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(54) **SPINNING TOP TOY**

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(57) **ABSTRACT**

A spinning top toy includes a spinning top accelerator and a spinning top body movably connected with the spinning top accelerator. The spinning top accelerator includes a housing and a driving device, a clamping assembly and an injection pushing assembly disposed in the housing. The driving device includes a case and an acceleration gear set which is rotatably provided in the case. A gravity block is slidably provided on the case, and the gravity block is drivingly connected to the acceleration gear set. The clamping assembly is drivingly connected to the acceleration gear set, and is used to movably clamp the spinning top body. The injection pushing assembly is used to push the spinning top body. When the gravity block slides back and forth on the case by swinging, the gravity block drives the acceleration gear set to rotate, thereby driving the clamping assembly to rotate.

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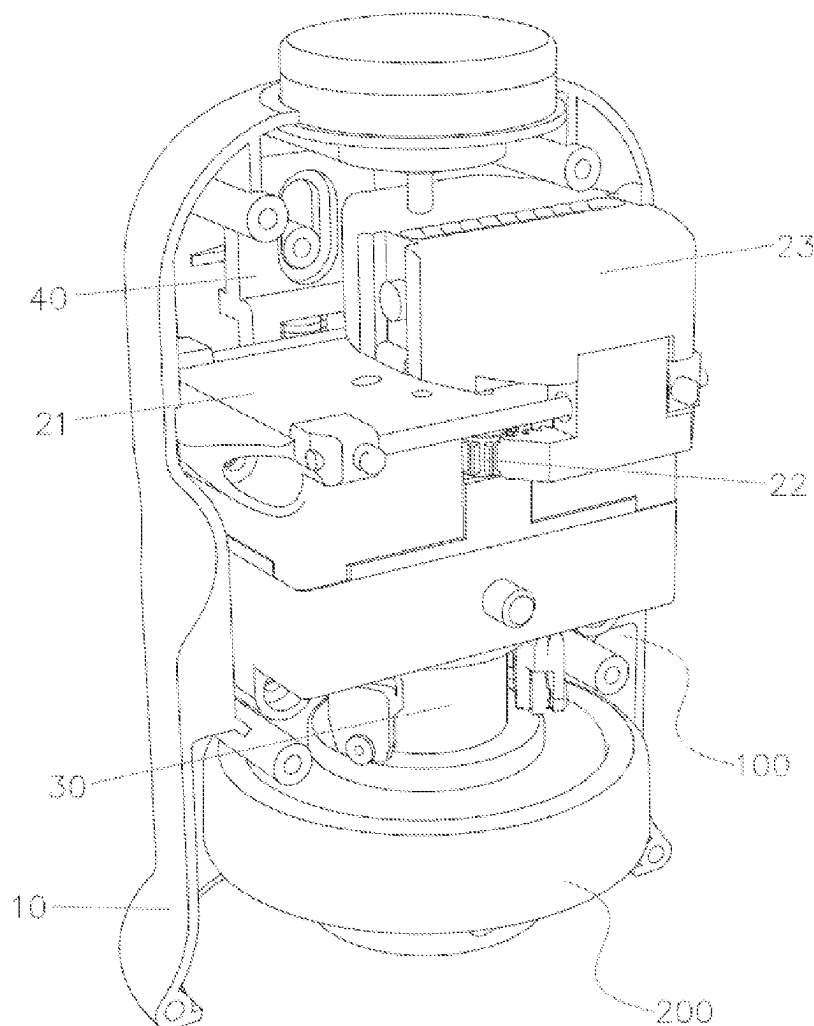
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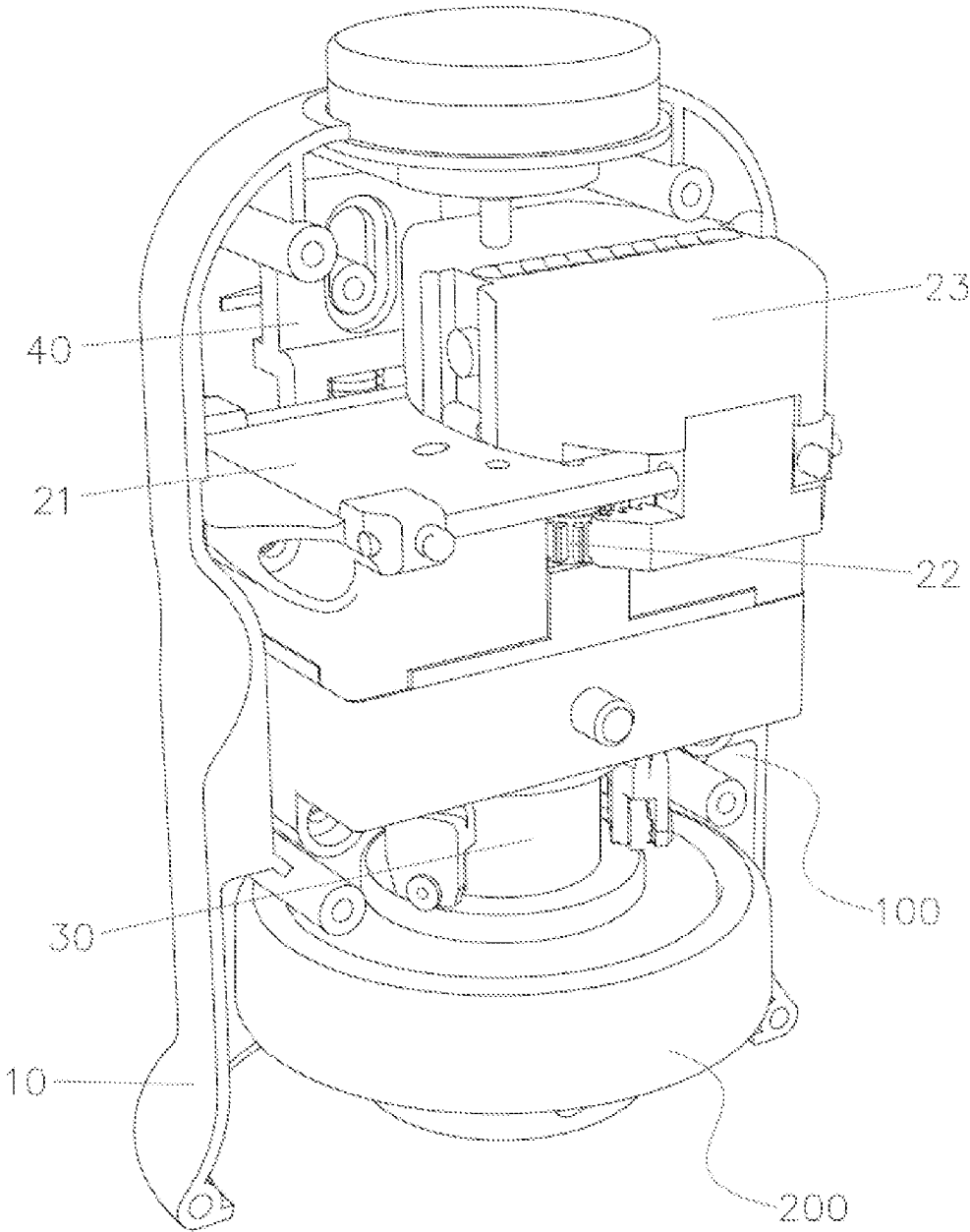


FIG. 1

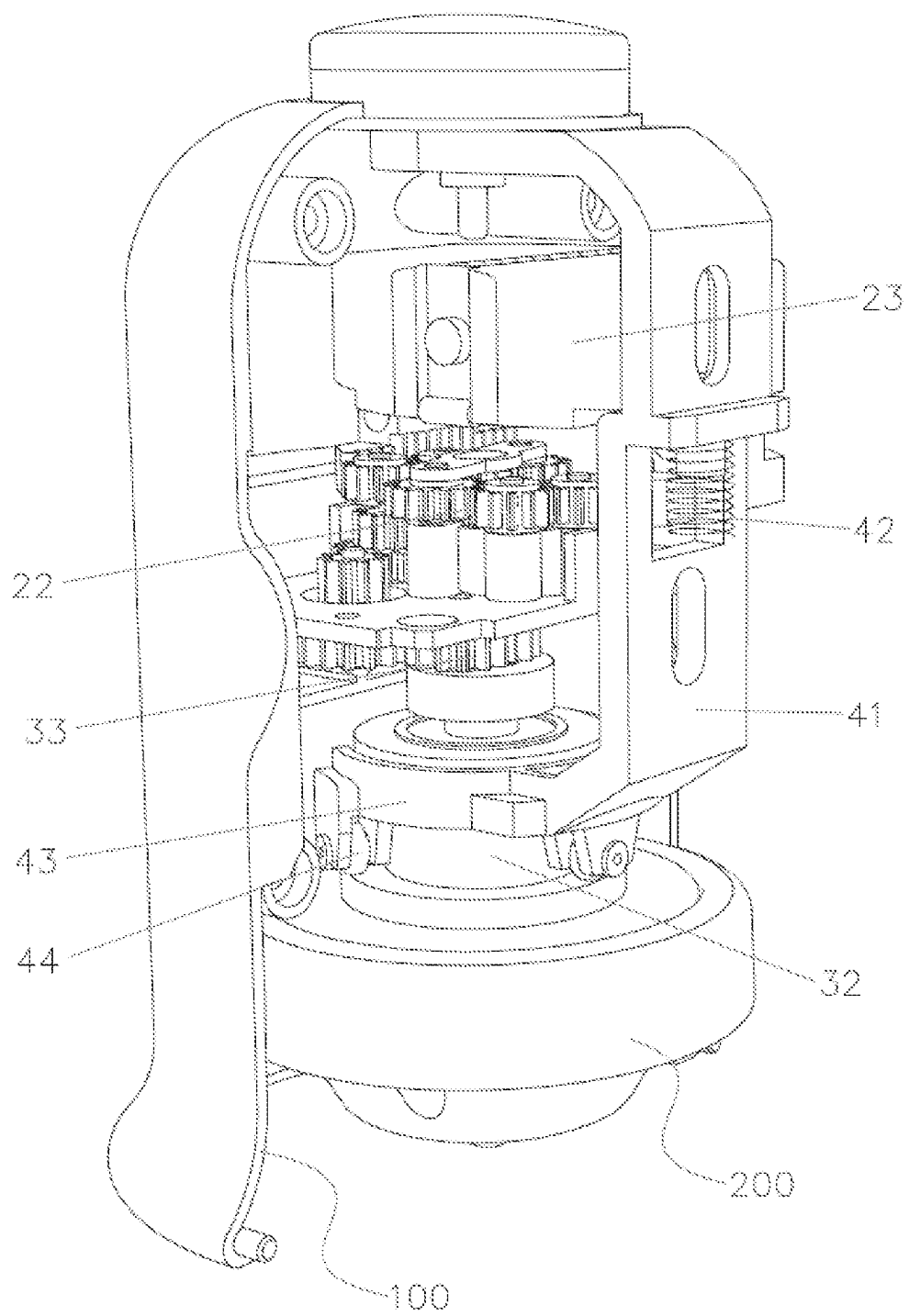


FIG. 2

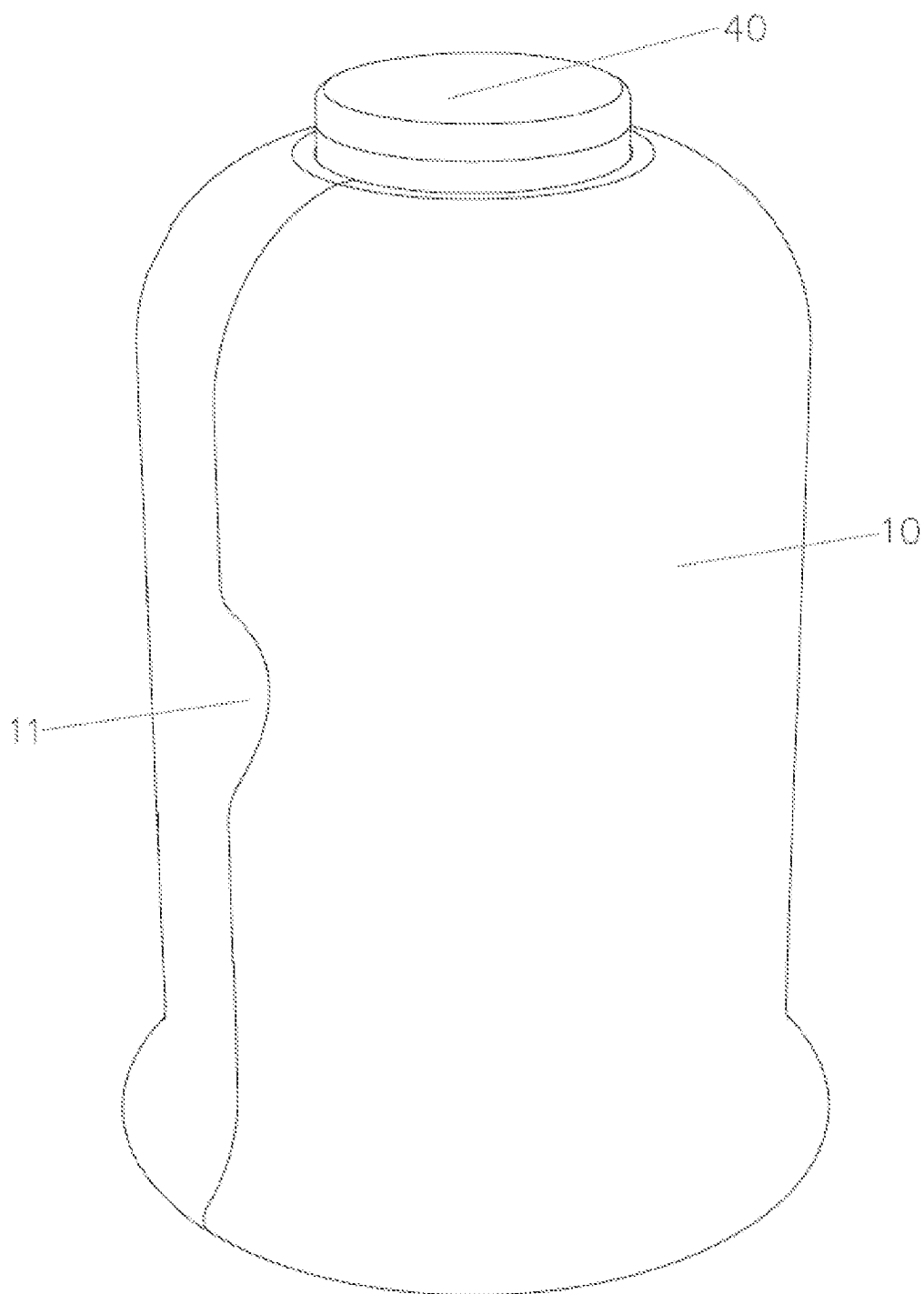


FIG. 3

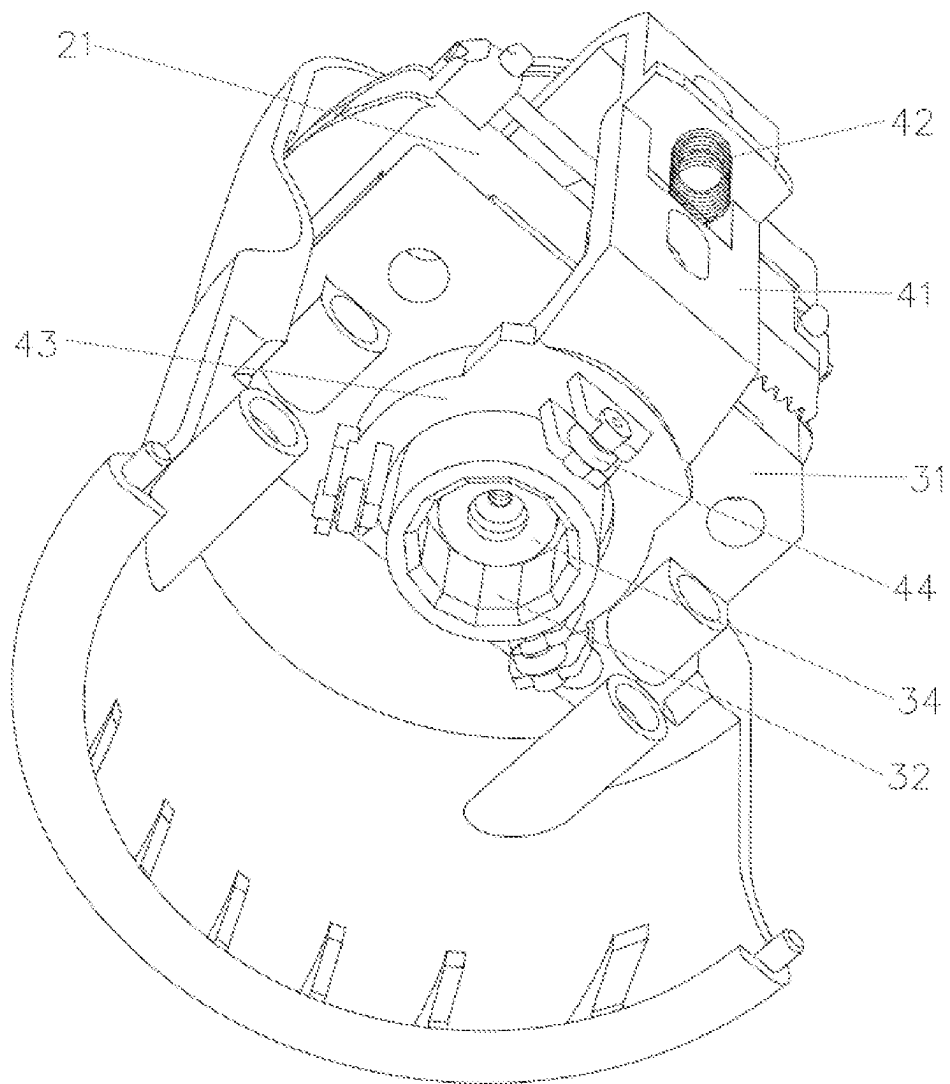


FIG. 4

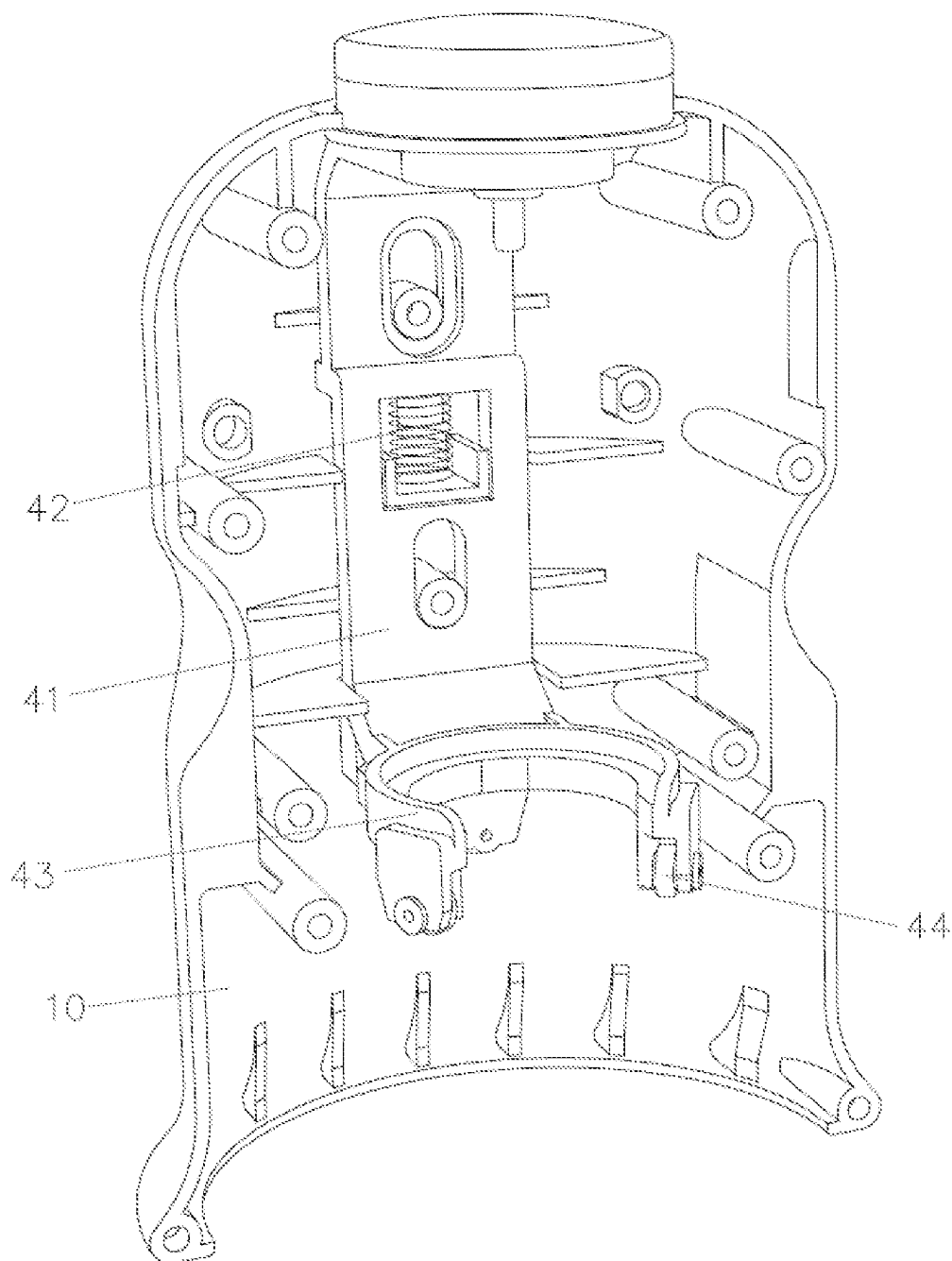


FIG. 5

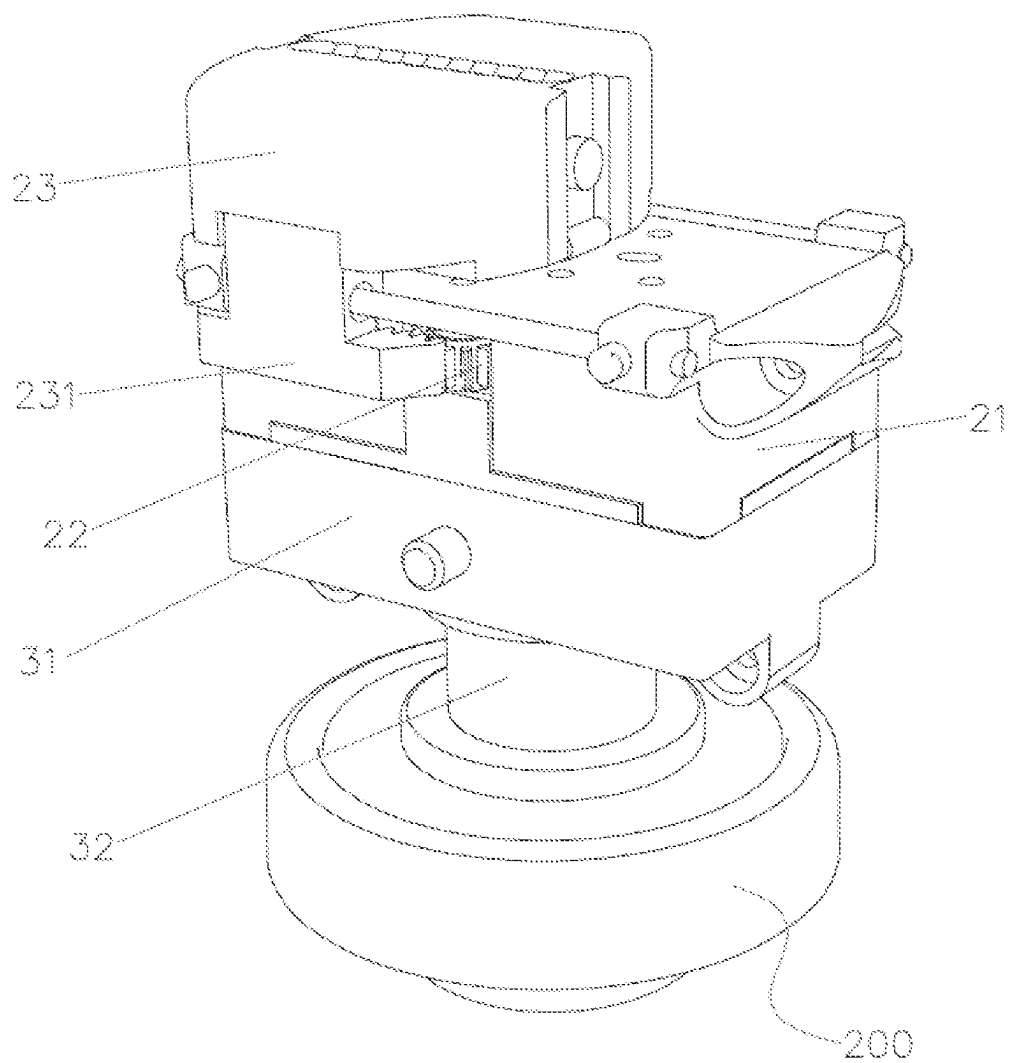


FIG. 6

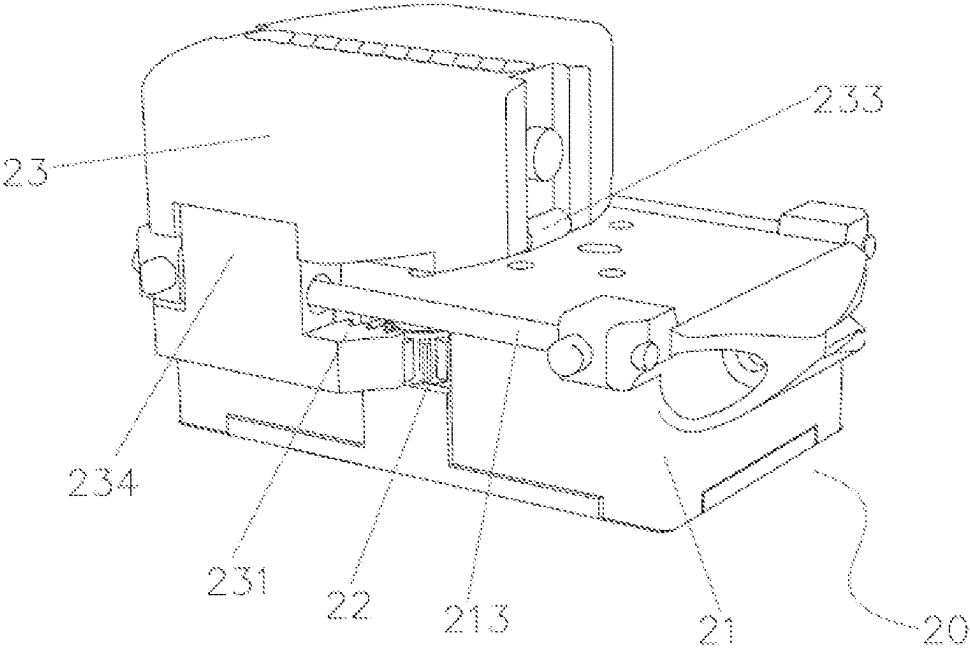


FIG. 7

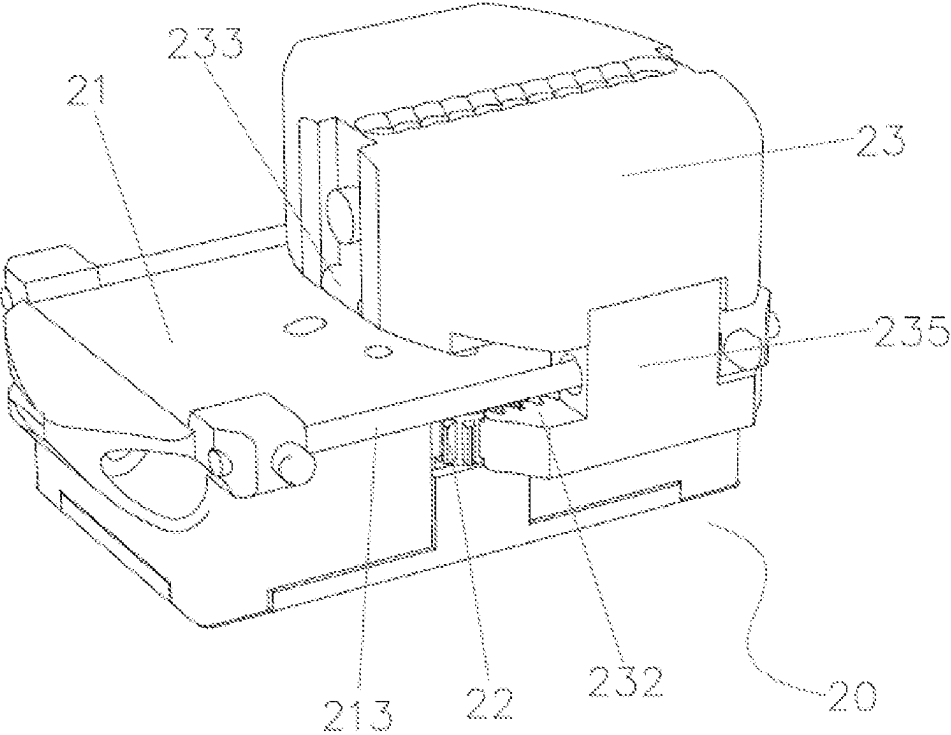


FIG. 8

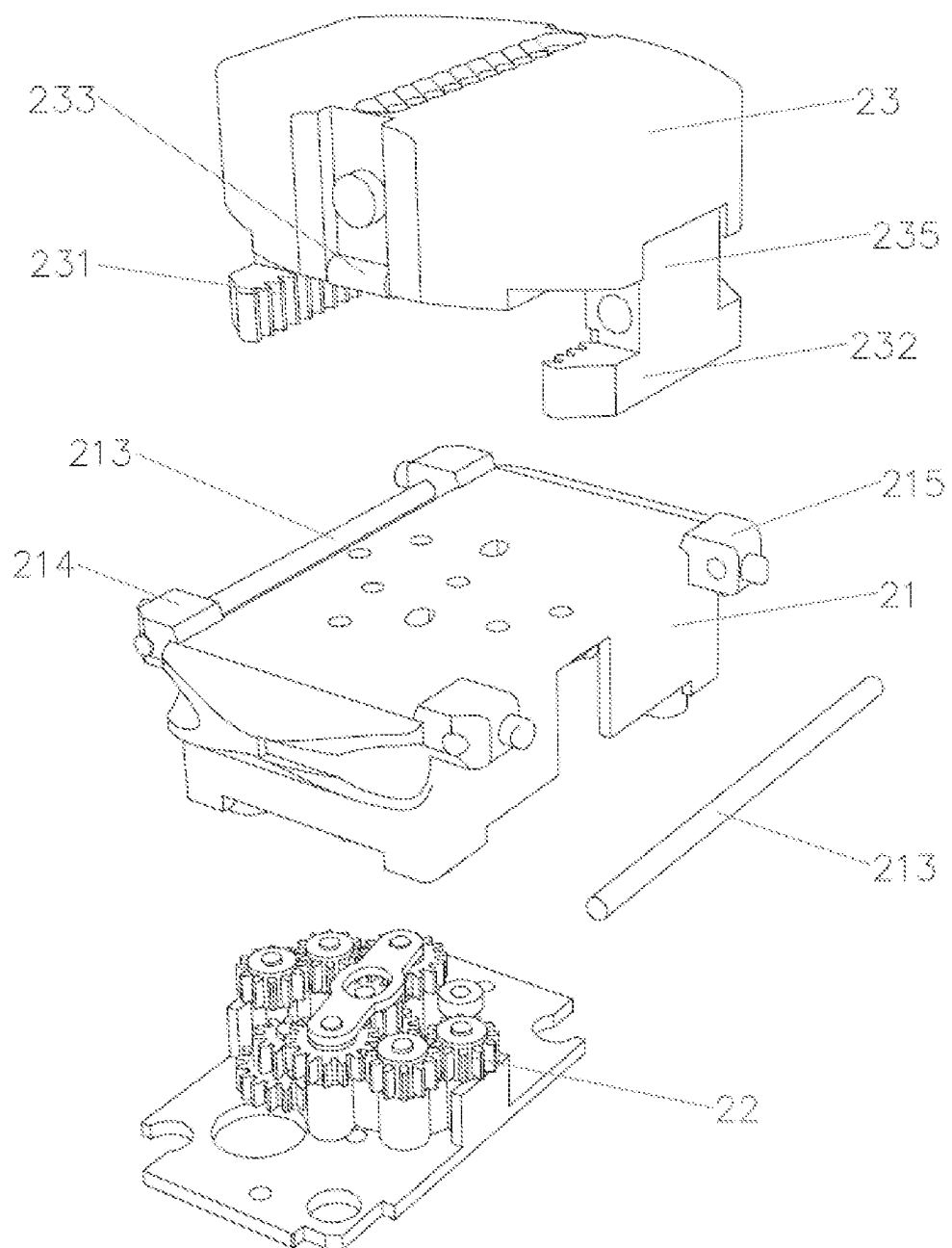


FIG. 9

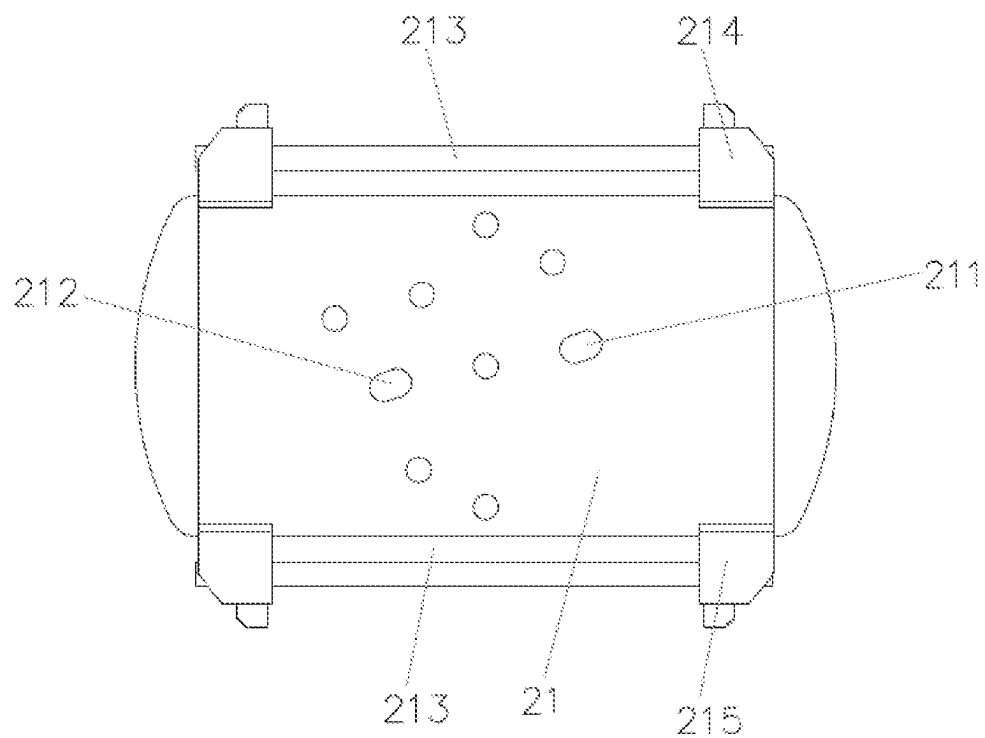


FIG. 10

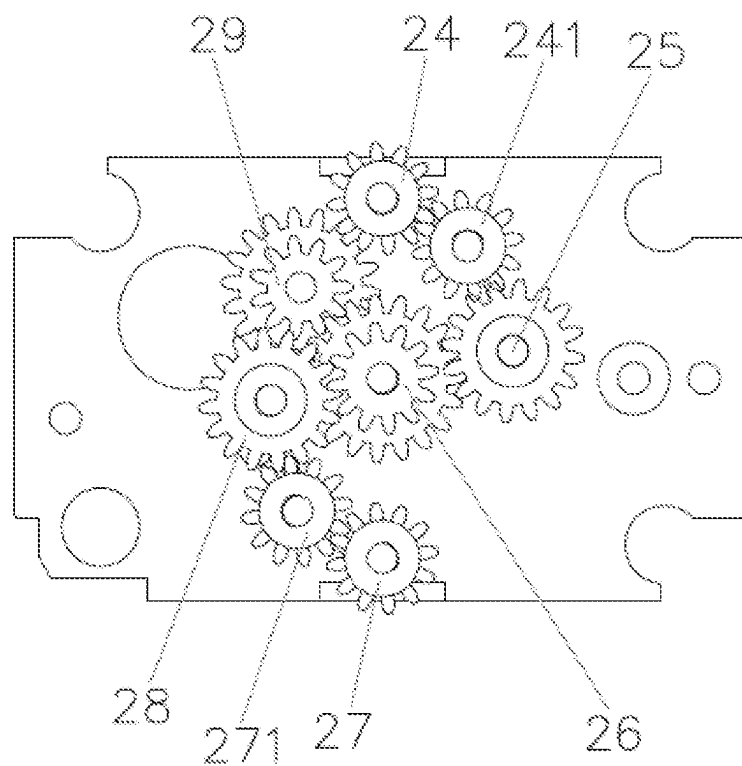


FIG. 11

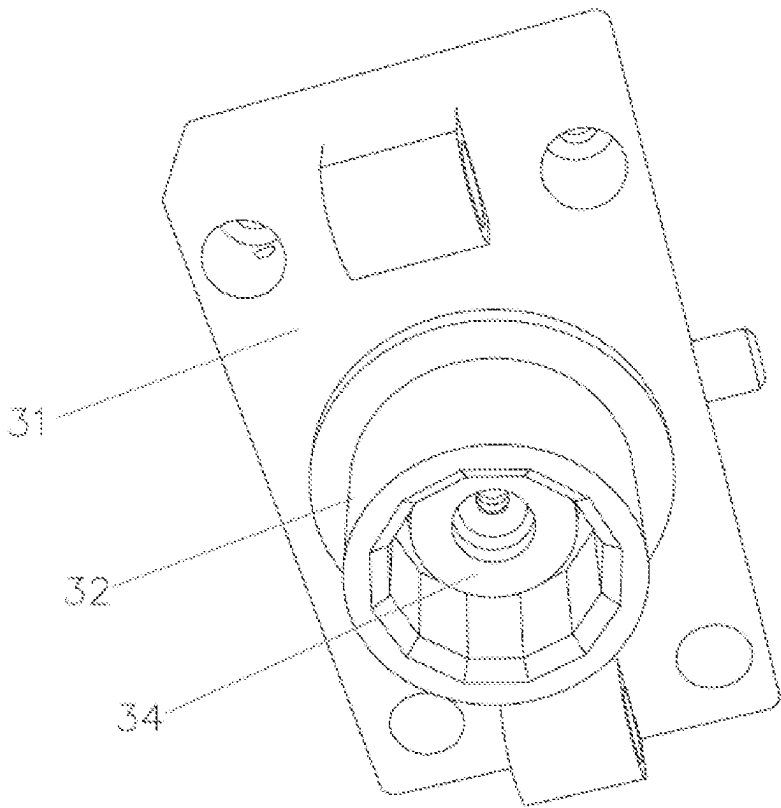


FIG. 12

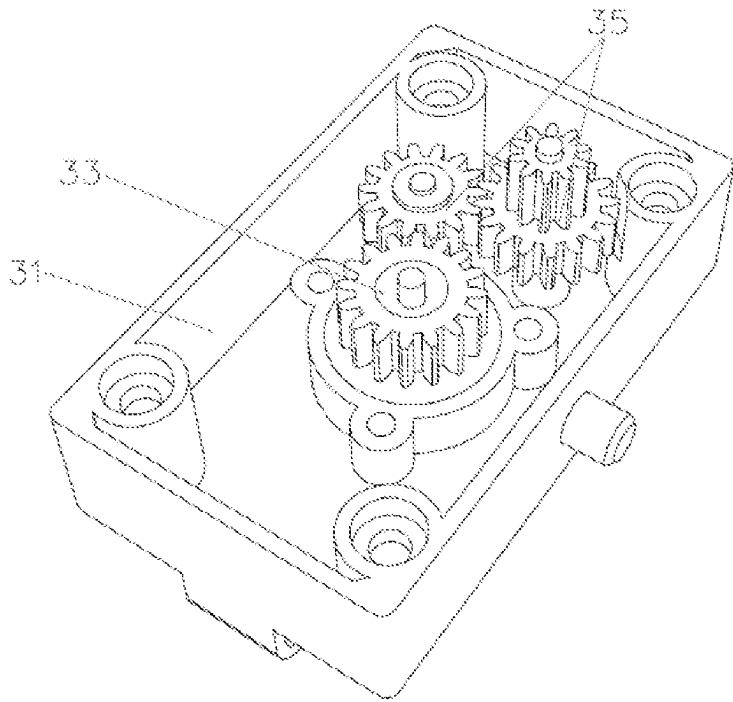


FIG. 13

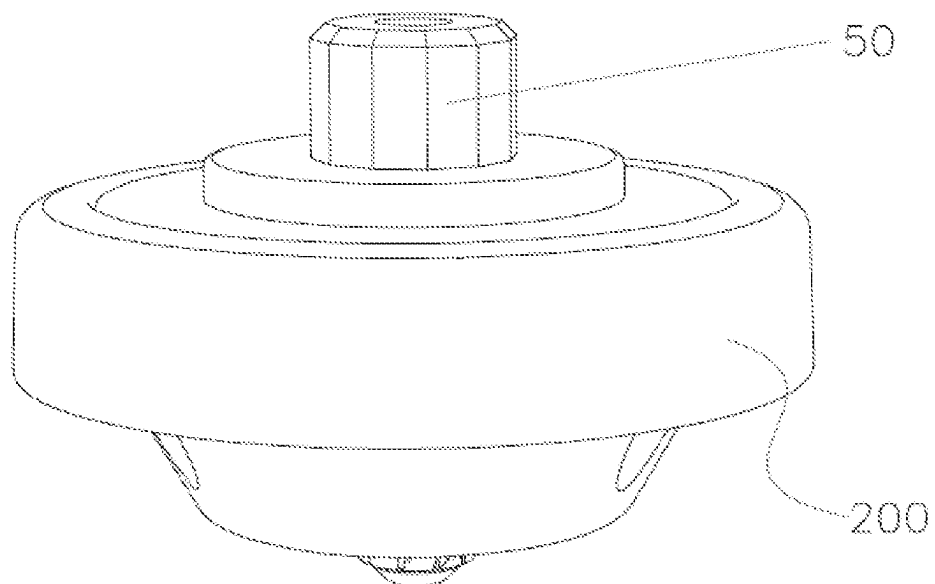


FIG. 14

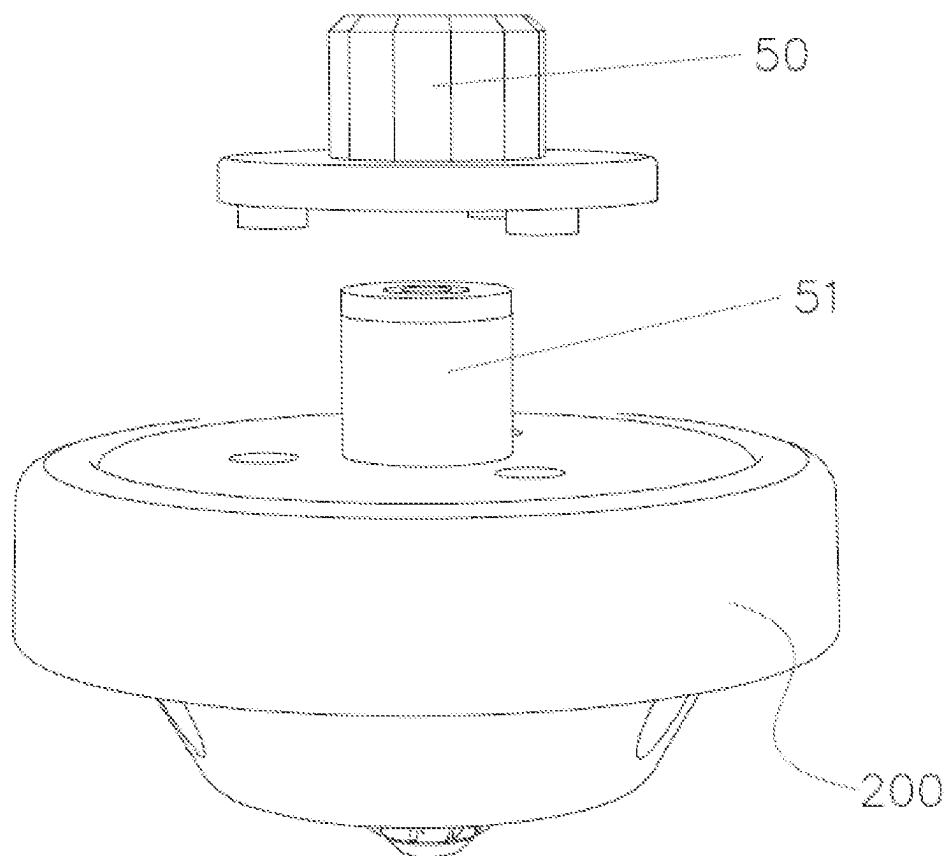


FIG. 15

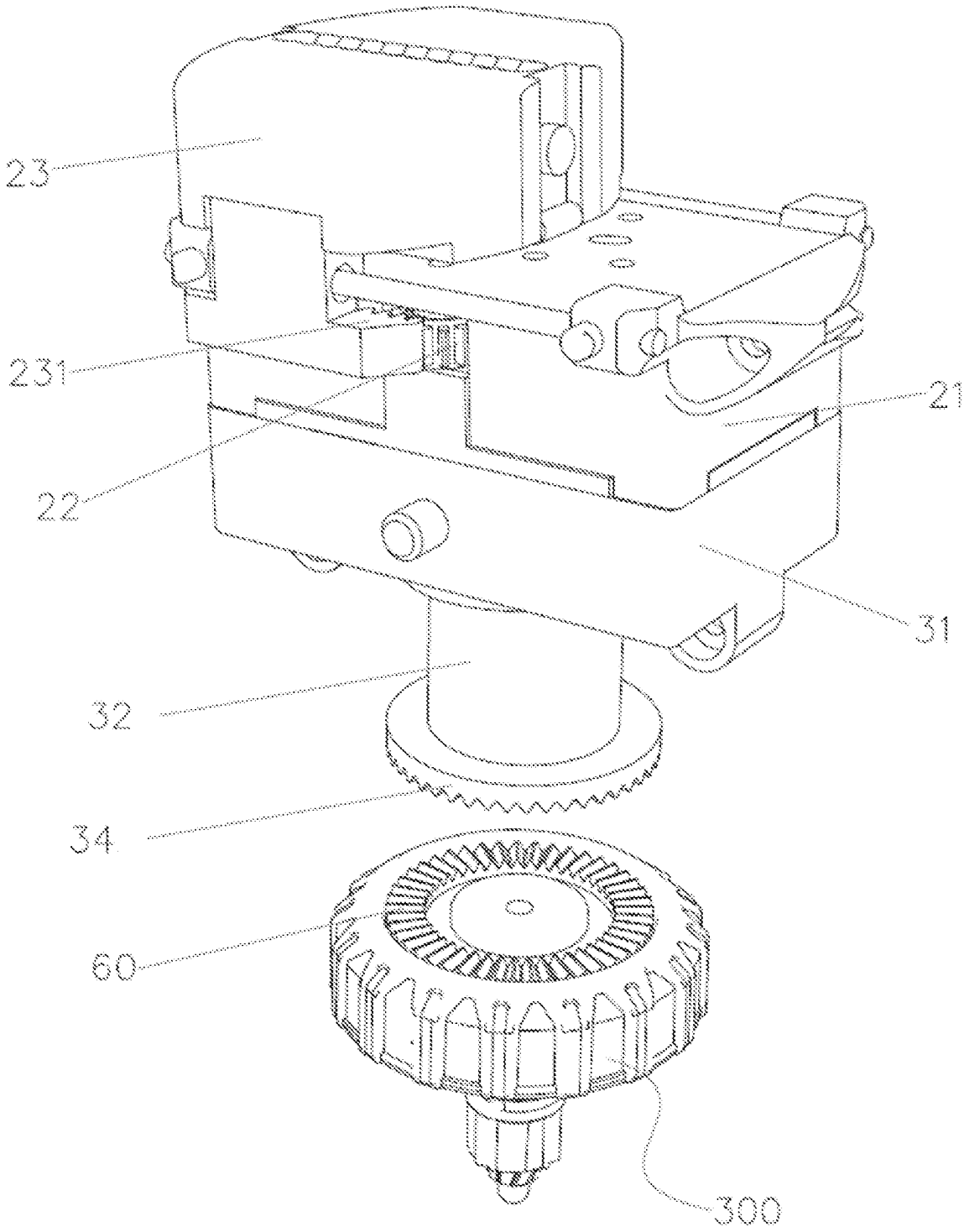


FIG. 16

SPINNING TOP TOY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to PCT/CN2023/079564 filed on Mar. 3, 2023, which claims priority to Chinese Patent Application No. 202210758455.4 filed on Jun. 30, 2022. The entire contents of both are hereby incorporated by reference.

FIELD OF TECHNOLOGY

[0002] The following relates to the technical field of toys, and in particular to a spinning top toy.

BACKGROUND

[0003] Toys are tools for intellectual development and entertainment. With the continuous improvement of people's living standards, users' pursuit of the quality and functionality of toys is also getting higher and higher. Among them, projectile toys based on spinning tops have attracted a large number of fans and users due to animation movies and their unique gameplay.

[0004] However, existing projectile toys usually use rack acceleration to accelerate and rotate the spinning top. Specifically, a rack first passes through a driving gear, and then the rack is pulled to drive the driving gear to rotate, and then the driving gear drives the spinning top to rotate and accelerate. This kind of spinning top toy can usually only be accelerated once. After the rack is pulled out, it cannot be accelerated twice, causing the spinning top to be unable to obtain more rotational potential energy. In addition, a user must use both hands to operate through a driving method of the rack acceleration. This makes driving and acceleration of the spinning top cumbersome, time-consuming and labor-intensive, and reduces the fun of the spinning top toy.

SUMMARY

[0005] According to an aspect of this disclosure, a spinning top toy is disclosed. The spinning top toy includes a spinning top accelerator and a spinning top body movably connected with the spinning top accelerator; wherein, the spinning top accelerator includes a housing and a driving device, a clamping assembly and an injection pushing assembly disposed in the housing, the driving device includes a case and an acceleration gear set which is rotatably provided in the case, a gravity block is slidably provided on the case, and the gravity block is drivingly connected to the acceleration gear set; the clamping assembly is drivingly connected to the acceleration gear set, and is used to movable clamp the spinning top body; the injection pushing assembly is used to push the spinning top body; when the gravity block slides back and forth on the case by swinging, the gravity block drives the acceleration gear set to rotate, thereby driving the clamping assembly to rotate.

[0006] In some embodiments, the acceleration gear set is rotatably disposed inside the case, a first opening is provided on one side of the case, and at least a portion of the acceleration gear set extends out of the first opening of the case; a first driving rack is provided on one side of the gravity block, and the first driving rack is cooperatively and drivingly connected with the portion of the acceleration gear set extending out of the first opening of the case.

[0007] In some embodiments, the acceleration gear set includes a first active gear, a first clutch gear and a driving gear, the case is provided with a first arc-shaped groove, the first active gear and the driving gear are respectively rotatably provided in the case, and the first active gear meshes with the first clutch gear; the first clutch gear is slidably disposed in the first arc-shaped groove, when the first clutch gear slides to one end of the first arc-shaped groove, the first clutch gear meshes with the driving gear, and when the first clutch gear slides to other positions of the first arc-shaped groove, the first clutch gear and the driving gear do not contact each other; at least a portion of the first active gear extends out of the first opening of the case, and the portion of the first active gear extending out of the first opening is cooperatively and drivingly connected with the first driving rack of the gravity block.

[0008] In some embodiments, a second opening is provided on the other side of the case, and a second driving rack is provided on the other side of the gravity block; the acceleration gear set also includes a second active gear and a second clutch gear; the case is provided with a second arc-shaped groove; the second clutch gear is slidably disposed in the second arc-shaped groove, and the second clutch gear meshes with the second active gear; when the second clutch gear slides to one end of the second arc-shaped groove, the second clutch gear meshes with the driving gear; when the second clutch gear slides to other positions of the second arc-shaped groove, the second clutch gear and the driving gear do not contact each other.

[0009] In some embodiments, at least a portion of the second active gear extends out of the second opening of the case, and the portion of the second active gear extending out of the second opening is cooperatively and drivingly connected with the second driving rack of the gravity block; the second active gear, the second clutch gear and the second arc-shaped groove are respectively arranged symmetrically with the first active gear, the first clutch gear and the first arc-shaped groove with respect to the driving gear.

[0010] In some embodiments, guide slide rods are provided in parallel on both sides of the case, and both sides of the gravity block are respectively slidably sleeved on the guide slide rods on both sides of the case.

[0011] In some embodiments, the clamping assembly includes a magnetic sleeve, which is drivingly connected to the acceleration gear set; the magnetic sleeve has a cylindrical structure with an open lower end, a magnetic unit is provided on the top of an inner wall of the magnetic sleeve, and a magnet unit is provided on the top of the spinning top body; the spinning top body is attracted and connected to the magnetic unit of the magnetic sleeve through the magnet unit on the top of the spinning top body.

[0012] In some embodiments, the clamping assembly also includes a transmission gearbox and a passive gear rotatably arranged in the transmission gearbox; the transmission gearbox is fixed below the acceleration gear set of the driving device, the passive gear and the acceleration gear set is drivingly connected, and the passive gear is coaxially fixedly connected with the magnetic sleeve.

[0013] In some embodiments, one or more transmission gears are arranged between the passive gear and the acceleration gear set, and the passive gear, the one or more transmission gears and the acceleration gear set are drivingly connected in sequence.

[0014] In some embodiments, the housing is a cavity structure with upper and lower openings, the injection pushing assembly includes an injection pushing rod and a return spring, an upper end of the injection pushing rod is located at the upper opening of the housing, a middle part of the injection pushing rod is connected to an inner wall of the housing through the return spring, and a lower end of the injection pushing rod is located on an outer peripheral side of the magnetic sleeve.

[0015] In the spinning top toy of this application, the driving device swings the gravity block back and forth, so that the gravity block continuously accelerates and rotates the acceleration gear set. Particularly, the acceleration gear set is driven and accelerated through the driving rack(s) on one side or both sides of the gravity block, and the one or two clutch gears in the acceleration gear set ensure the one-way rotation of the driving gear, thus avoiding a bidirectional rotation of the driving gear due to the back and forth swing of the gravity block. As a result, the driving gear always maintains the one-way rotation, and then the driving device drives the clamping assembly to rotate, the clamping assembly drives and stores energy in the spinning top body. Finally, the spinning top after rotation and energy storing is ejected out through the injection pushing assembly.

BRIEF DESCRIPTION

[0016] Some of the embodiments will be described in detail, with references to the following Figures, wherein like designations denote like members, wherein:

[0017] FIG. 1 is a schematic diagram of an internal structure of a spinning top toy of the present application;

[0018] FIG. 2 is another schematic diagram of the internal structure of the spinning top toy of the present application;

[0019] FIG. 3 is a schematic diagram of an external structure of the spinning top toy of the present application;

[0020] FIG. 4 is a schematic structural diagram of the spinning top accelerator of the spinning top toy of the present application;

[0021] FIG. 5 is a schematic structural diagram of an injection pushing assembly of the spinning top toy of the present application;

[0022] FIG. 6 is a schematic diagram of a connection between a driving device and a spinning top body of the spinning top toy of the present application;

[0023] FIG. 7 is a schematic structural diagram of the driving device of the spinning top toy of the present application;

[0024] FIG. 8 is another structural schematic diagram of the driving device of the spinning top toy of the present application;

[0025] FIG. 9 is an exploded schematic diagram of the driving device of the spinning top toy of the present application;

[0026] FIG. 10 is a schematic structural diagram of a case of the driving device of the spinning top toy of the present application;

[0027] FIG. 11 is a schematic structural diagram of an acceleration gear set of the driving device of the spinning top toy of the present application;

[0028] FIG. 12 is a schematic diagram of a bottom structure of a clamping assembly of the spinning top toy of the present application;

[0029] FIG. 13 is a schematic diagram of an internal structure of the clamping assembly of the spinning top toy of the present application;

[0030] FIG. 14 is a schematic structural diagram of the spinning top body of the spinning top toy of the present application;

[0031] FIG. 15 is an exploded schematic diagram of the spinning top body of the spinning top toy of the present application; and

[0032] FIG. 16 is a schematic diagram of a connection between the driving device and the spinning top body according to embodiment 3 of the present application.

DETAILED DESCRIPTION

[0033] To further explain various embodiments, the present application provides drawings. These drawings are part of the disclosure of the present application, and are mainly used to illustrate the embodiments, and may be used to explain the operating principles of the embodiments in conjunction with the relevant descriptions in the specification. With reference to these contents, those of ordinary skill in the conventional art will be able to understand other possible implementations and advantages of the present application.

[0034] In the description of the present application, it should be understood that an orientation or position relationship indicated by terms “center”, “longitudinal”, “transverse”, “length”, “width”, “thickness”, “upper”, “lower”, “left”, “right”, “top”, “bottom”, “inner”, “outer”, “axis”, “radial”, “circumferential”, etc. are based on the orientation or position relationship shown in the drawings. This is only to facilitate the description of the present application and to simplify the description, and does not indicate or imply that the device or element referred to must have a specific orientation, be constructed and operated in a specific orientation, and therefore no limitations to the present application can be understood.

Embodiment 1

[0035] Please refer to FIGS. 1 to 15. FIG. 1 is a schematic diagram of an internal structure of a spinning top toy of the present application; FIG. 2 is another schematic diagram of the internal structure of the spinning top toy of the present application; FIG. 3 is a schematic diagram of an external structure of the spinning top toy of the present application; FIG. 4 is a schematic structural diagram of the spinning top accelerator of the spinning top toy of the present application; FIG. 5 is a schematic structural diagram of an injection pushing assembly of the spinning top toy of the present application; FIG. 6 is a schematic diagram of a connection between a driving device and a spinning top body of the spinning top toy of the present application; FIG. 7 is a schematic structural diagram of the driving device of the spinning top toy of the present application; FIG. 8 is another structural schematic diagram of the driving device of the spinning top toy of the present application; FIG. 9 is an exploded schematic diagram of the driving device of the spinning top toy of the present application; FIG. 10 is a schematic structural diagram of a case of the driving device of the spinning top toy of the present application; FIG. 11 is a schematic structural diagram of an acceleration gear set of the driving device of the spinning top toy of the present application; FIG. 12 is a schematic diagram of a bottom

structure of a clamping assembly of the spinning top toy of the present application; FIG. 13 is a schematic diagram of an internal structure of the clamping assembly of the spinning top toy of the present application; FIG. 14 is a schematic structural diagram of the spinning top body of the spinning top toy of the present application; FIG. 15 is an exploded schematic diagram of the spinning top body of the spinning top toy of the present application.

[0036] This embodiment provides a spinning top toy, which includes a spinning top accelerator 100 and a spinning top body 200 movably connected to the spinning top accelerator 100; the spinning top accelerator 100 includes a housing 10 and a driving device 20, a clamping assembly 30 and an injection pushing assembly 40 disposed in the housing 10. The driving device 20 includes a case 21 and an acceleration gear set 22. The acceleration gear set 22 is rotatably provided in the case 21, and a gravity block 23 is slidably provided on the case 21. The gravity block 23 is drivingly connected to the acceleration gear set 22; the clamping assembly 30 is drivingly connected to the acceleration gear set 22, and the clamping assembly 30 is used to movable clamp the spinning top body 200; the injection pushing assembly 40 is used to push the spinning top body 200; when the gravity block 23 slides back and forth on the case 21 by swinging, the gravity block 23 drives the acceleration gear set 22 to rotate, thereby driving the clamping assembly 30 to rotate.

[0037] Specifically, the acceleration gear set 22 is rotatably disposed inside the case 21, a first opening is provided on one side of the case 21, and at least a portion of the acceleration gear set 22 extends out of the first opening of the case 21; a first driving rack 231 is provided on one side of the gravity block 23, and the first driving rack 231 is cooperatively and drivingly connected with the portion of the acceleration gear set 22 extending out of the first opening of the case 21.

[0038] In order to ensure that an output end of the acceleration gear set 22 is able to rotate in one direction when the gravity block 23 slides back and forth on the case 21, the acceleration gear set 22 in this embodiment includes a first active gear 24, a first clutch gear 25 and a driving gear 26. The case 21 is provided with a first arc-shaped groove 211. The first active gear 24 and the driving gear 26 are respectively rotatably provided in the case 21, and the first active gear 24 meshes with the first clutch gear 25. The first clutch gear 25 is slidably disposed in the first arc-shaped groove 211. When the first clutch gear 25 slides to one end of the first arc-shaped groove 211, the first clutch gear 25 meshes with the driving gear 26. When the first clutch gear 25 slides to other positions of the first arc-shaped groove 211, the first clutch gear 25 and the driving gear 26 do not contact each other.

[0039] Further, at least a portion of the first active gear 24 extends out of the first opening of the case 21, and the portion of the first active gear 24 extending out of the first opening is cooperatively and drivingly connected with the first driving rack 231 of the gravity block 23. Wherein, in order to enable the gravity block 23 to better drive the first active gear 24 when sliding back and forth, the first opening of this embodiment is provided in the middle of one side of the case 21, and a length of the first driving rack 231 is slightly longer than half a length of one side of the case 21. In this way, when the gravity block 23 slides back and forth, since the first opening is located in the middle of one side of

the case 21 and the length of the first driving rack 231 is just longer than half the length of one side of the case 21, the first driving rack 231 always meshes with and is connected to the first active gear 24. Moreover, a travel distance of the first driving rack 231 in back and forth sliding that may drive the first active gear 24 to rotate is half the length of one side of the case 21, thereby allowing that the gravity block 23 may better drive the first active gear 24.

[0040] It should be noted that in this embodiment the first opening is not limited to being located in the middle of one side of the case 21. It may also be located in other positions on one side of the case 21. Correspondingly, the length of the first driving rack 231 is not limited to the above length, and other lengths of the driving rack may also be used.

[0041] Therefore, the acceleration gear set 22 of this embodiment is provided with a slidable first clutch gear 25, and a first arc-shaped groove 211 matching the first clutch gear 25 is provided on the case 21, allowing that a rotating shaft of the first clutch gear 25 may slide in the first arc-shaped groove 211. In addition, the first active gear 24 of this embodiment always meshes with the first clutch gear 25, when the gravity block 23 slides along a left direction, the first driving rack 231 drives the first active gear 24 to rotate clockwise. At the same time, the first active gear 24 drives the first clutch gear 25 to rotate counterclockwise. At this time, the first clutch gear 25 slides to one end of the first arc-shaped groove 211 close to the driving gear 26 under a pushing action of the first active gear 24, and meshes with and is connected with the driving gear 26. At the same time, due to the pushing action of the first active gear 24, the first clutch gear 25 always meshes with the driving gear 26. That is to say, when the gravity block 23 slides to the left, the first driving rack 231 drives the first active gear 24, the first clutch gear 25 and the driving gear 26 to rotate in sequence.

[0042] When the gravity block 23 slides along a right direction, the first driving rack 231 drives the first active gear 24 to rotate counterclockwise, and at the same time the first active gear 24 drives the first clutch gear 25 to rotate clockwise. At this time, the first clutch gear 25 slides to one end of the first arc-shaped groove 211 away from the driving gear 26 under the pushing action of the first active gear 24, and is not in contact with the driving gear 26. Due to the pushing action of the first active gear 24, the first clutch gear 25 remains disengaged from the driving gear 26 at all times. That is to say, when the gravity block 23 slides to the right, the first driving rack 231 drives the first active gear 24 and the first clutch gear 25, and the driving gear 26 continues to rotate in its original direction since it is disengaged from the first clutch gear 25.

[0043] Therefore, in this embodiment, a position of the first arc-shaped groove 211 is cleverly set, and when the first clutch gear 25 moves to one end of the first arc-shaped groove 211, the first clutch gear 25 meshes with the driving gear 26. When the first clutch gear 25 slides to other positions of the first arc-shaped groove 211, the first clutch gear 25 and the driving gear 26 do not contact each other, so that a rotation direction of the driving gear 26 is kept unchanged through a back and forth sliding motion of the gravity block 23.

[0044] In addition, in the acceleration gear set 22 of this embodiment, one or more first driven gears 241 are drivingly connected between the first active gear 24 and the first clutch gear 25.

[0045] In some embodiments, first protrusions 214 are respectively provided at both ends of the side of the case 21 provided with the first opening, and a guide slide rod 213 is provided between the two first protrusions 214. The gravity block 23 is slidable sleeved on the guide slide rod 213 of the case 21. In this embodiment, a first guide seat 234 is provided between the first driving rack 231 of the gravity block 23 and the gravity block 23. The first guide seat 234 is provided with a first guide hole which is slidably sleeved on the guide slide rod 213.

[0046] Therefore, in the case 21 of this embodiment, by providing the two first protrusions 214, which may serve as an installation structure for the guide slide rod 213, and may also serve as a limiting structure for the first driving rack 231, it may effectively prevent the first driving rack 231 from sliding out of the guide slide rod 213, making a reciprocating sliding of the gravity block 23 safe and effective.

[0047] In order to make the gravity block 23 slide more smoothly, in this embodiment, one or more sliding wheels 233 are provided at the bottom of the gravity block 23, and the gravity block 23 is slidably disposed on an upper surface of the case 21 through the one or more sliding wheels 233. In this way, a surface-to-surface contact friction between the gravity block 23 and the case 21 is avoided, making a sliding movement of the gravity block 23 relative to the case 21 smoother.

[0048] In order to further ensure smooth and stable sliding of the gravity block 23, the other side of the case 21 in this embodiment is also provided with the guide slide rod 213, and the guide slide rods 213 on both sides of the case 21 are parallel to each other. Correspondingly, second protrusions 215 are respectively provided at both ends of the other side of the case 21. The guide slide rod 213 is provided between the two second protrusions 215, and a second guide seat 235 is provided at the bottom of the other side of the gravity block 23. The second guide seat 235 is provided with a second guide hole. In this way, both sides of the gravity block 23 are slidably sleeved on the guide slide rods 213 on both sides of the case 21 through the first guide hole and the second guide hole respectively. Combined with one or more sliding wheels 233 at the bottom of the gravity block 23, a sliding of the gravity block 23 relative to the case 21 is more stable and smooth, which is also beneficial to a meshing drive between the first driving rack 231 of the gravity block 23 and the acceleration gear set 22.

[0049] In this embodiment, the spinning top accelerator 100 includes a housing 10 with upper and lower openings. The case 21 of the driving device 20 is fixed inside the housing 10. The clamping assembly 30 includes a transmission gearbox 31 and a magnetic sleeve 32. The transmission gearbox 31 is fixed below the case 21 of the driving device 20, and the bottom of the case 21 is provided with a through hole. The transmission gearbox 31 is rotatably provided with a passive gear 33. The passive gear 33 meshes and is connected to the driving gear 26 of the driving device 20. The magnetic sleeve 32 is arranged below the transmission gearbox 31, and the magnetic sleeve 32 is coaxially fixedly connected with the passive gear 33. Therefore, the magnetic sleeve 32 of this embodiment is used to attract and clamp the spinning top body 200.

[0050] Further, in this embodiment, the magnetic sleeve 32 has a cylindrical structure with an open lower end, and a magnetic unit 34 is provided on the top of an inner wall of

the magnetic sleeve 32. In addition, a top center of the spinning top body 200 of this embodiment is provided with a magnetic protrusion 50 protruding upward, and a magnet unit 51 is provided inside the magnetic protrusion 50. In this way, the magnetic unit 34 in the magnetic sleeve 32 may be used to attract the spinning top body 200 with the magnet unit 51 on the top and fix the spinning top body 200 by attraction. Therefore, the spinning top accelerator 100 of this embodiment may drive the passive gear 33 to rotate through the driving gear 26 of the driving device 20, and at the same time drive the magnetic sleeve 32 to rotate, and then drive the spinning top body 200 that is attracted and clamped by the magnetic sleeve 32 to rotate and store energy.

[0051] In order to ensure the stability of the connection between the spinning top body 200 and the magnetic sleeve 32, in this embodiment, the magnetic protrusion 50 of the spinning top body 200 have a polygonal cylinder structure. Correspondingly, interior of the magnetic sleeve 32 is a polygonal cavity structure. In this way, when the magnetic sleeve 32 is attracted and connected to the spinning top body 200, the polygonal cylinder structure design may effectively prevent the two from being displaced from each other during rotation.

[0052] In addition, the injection pushing assembly 40 of this embodiment includes an injection pushing rod 41 and a return spring 42. An upper end of the injection pushing rod 41 is located at an upper opening of the housing 10, a middle part of the injection pushing rod 41 is connected to an inner wall of the housing 10 through the return spring 42, and a lower end of the injection pushing rod 41 is located on an outer peripheral side of the magnetic sleeve 32. Therefore, by pressing the upper end of the injection pushing rod 41 downward, the injection pushing rod 41 moves downward and compresses the return spring 42. At the same time, the lower end of the injection pushing rod 41 moves downward quickly and may quickly push the spinning top in the magnetic sleeve 32 out from the lower opening of the housing 10; after loosening the upper end of the injection pushing rod 41, the injection pushing rod 41 quickly moves up and resets under an action of the return spring 42.

[0053] Further, in order to reduce a friction force generated when the injection pushing rod 41 pushes the spinning top body 200, in this embodiment, an arc-shaped pushing ring 43 is provided at a bottom of the injection pushing rod 41, and the arc-shaped pushing ring 43 is located on an outer peripheral side of the magnetic sleeve 32. A number of pulleys 44 are provided at intervals at a bottom of the arc-shaped pushing ring 43. In this way, when the arc-shaped pushing ring 43 of the injection pushing rod 41 is about to touch the spinning top body 200 that rotates at a high speed, the pulleys 44 at the bottom of the arc-shaped pushing ring 43 may first contact the spinning top body 200, and the pulleys 44 are driven to rotate under the high-speed rotation of the spinning top body 200. This may greatly reduce the friction force generated when the injection pushing rod 41 pushes the spinning top body 200, and preserve more of a rotational potential energy of the spinning top body 200.

[0054] In this embodiment, the driving device 20 is operated by a user holding the housing 10 of the spinning top accelerator 100 and rocking it left and right. Under the action of inertia, the gravity block 23 keeps sliding left and right along with the housing 10 to perform a reciprocating motion, and at the same time drives the acceleration gear set 22 to rotate, so that the driving gear 26 of the acceleration

gear set 22 drives the passive gear 33 to rotate, and finally drives the spinning top body 200 in the magnetic sleeve 32 to rotate and store energy. After storing energy, the spinning top body 200 may be ejected out through the injection pushing rod 41.

[0055] Furthermore, in this embodiment, a magnetic connection between the magnetic sleeve 32 and the spinning top body 200 is provided, so that the spinning top body 200 after being ejected may be quickly recovered to continue to accelerate and store energy. During a specific operation, it only need to roughly align an opening of the magnetic sleeve 32 with the magnetic protrusion 50 of the rotating spinning top body 200, and the spinning top body 200 may be quickly re-attracted and clamped in the magnetic sleeve 32 under the magnetic attraction of the two, and through rocking the housing 10 left and right again to re-accelerate and to rotate the spinning top body 200, thereby making the spinning top toy of the present application more entertaining and playable.

[0056] In some embodiments, one or more third driven gears 35 may be disposed between the passive gear 33 and the driving gear 26. In order to clearly distinguish a rocking direction of the gravity block 23, recessed portions 11 are provided on both sides of the housing 10 in this embodiment, and a connection line of the two recessed portions 11 is parallel to a sliding direction of the gravity block 23. In this way, the user may distinguish the rocking direction of the gravity block 23 by holding the two recessed portions 11.

[0057] Therefore, in the spinning top toy of this embodiment, the driving device 20 swings the gravity block 23 back and forth, so that the gravity block 23 continuously accelerates and rotates the acceleration gear set 22. Particularly, the acceleration gear set 22 is driven and accelerated through the first driving rack 231 on one side of the gravity block 23, and the first clutch gear 25 in the acceleration gear set 22 ensures the one-way rotation of the driving gear 26, thus avoiding a bidirectional rotation of the driving gear 26 due to the back and forth swing of the gravity block 23. As a result, the driving gear 26 always maintains the one-way rotation, and drives the passive gear 33 and the magnetic sleeve 32 to rotate synchronously, thereby accelerates and stores energy in the spinning top body 200 attracted in the magnetic sleeve 32. Finally, a stored energy spinning top body 200 is ejected out from the lower opening of the housing 10 through the injection pushing rod 41. Therefore, the spinning top toy of the present application is easy to operate, has a novel and interesting driving method, expands the functionality and fun of the driving device 20, and has high marketing value.

Embodiment 2

[0058] With reference to FIGS. 1 to 15, this embodiment is substantially the same as Embodiment 1. The difference is that in this embodiment, a second opening is provided on the other side of the case 21, and a second driving rack 232 is provided on the other side of the gravity block 23; the acceleration gear set 22 also includes a second active gear 27 and a second clutch gear 28; the case 21 is provided with a second arc-shaped groove 212; the second clutch gear 28 is slidably disposed in the second arc-shaped groove 212, and the second clutch gear 28 meshes with the second active gear 27; when the second clutch gear 28 slides to one end of the second arc-shaped groove 212, the second clutch gear 28 meshes with the driving gear 26; when the second clutch

gear 28 slides to other positions of the second arc-shaped groove 212, the second clutch gear 28 and the driving gear 26 do not contact each other.

[0059] In this embodiment, at least a portion of the second active gear 27 extends out of the second opening of the case 21, and the portion of the second active gear 27 extending out of the second opening is cooperatively and drivingly connected with the second driving rack 232 of the gravity block 23. The second active gear 27, the second clutch gear 28 and the second arc-shaped groove 212 are respectively arranged symmetrically with the first active gear 24, the first clutch gear 25 and the first arc-shaped groove 211 with respect to the driving gear 26.

[0060] That is to say, compared with Embodiment 1, the case 21 of this embodiment is further provided with the second opening and the second arc-shaped groove 212, and the second opening is provided in the middle of the other side of the case 21. The second arc-shaped groove 212 and the first arc-shaped groove 211 are arranged symmetrically with respect to the driving gear 26; and the acceleration gear set 22 of this embodiment is further provided with the second active gear 27 and the second clutch gear 28, and the second active gear 27 and the second clutch gear 28 are arranged symmetrically with the first active gear 24 and the first clutch gear 25 in Embodiment 1 with respect to the driving gear 26; correspondingly, the other side of the gravity block 23 is provided with the second driving rack 232, the second guide seat 235 is provided between the second driving rack 232 and the gravity block 23, and the second driving rack 232 and the first driving rack 231 are arranged symmetrically with respect to the case 21.

[0061] Therefore, when the gravity block 23 of this embodiment slides along the left direction, the first driving rack 231 drives the first active gear 24 to rotate clockwise, and at the same time, the first active gear 24 drives the first clutch gear 25 to rotate counterclockwise. At this time, the first clutch gear 25 slides to one end of the first arc-shaped groove 211 close to the driving gear 26 under a pushing action of the first active gear 24 and meshes with the driving gear 26. At the same time, due to the pushing action of the first active gear 24, the first clutch gear 25 always meshes with the driving gear 26. The second driving rack 232 drives the second active gear 27 to rotate counterclockwise, and at the same time the second active gear 27 drives the second clutch gear 28 to rotate clockwise. At this time, the second clutch gear 28 slides to one end of the second arc-shaped groove 212 away from the driving gear 26 and is not in contact with the driving gear 26 under pushing action of the second active gear 27, and due to the pushing action of the second active gear 27, the second clutch gear 28 remains disengaged from the driving gear 26 at all times.

[0062] That is to say, when the gravity block 23 drives the first driving rack 231 and the second driving rack 232 to slide to the left, the first driving rack 231 drives the driving gear 26 to rotate, and due to the second clutch gear 28 and the driving gear 26 are not in contact with each other, and the second clutch gear 28 is idling so that the second driving rack 232 does not drive the driving gear 26 to rotate.

[0063] When the gravity block 23 slides along the right direction, the first driving rack 231 drives the first active gear 24 to rotate counterclockwise, and at the same time the first active gear 24 drives the first clutch gear 25 to rotate clockwise. At this time, the first clutch gear 25 slides to one end of the first arc-shaped groove 211 away from the driving

gear 26 and is not in contact with the driving gear 26 under pushing action of the first active gear 24. Due to the pushing action of the first active gear 24, the first clutch gear 25 remains disengaged from the driving gear 26 at all times. The second driving rack 232 drives the second active gear 27 to rotate clockwise, and at the same time the second active gear 27 drives the second clutch gear 28 to rotate counter-clockwise. At this time, the second clutch gear 28 slides to one end of the second arc-shaped groove 212 close to the driving gear 26 and meshes with the driving gear 26 under pushing action of the second active gear 27. Due to the pushing action of the second active gear 27, the second clutch gear 28 always meshes with the driving gear 26, thereby allowing the second driving rack 232 to drive the second active gear 27, the second clutch gear 28 and the driving gear 26 to rotate in sequence.

[0064] That is to say, when the gravity block 23 drives the first driving rack 231 and the second driving rack 232 to slide to the right, since the first clutch gear 25 and the driving gear 26 are in a separated state, the first driving rack 231 drives the first active gear 24 and the first clutch gear 25 to idle. The second driving rack 232 drives the second active gear 27, the second clutch gear 28 and the driving gear 26 to rotate in sequence, and causes the driving gear 26 to continue to rotate in the original direction. Moreover, driven by the second driving rack 232, the second active gear 27 continues to drive the driving gear 26 to rotate through the second clutch gear 28, so that the gravity block 23 always drives the driving gear 26 in a single direction and stores energy during the reciprocating sliding process.

[0065] Therefore, in this embodiment, the first active gear 24, the first clutch gear 25, the first arc-shaped groove 211 are arranged symmetrically respectively with the second active gear 27, the second clutch gear 28, and the second arc-shaped groove 212 with respect to the driving gear 26. The first driving rack 231 and the second driving rack 232 of the gravity block 23 are arranged symmetrically with respect to the case 21, so that when the gravity block 23 slides back and forth, the driving gear 26 always keeps the rotation direction unchanged.

[0066] Furthermore, one or more second driven gears 271 are drivingly connected between the second active gear 27 and the second clutch gear 28 in this embodiment. In order to better connect the passive gear 33 of the transmission gearbox 31, the driving gear 26 of this embodiment may also be drivingly connected with one or more output gears 29.

[0067] Therefore, in the spinning top toy of this embodiment, the driving device 20 swings the gravity block 23 back and forth, so that the gravity block 23 continuously accelerates and rotates the acceleration gear set 22. Particularly, the acceleration gear set 22 is driven and accelerated through the driving racks on both sides of the gravity block 23, and the two clutch gears in the acceleration gear set 22 ensures the one-way rotation of the driving gear 26, thus avoiding a bidirectional rotation of the driving gear 26 due to the back and forth swing of the gravity block 23. As a result, the driving gear 26 always maintains the one-way rotation, and drives the passive gear 33 and the magnetic sleeve 32 to rotate synchronously, thereby accelerates and stores energy in the spinning top body 200 attracted in the magnetic sleeve 32. Finally, a stored energy spinning top body 200 is ejected out from the lower opening of the housing 10 through the injection pushing rod 41. Therefore, the spinning top toy of the present application is easy to operate, has a novel and

interesting driving method, expands the functionality and fun of the driving device 20, and has high marketing value.

Embodiment 3

[0068] Please refer to FIG. 16. FIG. 16 is a schematic diagram of a connection between the driving device and the spinning top body according to embodiment 3 of the present application. This embodiment is substantially the same as Embodiment 1 or 2. The difference lies in that: a bottom of the magnetic sleeve 32 in this embodiment is provided with an annular zigzag magnetic unit 34, and a top surface of the spinning top body 300 in this embodiment is provided with an annular zigzag magnet unit 60. In this way, the spinning top body 300 of this embodiment may be magnetically attracted on the magnetic unit 34 of the magnetic sleeve 32 through the magnet unit 60 on the top surface of the spinning top body 300. Moreover, through the mutual engagement of the magnet unit 60 and the magnetic unit 34, the magnetic sleeve 32 and the spinning top body 300 in this embodiment are relatively more stable during synchronous rotation and are less likely to be displaced.

[0069] Although the present invention has been disclosed in the form of preferred embodiments and variations thereon, it will be understood that numerous additional modifications and variations could be made thereto without departing from the scope of the invention.

[0070] For the sake of clarity, it is to be understood that the use of “a” or “an” throughout this application does not exclude a plurality, and “comprising” does not exclude other steps or elements.

1. A spinning top toy, comprising:

spinning top accelerator and a spinning top body movably connected with the spinning top accelerator;

wherein, the spinning top accelerator includes a housing and a driving device, a clamping assembly and an injection pushing assembly disposed in the housing, the driving device includes a case and an acceleration gear set which is rotatably provided in the case, a gravity block is slidably provided on the case, and the gravity block is drivingly connected to the acceleration gear set; the clamping assembly is drivingly connected to the acceleration gear set, and is used to movably clamp the spinning top body; the injection pushing assembly is used to push the spinning top body;

wherein, when the gravity block slides back and forth on the case by swinging, the gravity block drives the acceleration gear set to rotate, thereby driving the clamping assembly to rotate.

2. The spinning top toy of claim 1, wherein;

the acceleration gear set is rotatably disposed inside the case, a first opening is provided on one side of the case, and at least a portion of the acceleration gear set extends out of the first opening of the case; a first driving rack is provided on one side of the gravity block, and the first driving rack is cooperatively and drivingly connected with the portion of the acceleration gear set extending out of the first opening of the case.

3. The spinning top toy of claim 2, wherein;

the acceleration gear set includes a first active gear, a first clutch gear and a driving gear, the case is provided with a first arc-shaped groove, the first active gear and the driving gear are respectively rotatably provided in the

case, and the first active gear meshes with the first clutch gear; the first clutch gear is slidably disposed in the first arc-shaped groove, when the first clutch gear slides to one end of the first arc-shaped groove, the first clutch gear meshes with the driving gear, and when the first clutch gear slides to other positions of the first arc-shaped groove, the first clutch gear and the driving gear do not contact each other; at least a portion of the first active gear extends out of the first opening of the case, and the portion of the first active gear extending out of the first opening is cooperatively and drivingly connected with the first driving rack of the gravity block.

4. The spinning top toy of claim 3, wherein;

a second opening is provided on the other side of the case, and a second driving rack is provided on the other side of the gravity block; the acceleration gear set also includes a second active gear and a second clutch gear; the case is provided with a second arc-shaped groove; the second clutch gear is slidably disposed in the second arc-shaped groove, and the second clutch gear meshes with the second active gear; when the second clutch gear slides to one end of the second arc-shaped groove, the second clutch gear meshes with the driving gear; when the second clutch gear slides to other positions of the second arc-shaped groove, the second clutch gear and the driving gear do not contact each other.

5. The spinning top toy of claim 4, wherein;

at least a portion of the second active gear extends out of the second opening of the case, and the portion of the second active gear extending out of the second opening is cooperatively and drivingly connected with the second driving rack of the gravity block; the second active gear, the second clutch gear and the second arc-shaped groove are respectively arranged symmetrically with the first active gear, the first clutch gear and the first arc-shaped groove with respect to the driving gear.

6. The spinning top toy of claim 1, wherein; guide slide rods are provided in parallel on both sides of the case, and both sides of the gravity block are respectively slidably sleeved on the guide slide rods on both sides of the case.

7. The spinning top toy of claim 1, wherein;

the clamping assembly includes a magnetic sleeve, which is drivingly connected to the acceleration gear set; the magnetic sleeve has a cylindrical structure with an open lower end, a magnetic unit is provided on the top of an inner wall of the magnetic sleeve, and a magnet unit is provided on the top of the spinning top body; the spinning top body is attracted and connected to the magnetic unit of the magnetic sleeve through the magnet unit on the top of the spinning top body.

8. The spinning top toy of claim 7, wherein;

the clamping assembly also includes a transmission gearbox and a passive gear rotatably arranged in the transmission gearbox; the transmission gearbox is fixed below the acceleration gear set of the driving device, the passive gear and the acceleration gear set is drivingly connected, and the passive gear is coaxially fixedly connected with the magnetic sleeve.

9. The spinning top toy of claim 8, wherein;

one or more transmission gears are arranged between the passive gear and the acceleration gear set, and the passive gear, the one or more transmission gears and the acceleration gear set are drivingly connected in sequence.

10. The spinning top toy of claim 7, wherein;

the housing is a cavity structure with upper and lower openings, the injection pushing assembly includes an injection pushing rod and a return spring, an upper end of the injection pushing rod is located at the upper opening of the housing, a middle part of the injection pushing rod is connected to an inner wall of the housing through the return spring, and a lower end of the injection pushing rod is located on an outer peripheral side of the magnetic sleeve.

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