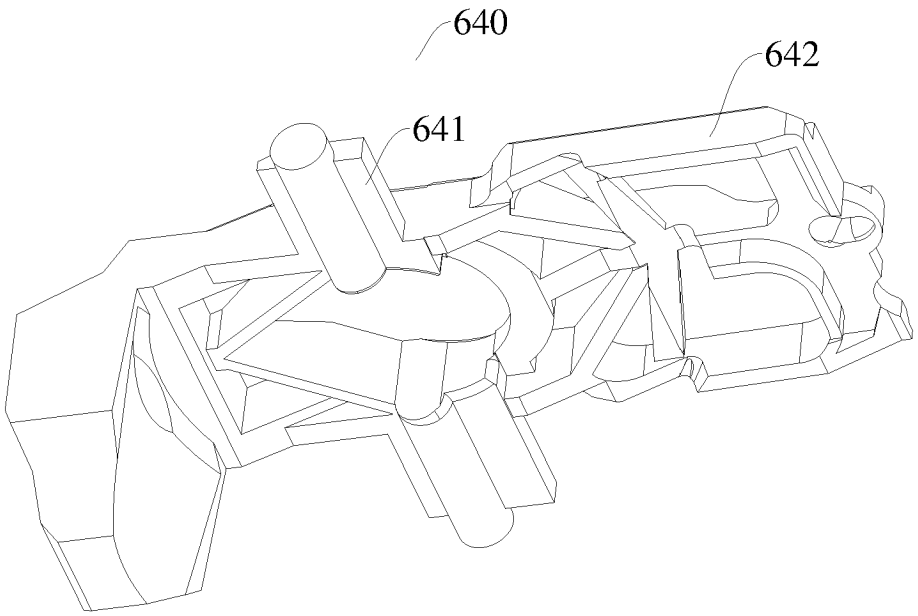

FIG. 16

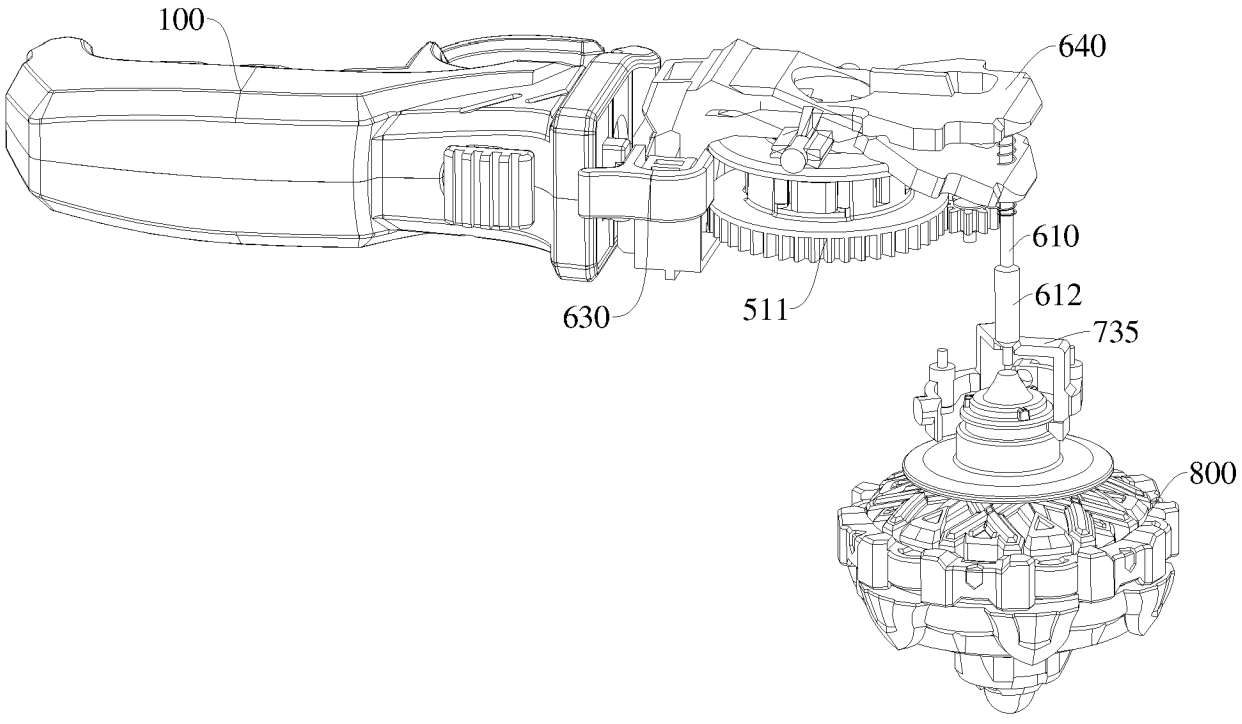

FIG. 17

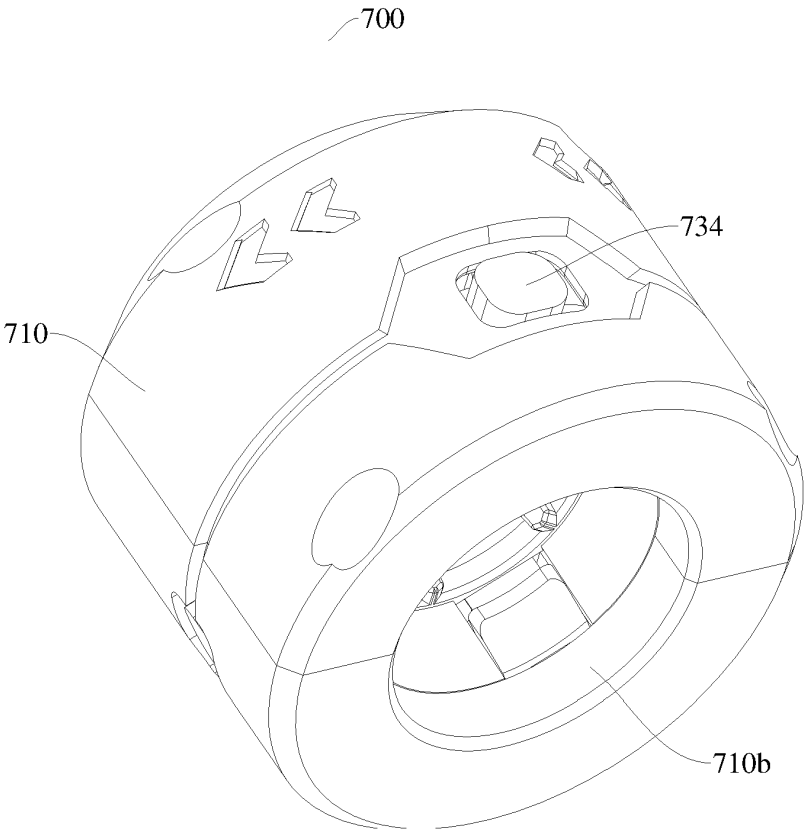
700
734
710
710b

FIG. 18

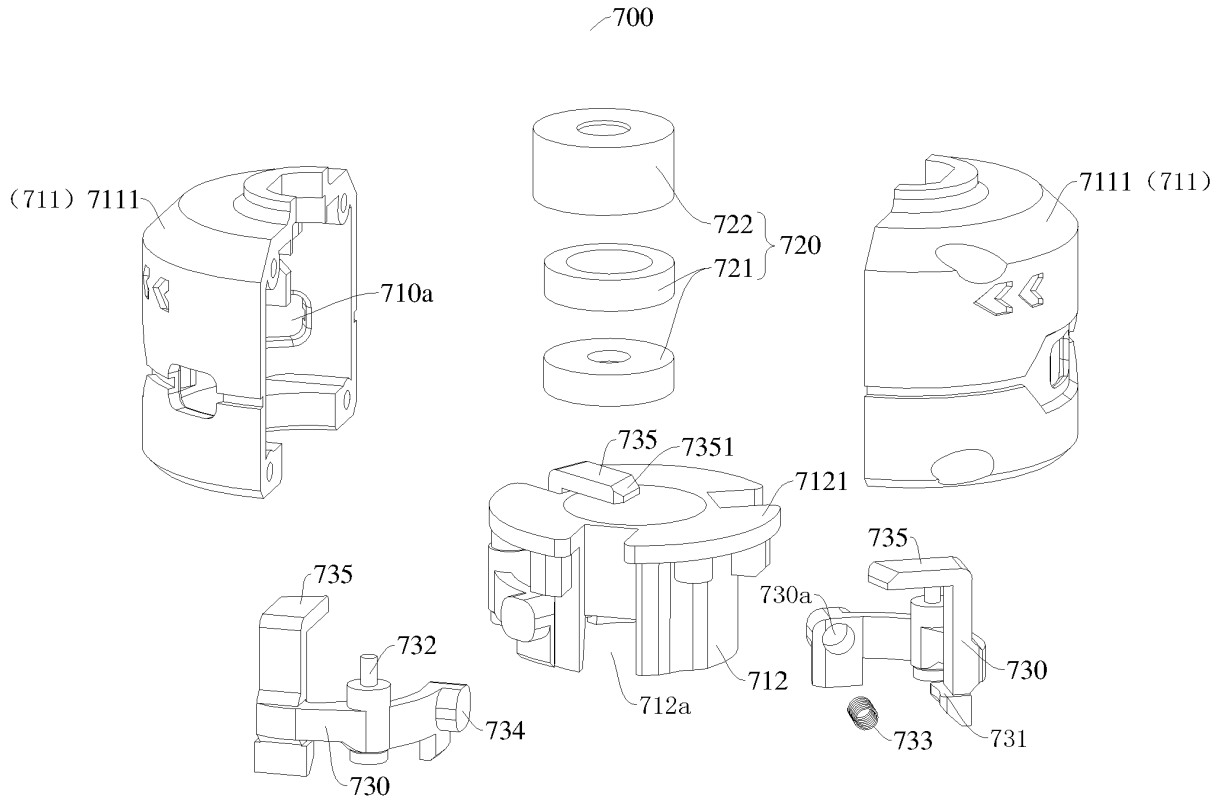
700
(711) 7111
710a
722
720
721
7111 (711)
735
7351
7121
735
730a
735
732
734
730
712
712a
730
733
731

FIG. 19

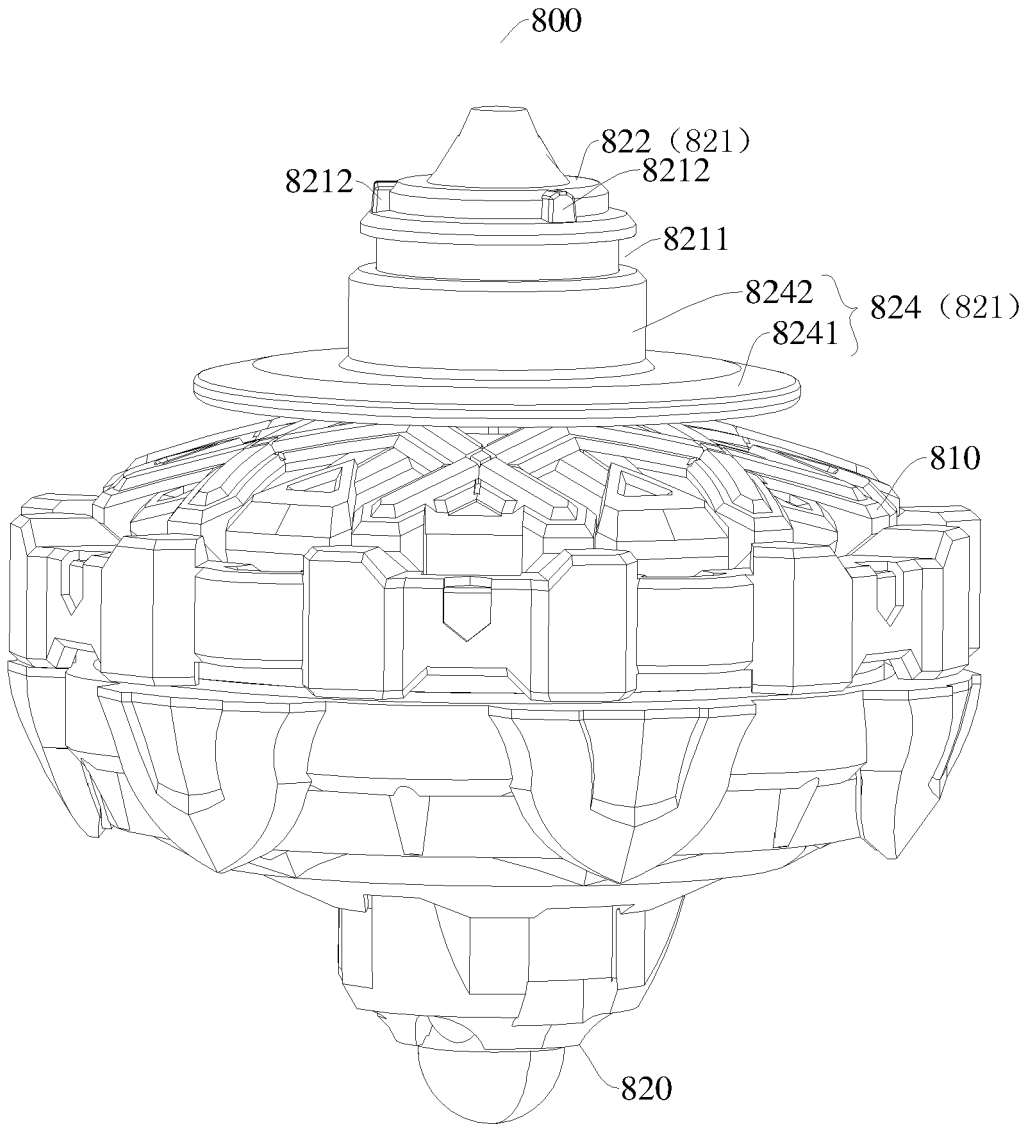

FIG. 20

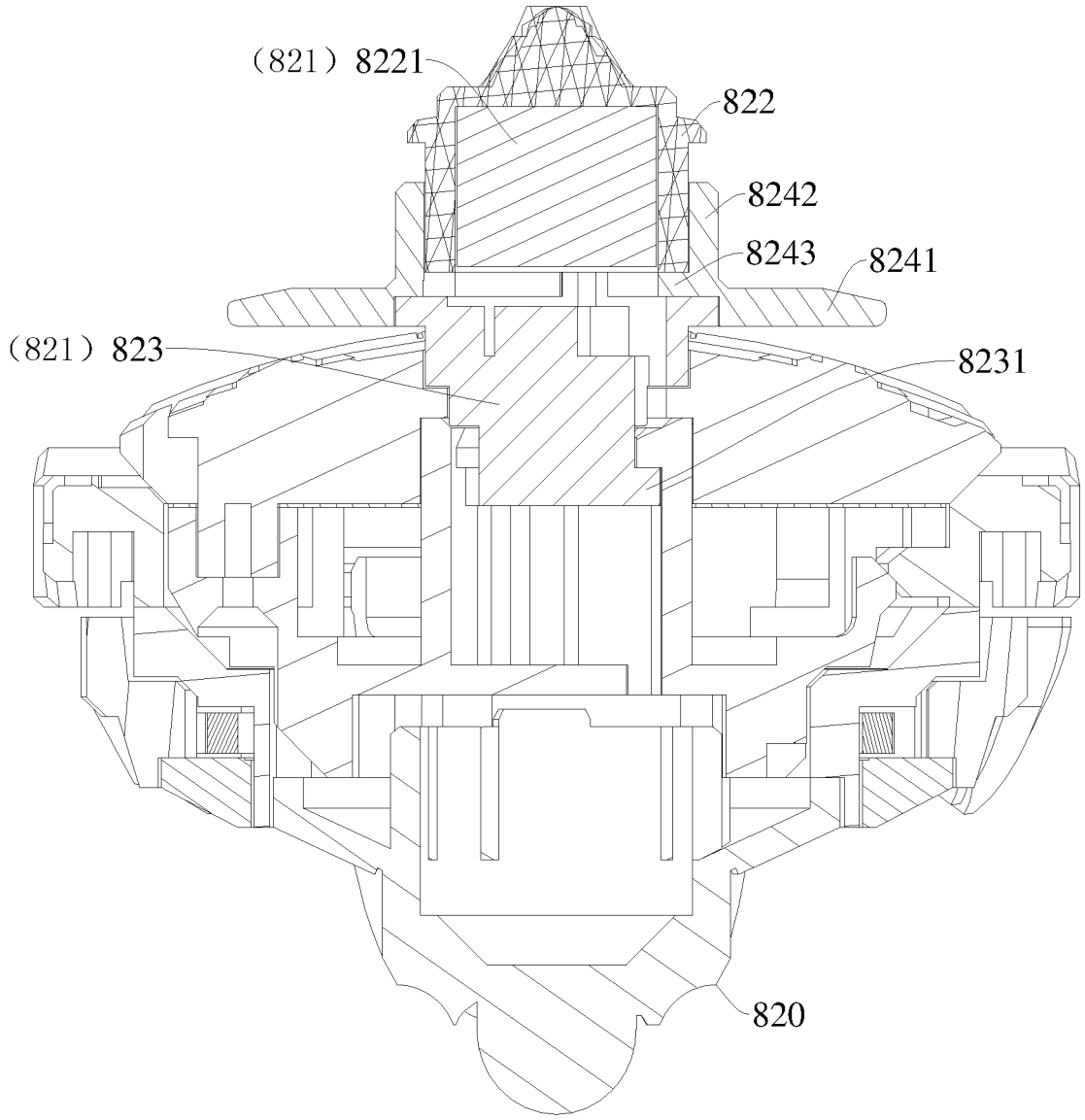

FIG. 21

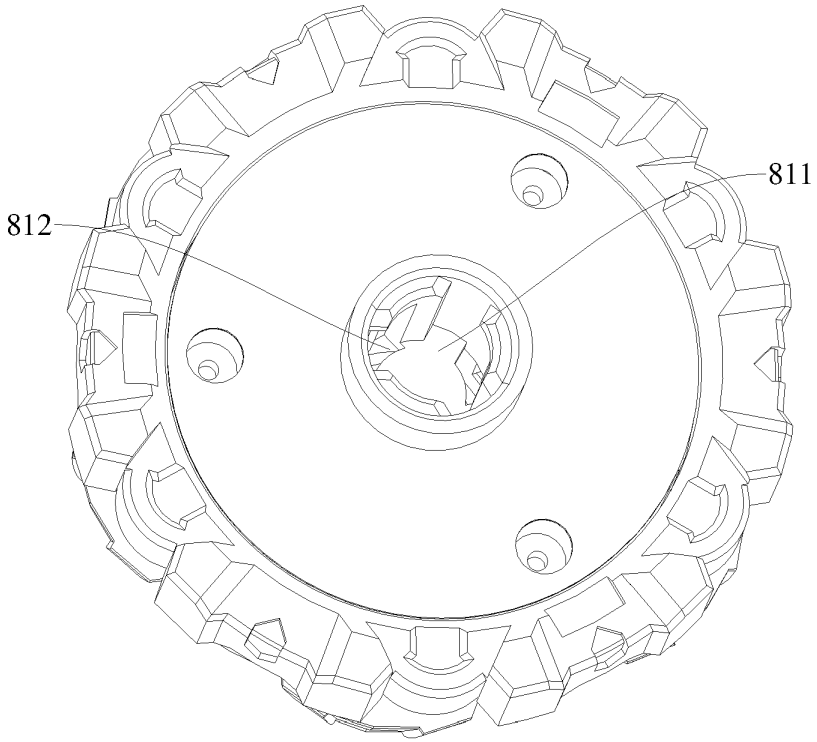

FIG. 22

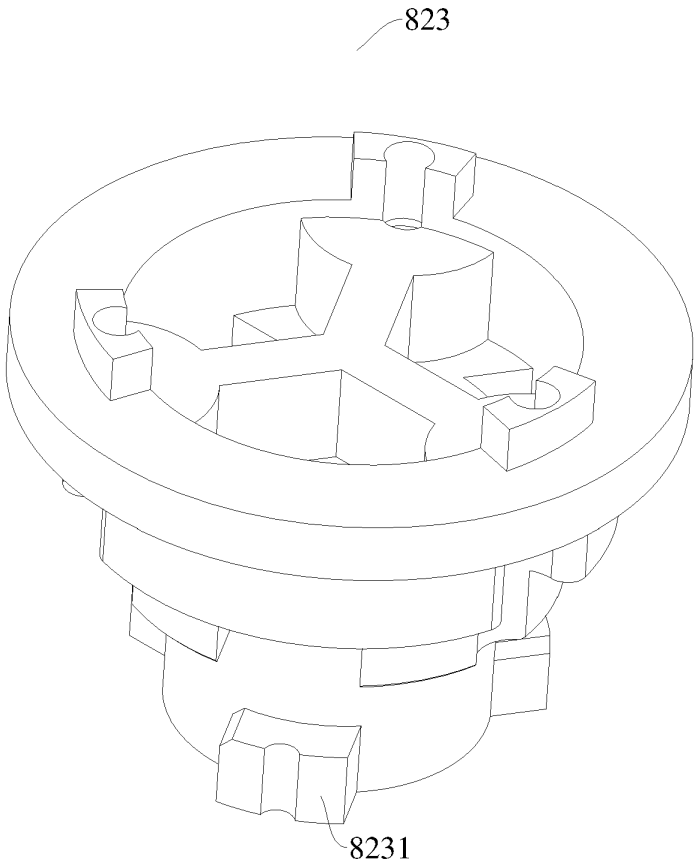

FIG. 23

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Patent documents cited in the description

- US 6089946 A **[0004]**