

(19)



(11)

EP 3 613 475 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

26.02.2020 Bulletin 2020/09

(51) Int Cl.:

A63B 21/00 (2006.01)**A63B 22/20** (2006.01)**A63B 21/02** (2006.01)**A63B 21/045** (2006.01)**A63B 21/068** (2006.01)**A63B 23/02** (2006.01)**A63B 71/02** (2006.01)(21) Application number: **19170983.1**(22) Date of filing: **25.04.2019**

(84) Designated Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated Extension States:

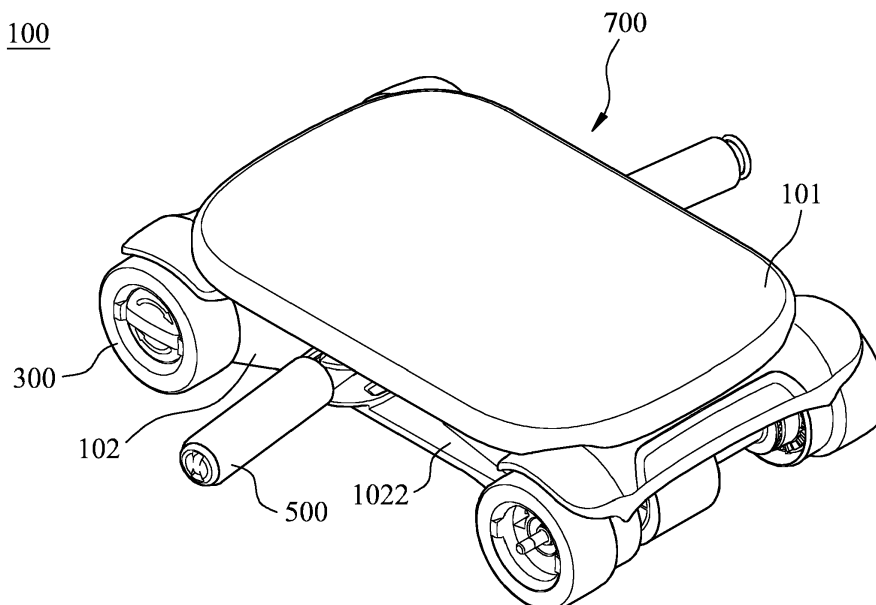
BA ME

Designated Validation States:

KH MA MD TN(72) Inventor: **CHUANG, Lung-Fei****42083 Taichung City (TW)**(74) Representative: **dompatent von Kreisler Selting Werner -****Partnerschaft von Patent- und Rechtsanwälten mbB****Deichmannhaus am Dom****Bahnhofsvorplatz 1****50667 Köln (DE)**(30) Priority: **24.08.2018 CN 201821372425 U**(71) Applicant: **Chuang, Lung-Fei****Taichung City 42083 (TW)**(54) **SPORTING DEVICE**

(57) A sporting device includes a fixing structure, at least one wheel and an elastic assembly. The at least one wheel is disposed on the fixing structure. The elastic assembly is disposed on the fixing structure and selectively linked with the at least one wheel. When the at least

one wheel is unlinked with the elastic assembly, the elastic assembly would not be driven by the at least one wheel, when the at least one wheel is linked with the elastic assembly, the elastic assembly storages a force by driving the at least one wheel.

100**Fig. 1****EP 3 613 475 A1**

Description

BACKGROUND

Technical Field

[0001] The present disclosure relates to a sporting device. More particularly, the present disclosure relates to a sporting device which is multifunctional and convenient to use.

Description of Related Art

[0002] Since fitness exercises are very helpful for physical exercise, a variety of fitness equipment is widely used, for example, an abdominal wheel exerciser allowing a bodybuilder to bend the body to the ground for reciprocating training, and making the abdominal muscles, the waist and the buttocks, as well as the arm and other parts of the body can be exercised, and has the effect of stretching the chest, shoulders, arms and back muscles to promote health. Therefore, the abdominal wheel exerciser is a better product for modern people who want to exercise. However, there are still many shortcomings in the conventional abdominal wheel exerciser for the function or movement thereof.

[0003] In general, the abdominal wheel exerciser is mainly composed of a grip for holding by the user and a wheel coupled to the grip. For example, conventional fitness apparatuses have an elastic element and two grips which are foldable or detachable. The grips can be held by the user and when the wheel rotates in a clockwise direction, the elastic element is compressed to rotate the wheel in a counterclockwise direction, at the same time, the restoring force of the elastic element can assist the user return to the posture.

[0004] Moreover, skateboarding is also one of the most popular sports equipment nowadays; and skateboards technology is divided into two types of unpowered and powered, and all kinds of skateboards on the market are still only used as skateboarding.

[0005] Although the abdominal wheel exerciser and the skateboard can achieve their intended abdominal exercise or exercise purposes, however, they cannot be changed to other sports forms, and there is no other way to change the fitness exercise, which is difficult for the general fitness person to accept. Therefore, the market is still looking for a sports device that can generate more motion modes and changeable motion modes to meet the general public demand.

SUMMARY

[0006] According to one aspect of the present disclosure, a sporting device includes a fixing structure, at least one wheel and an elastic assembly. The at least one wheel is disposed on the fixing structure. The elastic assembly is disposed on the fixing structure and selectively

linked with the at least one wheel. When the at least one wheel is unlinked with the elastic assembly, the elastic assembly would not be driven by the at least one wheel, when the at least one wheel is linked with the elastic assembly, the elastic assembly stores a force by driving the at least one wheel.

[0007] According to the sporting device of the foregoing aspect, the elastic assembly has at least one spring.

[0008] According to the sporting device of the foregoing aspect, the sporting device further includes two grips, the two grips are connected to two sides of the fixing structure, respectively, and the two grips for a user to hold, wherein the two grips are foldably and pivotally connected to the fixing structure.

[0009] According to the sporting device of the foregoing aspect, wherein the at least one wheel includes two arc holes and two tilting grooves, each of the tilting grooves is located on one inner side of each of the arc holes. The sporting device further includes an inserting element, the inserting element is disposed on the at least one wheel and includes two inserting rods and two guiding blocks. The two inserting rods are limited in the arc holes, respectively. The two guiding blocks are connected to an end of each of the inserting rods, respectively, wherein the inserting element is rotated for sliding each of the guiding blocks in each of the tilting grooves so as to displace the inserting element along an axial direction of the at least one wheel.

[0010] According to the sporting device of the foregoing aspect, wherein the fixing structure includes a board body and two wheel axles, wherein the board body includes two side boards, and the two wheel axles are connected between the two side boards, respectively. A number of the at least one wheel is four. Two of the wheels are disposed on two ends of one of the wheel axles, respectively, and the other two of the wheels are disposed on two ends of the other one of the wheel axles, respectively. The elastic assembly is disposed on at least one of the wheel axles and selectively linked with one of the wheels which is disposed on at least one of the wheel axles.

[0011] According to the sporting device of the foregoing aspect, the sporting device further includes an inserting element. The elastic assembly includes at least one spring which surrounds the at least one of the wheel axles. The inserting element is movably disposed between the one of the wheels and the at least one spring, wherein when the inserting element is located at a first position, the one of the wheels is linked with the at least one spring, when the inserting element is located at a second position, the one of the wheels is unlinked with the at least one spring.

[0012] According to the sporting device of the foregoing aspect, the one of the wheels includes two arc holes and two tilting grooves. Each of the tilting grooves is located on one inner side of each of the arc holes. The inserting element is disposed on the one of the wheels and includes two inserting rods and two guiding blocks.

The two inserting rods are limited in the two arc holes, respectively. The two guiding blocks are connected to the end of each of the inserting rods, respectively, and each of the guiding blocks corresponds to each of the tilting grooves. The inserting element is rotated for sliding each of the guiding blocks in each of the tilting grooves so as to displace the inserting element along an axial direction of the one of the wheels from the first position to the second position.

[0013] According to the sporting device of the foregoing aspect, the elastic assembly includes two springs. The two springs are disposed on the two wheel axles, respectively. Each of the springs is detachably connected with each of the wheels on each of the wheel axles. When the one of the wheels of the wheel axle disposed by each of the springs is unlinked with each of the springs, each of the springs would not be driven by the one of the wheels, and when the one of the wheels is linked with each of the springs, each of the springs stores a force by driving the one of the wheels.

[0014] According to the sporting device of the foregoing aspect, each of the springs has a fixed torque spring structure or a torsion spring structure.

[0015] According to the sporting device of the foregoing aspect, the sporting device further includes two grips. The two grips are connected to two sides of the board body, respectively, and the two grips for a user to hold. The two grips are foldably and pivotally connected to the board body.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The present disclosure can be more fully understood by reading the following detailed description of the embodiment, with reference made to the accompanying drawings as follows:

Fig. 1 is a three-dimensional view of a sporting device according to the 1st embodiment of the present disclosure.

Fig. 2 is a partial three-dimensional view of the 1st embodiment in Fig. 1.

Fig. 3 is a partial exploded three-dimensional view of the 1st embodiment in Fig. 1.

Fig. 4A is a three-dimensional view of the appearance of the wheel and the inserting element according to the 1st embodiment.

Fig. 4B is another three-dimensional view of the appearance the wheel and the inserting element according to the 1st embodiment.

Fig. 4C is a cross-sectional view taken along line 4c-4c in Fig.4B.

Fig. 4D is another cross-sectional view of Fig.4B.

Fig. 5 is another partial exploded three-dimensional view of the 1st embodiment in Fig. 1.

Fig. 6 is further another partial exploded three-dimensional view of the 1st embodiment in Fig. 1.

Fig. 7 is a partial cross-sectional view taken along line 7-7 of the 1st embodiment in Fig.2.

Fig. 8A is a cross-sectional view of the separating position of the left spring base of the 1st embodiment in Fig. 7.

Fig. 8B is a cross-sectional view of the meshing position of the left spring base of the 1st embodiment in Fig. 7.

Fig. 9 is a partial three-dimensional view of the sporting device according to the 2nd embodiment of the present disclosure.

Fig. 10 is a partial exploded three-dimensional view of the 2nd embodiment in Fig. 9.

Fig. 11 is a partial exploded three-dimensional view of the elastic assembly and the wheel axle of the 2nd embodiment in Fig. 9.

Fig. 12 is a three-dimensional view of the elastic assembly and the wheel axle of the 2nd embodiment in Fig. 9.

Fig. 13A is a side view of the elastic assembly and the wheel axle of the 2nd embodiment in Fig. 9.

Fig. 13B is a cross-sectional view taken along line 13b-13b of the elastic assembly and the wheel axle of the 2nd embodiment in Fig. 13A.

Fig. 14 is another side view of the elastic assembly and the wheel axle of the 2nd embodiment in Fig. 9.

Fig. 15A is further another side view of the elastic assembly and the wheel axle of the 2nd embodiment in Fig. 9.

Fig. 15B is a cross-sectional view taken along line 15b-15b of the elastic assembly and the wheel axle of the 2nd embodiment in Fig. 15A.

Fig. 16 is a partial cross-sectional view taken along line 16-16 of the 2nd embodiment in Fig. 9.

Fig. 17 is a three-dimensional view of the sporting device according to the 3rd embodiment of the present disclosure.

Fig. 18 is a partial cross-sectional view of the 3rd embodiment in Fig. 17.

Fig. 19A is a cross-sectional view taken along line 19-19 of the grip of the 3rd embodiment in Fig. 18.

Fig. 19B is another cross-sectional view taken along line 19-19 of the grip of the 3rd embodiment in Fig. 18.

Fig. 20 is a schematic view of the 1st using state of the 1st embodiment in Fig. 1.

Fig. 21 is a schematic view of the 2nd using state of the 1st embodiment in Fig. 1.

Fig. 22 is a schematic view of the 3rd using state of the 1st embodiment in Fig. 1.

DETAILED DESCRIPTION

[0017] Please refer to Fig. 1, Fig. 2, Fig. 3, Fig. 4A, Fig. 4B, Fig. 4C, Fig. 4D, Fig. 5 and Fig. 6. Fig. 1 is a three-dimensional view of a sporting device 100 according to the 1st embodiment of the present disclosure, Fig. 2 is a partial three-dimensional view of the 1st embodiment in Fig. 1, Fig. 3 is a partial exploded three-dimensional view of the 1st embodiment in Fig. 1, Fig. 4A is a three-dimensional view of the appearance of the wheel and the inserting element according to the 1st embodiment, Fig. 4B is another three-dimensional view of the appearance of the wheel and the inserting element according to the 1st embodiment, Fig. 4C is a cross-sectional view taken along line 4c-4c in Fig. 4B, Fig. 4D is another cross-sectional view of Fig. 4B, Fig. 5 is another partial exploded three-dimensional view of the 1st embodiment in Fig. 1, and Fig. 6 is further another partial exploded three-dimensional view of the 1st embodiment in Fig. 1. According to the 1st embodiment of the present disclosure, a sporting device 100 includes a fixing structure 700, at least one wheel 300 and at least one elastic assembly 400.

[0018] The wheel 300 is disposed on the fixing structure 700, the elastic assembly 400 is disposed on the fixing structure 700 and selectively linked with the wheel 300. When the wheel 300 is unlinked with the elastic assembly 400, the elastic assembly 400 would not be driven by the wheel 300, when the wheel 300 is linked with the elastic assembly 400, the elastic assembly 400 stores a force by driving the wheel 300. The details of the elements of the present disclosure will be described as follows.

[0019] In Fig. 1, the sporting device 100 includes four wheels 300 and the elastic assembly 400, the fixing structure 700 includes a board body 101 and two wheel axles 200, the board body 101 includes two side boards 102 which are relative to each other, the two wheel axles 200 is connected between the two side boards 102, respectively, and there is a spacing distance between the two

wheel axles 200. Two of the wheels 300 are disposed on two ends of one of the wheel axles 200, respectively, and the other two of the wheels 300 are disposed on two ends of the other one of the wheel axles 200, respectively.

[0020] In detail, the two side boards 102 are parallel to each other and each of the two side boards 102 includes two pivoting members 1021 and eight guiding holes 1023, wherein each of the pivoting members 1021 has a pivoting hole. Four of the guiding holes 1023 are equidistantly disposed around one of the pivoting members 1021, and each of the guiding holes 1023 is passed through the side boards 102 along the axial direction of each wheel 300. The sporting device 100 includes a connecting assembly 800, the connecting assembly 800 includes at least one guiding element 850, each guiding element 850 is cooperated with each four of the guiding holes 1023, and each guiding element 850 includes four guiding pins 851 which can be slidably limited in each of the guiding holes 1023.

[0021] The two wheel axles 200 are disposed in the two pivoting members 1021, and the two wheel axles 200 are parallel to each other and are disposed between the two side boards 102. A thread 201 is disposed around each end of each of the wheel axles 200, and each of the wheel axles 200 includes two bearings 202 and a bearing casing 203, wherein the bearings 202 and the bearing casing 203 are disposed around the wheel axle 200.

[0022] Each of the four wheels 300 is disposed on each bearing 202. Each of the wheel axles 200 can further include two screw members 301, each of the screw members 301 is connected to the thread 201 of the wheel axles 200, so that each of the wheels 300 is pivotably limited around the outside of each of the pivoting members 1021 and the position of each of the wheels 300 is corresponding to each guiding element 850.

[0023] At least one of the wheels 300 can include two arc holes 320 and two tilting grooves 321. Each of the tilting grooves 321 is located on one inner side of each arc hole 320. The connecting assembly 800 of the sporting device 100 includes at least one inserting element 830, and the number of the inserting elements 830 can be one, each inserting element 830 is disposed on each of the wheels 300. Each inserting element 830 includes two inserting rods 831 and two guiding blocks 832, each of the inserting rods 831 is limited in each of the arc holes 320, each of the guiding blocks 832 is connected to an end of each of the inserting rods 831, and each of the guiding blocks 832 is corresponded to each of the tilting grooves 321. The inserting elements 830 is rotated for sliding each of the guiding blocks 832 in each of the tilting grooves 321 so as to displace the inserting elements 830 along the axial direction of each wheel 300 from a first position 831A to a second position 831B. Therefore, the inserting rods 831 of the inserting elements 830 can be selectively positioned in the first position 831A or the second position 831B.

[0024] The end of the inserting rods 831 is abutted

against the guiding elements 850, and when each inserting rods 831 is moved from the first position 831A to the second position 831B, the guiding elements 850 can be pushed so as to displace the four guiding pins 851 along the axial direction in each guiding holes 1023. The connecting assembly 800 can further include at least one inserting spring 840, each inserting spring 840 is located between each inserting element 830 and each wheel 300. Therefore, the positioning effect of the inserting elements 830 in the first position 831A and the second position 831B can be ensured by the inserting springs 840.

[0025] The elastic assembly 400 includes two springs 410 and two gear bases 420, wherein each of the springs 410 has a fixed torque spring structure, and the two springs 410 of the elastic assembly 400 are disposed on the two wheel axles 200, respectively. Each of the springs 410 includes a scrolling end 411 and a rolling end 412. The elastic assembly 400 further includes two cylindrical bushings 4121. Each rolling end 412 is disposed on each wheel axle 200 via the two cylindrical bushings 412. Each of the gear bases 420 is disposed around each of the wheel axles 200, and each of the gear bases 420 includes a plurality of teeth 421 and an embedding slot 422. Each of the scrolling ends 411 is disposed at the embedding slot 422 of each of the gear bases 420.

[0026] The connecting assembly 800 further includes a left spring base 810 and a right spring base 820. Each of the left spring bases 810 and each of the right spring bases 820 includes a plurality of positioning teeth 870. The positioning teeth 870 of the left spring base 810 can be selectively and correspondingly engaged with the teeth 421 of the one of the gear bases 420; the positioning teeth 870 of the right spring base 820 can be selectively and correspondingly engaged with the teeth 421 of the other one of the gear bases 420.

[0027] Please refer to Fig. 7, Fig. 8A and Fig. 8B, and please refer to Fig. 1 to Fig. 6 together. Fig. 7 is a partial cross-sectional view taken along line 7-7 of the 1st embodiment in Fig. 2, Fig. 8A is a cross-sectional view of the separating position 810A of the left spring base 810 of the 1st embodiment in Fig. 7, Fig. 8B is a cross-sectional view of the meshing position 810B of the left spring base 810 of the 1st embodiment in Fig. 7. The left spring base 810 or the right spring base 820 is pushed by the aforementioned guiding element 850 to be selectively positioned at the meshing position 810B and the separating position 810A, and the diagrams of the left spring base 810 at the meshing position 810B or the separating position 810A are only exemplarily illustrated in Fig. 7, Fig. 8A and Fig. 8B.

[0028] When the inserting elements 830 is rotated, the inserting elements 830 will be displaced along the axial direction of the wheels 300 so as to move from the first position 831A to the second position 831B for pushing the guiding elements 850, so that the four guiding pins 851 can slide in the guiding holes 1023 for pushing the left spring base 810 or the right spring base 820 to be

positioned at the meshing position 810B. At this time, the left spring base 810 or the right spring base 820 is engaged with the gear bases 420 and the springs 410 storage the force by rotating the wheels 300 so as to provide a restoring force. The connecting assembly 800 can further include two releasing springs 860, the two releasing springs 860 are located between the one of the gear bases 420 and the left spring base 810 and the other one of the gear bases 420 and the right spring base 820, respectively. Therefore, the positioning effect of the switch of the left spring base 810 at the meshing position 810B and the separating position 810A can be effectively ensured by the releasing springs 860.

[0029] When the inserting elements 830 is rotated in the reverse direction, the inserting elements 830 will be moved from the second position 831B to the first position 831A, the two releasing springs 860 will push the left spring base 810 and the right spring base 820, respectively, and the left spring base 810 and the right spring base 820 will push the guiding elements 850, respectively, so as to slide the four guiding pins 851 in the guiding holes 1023. Thus, the left spring base 810 can be restorably positioned in the separating position 810A. At this time, the left spring base 810 or the right spring base 820 is kept disengagement with the gear bases 420 by the releasing springs 860, and the elastic assembly 400 cannot storage the force by rotating the wheels 300, which is in a state without the restoring force.

[0030] In Fig. 1 to Fig. 3, the sporting device 100 can further include two grips 500 connected to two sides of the fixing structure 700, respectively. The two grips 500 are for a user to hold. The two grips 500 are foldably and pivotally connected to the fixing structure 700. The fixing structure 700 can include two storage slots 1022 located at the two side boards 102, respectively, and the two grips 500 are foldably and pivotally connected to the storage slots 1022 for storage or operation.

[0031] Therefore, the linking relationship between the wheels 300 and the elastic assembly 400 can be switched by the connecting assembly 800. The sporting device 100 can be used as a reciprocating exercise device by selectively generating the restoring force, or can be used as a free roller without the restoring force. Moreover, the user can switch an one-way restoring force operation mode or a two-way restoring force operation mode by the two springs 410 of the elastic assembly 400 and the opposite arrangement structure of the left spring base 810 and the right spring base 820.

[0032] Please refer to Fig. 9, Fig. 10, Fig. 11, Fig. 12, Fig. 13A, Fig. 13B, Fig. 14, Fig. 15A, Fig. 15B and Fig. 16. Fig. 9 is a partial three-dimensional view of the sporting device 100T according to the 2nd embodiment of the present disclosure; Fig. 10 is a partial exploded three-dimensional view of the 2nd embodiment in Fig. 9; Fig. 11 is a partial exploded three-dimensional view of the elastic assembly 400T and the wheel axle 200T of the 2nd embodiment in Fig. 9; Fig. 12 is a three-dimensional view of the elastic assembly 400T and the wheel axle

200T of the 2nd embodiment in Fig. 9; Fig. 13A is a side view of the elastic assembly 400T and the wheel axle 200T of the 2nd embodiment in Fig. 9; Fig. 13B is a cross-sectional view taken along line 13b-13b of the elastic assembly 400T and the wheel axle 200T of the 2nd embodiment in Fig. 13A; Fig. 14 is another side view of the elastic assembly 400T and the wheel axle 200T of the 2nd embodiment in Fig. 9; Fig. 15A is further another side view of the elastic assembly and the wheel axle of the 2nd embodiment in Fig. 9; Fig. 15B is a cross-sectional view taken along line 15b-15b of the elastic assembly 400T and the wheel axle 200T of the 2nd embodiment in Fig. 15A, and Fig. 16 is a partial cross-sectional view taken along line 16-16 of the 2nd embodiment in Fig. 9. In Fig. 9, the board body is omitted for making the diagram concise, and the detailed structure and operation will be described later.

[0033] According to the 2nd embodiment of the present disclosure, the sporting device 100T includes a fixing structure (its reference numeral is omitted), four wheels 300T and two elastic assemblies 400T. The same or similar structures of the 2nd embodiment and the 1st embodiment are not described herein again.

[0034] The fixing structure includes a board body (not shown), the board body includes two side boards 102T, the two side boards 102T are parallel to each other and each of the two side boards 102T includes two pivoting members 1021T and eight guiding holes (its reference numeral is omitted), wherein each of the pivoting members 1021T has a pivoting hole. Four of the guiding holes are equidistantly disposed around one of the pivoting members 1021T, and each of the guiding holes is passed through the side boards 102T along the axial direction of each wheel 300T. The sporting device 100T can include a connecting assembly (not shown), the connecting assembly includes at least one guiding element 850T, each guiding element 850T is cooperated with each four of the guiding holes, and each guiding element 850T includes four guiding pins (not shown) which can be slidably limited in each of the guiding holes, the structure of the guiding elements 850T are the same as the guiding elements 850 of Fig. 5. In addition, each of the side boards 102T further includes two single direction teeth 1024T, each of the single direction teeth 1024T is surrounded in an inner side of each pivoting member 1021T.

[0035] The two wheel axles 200T are disposed in the two pivoting members 1021T, and the two wheel axles 200T are parallel to each other and are disposed between the two side boards 102T. The connecting assembly can further include at least one steering base 600T, at least one guiding spring 610T and at least one guiding pin 620T. The steering bases 600T are rotatably sleeved on each wheel axle 200T, each steering base 600T includes a plurality of left meshing teeth 601T and a plurality of right meshing teeth 602T and the left meshing teeth 601T and the right meshing teeth 602T are positioned at each end of the steering bases 600T, respectively. Each steering base 600T includes two tilting guiding grooves 603T

on the opposite sides, the guiding pins 620T are vertically and fixedly passed through the wheel axles 200T, and the ends of the guiding pins 620T are disposed in the tilting guiding grooves 603T, and the guiding springs 610T are disposed around the steering bases 600T.

[0036] Each of the four wheels 300T is disposed on each wheel axle 200T, so that, each of the wheels 300T is pivotally limited around the outside of each of the pivoting members 1021T and the position of each of the wheels 300T is corresponding to each of the guiding elements 850T. The connecting assembly of the sporting device 100T includes at least one of inserting elements 830T, and the number of the inserting elements 830T can be one, each of the inserting elements 830T is disposed on each of the wheels 300T. The structure of the inserting elements 830T is the same as the inserting elements 830 shown in Fig. 4C. Each inserting element 830T is rotated for sliding each of the guiding blocks (its reference numeral is omitted) in each of the tilting grooves (its reference numeral is omitted) so as to displace each inserting element 830T along the axial direction of each wheel 300T from a first position (its reference numeral is omitted) to a second position (its reference numeral is omitted). Therefore, the inserting elements 830T can be selectively positioned in the first position 831A or the second position 831B. The end of the inserting elements 830T is abutted against the guiding elements 850T so as to displace the guiding elements 850T.

[0037] Each of the elastic assemblies 400T includes a spring 410T. The connecting assembly includes at least one left spring gear base 810T, at least one right spring gear base 820T and at least one protecting sleeve 870T, and each spring 410T is disposed on each wheel axle 200T. Each spring 410T has a torsion spring structure and each end of each spring 410T is fixed to each left spring gear base 810T and each right spring gear base 820T. The left spring gear bases 810T and the right spring gear bases 820T are both cylindrical and movably disposed between the protecting sleeves 870T and the wheel axles 200T. Each left spring gear base 810T includes a plurality of left teeth 811T, and each right spring gear base 820T includes a plurality of right teeth 821T; the left teeth 811T of the left spring gear bases 810T can be selectively engaged with the left meshing teeth 601T of the steering bases 600T, the right teeth 821T of the right spring gear bases 820T can selectively engage with the right meshing teeth 602T of the steering bases 600T. The left spring gear base 810T includes a plurality of positioning teeth 812T which are configured to engage with one of the single direction teeth 1024T in the opposite side, the right spring gear base 820T includes a plurality of positioning teeth 822T which are configured to engage with the other one of the single direction teeth 1024T. In addition, each guiding spring 610T is located between the left spring gear base 810T and the right spring gear base 820T.

[0038] Therefore, the sporting device 100T can be used as a reciprocating exercise device by selectively

generating a restoring force, or can be used as a free roller without the restoring force. Moreover, the user can switch the one-way restoring force operation mode or the two-way restoring force operation mode by the two springs 410T of the elastic assemblies 400T and the opposite arrangement structure of the left spring gear bases 810T and the right spring gear bases 820T.

[0039] The sporting device 100T can switch the restoring force by rotating the inserting elements 830T of the wheels 300T. In detail, when the inserting element 830T on the right side is rotated and displaced along the axial direction of the wheel 300T, the inserting element 830T on the right side will be switched to the second position. The end of the inserting rod of the inserting element 830T is abutted against the guiding element 850T so as to displace the guiding element 850T along the axial direction of the wheel 300. At this time, the right spring gear base 820T is separated from the single direction teeth 1024T by pushing the guiding element 850T, since each end of the guiding pin 620T are disposed in the tilting guiding groove 603T, when the wheels 300T drive the wheel axle 200T rotating, the guiding pin 620T guides the steering base 600T disposing to the position as shown in Fig. 13A and Fig. 13B for the right meshing teeth 602T engaging with the right teeth 821T, so as to rotate the right spring gear base 820T by driving the wheel axle 200T. Therefore, since the left spring gear base 810T is fixed to the side board 102T and cannot be rotated, the wheels 300T drive the right spring gear base 820T for twisting the spring 410T to be stored.

[0040] On the contrary, when the inserting element 830T on the left side is rotated to be displaced along the axial direction of the wheel 300T, the inserting element 830T on the left side will be switched to the second position, the end of the inserting rod is abutted against the guiding element 850T for sliding in the axial direction the wheel 300T. At this time, the left spring gear base 820T is pushed by the guiding element 850T for separating from the single direction teeth 1024T, therefore, when the wheels 300T drive the wheel axle 200T rotating, the guiding pin 620T will guide the steering base 600T displacing to the position as shown in Fig. 15A and Fig. 15B, and the left meshing teeth 601T will engage with the left teeth 811T, so as to rotate the left spring gear base 810T by driving the wheel axle 200T. Therefore, since the right spring gear base 820T is fixed to the side board 102T and cannot be rotated, the wheels 300T drive the left spring gear base 810T for twisting the spring 410T to be stored, thereby changing the direction of the restoring force.

[0041] When each inserting element 830T of each wheel 300T is rotated to the second position, the steering bases 600T will be kept disengagement with the left spring gear bases 810T and the right spring gear bases 820T, and neither the left spring gear bases 810T nor the right spring gear bases 820T will mesh with the single direction teeth 1024T, so as to achieve the effect of the free rotation of the wheels 300T.

[0042] Please refer to Fig. 17, Fig. 18, Fig. 19A and Fig. 19B. Fig. 17 is a three-dimensional view of the sporting device 100S according to the 3rd embodiment of the present disclosure, Fig. 18 is a partial cross-sectional view of the 3rd embodiment in Fig. 17, Fig. 19A is a cross-sectional view taken along line 19-19 of the grips 500 of the 3rd embodiment in Fig. 18, and Fig. 19B is another cross-sectional view taken along line 19-19 of the grips 500 of the 3rd embodiment in Fig. 18. The sporting device 100S further includes two grips 500 disposed on the two side boards 102T of the fixing structure (its reference numeral is omitted), respectively, and are for a user to hold, and the grips 500 are foldably and pivotally connected to the fixing structure. The fixing structure can include two storage slots 1022T located on the two side boards 102T, respectively, and the two grips 500 are foldably and pivotally connected to the storage slots 1022T for storage or operation.

[0043] Each grip can include a flexible positioning mechanism 501, each flexible positioning mechanism 501 includes two protruding positioning portions 502, and each grip 500 further includes a controlling element 503 having a recovery spring 504. The controlling elements 503 protrude from the end of each grip 500 for pressing. When the user holds the grips 500, the controlling elements 503 can be pressed to push the flexible positioning mechanisms 501 for retracting the two protruding positioning portions 502. Therefore, the two grips 500 are effectively to be folded or unfolded and are for storage or operation.

[0044] Please refer to Fig. 20 to Fig. 22, Fig. 20 to Fig. 22 illustrate three different states of use of the sporting device 100. Fig. 20 is a schematic view of the 1st using state of the 1st embodiment in Fig. 1, Fig. 21 is a schematic view of the 2nd using state of the 1st embodiment in Fig. 1, and Fig. 22 is a schematic view of the 3rd using state of the 1st embodiment in Fig. 1.

[0045] In Fig. 20, the sporting device 100 cooperates with the grips as a mode of the abdominal exercise equipment, and at this time, the present disclosure is suitable for switching to the one-way restoring force operation mode having a restoring force. In Fig. 21, the board body of the sporting device 100 is placed to against the back of the user as a mode of balancing the abdominal exercise equipment, and at this time, the present disclosure is suitable for switching to the two-way restoring force operation mode. In Fig. 22, the board body of the sporting device 100 can be stood on by the user, so that the sporting device 100 can be used as a skateboard, and at this time, the present disclosure is suitable for switching to a free rotation function without the restoring force.

[0046] It can be known from the above embodiments, the present disclosure has the following advantages:

First, the sporting device can provide the operation with one-way restoring force.

Second, the sporting device can also switch to the

free operation without the restoring force during exercise.

Third, the direction of the restoring force can be changed, or the sporting device can provide the restoring force on both two directions.

Claims

1. A sporting device (100), comprising:

a fixing structure (700);
at least one wheel (300) disposed on the fixing structure (700); and
an elastic assembly (400) disposed on the fixing structure (700) and selectively linked with the wheel (300);
wherein, when the at least one wheel (300) is unlinked with the elastic assembly (400), the elastic assembly (400) would not be driven by the at least one wheel (300), when the at least one wheel (300) is linked with the elastic assembly (400), the elastic assembly (400) stores a force by driving the at least one wheel (300).

2. The sporting device (100) of claim 1, wherein the elastic assembly (400) has at least one spring (410).

3. The sporting device (100) of claim 1, further comprising:

two grips (500) connected to two sides of the fixing structure (700), respectively, and the two grips (500) for a user to hold;
wherein, the two grips (500) are foldably and pivotally connected to the fixing structure (700).

4. The sporting device (100) of claim 1, wherein, the at least one wheel (300) comprises two arc holes (320) and two tilting grooves (321), each of the tilting grooves (321) is located on one inner side of each of the arc holes (320); and the sporting device (100) further comprises an inserting element (830) disposed on the at least one wheel (300) and comprising:

two inserting rods (831) limited in the arc holes (320), respectively; and
two guiding blocks (832) connected to an end of each of the inserting rods (831), respectively;

wherein, the inserting element (830) is rotated for sliding each of the guiding blocks (832) in each of the tilting grooves (321) so as to displace the inserting element (830) along an axial direction of the at least one wheel (300).

5. The sporting device (100) of claim 1, wherein the fixing structure (700) comprises:

a board body (101) comprising two side boards (102); and
two wheel axles (200) connected between the two side boards (102), respectively;

a number of the at least one wheel (300) is four, wherein two of the wheels (300) are disposed on two ends of one of the wheel axles (200), respectively, and the other two of the wheels (300) are disposed on two ends of the other one of the wheel axles (200), respectively; and
the elastic assembly (400) disposed on at least one of the wheel axles (200) and selectively linked with one of the wheels (300) which is disposed on at least one of the wheel axles (200).

6. The sporting device (100) of claim 5, further comprising an inserting element (830), wherein the elastic assembly (400) comprises at least one spring (410) which surrounds the at least one of the wheel axles (200), the inserting element (830) is movably disposed between the one of the wheels (300) and the at least one spring (410); wherein when the inserting element (830) is located at a first position (831A), the one of the wheels (300) is linked with the at least one spring (410), when the inserting element (830) is located at a second position (831B), the one of the wheels (300) is unlinked with the at least one spring (410).

7. The sporting device (100) of claim 6, wherein the one of the wheels (300) comprises two arc holes (320) and two tilting grooves (321), each of the tilting grooves (321) is located on one inner side of each of the arc holes (320), the inserting element (830) is disposed on the one of the wheels (300) and comprises:

two inserting rods (831) limited in the two arc holes (320), respectively; and
two guiding blocks (832) connected to the end of each of the inserting rods (831), respectively, and each of the guiding blocks (832) corresponds to each of the tilting grooves (321);

wherein, the inserting element (830) is rotated for sliding each of the guiding blocks (832) in each of the tilting grooves (321) so as to displace the inserting element (830) along an axial direction of the one of the wheels (300) from the first position (831A) to the second position (831B).

8. The sporting device (100) of claim 5, wherein, the elastic assembly (400) comprises two springs (410) disposed on the two wheel axles (300), respectively,

and each of the springs (410) is detachably connected with each of the wheels (300) on each of the wheel axles (200);

wherein, when the one of the wheels (300) of the wheel axles (200) disposed by each of the springs (410) is unlinked with each of the springs (410), each of the springs (410) would not be driven by the one of the wheels (300), and when the one of the wheels (300) is linked with each of the springs (410), each of the springs (410) stores a force by driving the one of the wheels (300).

9. The sporting device (100) of claim 8, wherein each of the springs (410) has a fixed torque spring structure or a torsion spring structure.

10. The sporting device (100) of claim 5, further comprising:

two grips (500) connected to two sides of the board body (101), respectively, and the two grips (500) for a user to hold;

wherein, the two grips (500) are foldably and pivotally connected to the board body (101).

5

10

15

20

25

30

35

40

45

50

55

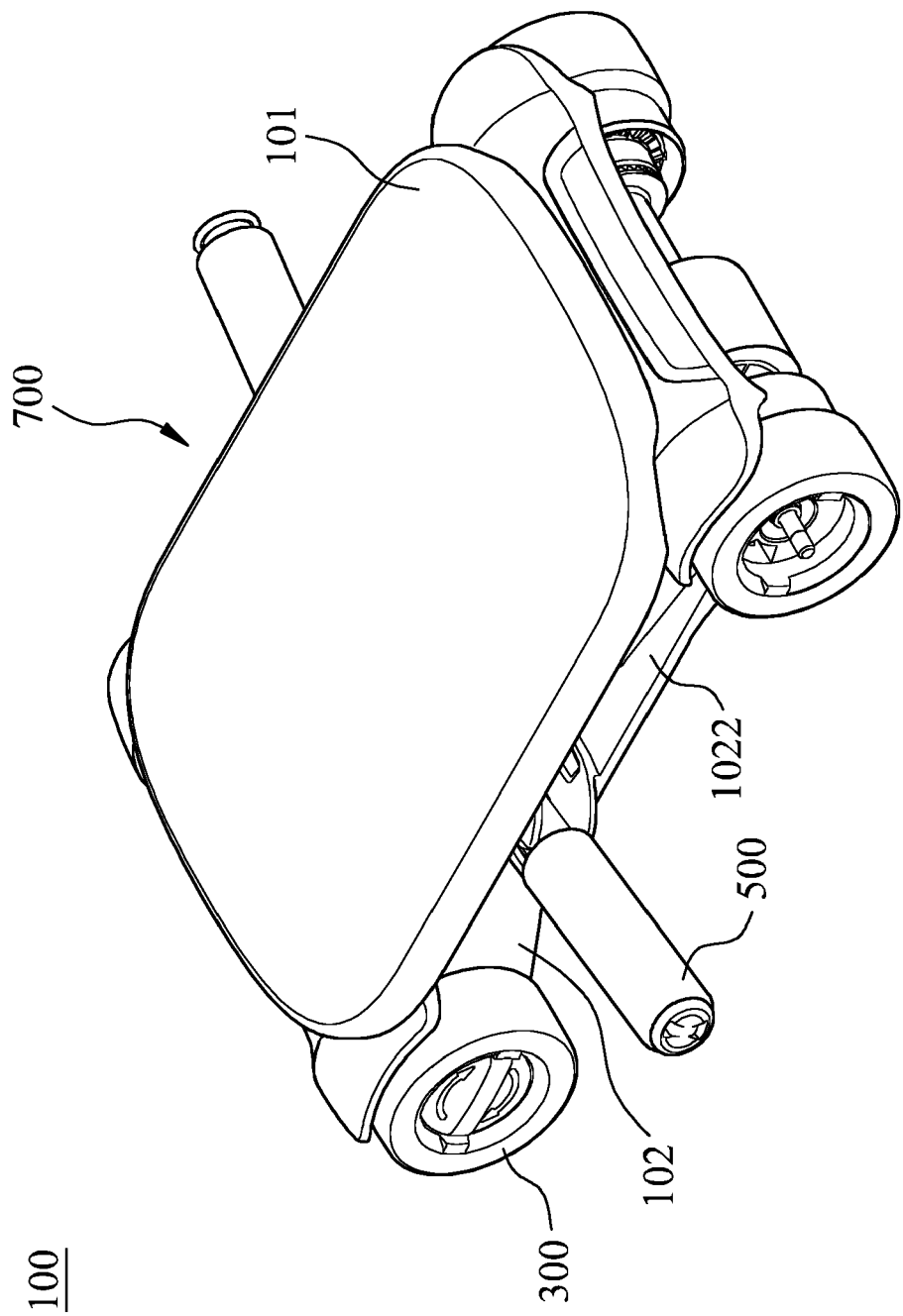


Fig. 1

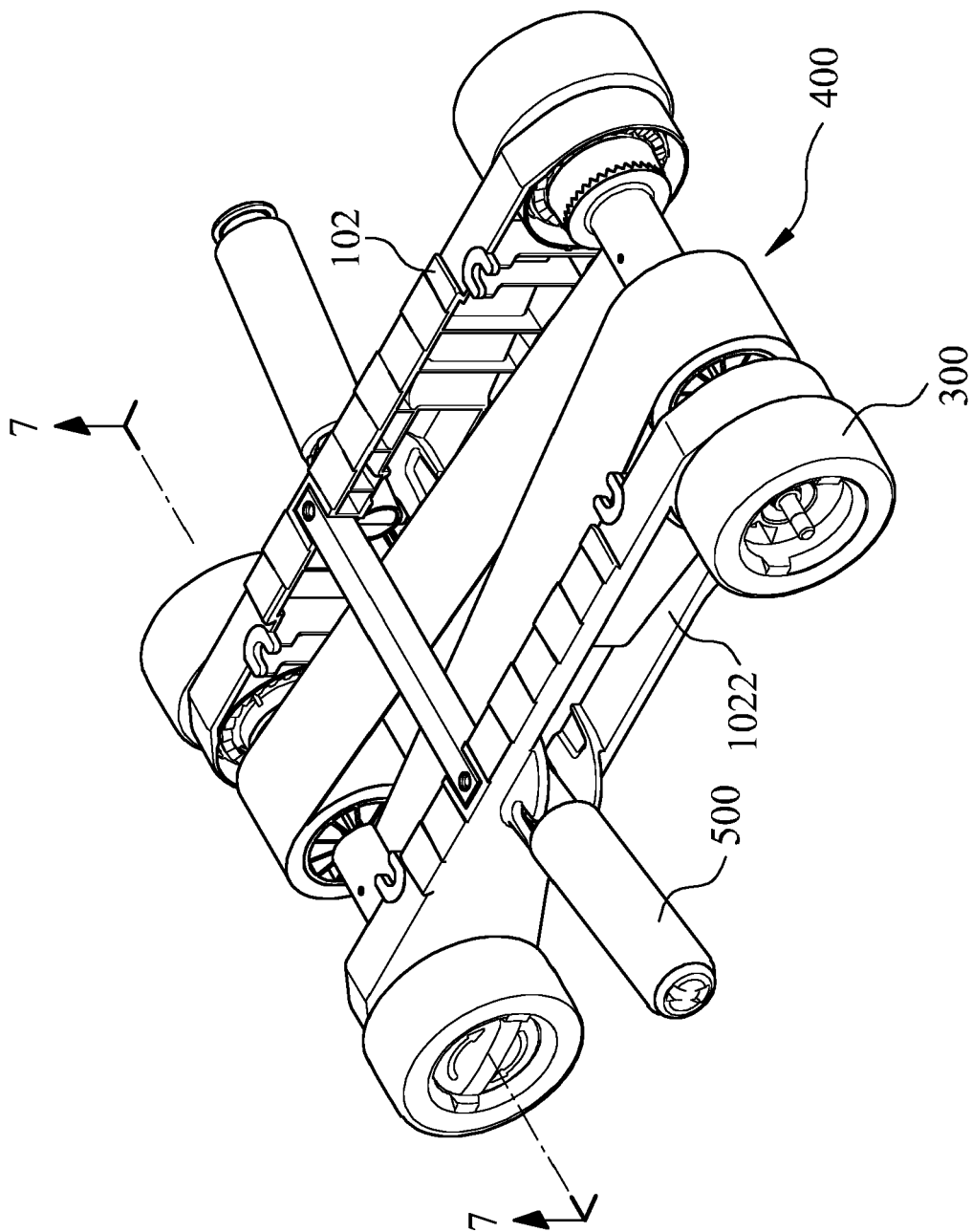


Fig. 2

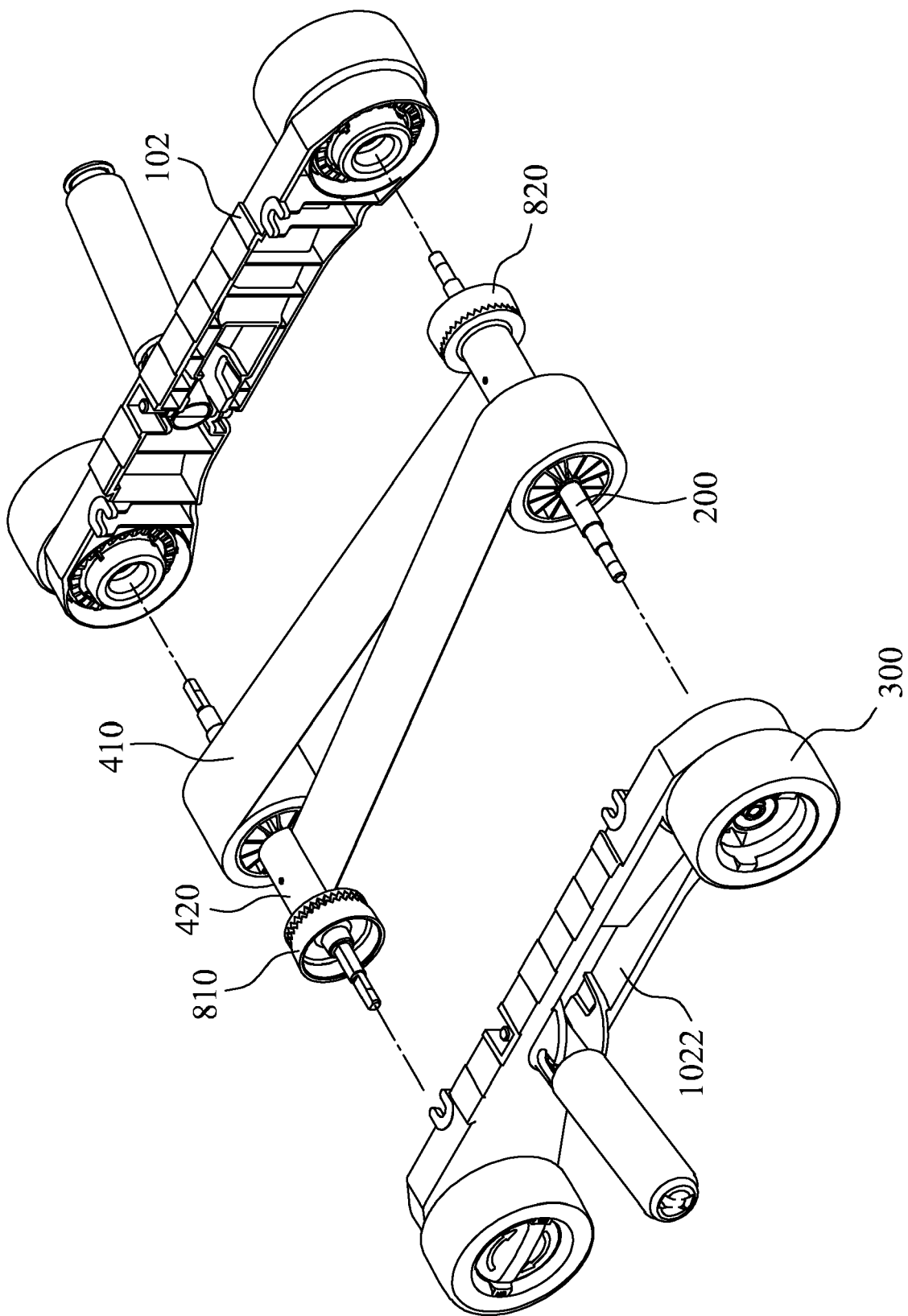


Fig. 3

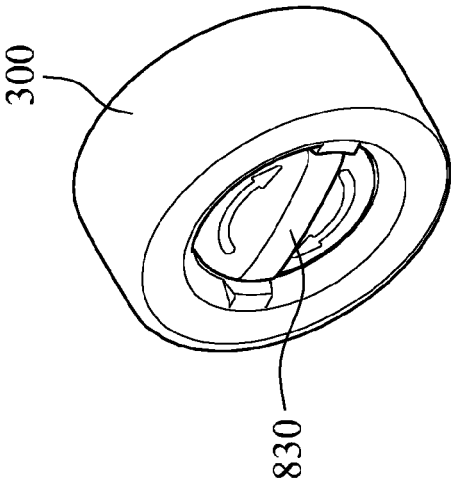


Fig. 4A

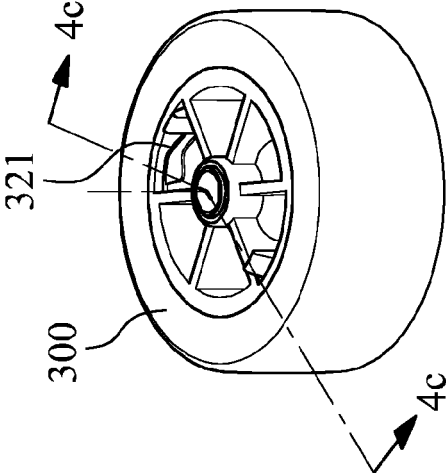


Fig. 4B

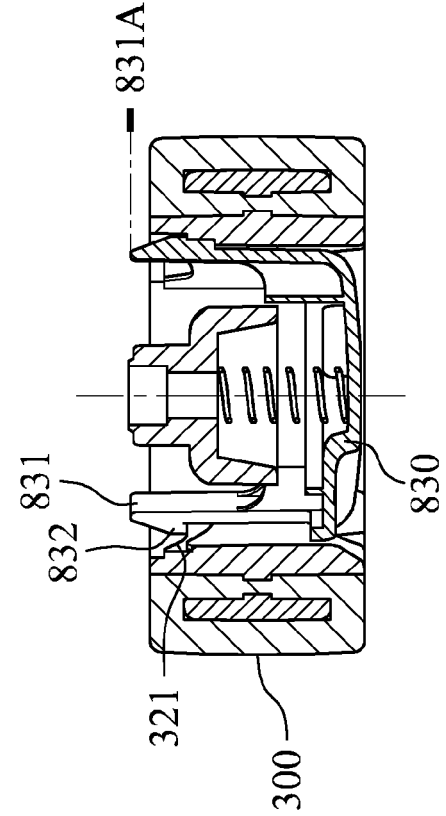


Fig. 4C

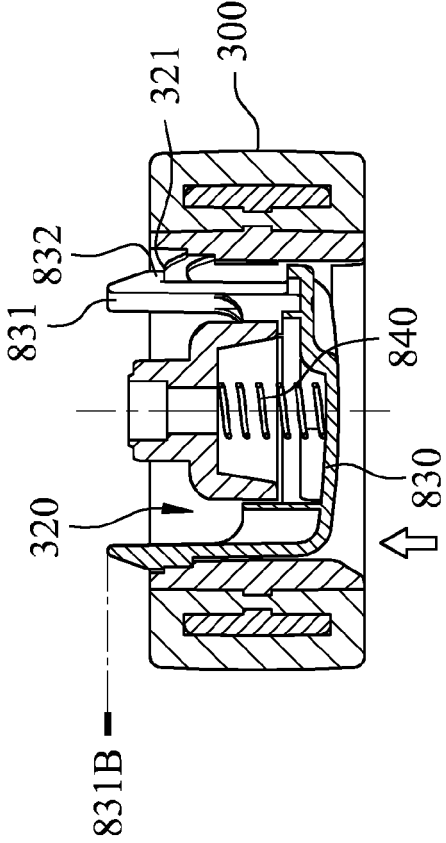


Fig. 4D

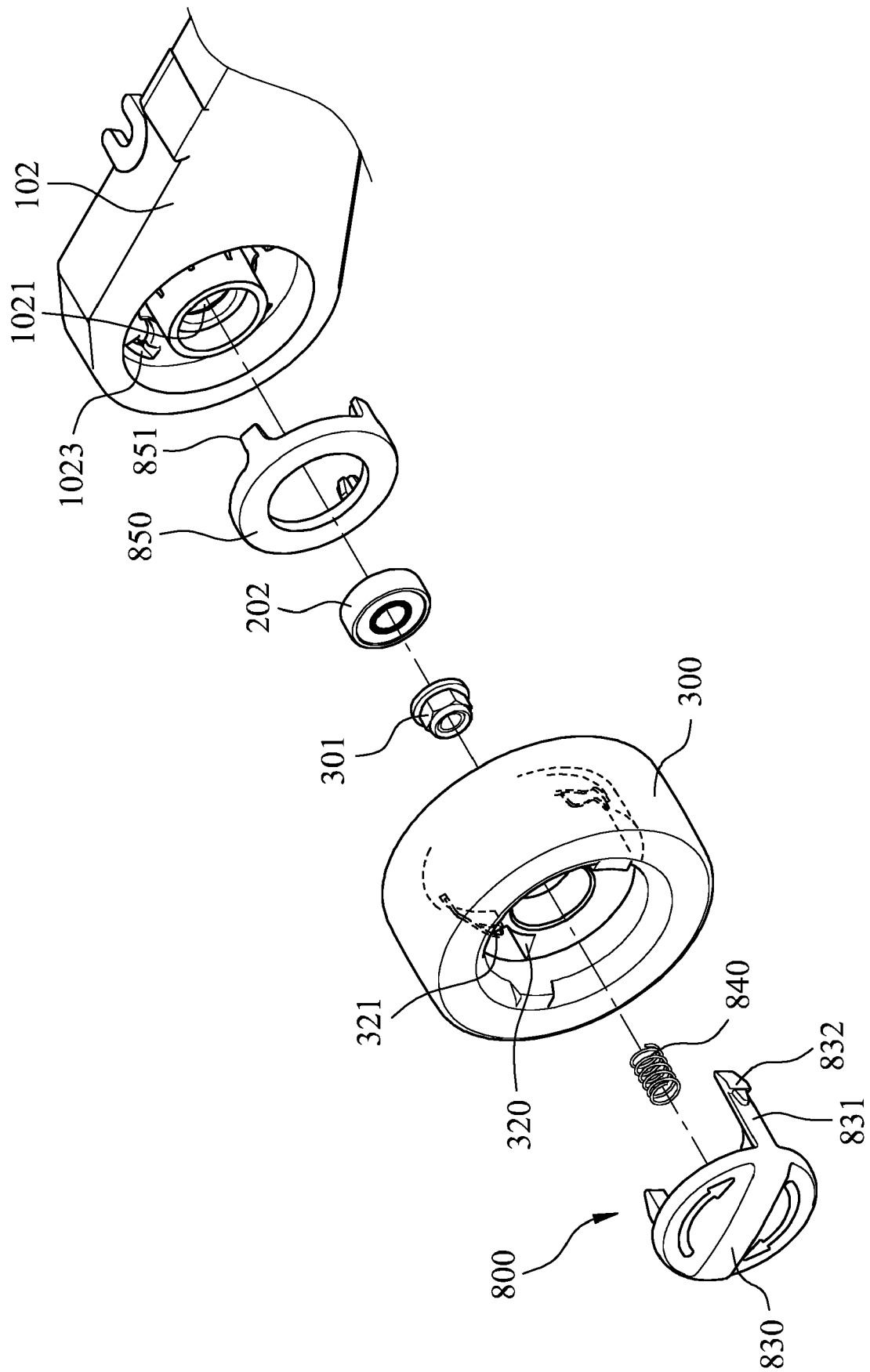


Fig. 5

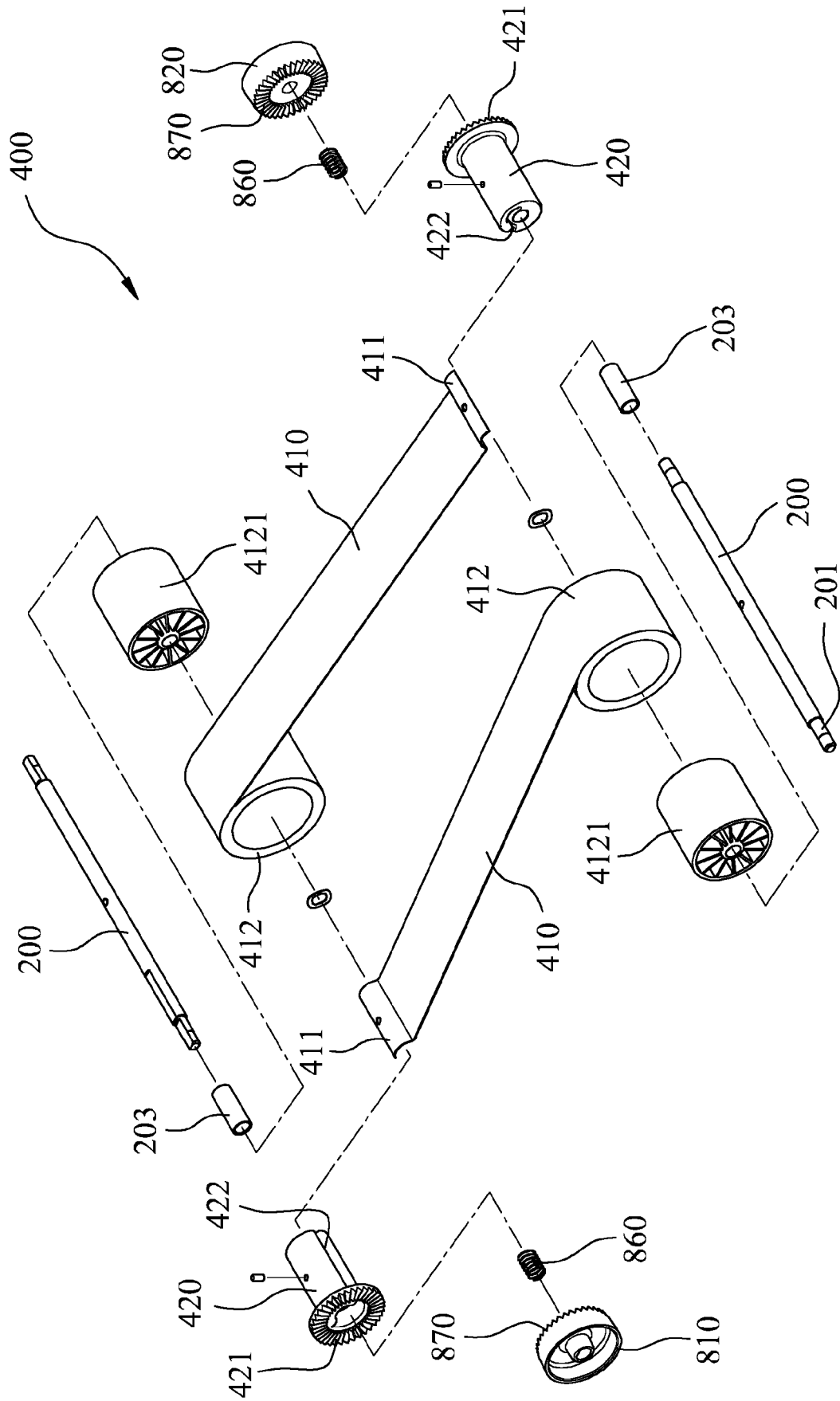


Fig. 6

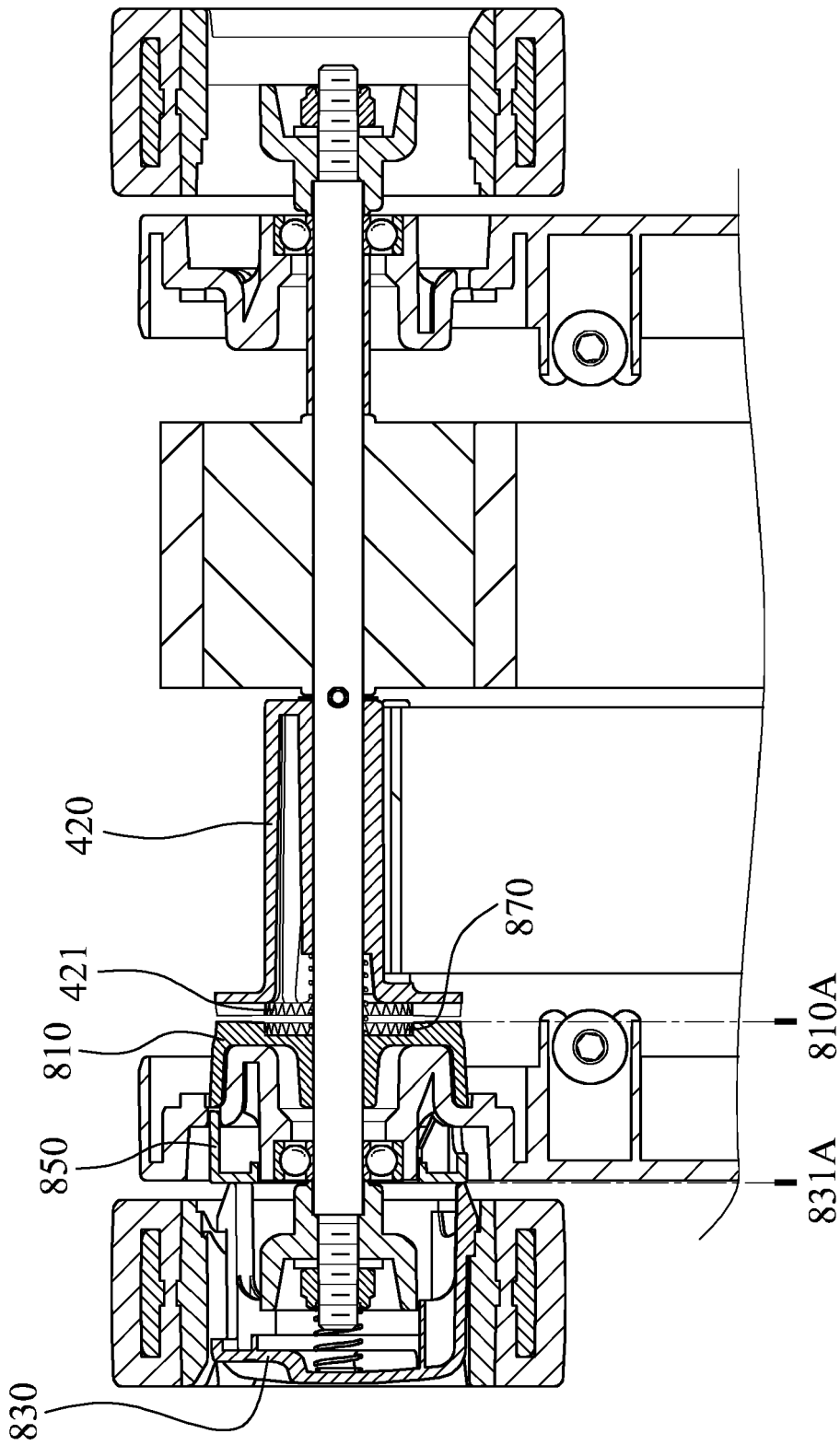


Fig. 7

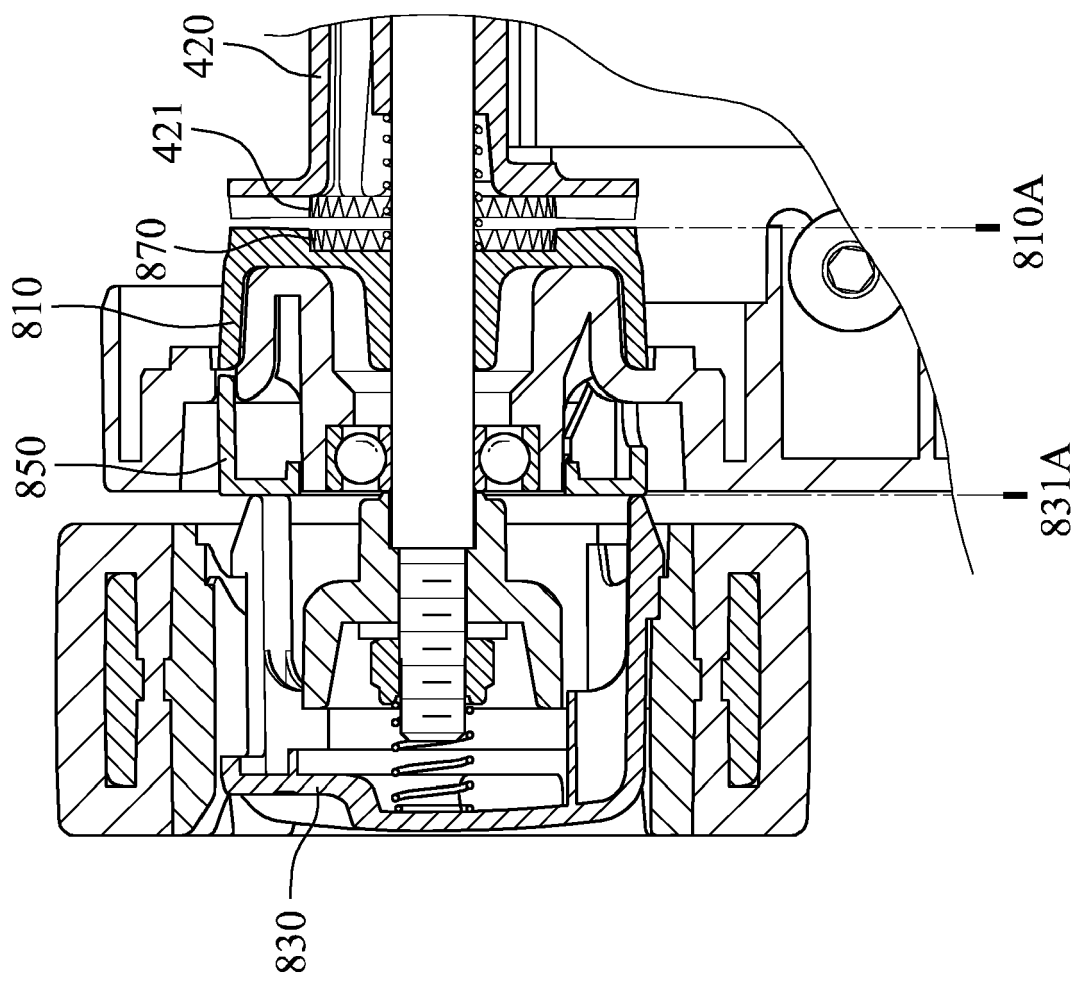


Fig. 8A

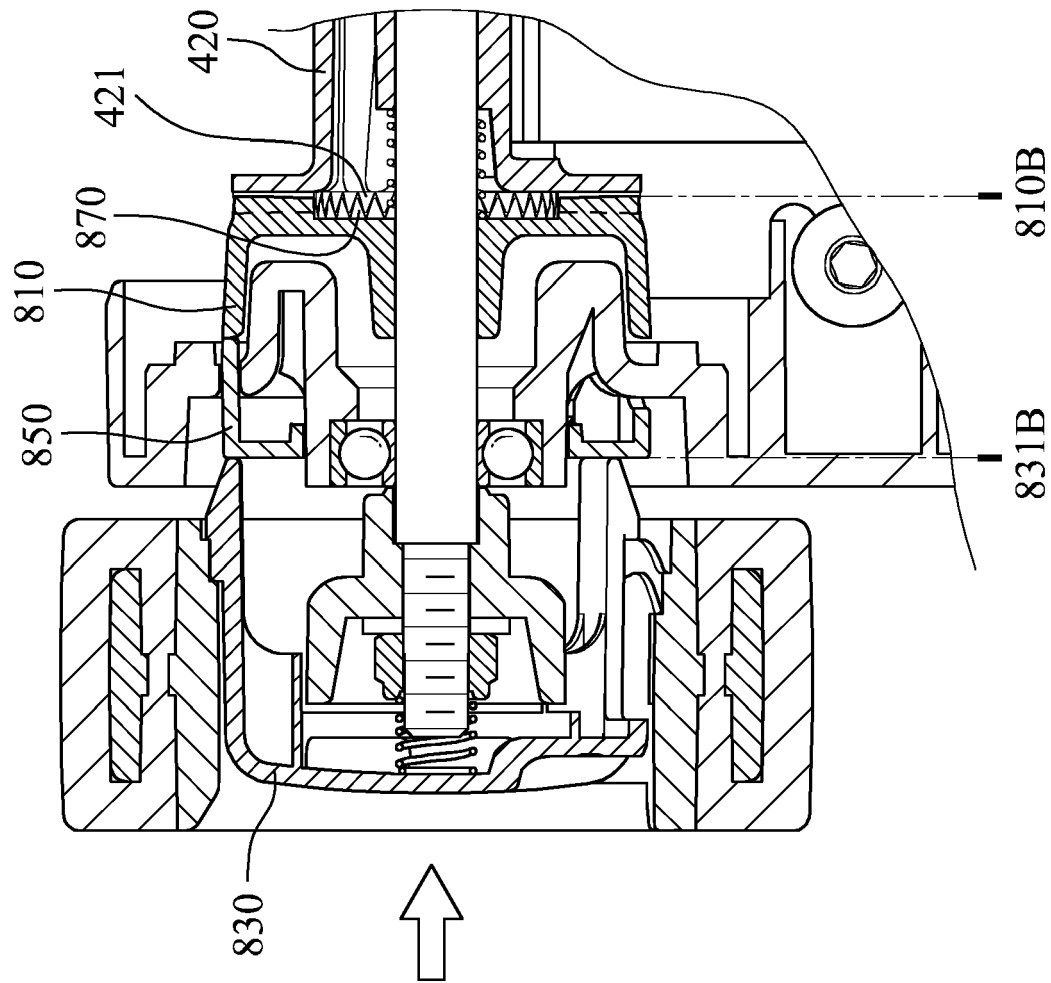


Fig. 8B

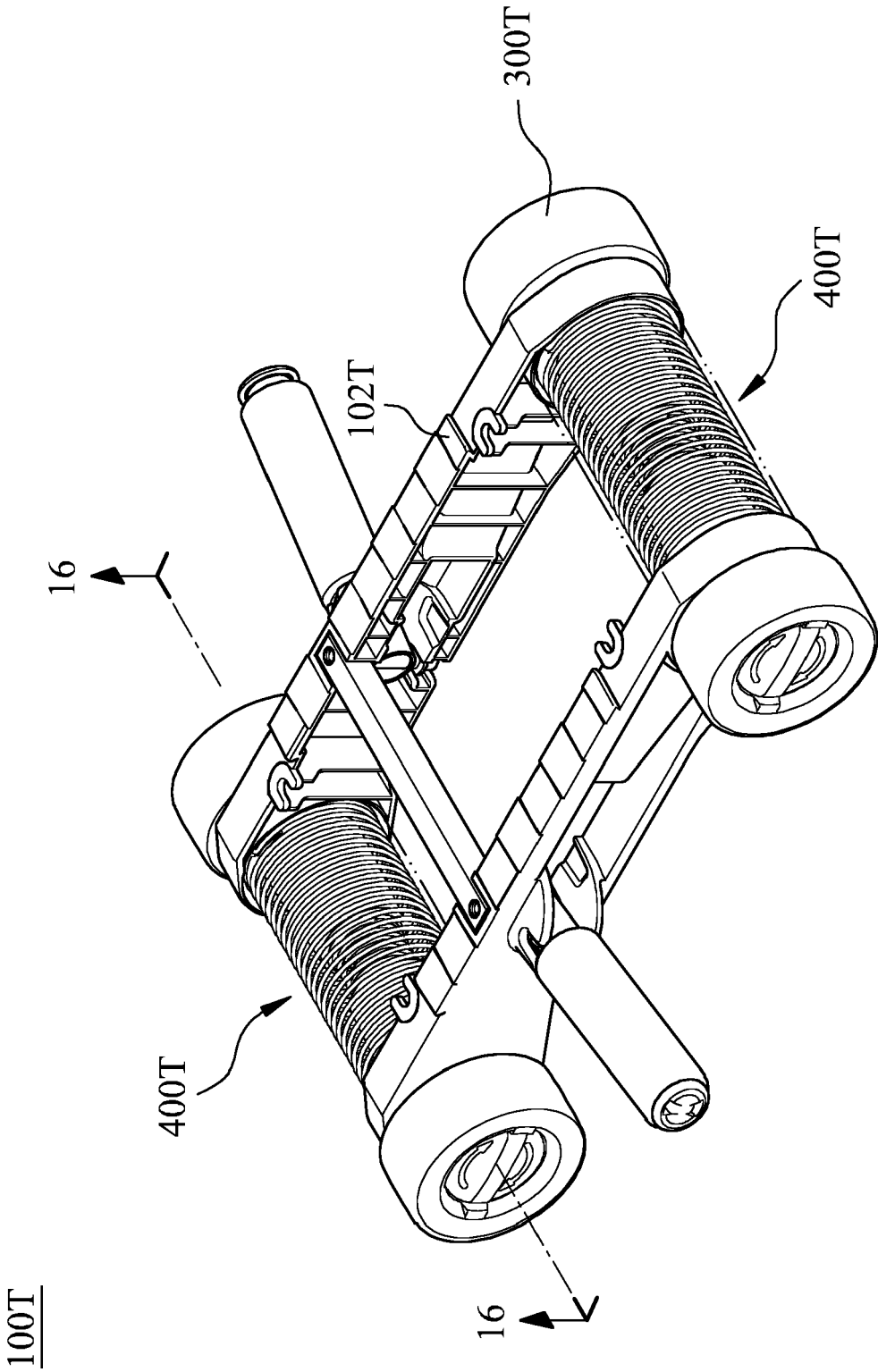


Fig. 9

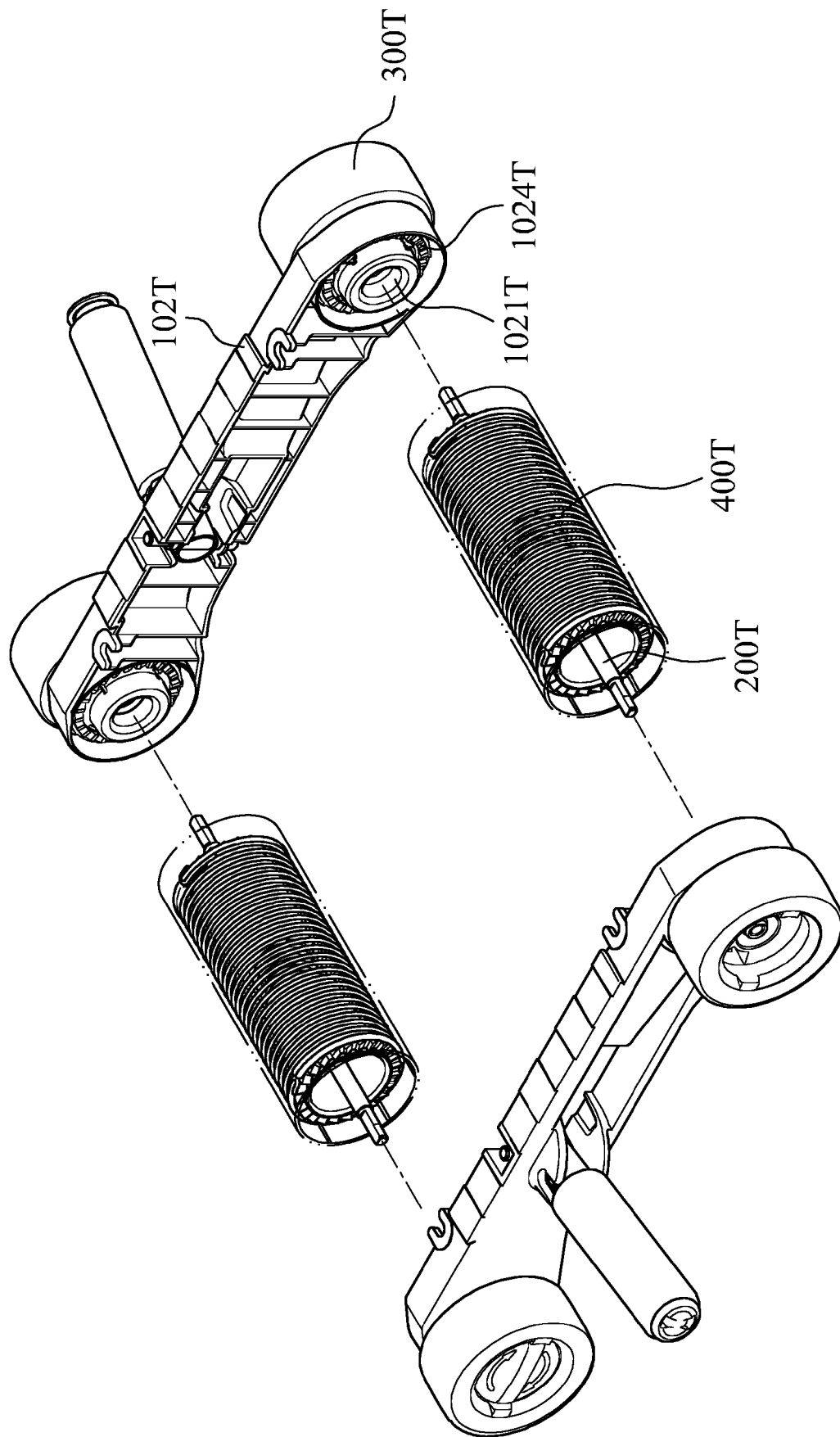


Fig. 10

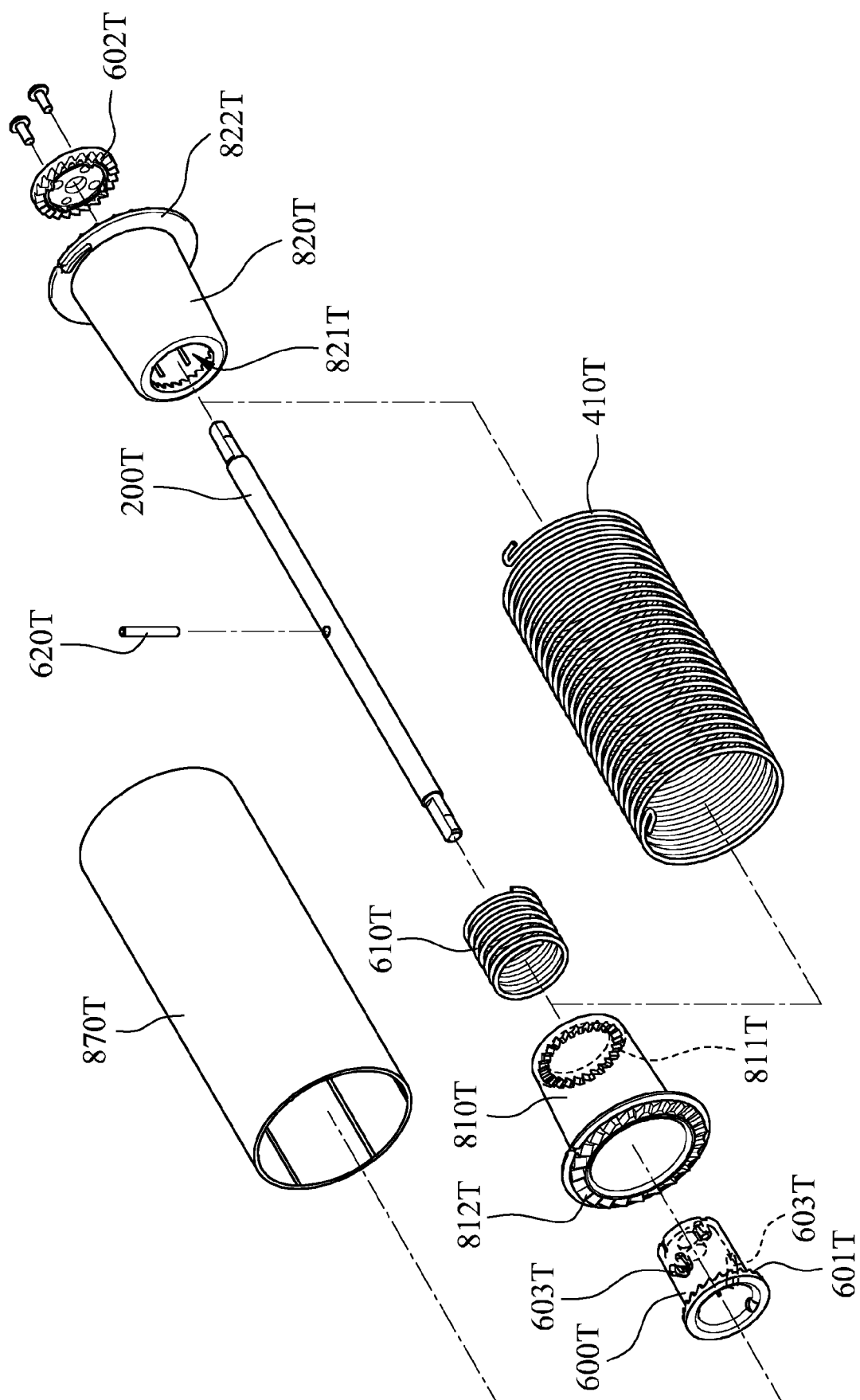


Fig. 11

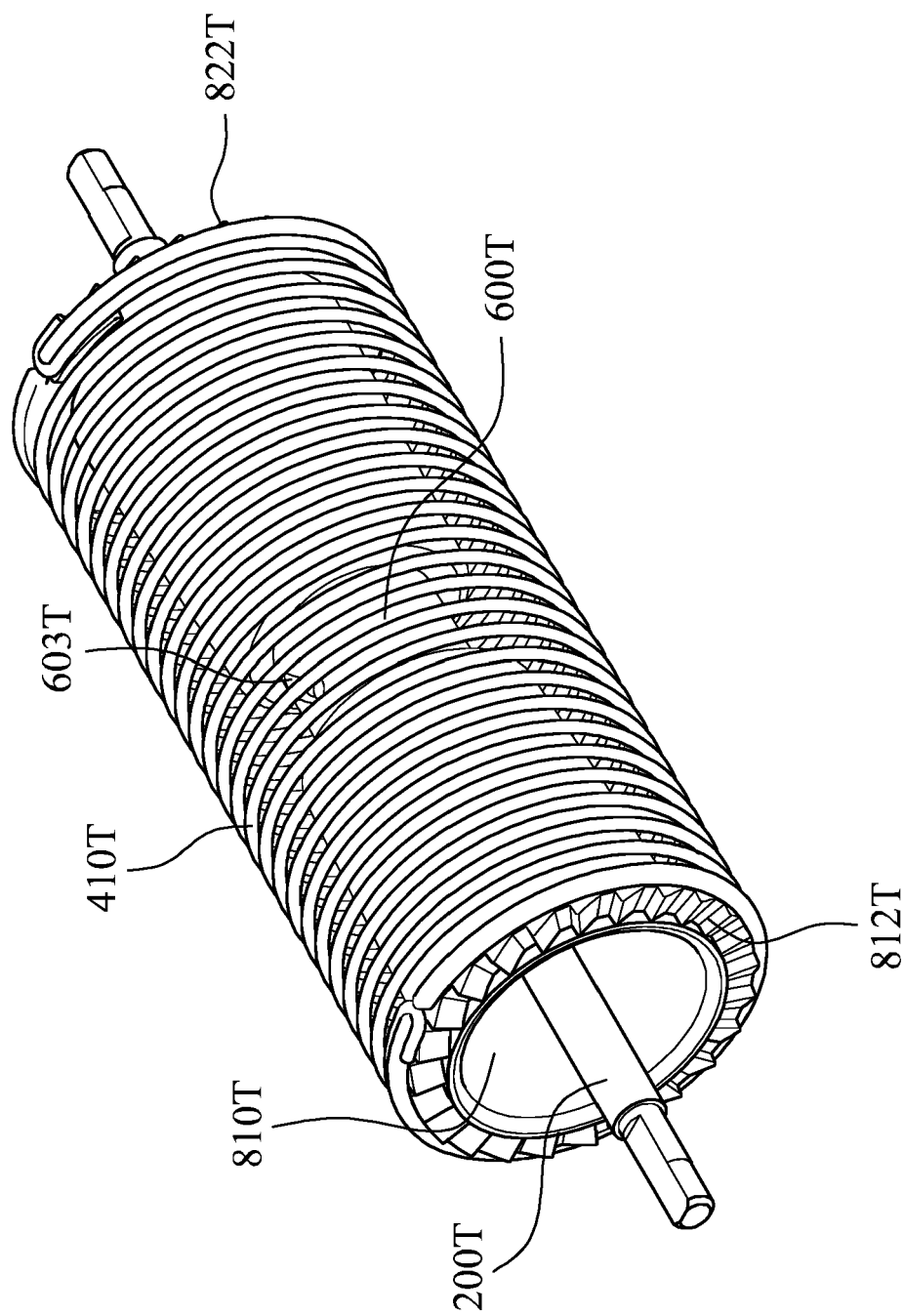


Fig. 12

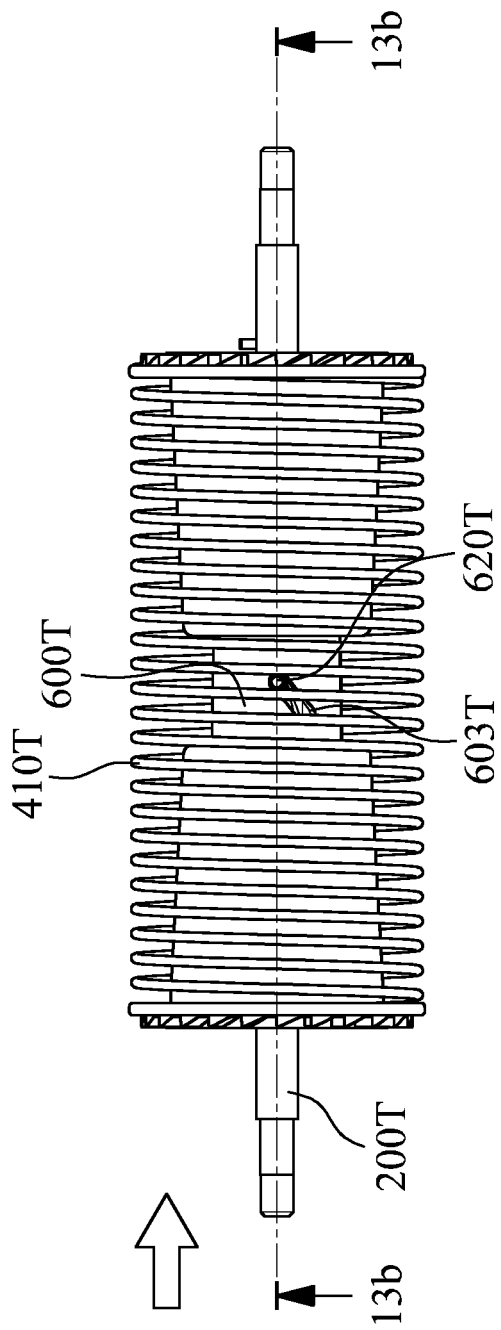


Fig. 13A

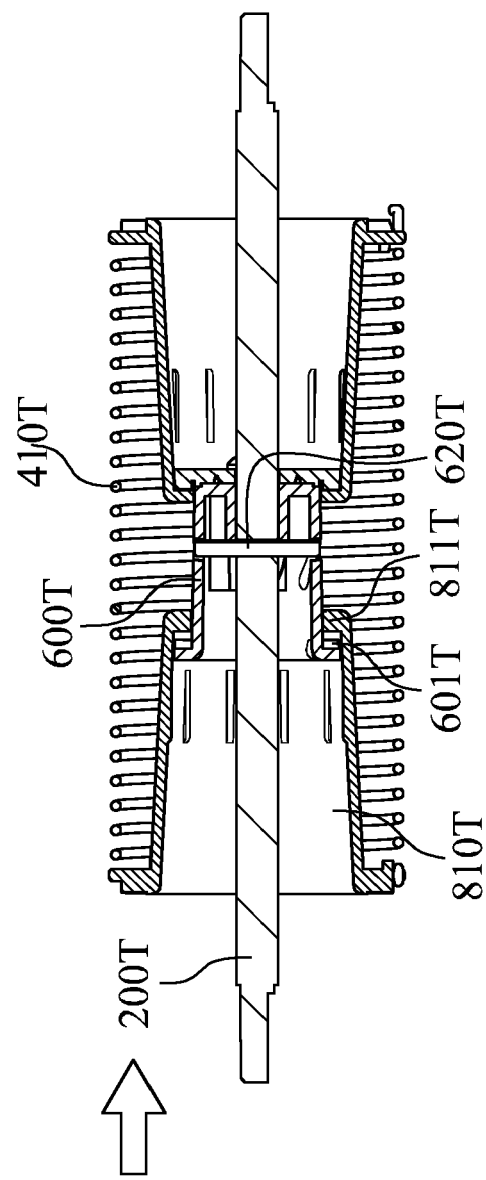


Fig. 13B

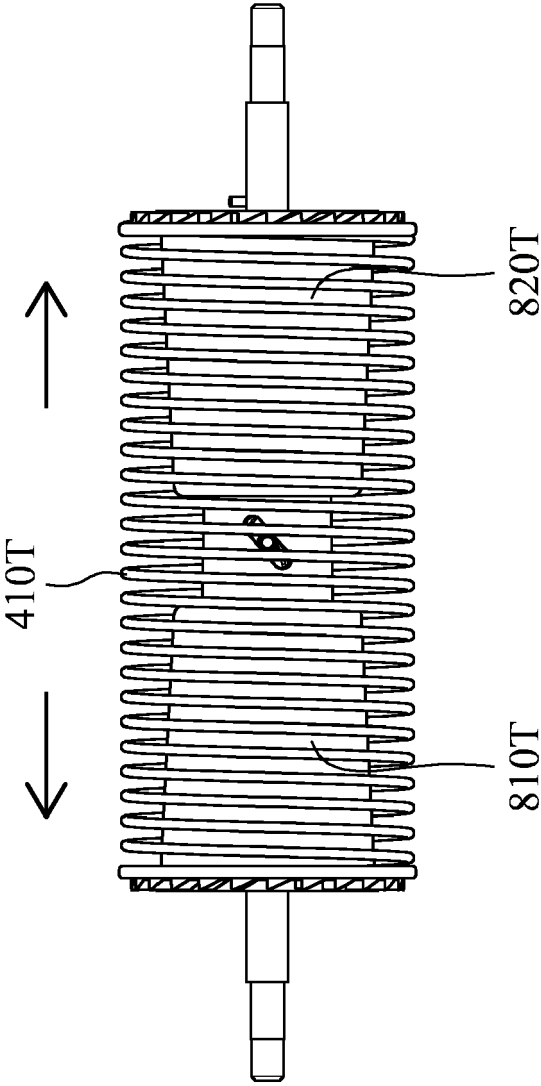


Fig. 14

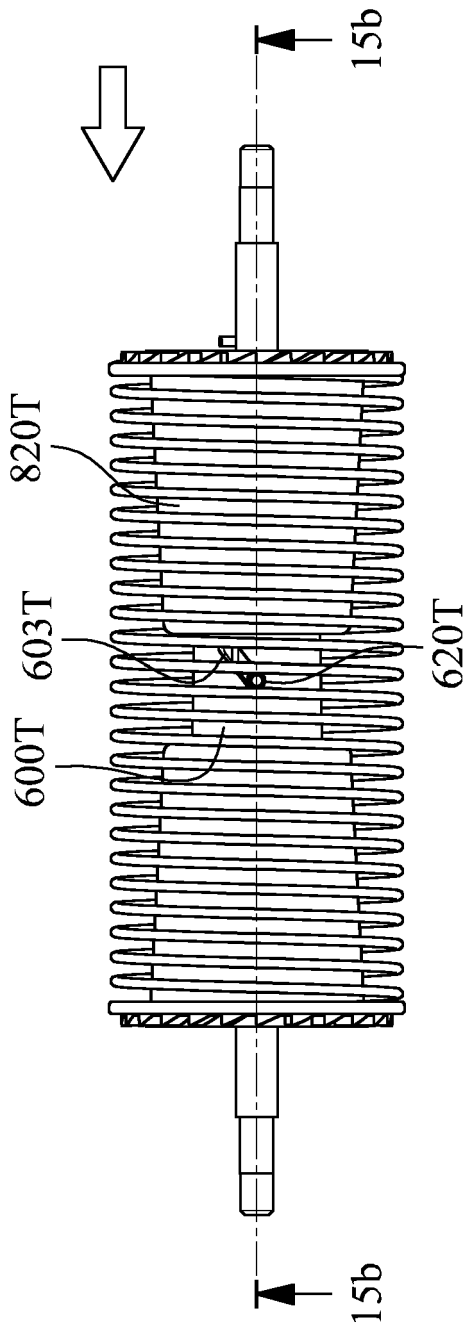


Fig. 15A

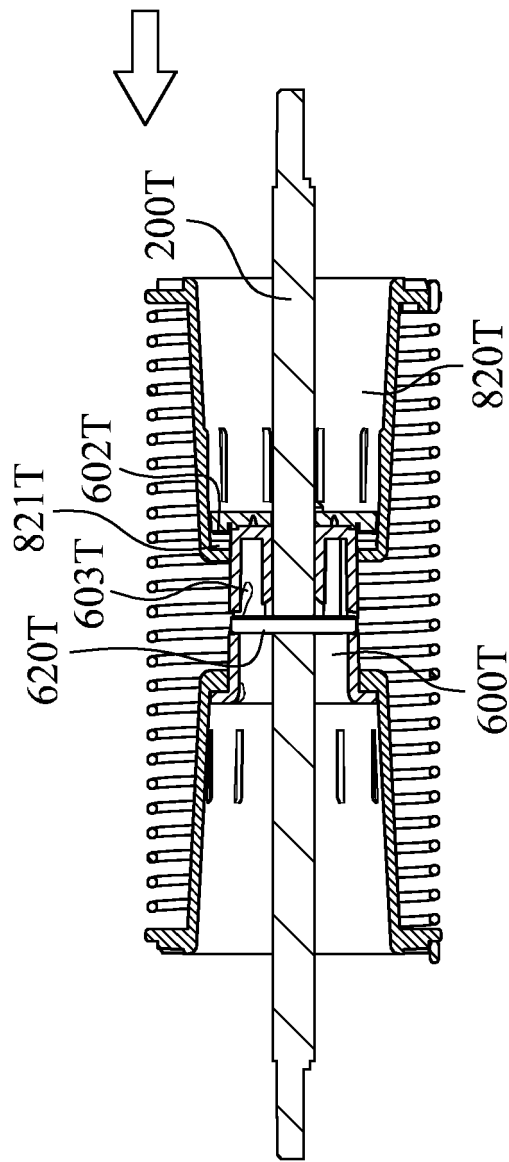


Fig. 15B

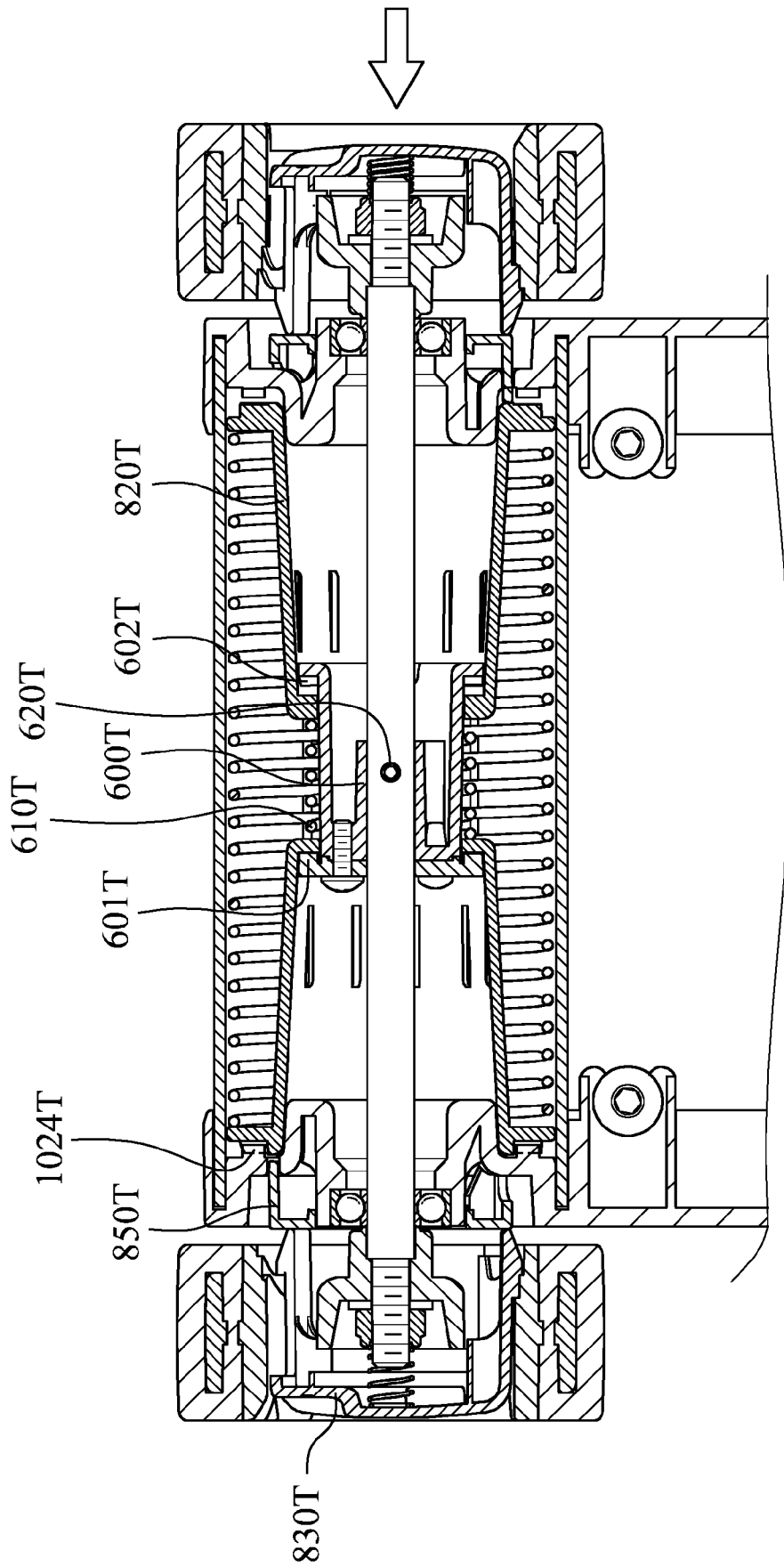


Fig. 16

100S

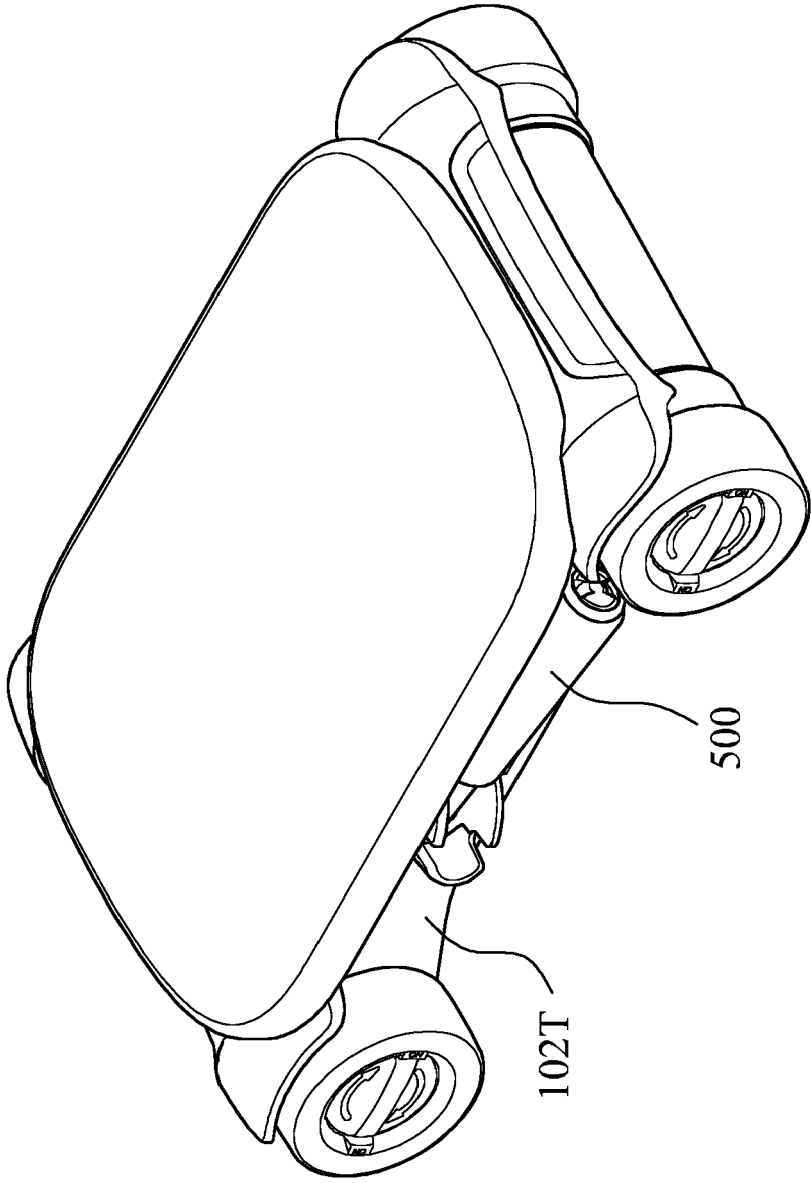


Fig. 17

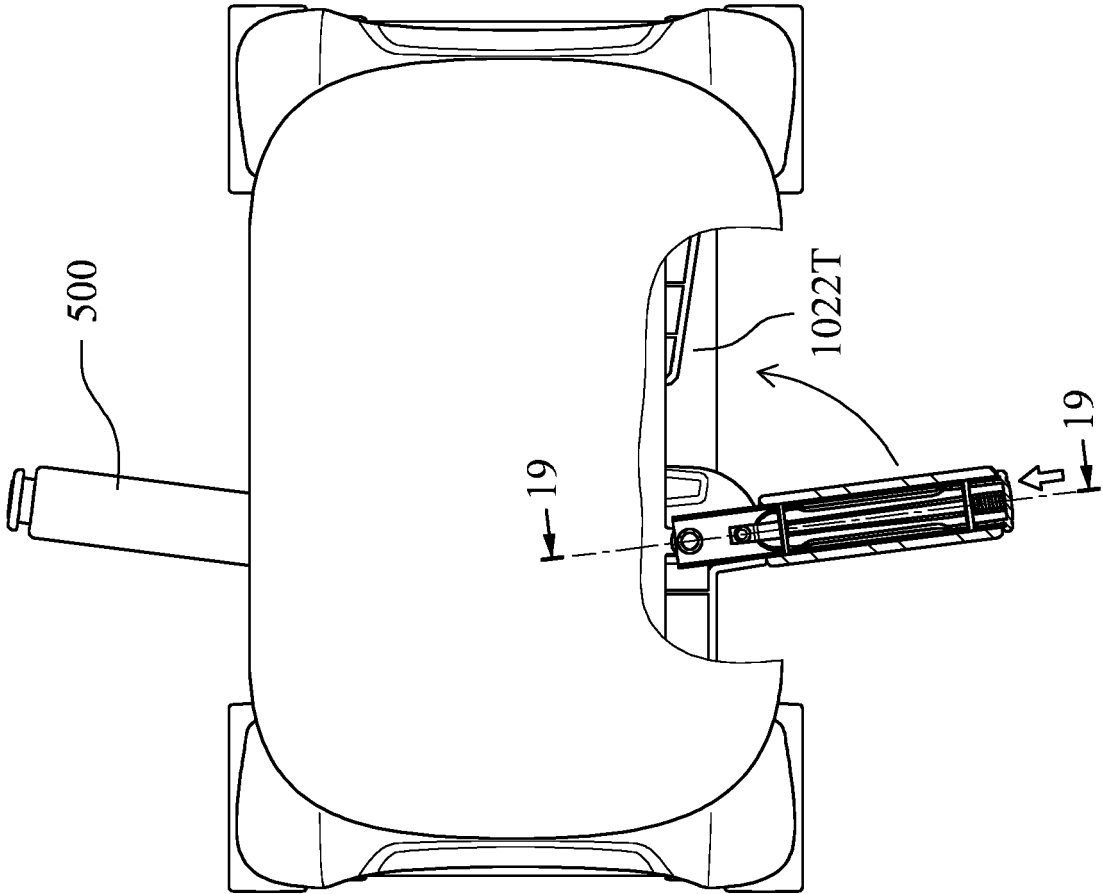


Fig. 18

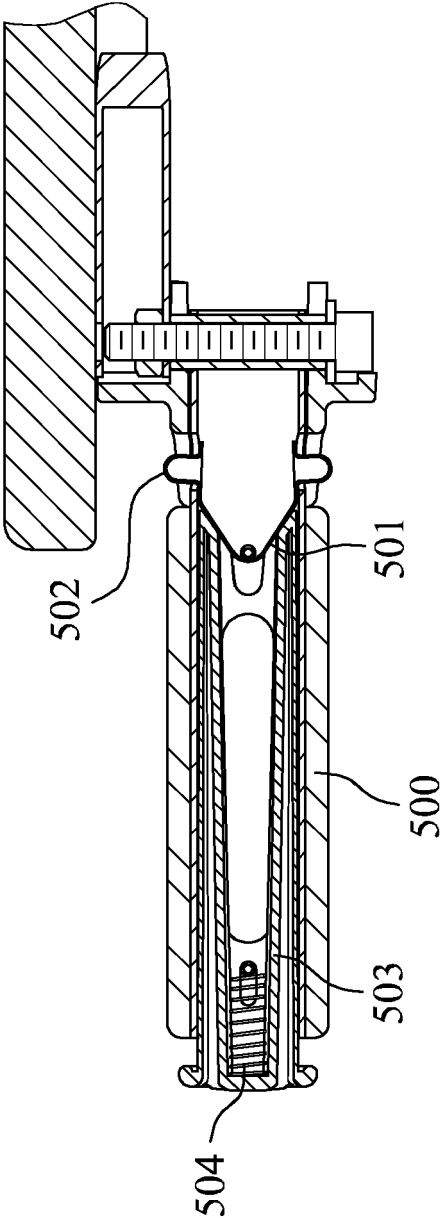


Fig. 19A

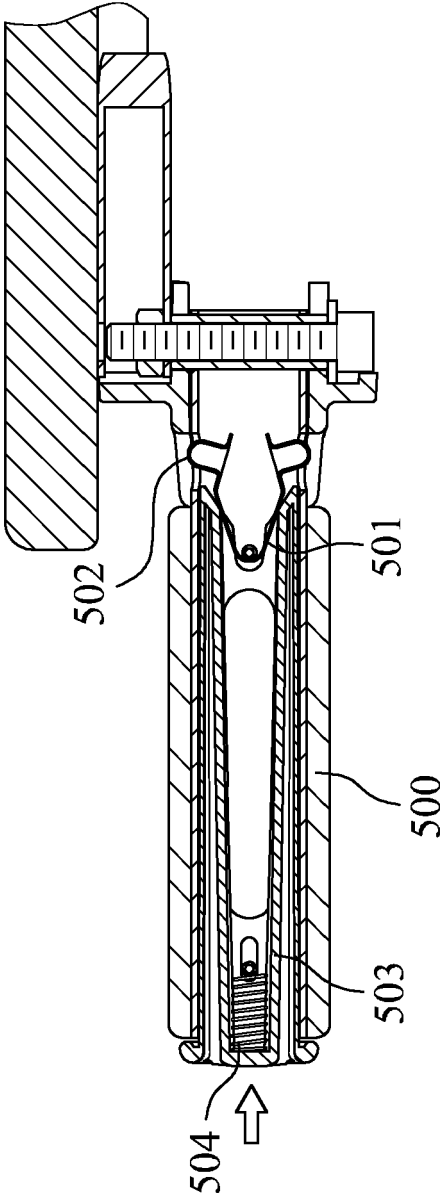


Fig. 19B

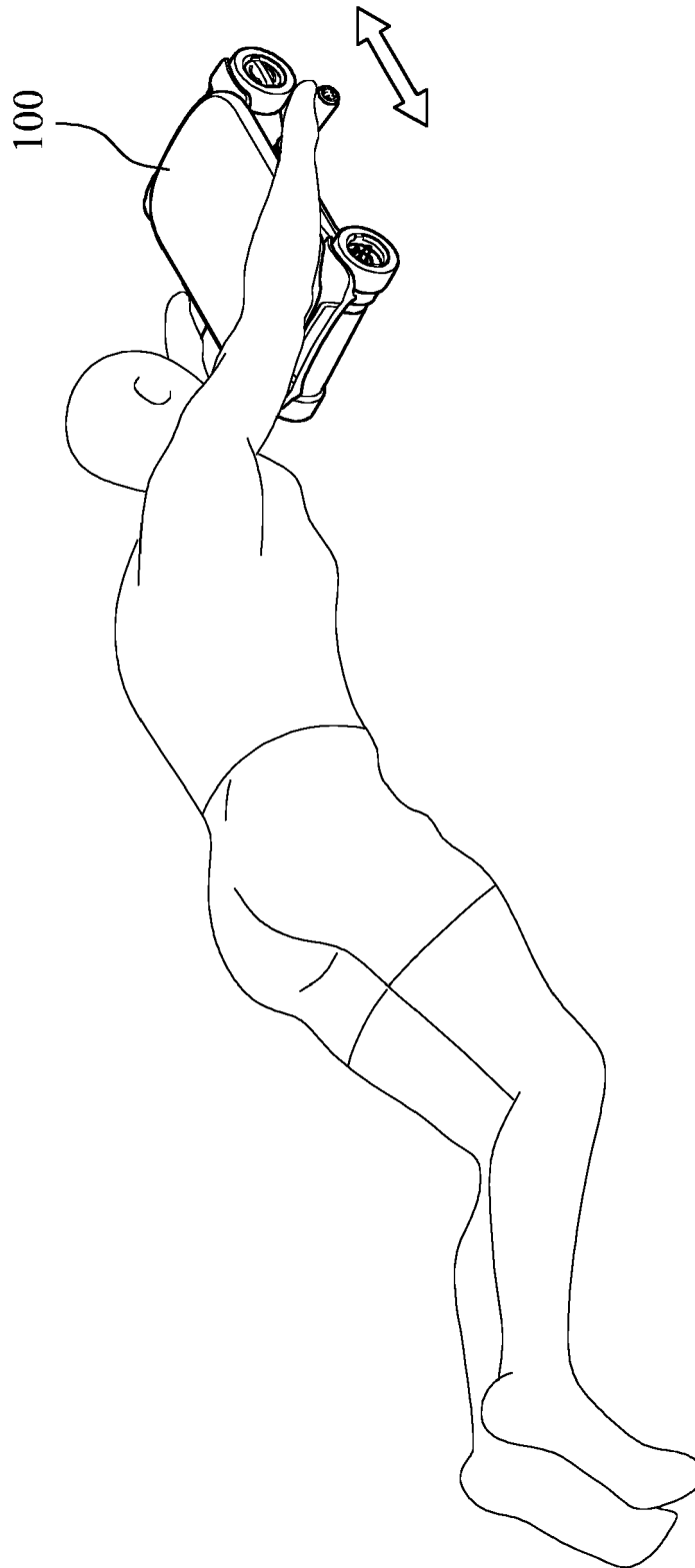


Fig. 20

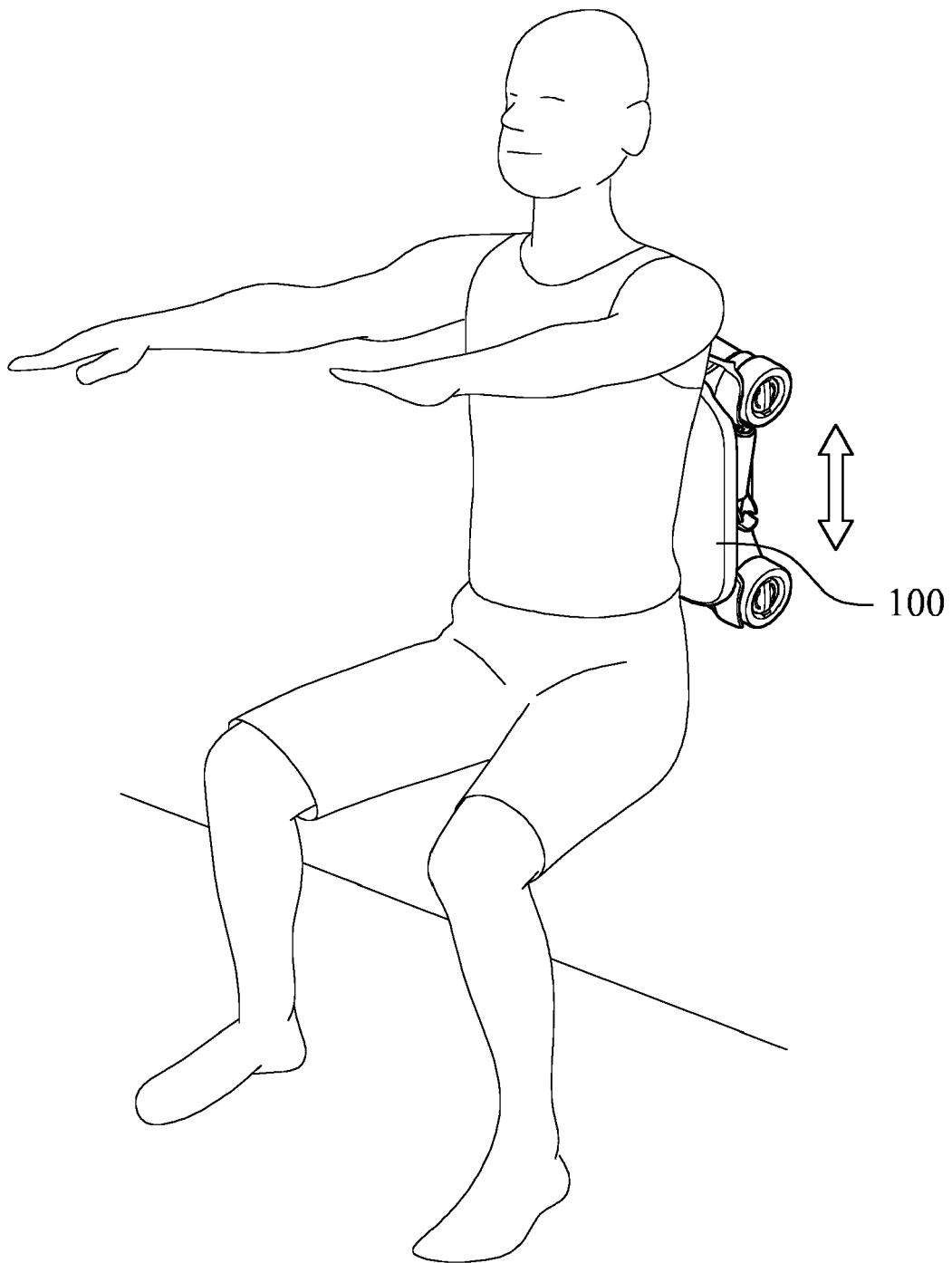


Fig. 21

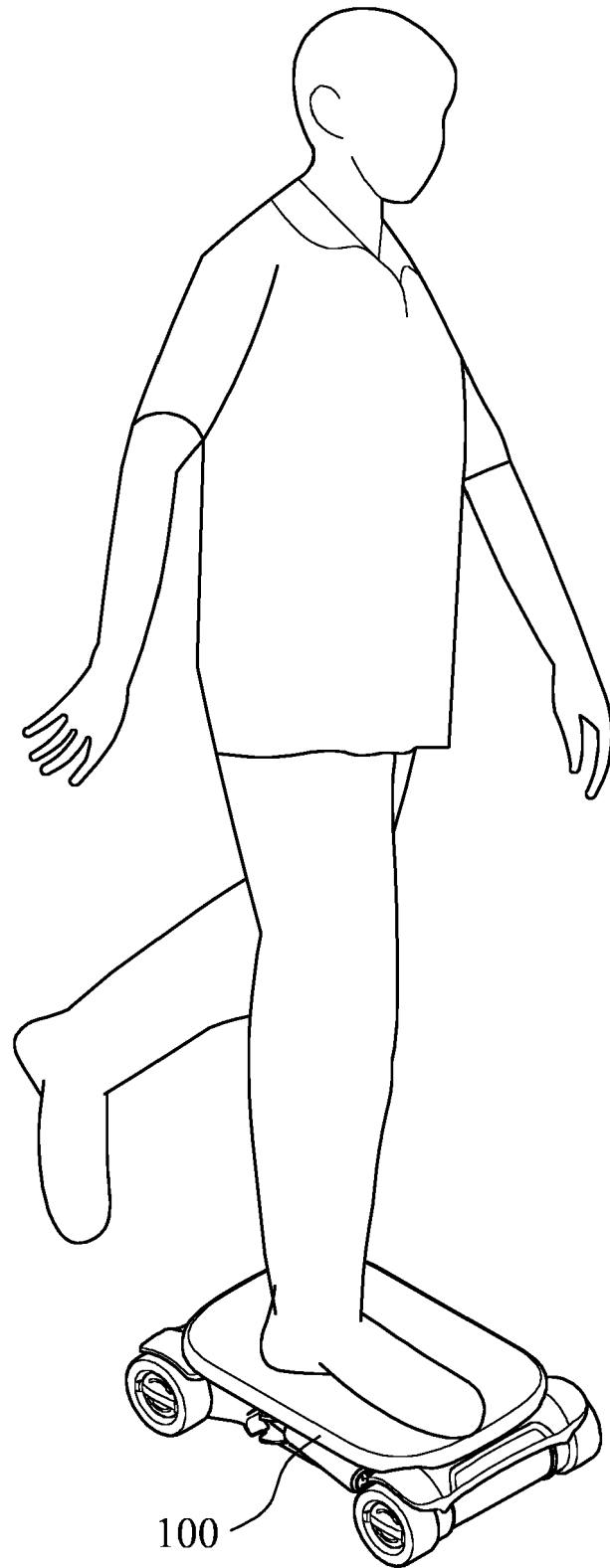


Fig. 22



EUROPEAN SEARCH REPORT

Application Number
EP 19 17 0983

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2012/157274 A1 (MACCOLL IAN COATS [US] ET AL) 21 June 2012 (2012-06-21)	1-3	INV.
Y	* paragraph [0036] - paragraph [0038] *	3	A63B21/00
A	* paragraph [0056] - paragraph [0058]; claim 3; figures *	4-10	A63B22/20
	-----		A63B21/02
X	US 2014/187394 A1 (BLAHNIK JAY C [US] ET AL) 3 July 2014 (2014-07-03)	1	A63B21/045
A	* paragraph [0050] - paragraph [0051]; figure 6a *	2-10	A63B21/068
	-----		A63B23/02
X	WO 96/18435 A1 (LANDERS JEFFREY A [US]; CHERNACK MILTON PHILLIP [US]) 20 June 1996 (1996-06-20)	1,2	A63B71/02
A	* page 15, line 10 - page 16, line 16; figure 1 *	3-10	

Y	US 8 708 874 B2 (CHEN JUI-YAO [TW]; TRISTAR PRODUCTS INC [US]) 29 April 2014 (2014-04-29)	3	
	* column 4, line 24 - line 31; figures *		

A	US 5 669 864 A (BRISTER TIMOTHY G [US]) 23 September 1997 (1997-09-23)	1-10	TECHNICAL FIELDS SEARCHED (IPC)
	* figures *		A63B

A	US 6 761 672 B1 (WILLIAMS NATHAN N [US]) 13 July 2004 (2004-07-13)	1-10	
	* figures *		

The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 22 October 2019	Examiner Lundblad, Hampus
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 19 17 0983

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

22-10-2019

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012157274 A1	21-06-2012	AU 2011343490 A1	14-03-2013
		CA 2808244 A1	21-06-2012
		CN 103153407 A	12-06-2013
		CN 105327486 A	17-02-2016
		EP 2651523 A2	23-10-2013
		JP 5865390 B2	17-02-2016
		JP 2014502529 A	03-02-2014
		KR 20130052677 A	22-05-2013
		US 2012157274 A1	21-06-2012
		US 2015182792 A1	02-07-2015
		WO 2012083237 A2	21-06-2012

US 2014187394 A1	03-07-2014	NONE	

WO 9618435 A1	20-06-1996	AU 4510996 A	03-07-1996
		US 5643162 A	01-07-1997
		WO 9618435 A1	20-06-1996

US 8708874 B2	29-04-2014	NONE	

US 5669864 A	23-09-1997	CA 2182550 A1	15-02-1997
		US 5669864 A	23-09-1997

US 6761672 B1	13-07-2004	NONE	
