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Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) **ADJUSTABLE DUMBBELL GRIP STRUCTURE**

(57) An adjustable dumbbell grip, comprising a central tube (1), internal parts (8), external parts (11), a first screw shaft (4) and a second screw shaft (5); a central rod (7) is provided inside the central tube; the internal parts are two and each internal part is respectively provided on a side of the central tube; the internal parts are connected to the central tube via a plurality of fastening pieces (13), a plurality of insert blocks (14) are provided on the fastening pieces; by rotating the central tube and screw shaft structure, the first screw shaft and the second screw shaft disposed on two ends of the assembly extend outwards, so weight plates can be placed on the screw shafts. Meanwhile, by moving pins, semicircular weight plates can be attached, making it easy to increase or reduce weights with weight plates, semicircular weight plates and initial weight plates, and the assembly is easy to use, adjust and maintain.

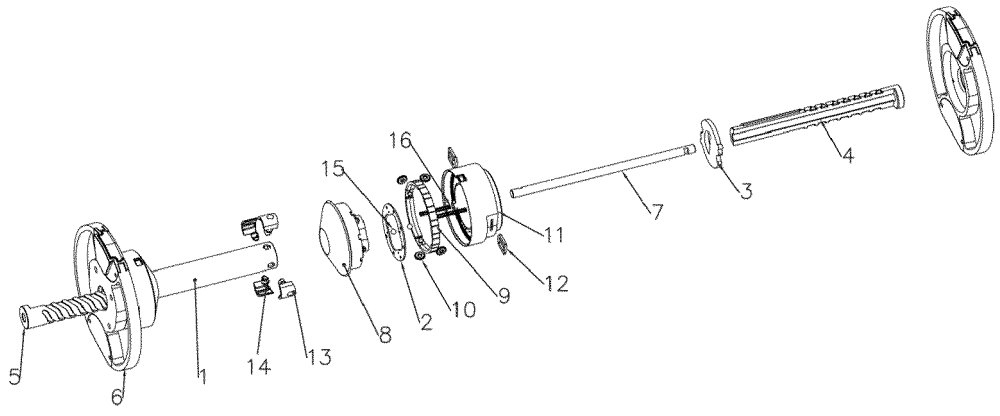


Figure 1

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## Description

### Technical Field

**[0001]** The present invention relates to the technical field of fitness equipment, in particular to an adjustable dumbbell grip structure.

### Background Technology

**[0002]** A dumbbell is a simple muscle force enhancement and exercise device used for muscle strength training and muscle complex movement training. Patients with low muscle strength due to movement paralysis, pain and long-term inactivity, etc., can hold dumbbells, and use the weight of dumbbells to carry out anti-resistance active movement and muscle strength training. Dumbbells in the prior art have the deficiency of inconvenient adjustment of weight plates and it is not possible to adjust weight quickly.

### Summary of Invention

**[0003]** The purpose of the present invention is to provide an adjustable dumbbell grip structure to solve the problem mentioned in the background technology.

**[0004]** In order to achieve above purposes, technical solutions of the present invention are as follows:

An adjustable dumbbell grip structure, comprising a central tube, internal parts, external parts, a first screw shaft and a second screw shaft, wherein a central rod is provided inside the central tube; the internal parts are arranged to be two and each of the internal parts is respectively provided on a side of the central tube; the internal parts are connected to the central tube via a plurality of fastening pieces, a plurality of insert blocks are provided on the plurality of fastening pieces, and the internal parts, the plurality of fastening pieces and the central tube are sequentially and fixedly connected by the plurality of insert blocks; a digital ring is sleeved onto an outside portion of each of the internal parts, a plurality of gears are provided inside the digital ring, a plurality of slots for allowing the plurality of gears rotating are provided on each of the internal parts; the external parts are provided to be two and correspond to the internal parts; a toothed ring engaging with the plurality of gears is provided in each of the external parts; the first screw shaft and the second screw shaft pass the internal parts and the external parts and are provided inside the central tube, fixing plates are provided on both the first screw shaft and the second screw shaft, and both the first screw shaft and the second screw shaft are internally hollow and sleeved onto the central rod, cross sections of both the first screw shaft and the second screw shaft are a semicircle, inner openings in the fixing plates are also a semicircle, the inner openings in the fixing plates correspond to grooves provided on both ends of the central rod and in the meantime the first screw shaft and the second screw shaft; threads are provided on both the first screw shaft and the second screw shaft, and the threads engage with the insert blocks.

**[0005]** Preferably, pins are provided in the external parts, cam portions are provided in the internal parts, and the pins engage with the cam portion.

**[0006]** Preferably, gear plates are provided in the internal parts, the cam portions of the internal parts correspond to inner openings of the gear plates, a plurality of round holes are provided on each of the gear plates, and the plurality of round holes are arranged more than two.

**[0007]** Preferably, the external parts are provided with springs and balls, one end of each of the springs is attached in the external parts, and another end of each of the springs is compressed against each of the balls by each of the fixing plates.

**[0008]** Preferably, initial weight plates are installed on the external parts via bolts.

**[0009]** Compared with the prior art, the invention has following beneficial effects: by rotating the central tube and with the help of the screw shaft structure in the present invention, the first screw shaft and the second screw shaft disposed on two end portions of the entire structure can extend outwards, so that weight plates can be placed on the first screw shaft and the second screw shaft. Meanwhile, with movement of the pins, semicircular weight plates can be attached to the entire structure, making it easy to increase or reduce weights with the weight plates, semicircular weight plates and the initial weight plates, which makes the adjustable dumbbell grip structure according to the present invention easy to use, adjust and maintain.

### Brief Description of Drawings

**[0010]**

Figure 1 is a schematic view of the adjustable dumbbell grip structure according to the present invention;
Figure 2 is a structural schematic view showing the internal parts of the present invention installation;
Figure 3 is a structural schematic view showing the external parts of the present invention installation;
Figure 4 is a structural schematic view showing installation of the initial weight plates of the present invention;
Figure 5 is a structural schematic view showing connections among the weight plates of the present invention;
Figure 6 is a structural schematic view of the weight plates and the semicircular weight plates of the present invention;
Figure 7 is a structural schematic view of the initial weight plates, the weight plates and semicircular weight plates of the present invention.

**[0011]** Markups in the drawings of the present invention indicate as following: 1- central tube; 2-gear plate;

3-fixing plate; 4-first screw shaft; 5-second screw shaft; 6-initial weight plate; 7-central rod; 8-internal part; 9-digital ring; 10-gear; 11-external part; 12-pin; 13-fastening piece; 14-insert block; 15-ball; 16-spring; 17-weight plate; 18-semicircular weight plate; 19-pedestal; 20-buckle; 21- socket.

**Embodiments**

**[0012]** Technical solutions in embodiments of the present invention will be clearly and completely described below in conjunction with the accompanying drawings showing the embodiments of the present invention. Obviously, the described embodiments are only some of the embodiments of the present invention, rather than all the embodiments. Based on the embodiments of the present invention, all other embodiments obtained by those of ordinary skill in the art without involving creative work shall fall within protection scope of the present invention.

**[0013]** In the description of the present invention, it should be understood that the terms like "longitudinal", "lateral", "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", etc. based on orientation or positional relationship shown in the drawings, is only for convenience of describing the present invention, instead of indicating or implying that the device or elements must have a specific orientation or be configured and operated in a specific orientation, which therefore cannot be understood as a limitation to the present invention.

**[0014]** With reference to Figure 1, the present invention provides a following technical solution:

An adjustable dumbbell grip structure, comprising a central tube 1, internal parts 8, external parts 11, a first screw shaft 4 and a second screw shaft 5, wherein a central rod 7 is provided inside the central tube 1; the internal parts 8 are arranged to be two and each of the internal parts 8 is respectively provided on a side of the central tube 1; the internal parts 8 are connected to the central tube 1 via a plurality of fastening pieces 13, a plurality of insert blocks 14 are provided on the plurality of fastening pieces 13, and the internal parts 8, the plurality of fastening pieces 13 and the central tube 1 are sequentially and fixedly connected by the plurality of insert blocks 14; a digital ring 9 is sleeved onto an outside portion of each of the internal parts 8, a plurality of gears 10 are provided inside the digital ring 9, a plurality of slots for allowing the plurality of gears 10 rotating are provided on each of the internal parts 8; the external parts 11 are provided to be two and correspond to the internal parts 8; a toothed ring engaging with the plurality of gears 10 is provided in each of the external parts 11; the first screw shaft 4 and the second screw shaft 5 pass the internal parts 8 and the external parts 11 and are provided inside the central tube 1, fixing plates 3 are provided on both the first screw shaft 4 and the second screw shaft 5, and both the first screw shaft 4 and the second screw shaft 5 are internally hollow and sleeved onto the central rod 7, cross sections of both the first screw shaft 4 and the second screw shaft 5 are a semicircle, inner openings in the fixing plates 3 are also a semicircle, the inner openings in the fixing plates 3 correspond to grooves provided on both ends of the central rod 7 and in the meantime the first screw shaft 4 and the second screw shaft 5; threads are provided on both the first screw shaft 4 and the second screw shaft 5, and the threads engage with the insert blocks 14.

**[0015]** Further, pins 12 are provided in the external parts 11, cam portions are provided in the internal parts 8, and the pins 12 engage with the cam portion.

**[0016]** Still further, gear plates 2 are provided in the internal parts 8, the cam portions of the internal parts 8 correspond to inner openings of the gear plates 2, specifically, the cam portions in the internal parts 8 are of the same contour as the inner openings in the gear plate 2; a plurality of round holes are provided on each of the gear plates 2, and the plurality of round holes are arranged more than two, in the present embodiment there are eight evenly distributed round holes.

**[0017]** Further still, the external parts 11 are provided with springs 16 and balls 15, one end of each of the springs 16 is attached in the external parts 11, and another end of each of the springs 16 is compressed against each of the balls 15 with the gear plates 2 and holds each of the balls 15 in one of the round holes in the gear plate 2; the gear plate 2 will rotate and the balls 15 will be switched to one of the round holes in the gear plate 2 once the central tube 1 is turned 45°, and gear adjustment is done.

**[0018]** Further, initial weight plates 6 are installed on the external parts 11 via bolts.

**[0019]** The present invention is implemented in details as follows:

As shown in Figure 2, firstly, insert the internal parts 8 onto the central tube 1, put one end of each of the insert blocks 14 into a circular hole provided respectively in both ends of the central tube 1, pass another end of each of the insert blocks 14 through the round holes on the fastening pieces 13, and connect to the cam portions of the internal part 13. Insert the fastening pieces 13 into the internal parts 8 to lock the internal parts 8 in place; an inner opening in each of the gear plates 2 corresponds to the cam portions of the internal part 8, with each of the gear plates 2 sleeved onto the cam portions of the internal parts 8. As is shown in figure 1, the springs 16 and the balls 15 are provided in the external parts 11, one end of each of the springs 16 is respectively fixed in the external parts 11 and another end of each of the springs 16 is compressed by each of the fixing plates 3 with the balls 15 located in a round hole provided in the gear plates 2, as the round holes in each of the gear plates 2 are provided to be eight in the present embodiment, the gear plate 2 will rotate and the balls 15 will be switched to one of the round holes in the gear plate 2 once the central tube 1 is turned 45°, gear adjustment is done, and with the digital ring 9 it is easier to see the gear.

**[0020]** The digital rings 9 are sleeved onto the internal parts 8, and on the internal parts 8 are provided slots to allow the gears 10 rotate. The gears 10 are rotatably installed in the digital rings 9; gear rings engaging with the gears 10 are provided in the external parts 11; the gears 10 and the digital rings 9 are assembled with the internal parts 8 and the external parts 11 so that when the external parts 11 are placed on a pedestal 19, rotate the central tube 1 and as the central tube 1 and the internal parts 8 are interlocked, the internal parts 8 are driven to rotate via gears 10.

**[0021]** As is shown in figure 4, two initial weight plates 6, which serve as initial adjusting weight of the dumbbell, are fixed to both sides of the external parts 11 with bolts.

**[0022]** As is shown in figure 1, the fixing plates 3 are engaged with the central rod 7 via grooves provided on the central rod 7, cover the first screw shaft 4 and the second screw shaft 5 over both sides of the central rod 7, the inner openings provided in the fixing plates 3 are fully occupied; as is shown in figure 3, connect the fixing plates 3 with the central rod 7, the entire assembly is locked. When the central tube 1 is turned, the insert blocks 14 turn against screw grooves on the first screw shaft 4 and the second screw shaft 5, turning of the insert blocks 14 extend or retract the first screw shaft 4 and the second screw shaft 5 simultaneously for increasing or reducing the weight plates 17.

**[0023]** Both the initial weight plates 6 and weight plates 17 are provided with buckles 20 and sockets 21 as shown in Figure 5, and the weight plates 17 are buckled and connected in sequence to ensure that the weight plates 17 will not fall out in the axial direction, and the first screw shaft 4 and the second screw shaft 5 are extended and inserted into central round holes of newly added weight plates 17, as shown in Figure 5, to ensure that the weight plates 17 will not fall out in the radial direction.

**[0024]** The pins 12 are provided in the external parts 11, and by rotating the central tube 1, the internal parts 8 are rotated and the cam portions in the internal parts 8 will extend and retract the pins 12 as shown in figure 2 and figure 6, when the pins 12 are extended, the semicircular weight plates 18 are fixed in position with the pins 12 interposed into receivers provided in the semicircular weight plates 18, as is shown in figure 7, when necessary, put additional weight plates 17 to lift both the weight plates 17 and the semicircular weight plates 18, with weight of the semicircular weight plates 18 a half of the weight plates 17, to meet various training demand. When the pins 12 are retracted, the semicircular weight plates 18 will rest on the pedestal 19, and weight adjustment is easy, convenient and fast.

**[0025]** Although the embodiments of the present invention have been shown and described, those of ordinary skill in the art can understand that many changes, modifications, substitutions and variations of these embodiments may be made to these embodiments without departing from principles and spirits of the present invention. And scope of the present invention is defined by the appended claims and their equivalents.

## Claims

1. An adjustable dumbbell grip structure, comprising a central tube, internal parts, external parts, a first screw shaft and a second screw shaft, wherein a central rod is provided inside the central tube; the internal parts are arranged to be two and each of the internal parts is respectively provided on a side of the central tube; the internal parts are connected to the central tube via a plurality of fastening pieces, a plurality of insert blocks are provided on the plurality of fastening pieces, and the internal parts, the plurality of fastening pieces and the central tube are sequentially and fixedly connected by the plurality of insert blocks; a digital ring is sleeved onto an outside portion of each of the internal parts, a plurality of gears are provided inside the digital ring, a plurality of slots for allowing the plurality of gears rotating are provided on each of the internal parts; the external parts are provided to be two and correspond to the internal parts; a toothed ring engaging with the plurality of gears is provided in each of the external parts; the first screw shaft and the second screw shaft pass the internal parts and the external parts and are provided inside the central tube, fixing plates are provided on both the first screw shaft and the second screw shaft, and both the first screw shaft and the second screw shaft are internally hollow and sleeved onto the central rod, cross sections of both the first screw shaft and the second screw shaft are a semicircle, inner openings in the fixing plates are also a semicircle, the inner openings in the fixing plates correspond to grooves provided on both ends of the central rod and in the meantime the first screw shaft and the second screw shaft; threads are provided on both the first screw shaft and the second screw shaft, and the threads engage with the insert blocks.

2. The adjustable dumbbell grip structure of claim 1, wherein pins are provided in the external parts, cam portions are provided in the internal parts, and the pins engage with the cam portion.

3. The adjustable dumbbell grip structure of claim 1, wherein gear plates are provided in the internal parts, the cam portions of the internal parts correspond to inner openings of the gear plates, a plurality of round holes are provided on each of the gear plates, and the plurality of round holes are arranged more than two.

4. The adjustable dumbbell grip structure of claim 3, wherein springs and balls are provided in the external parts, one end of each of the springs is attached

in the external parts, and another end of each of the springs is compressed against each of the balls via each of the gear plate respectively.

**5.** The adjustable dumbbell grip structure of claim 4, wherein initial weight plates are installed on the external parts via bolts.

**Amended claims in accordance with Rule 137(2) EPC.**

**1.** An adjustable dumbbell grip structure, comprising a central tube (1), internal parts (8), external parts (11), a first screw shaft (4) and a second screw shaft (5), wherein a central rod (7) is provided inside the central tube (1); the internal parts (8) are arranged to be two and each of the internal parts (8) is respectively provided on a side of the central tube (1); the internal parts (8) are connected to the central tube (1) via a plurality of fastening pieces (13), a plurality of insert blocks (14) are provided on the plurality of fastening pieces (13), and the internal parts (8), the plurality of fastening pieces (13) and the central tube (1) are sequentially and fixedly connected by the plurality of insert blocks (14); a numeral ring (9) is sleeved onto an outside portion of each of the internal parts (8), a plurality of gears (10) are provided inside the numeral ring (9), a plurality of slots for allowing the plurality of gears (10) rotating are provided on each of the internal parts (8); the external parts (11) are provided to be two and correspond to the internal parts (8); a toothed ring engaging with the plurality of gears (10) is provided in each of the external parts (11); the first screw shaft (4) and the second screw shaft (5) pass the internal parts (8) and the external parts (11) and are provided inside the central tube (1), fixing plates (3) are provided on both the first screw shaft (4) and the second screw shaft (5), and both the first screw shaft (4) and the second screw shaft (5) are internally hollow and sleeved onto the central rod (7), cross sections of both the first screw shaft (4) and the second screw shaft (5) are a semicircle, inner openings in the fixing plates (3) are also a semicircle, the inner openings in the fixing plates (3) correspond to grooves provided on both ends of the central rod (7) and correspond to the first screw shaft (4) and the second screw shaft (5); threads are provided on both the first screw shaft (4) and the second screw shaft (5), and the threads engage with the insert blocks (14).

**2.** The adjustable dumbbell grip structure of claim 1, wherein pins (12) are provided in the external parts (11), cam portions are provided in the internal parts (8), and the pins (12) engage with the cam portions.

**3.** The adjustable dumbbell grip structure of claim 1, wherein gear plates (2) are provided in the internal parts (8), the cam portions of the internal parts (8) correspond to inner openings of the gear plates (2), a plurality of round holes are provided on each of the gear plates (2), and the plurality of round holes comprise more than two round holes.

**4.** The adjustable dumbbell grip structure of claim 3, wherein springs (16) and balls (15) are provided in the external parts (11), one end of each of the springs (16) is attached in the external parts (11), and another end of each of the springs (16) is compressed against each of the balls (15) via each of the gear plate (2) respectively.

**5.** The adjustable dumbbell grip structure of claim 4, wherein initial weight plates (6) are installed on the external parts (11) via bolts.

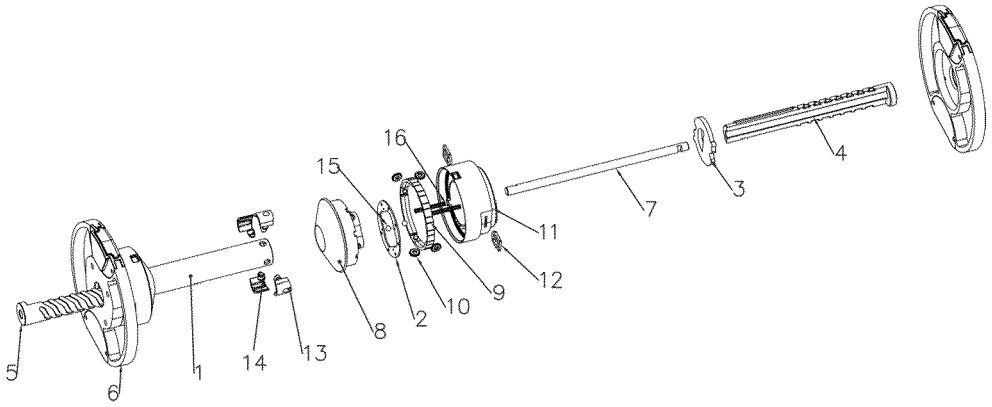


Figure 1

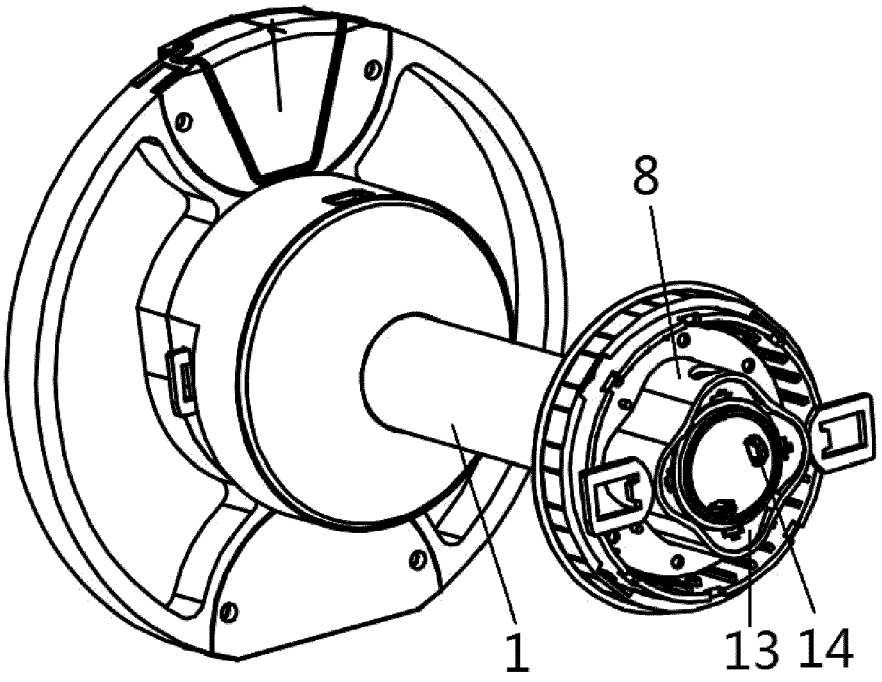


Figure 2

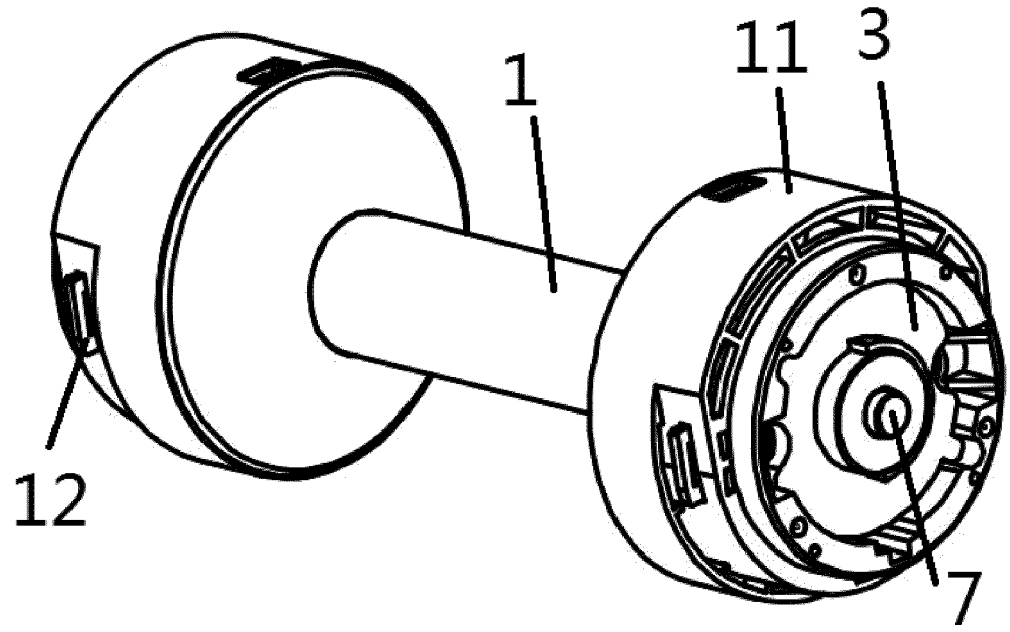


Figure 3

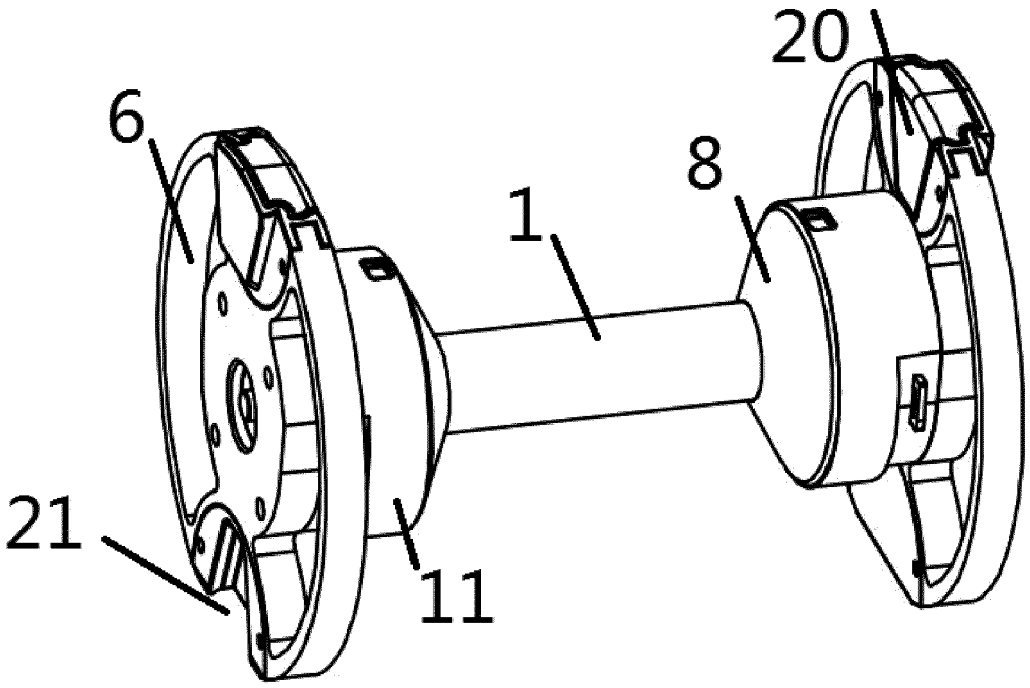


Figure 4

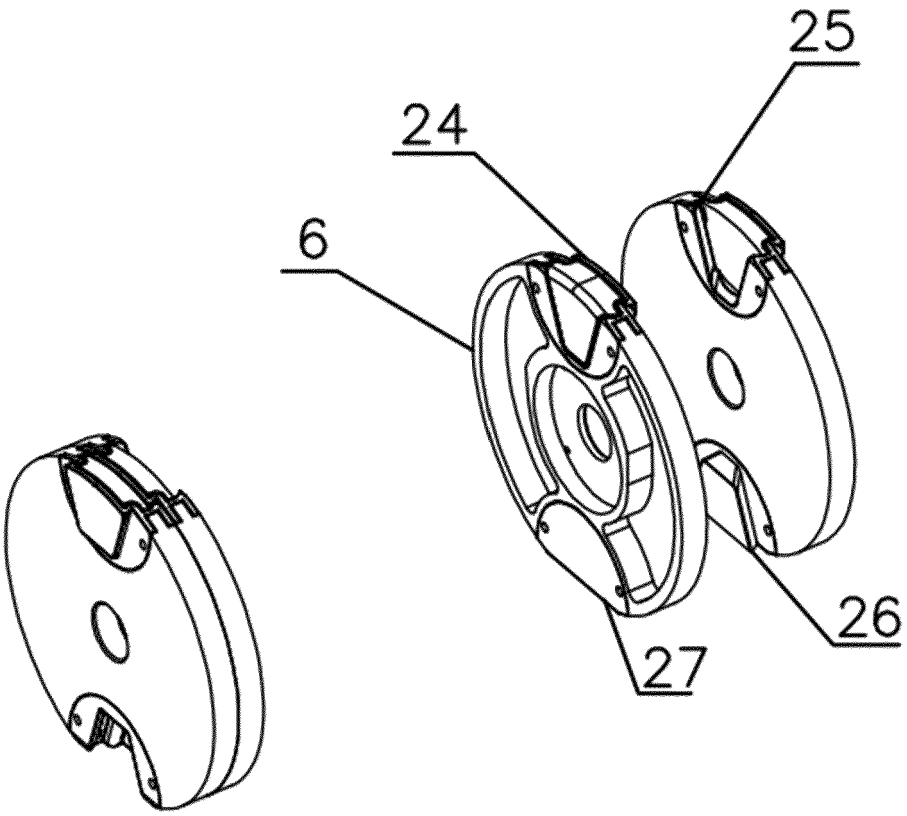


Figure 5

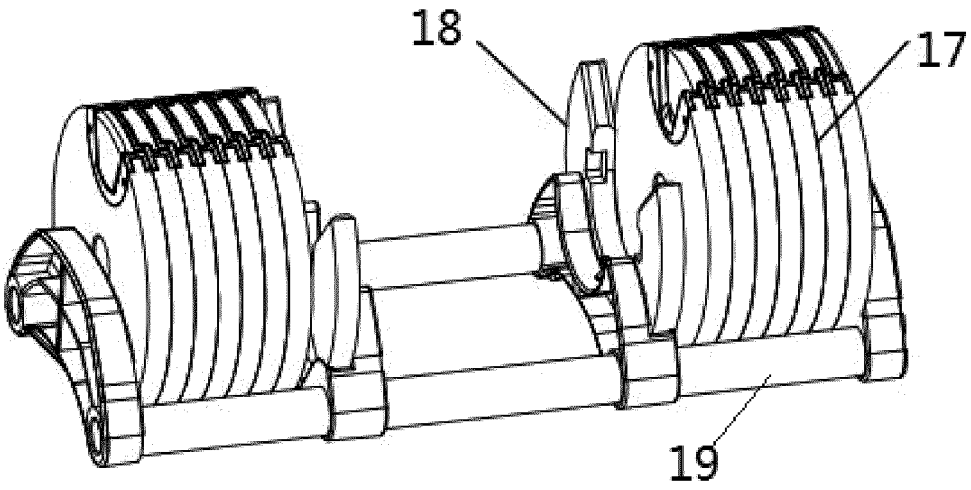


Figure 6

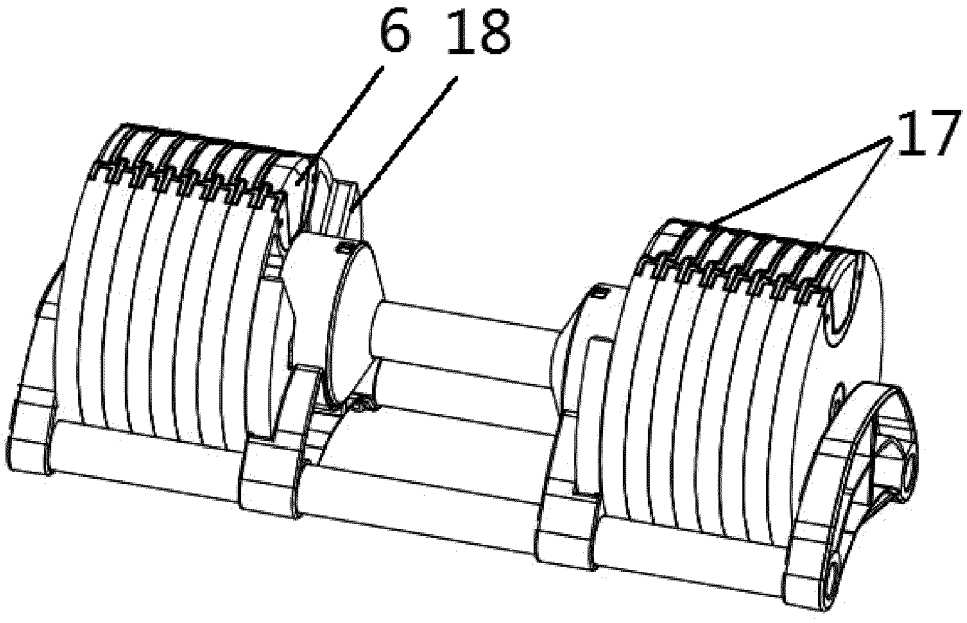


Figure 7

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Application Number
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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
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The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
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| Munich | 17 September 2021 | Herry, Manuel |

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