

(19)



(11)

EP 3 246 501 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:

21.06.2023 Bulletin 2023/25

(21) Application number: **16170681.7**

(22) Date of filing: **20.05.2016**

(51) International Patent Classification (IPC):

E05F 1/12 ^(2006.01)

E05F 3/10 ^(2006.01)

(52) Cooperative Patent Classification (CPC):

E05F 3/104; E05F 1/1215; E05F 3/14; E05F 3/20;

E05Y 2201/21; E05Y 2201/41; E05Y 2201/484;

E05Y 2201/492; E05Y 2201/638; E05Y 2900/132;

E05Y 2900/148; E05Y 2900/20

(54) **HINGE ASSEMBLAGE**

SCHARNIERMONTAGE

ASSEMBLAGE DE CHARNIÈRE

(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**

(43) Date of publication of application:

22.11.2017 Bulletin 2017/47

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EP-A2- 0 251 972

WO-A1-2008/018720

WO-A1-2012/018361

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Description

[0001] The invention relates to a hinge assemblage, and more particularly to an adjustable hinge assemblage.

[0002] Referring to Figures 1 and 2, a conventional hinge disclosed in Taiwanese Patent No. 1441987 (Chinese Patent Certificate No. 1696604) includes a leaf mechanism 11 and a torque-providing module 12. The leaf mechanism 11 includes a first leaf 111 fixed to a first object (not shown), a second leaf 112 fixed to a second object (not shown), a plurality of first barrels 113 fixed to the first leaf 111, and a plurality of second barrels 114 fixed to the second leaf 112. The first barrels 113 and the second barrels 114 are disposed in an alternating arrangement and pivoted to each other. The torque-providing module 12 is inserted into the first and second barrels 113, 114, and includes a core axle 121 that is co-rotatable with the first barrels 113, an inner tube 122 that is co-rotatable with the second barrels 114, and a torsion spring 123 that has two opposite end portions respectively fixed to the core axle 121 and the inner tube 122 for providing restoring torque.

[0003] When external forces are applied on the conventional hinge to pivot the first and second leaves 111, 112 relative to each other from an initial state, the core axle 121 and the inner tube 122 are driven to deform the torsion spring 123 so as to generate a restoring torque. When the external forces are removed, the restoring torque generated by the torsion spring 123 pivots the first and second leaves 111, 112 relative to each other toward the initial state.

[0004] However, a high-speed relative pivotal movement between first and second leaves 111, 112 toward the initial state may cause a severe collision between the first and second objects. On the contrary, if a damping device is employed in the conventional hinge to damp the relative pivotal movement between first and second leaves 111, 112 toward the initial state so as to prevent the severe collision between the first and second objects, the relative pivotal movement of first and second leaves 111, 112 away from the initial state may be considerably retarded.

[0005] Another assemblage is disclosed in WO 2012/018361. WO 2008/018720 further discloses a damping unit including an oil tube.

[0006] Therefore, an object of the invention is to provide a hinge assemblage that can alleviate at least one of the drawbacks of the prior art.

[0007] According to the invention, the hinge assemblage is for pivotally interconnecting first and second objects, and is in accordance with claim 1. The hinge assemblage includes a leaf mechanism, an actuating unit and a damping unit. The leaf mechanism includes a first leaf unit. The first leaf unit includes a first leaf fixed to the first object, a second leaf fixed to the second object and pivotable relative to the first leaf, a plurality of first barrels fixed to the first leaf, and a plurality of second barrels fixed to the second leaf. The first barrels and the second

barrels are disposed along an axis in an alternating arrangement. The hinge assemblage is operable to convert between an initial state and an open state. An angle formed between the first and second leaves when the hinge assemblage is in the initial state is different from that angle formed between the first and second leaves when the hinge assemblage is in the open state. The actuating unit is mounted to the first and second barrels of the first leaf unit, and includes a tubular member, a connecting axle and an actuating module. The tubular member is co-rotatable with the first leaf and the first barrels of the first leaf unit. The connecting axle extends into the tubular member and is co-rotatable with the second leaf and the second barrels of the first leaf unit. The actuating module is disposed in the tubular member and generates an actuating force during the conversion of the hinge assemblage between the initial and open states. The damping unit is mounted to the first and second barrels of the first leaf unit, and includes an oil tube, a first acting member, a follower member and a hydraulic module. The oil tube is co-rotatable with the first leaf and the first barrels of the first leaf unit. The first acting member is disposed fixedly in the oil tube and has an inclined cam surface. The follower member is movable relative to the oil tube along the axis, and has a main body that is disposed in the oil tube and that has a first abutment surface facing toward the cam surface of the first acting member, and a rod section that extends through the first acting member and out of the oil tube to engage the connecting axle of the actuating unit such that the follower member is co-rotatable with the connecting axle of the actuating unit. The follower member is guided by the first acting member to move relative to the oil tube in a first direction during the conversion of the hinge assemblage from the initial state to the open state, and in a second direction opposite to the first direction during the conversion of the hinge assemblage from the open state to the initial state. The hydraulic module is disposed in the oil tube for generating a damping force upon the movement of the follower member relative to the oil tube. The hydraulic module is configured such that the damping force generated by the hydraulic module during the conversion of the hinge assemblage from the initial state to the open state is different from the damping force generated by the hydraulic module during the conversion of the hinge assemblage from the open state to the initial state.

[0008] Other features and advantages of the invention will become apparent in the following detailed description of the embodiments with reference to the accompanying drawings, of which:

Figure 1 is a partly exploded perspective view illustrating the conventional hinge in Taiwanese Patent No. 1441987;

Figure 2 is a sectional view illustrating the conventional hinge in Taiwanese Patent No. 1441987;

Figure 3 is an exploded perspective view illustrating a first embodiment of a hinge assemblage which

does not fall within the scope of the claims;
 Figure 4 is an exploded perspective view illustrating a first actuating unit of the first embodiment;
 Figure 5 is sectional view illustrating the first actuating unit of the first embodiment;
 Figure 6 is an exploded perspective view illustrating a damping unit of the first embodiment;
 Figure 7 is an exploded perspective view illustrating a one-way valve assembly and a follower member of the damping unit of the first embodiment;
 Figure 8 is a partly exploded perspective view illustrating a throttle assembly of the damping unit of the first embodiment;
 Figure 9 is a sectional view illustrating the damping unit of the first embodiment;
 Figure 10 is a schematic perspective view illustrating the first embodiment in an initial state;
 Figure 11 is a schematic sectional view taken along line XI-XI in Figure 10 and illustrating the first embodiment in the initial state;
 Figure 12 is another schematic sectional view illustrating the first embodiment in an open state;
 Figure 13 illustrates the action of the follower member during the conversion of the first embodiment from the initial state to the open state;
 Figure 14 illustrates the action of the follower member during the conversion of the first embodiment from the open state to the initial state;
 Figure 15 is a schematic top view illustrating the first embodiment in the open state;
 Figure 16 is a schematic sectional view illustrating the first embodiment in the initial state and a mounting bolt of the throttle assembly being moved to an inner-limit position;
 Figure 17 illustrates the action of the follower member during the conversion of the first embodiment from the initial state to the open state when the mounting bolt of the throttle assembly is at the inner-limit position;
 Figure 18 is a schematic side view illustrating the hinge assemblage according to the invention interconnecting first and second objects;
 Figure 19 is a sectional view illustrating a second embodiment of an hinge assemblage which does not fall within the scope of the claims;
 Figure 20 is a sectional view illustrating a second actuating unit of the second embodiment;
 Figure 21 is a partly exploded perspective view illustrating a third embodiment of the hinge assemblage according to the invention;
 Figure 22 is a sectional view illustrating the third embodiment;
 Figure 23 is a partly exploded perspective view illustrating a fourth embodiment of the hinge assemblage according to the invention;
 Figure 24 is a sectional view illustrating the fourth embodiment;
 Figure 25 is a sectional view illustrating a fifth em-

bodiment of a hinge assemblage which does not fall within the scope of the claims;
 Figure 26 is an exploded perspective view illustrating a throttle assembly, a one-way valve assembly and a follower member of the fifth embodiment;
 Figure 27 illustrates the action of the follower member during the conversion of the fifth embodiment from the initial state to the open state;
 Figure 28 illustrates the action of the follower member during the conversion of the fifth embodiment from the open state to the initial state;
 Figure 29 is a partly exploded perspective view illustrating a sixth embodiment of the hinge assemblage according to the invention;
 Figure 30 is an exploded perspective view illustrating a damping unit of the sixth embodiment;
 Figure 31 is a schematic sectional view illustrating the sixth embodiment in the open state;
 Figure 32 is another schematic sectional view illustrating the sixth embodiment in the initial state;
 Figure 33 is still another schematic sectional view illustrating the sixth embodiment in the open state; and
 Figure 34 is a sectional view illustrating a seventh embodiment of the hinge assemblage according to the invention.

[0009] Before the invention is described in greater detail, it should be noted that where considered appropriate, reference numerals or terminal portions of reference numerals have been repeated among the figures to indicate corresponding or analogous elements, which may optionally have similar characteristics.

[0010] Referring to Figure 3, the first embodiment of a hinge assemblage is for pivotally interconnecting first and second objects 21, 22 (see Figures 15 and 18), and includes a leaf mechanism 3, a first actuating unit 4 and a damping unit 5. The first object 21 may be configured as one of a door and a doorframe, and the second object 22 may be configured as the other one of the door and the doorframe.

[0011] The leaf mechanism 3 includes a first leaf unit 31. The first leaf unit 31 includes a first leaf 311 fixed to the first object 21, a second leaf 312 fixed to the second object 22 and pivotable relative to said first leaf 311, a plurality of first barrels 313 fixed to the first leaf 311, and a plurality of second barrels 314 fixed to the second leaf 312. The first barrels 313 and the second barrels 314 are disposed along an axis (X) in an alternating arrangement. An inner surrounding surface of each of the first barrels 313 has two diametrically spaced-apart limiting surface portions 3131. One of the second barrels 314 has two diametrically spaced-apart limiting grooves 3141 that are formed in an inner surrounding surface thereof and that extend in the direction of the axis (X). Each of two opposite endmost ones of the first barrels 313 along the axis (X) is formed with two diametrically opposite first threaded through holes 3132, 3133 (see Figure 11).

[0012] Referring further to Figures 4 and 5, the first actuating unit 4 includes a first tubular member 41, a connecting axle 42, a first torque-controlling member 43, a first torsion spring 44, a first resilient member 45 and two bolts 46. The first tubular member 41 is inserted into the corresponding first and second barrels 313, 314, and is co-rotatable with the first leaf 311 and the first barrels 313. The connecting axle 42 is disposed adjacent to one end of the first tubular member 41. The first torque-controlling member 43 is disposed adjacent to the other end of the first tubular member distal from the connecting axle 42, and cooperates with the first torsion spring 44 to serve as an actuating module.

[0013] An outer surface of the first tubular member 41 has two diametrically opposite limiting surface portions 411 that respectively abut against the limiting surface portions 3131 of each of the corresponding first barrels 313, such that the first tubular member 41 is co-rotatable with the first barrels 313 and the first leaf 311. The first tubular member 41 further has a plurality of first engaging teeth 412 that are formed on an inner surface thereof and that surround the axis (X), and two second threaded through holes 413 (see Figure 11) that are respectively registered with the first threaded through holes 3132 of the corresponding first barrel 313.

[0014] The connecting axle 42 has opposite first and second end portions 421, 422 that are disposed along the axis (X), a polygonal hole 423 (see Figure 5) that is formed in the first end portion 421 and that extends along the axis (X), and two diametrically spaced-apart protrusions 424 that are formed on an outer surrounding surface of the first end portion 421. The second end portion 422 of the connecting axle 42 extends into the first tubular member 41. The protrusions 424 of the connecting axle 42 respectively engage the limiting grooves 3141 of the one of the second barrels 314 such that the connecting axle 42 is co-rotatable with the second barrels 314 and the second leaf 312.

[0015] The first torque-controlling member 43 has an insertion hole 431 that extends along the axis (X) and that permits the second end portion 422 of the connecting axle 42 to be inserted therein, a plurality of second engaging teeth 432 that are formed on an outer surface thereof and that are removably engaged with the first engaging teeth 412 of the first tubular member 41, and a coupling groove 433 that is formed in the outer surface thereof and that extends along the axis (X). The first and second engaging teeth 412, 432 are configured such that the first tubular member 41 and the first torque-controlling member 43 are co-rotatable when the first tubular member 41 is rotated in a first rotational direction or when the first torque-controlling member 43 is rotated in a second rotational direction opposite to the first rotational direction, and that the first torque-controlling member 43 is rotatable relative to the first tubular member 41 when the first torque-controlling member 43 is rotated in the first rotational direction.

[0016] The first torsion spring 44 is retained in the first

tubular member 41, surrounds the connecting axle 42, and has two opposite end sections 441, 442 that extend along the axis (X). The upper end section 441 is co-movably inserted into the coupling groove 433 of the first torque-controlling member 43. The lower end section 442 co-movably abuts against one of the protrusions 424 of the connecting axle 42.

[0017] The first resilient member 45 is disposed in the insertion hole 431 of the first torque-controlling member 43, and has two opposite ends respectively abutting against the first torque-controlling member 43 and the second end portion 422 of the connecting axle 42 for resiliently biasing the first torque-controlling member 43 and the connecting axle 42 away from each other.

[0018] Each of the bolts 46 is configured as a set screw, and engages threadably a respective one of the first threaded through holes 3132 of the corresponding first barrel 313 and a corresponding one of the second threaded through holes 413 of the first tubular member 41 to abut against the first torque-controlling member 43 for preventing relative movement between the first tubular member 41 and the first torque-controlling member 43.

[0019] Referring to Figures 3, and 6 to 9, the damping unit 5 includes an oil tube 51, a cap assembly 52, a sleeve member 53, a first acting member 54, a second acting member 55, a follower member 56, a one-way valve assembly 57, a second resilient member 58, a throttle assembly 59, two pad members 503, two bolts 504, a plurality of back-up rings 505 and a plurality of sealing rings 506. The first and second acting members 54, 55 are disposed fixedly in the oil tube 51. The follower member 56 is partially disposed in the oil tube 51 and between the first and second acting members 54, 55, and is movable relative to the oil tube 51. The follower member 56 cooperates with the first acting member 54 to define a first oil chamber 501 therebetween, and cooperates with the second acting member 55 to define a second oil chamber 502 therebetween. The first and second oil chambers 501, 502 are filled with oil. The one-way valve assembly 57 and the throttle assembly 59 cooperatively serve as a hydraulic module.

[0020] An outer surface of the oil tube 51 has two diametrically opposite limiting surface portions 511 that respectively abut against the limiting surface portions 3131 of each of the corresponding first barrels 313, such that the oil tube 51 is co-rotatable with the first barrels 313 and the first leaf 311. The oil tube 51 further has two diametrically opposite first positioning grooves 512 that are formed in an inner surface thereof and that are proximate to one of two opposite longitudinal ends thereof, two diametrically opposite second positioning grooves 513 that are formed in the inner surface thereof and that are proximate to the other one of the two opposite longitudinal ends thereof, and two third threaded through holes 514 (see Figure 11) that are respectively registered with the first threaded through holes 3133 of the corresponding first barrel 313.

[0021] The first acting member 54 has an inclined cam

surface 541 that faces toward the second acting member 55, and two positioning protrusions 542 that are formed on an outer surface thereof and that respectively engage the first positioning grooves 512 of the oil tube 51 so that the first acting member 54 is fixedly positioned in the oil tube 51.

[0022] The second acting member 55 has an inclined cam surface 551 that faces toward the first acting member 54, and two positioning protrusions 552 that are formed on an outer surface thereof and that respectively engage the second positioning grooves 513 of the oil tube 51 so that the second acting member 55 is fixedly positioned in the oil tube 51.

[0023] The follower member 56 has a main body 560 that has opposite first and second abutment surfaces 561, 562 respectively facing toward the cam surfaces 541, 551 of the first and second acting members 54, 55, a polygonal rod section 563 that extends away from the second acting member 54, through the first acting member 54 and out of the oil tube 51, a communicating passage 564 that extends along the axis (X) and through the main body 560 and the polygonal rod section 563, and a communicating hole 565 that is formed in the polygonal rod section 563 and that fluidly communicates with the communicating passage 564 and the first oil chamber 501. The polygonal rod section 563 is inserted into the polygonal hole 423 of the connecting axle 42 of the first actuating unit 4 in such a manner that the follower member 56 is co-rotatable with the connecting axle 42 about the axis (X) and is movable relative to the connecting axle 42 along the axis (X). The communicating passage 564 has a first end opening 5641 that is proximate to the second acting member 55, and a second end opening 5642 that is opposite to the first end opening 5641 and that is proximate to the connecting axle 42. The follower member 56 further has an inner threaded portion 5643 that is proximate to the second end opening 5642.

[0024] The cap assembly 52 and the sleeve member 53 are respectively threaded to the two opposite longitudinal ends of the oil tube 51. The sleeve member 53 has two through holes 531 that are respectively registered with the third threaded through holes 514 of the oil tube 51. The cap assembly 52 includes a cap body 521 that is threaded to the oil tube 51 and that permits the polygonal rod section 563 of the follower member 56 to extend therethrough, a plurality of back-up rings 522 that are sleeved between the cap body 521 and the polygonal rod section 563 of the follower member 56, and a sealing ring 523 that is sleeved on the follower member 56 between the cap body 521 and the polygonal rod section 563 of the follower member 56 and that is forcibly clamped between the back-up rings 522 for air-tightly sealing a gap between the cap body 521 and the polygonal rod section 563 of the follower member 56.

[0025] The one-way valve assembly 57 is disposed in the main body 560 of the follower member 56, and includes a valve seat 571, two oil passages 572 each extending in the direction of the axis (X) through the valve

seat 571 and fluidly communicating with the communicating passage 564 and the second oil chamber 502, two valve members 573 each being disposed in a respective one of the oil passages 572 for removably blocking the corresponding oil passage 572, two oil resilient members 574 each being disposed in a respective one of the oil passages 572 for resiliently biasing the corresponding valve member 573 toward the first oil chamber 501 so as to block the corresponding oil passage 572, and an extension hole 575 extending along the axis (X) through the valve seat 571. A middle portion of the extension hole 575 has an inner diameter smaller than that of each of two opposite longitudinal end portions of the extension hole 575.

[0026] The second resilient member 58 is disposed in the oil tube 51, and has two opposite ends respectively abutting against the second acting member 55 and the follower member 56.

[0027] The throttle assembly 59 extends along the axis (X) through the sleeve member 53, the second acting member 55, the follower member 56 and the one-way valve assembly 57, and includes a mounting bolt 591, a needle 592, a pin resilient member 593, a pin 594, a sleeve piece 595, a sealing ring 596 and a securing member 597.

[0028] The mounting bolt 591 extends along the axis (X) through the second acting member 55 and the sleeve member 53, engages threadably the sleeve member 53, and has a hexagonal hole 5911 formed in an end thereof and exposed out of the sleeve member 53.

[0029] The needle 592 extends along the axis (X) through the extension hole 575 of the one-way valve assembly 57, and has a first end portion 5921 that is rotatably mounted to the mounting bolt 591, a second end portion 5923 that is opposite to the first end portion 5921 and that extends into the polygonal rod section 563 of the follower member 56, a channel 5922 that is formed in the second end portion 5923 and that is defined by a channel-defining surface, an outer shoulder surface 5924 that is formed on the first end portion 5921, two annular clinging surfaces 5927 that are formed on an outer surrounding surface of the second end portion 5923, that are spaced apart from each other along the axis (X), and that fluid-tightly cling to an inner surface of the polygonal rod section 563 of the follower member 56, a first communicating hole 5925 that is formed in the second end portion 5923 and that fluidly communicates with the channel 5922 and a space defined between the annular clinging surfaces 5927, and two second communicating holes 5926 that are formed in the second end portion 5923 and that fluidly communicate with the channel 5922 and a space defined at one side of the annular clinging surfaces 5927 proximate to the first end portion 5921.

[0030] The pin 594 extends along the axis (X), is inserted into the polygonal rod section 563 of the follower member 56 and the channel 5922 of the needle 592, and cooperates with the channel-defining surface of the nee-

dle 5922 to define an oil space 5940 therebetween. The pin 594 has a conical section (I) that tapers toward the second acting member 55 and that has a tapered annular surface 5941, a head section 5942 that is distal from the second acting member 55 and that is threadedly secured to the polygonal rod section 563, and a hexagonal hole 5943 (see Figure 9) that is formed in the head section 5942.

[0031] The sleeve piece 595 is sleeved on the needle 592, abuts against the mounting bolt 591 and the outer shoulder surface 5924 of the needle 592, and has a rounded head portion 5951 that is formed at one end thereof proximate to the outer shoulder surface 5924 of the needle 592. The sleeve piece 595 has an outer diameter greater than that of a segment of the first end portion 5921 distal from the mounting bolt 591.

[0032] The securing member 597 is threaded to the inner threaded portion 5643 of the follower member 56, and has a hexagonal hole 5971 (see Figure 9) that is exposed out of the follower member 56.

[0033] The sealing ring 596 is sleeved on the securing member 597, and fluid-tightly seals a gap between the securing member 597 and the polygonal rod section 563 of the follower member 56 so as to fluid-tightly block the second end opening 5642 of the communicating passage 564.

[0034] The pad members 503 are respectively disposed in the through holes 531 of the sleeve member 53.

[0035] Each of the bolts 504 is configured as a set screw, and engages threadably a respective one of the first threaded through holes 3133 of the corresponding first barrel 313 and a corresponding one of the third threaded through holes 514 of the oil tube 51 to press the corresponding pad member 503 against the mounting bolt 591 for preventing relative movement between the oil tube 51, the sleeve member 53 and the mounting bolt 591.

[0036] The sealing rings 506 are respectively and fluid-tightly disposed between the mounting bolt 591 and the sleeve member 53, between the first acting member 54 and the oil tube 51, between the second acting member 55 and the oil tube 51, between the follower member 56 and the oil tube 51, between the first acting member 54 and the polygonal rod section 563 of the follower member 56, and between the second acting member 55 and the mounting bolt 591.

[0037] The back-up rings 505 are disposed between the first acting member 54 and the polygonal rod section 563 of the follower member 56 to forcibly press a corresponding sealing ring 506, and between the second acting member 55 and the mounting bolt 591 to forcibly press against another corresponding sealing ring 506.

[0038] Referring further to Figure 7, to assemble the damping unit 5, the one-way valve assembly 57 is first mounted in the communicating passage 564 of the follower member 56 at a position adjacent to the first end opening 5641, and the pin 594 and the sealing ring 596 are installed into the polygonal rod section 563 via the

second end opening 5642. Then, the securing member 597 is threaded to the inner threaded portion 5643 of the follower member 56 to position the pin 594 and the sealing ring 596 within the polygonal rod section 563. After the oil tube 51 is sequentially mounted with the cap assembly 52 and the first acting member 54, the aforesaid assembly of the follower member 56, the one-way valve assembly 57, the securing member 597, the pin 594 and the sealing ring 596 is inserted into the oil tube 51, and then the second resilient member 58, the second acting member 55 and the sleeve member 53 are sequentially mounted into the oil tube 51. Referring further to Figure 8, afterward, the pin resilient member 593, the needle 592, the sleeve piece 595 and the mounting bolt 591 are sequentially installed into the oil tube 51 in such a manner that the pin 594 is inserted into the channel 5922 of the needle 592, and that the pin resilient member 593 is disposed in the polygonal rod section 563 and has two opposite ends that respective abut against the needle 592 and an inner surface of the rod section 563. The needle 592 is moved relative to the pin 594 when the mounting bolt 591 is turned to move relative to the sleeve member 53.

[0039] Referring to Figures 9 to 11, an oil passageway is defined from the first end opening 5641 of the communicating passage 564, via a gap between the sleeve piece 595 and the valve seat 571, a gap between the needle 592 and the valve seat 571, the second communicating holes 5926, the oil space 5940, a gap defined between the pin 594 and an inner surrounding surface of the needle 592 and corresponding in position to the first communicating hole 5925, the first communicating hole 5925, the space defined between the annular clinging surfaces 5927, to the communicating hole 565 of the follower member 56 for fluid communication between the first and second oil chambers 501, 502. Each of the oil passages 572 is in spatial communication with the second oil chamber 502 and the gap between the needle 592 and the valve seat 571. When the mounting bolt 591 is turned by a tool (not shown) to move relative to the sleeve member 53 along the axis (X), the needle 592 is thereby moved relative to the pin 594 so as to adjust the volume of the oil space 5940.

[0040] Referring to Figures 3 and 10 to 13, when external forces are applied to pivot the first and second leaves 311, 312 relative to each other such that the hinge assemblage is converted from an initial state where an angle formed between the first and second leaves 311, 312 is 0 degree (see Figures 10 and 11), to an open state where the angle formed between the first and second leaves 311, 312 is 90 degrees (see Figures 12 and 15), the first tubular member 41 of the first actuating unit 4 and the connecting axle 42 are driven to rotate relative to each other, and the oil tube 51 of the damping unit 5 and the follower member 56 are driven to rotate relative to each other.

[0041] Referring further to Figure 4, the first tubular member 41 and the first torque-controlling member 43

are configured to be co-rotatable by virtue of the engagement between the first and second engaging teeth 412, 432 when the hinge assemblage is converted from the initial state to the open state. Since the end sections 441, 442 of the first torsion spring 44 respectively co-movably engage the coupling groove 433 of the first torque-controlling member 43 and one of the protrusions 424 of the connecting axle 42, the first torsion spring 44 is deformed to exert an actuating force, so as to generate a resultant restoring torque in response to the conversion of the hinge assemblage from the initial state to the open state.

[0042] Referring further to Figure 6, since the first and second acting members 54, 55 are co-rotatable with the oil tube 51 and since the follower member 56 is co-rotatable with the connecting axle 42, the cam surface 551 of the second acting member 55 is configured to push the second abutment surface 562 of the follower member 56 to move the follower member 56 relative to the oil tube 51 toward the first acting member 54 and away from the second acting member 55 in response to the conversion of the hinge assemblage from the initial state to the open state, so as to compress the first oil chamber 501.

[0043] At this time, the oil in the first oil chamber 501 flows through the communicating hole 565 of the follower member 56, the space defined between the annular clinging surfaces 5927, the first communicating hole 5925, the gap between the pin 594 and the inner surrounding surface of the needle 592, the oil space 5940, the second communicating holes 5926 into the gap between the needle 592 and the valve seat 571, and then flows into the second oil chamber 502 via the oil passages 572 of the one-way valve assembly 57 and via the gap between the sleeve piece 595 and the valve seat 571 and the first end opening 5641 of the communicating passage 564. The oil flowing from the gap between the needle 592 and the valve seat 571 through the oil passages 572 of the one-way valve assembly 57 pushes the valve members 573 against the biasing action of the oil resilient members 574 so as to unblock the oil passages 572. During the movement of the follower member 56 away from the second acting member 55, the pin 594 is moved relative to the needle 592 so as to enlarge the gap defined between the pin 594 and the inner surrounding surface of the needle 592 (i.e., the channel-defining surface) and corresponding in position to the first communicating hole 5925.

[0044] As such, in the beginning of the conversion of the hinge assemblage from the initial state to the open state, the gap defined between the pin 594 and the inner surrounding surface of the needle 592 and corresponding in position to the first communicating hole 5925 is relatively small, so that a damping force generated by the hydraulic module is relatively large. When the gap defined between the pin 594 and the inner surrounding surface of the needle 592 and corresponding in position to the first communicating hole 5925 is enlarged due to the increase of the angle between the first and second leaves 311, 312, the damping force generated by the hydraulic module becomes relatively small.

[0045] Referring further to Figure 14, when the external forces are removed, the restoring torque generated by the first torsion spring 44 pivots the connecting axle 42 and the first torque-controlling member 43 relative to each other so as to convert the hinge assemblage from the open state to the initial state. The cam surface 541 of the first acting member 54 pushes the first abutment surface 561 of the follower member 56 to move the follower member 56 relative to the oil tube 51 toward the second acting member 55 and away from the first acting member 54 in response to the conversion of the hinge assemblage from the open state to the initial state, so as to compress the second oil chamber 502.

[0046] At this time, the oil flowing from the second oil chamber 502 into the oil passages 572 of the one-way valve assembly 57 pushes the valve members 573 against the valve seat 571 so as to block the oil passages 572, so that the oil in the second oil chamber 502 is only permitted to flow into the first oil chamber 501 via the aforesaid oil passageway that is defined from the first end opening 5641 of the communicating passage 564, via the gap between the sleeve piece 595 and the valve seat 571, the gap between the needle 592 and the valve seat 571, the second communicating holes 5926, the oil space 5940, a gap between the pin 594 and the inner surrounding surface of the needle 592, the first communicating hole 5925, the space defined between the annular clinging surfaces 5927, to the communicating hole 565 of the follower member 56. As a result, the damping force generated by the hydraulic module during the conversion of the hinge assemblage from the open state to the initial state is greater than the damping force generated by the hydraulic module during the conversion of the hinge assemblage from the initial state to the open state.

[0047] During the conversion of the hinge assemblage from the open state to the initial state, when the angle between the first and second leaves 311, 312 is nearly 0 degree, the valve seat 571 is moved toward the sleeve piece 595 so as to narrow the gap between the sleeve piece 595 and the valve seat 571, and the pin 594 is moved relative to the needle 592 so as to narrow the gap defined between the pin 594 and the inner surrounding surface of the needle 592 and corresponding in position to the first communicating hole 5925, so that the damping force generated by the hydraulic module becomes even greater.

[0048] Referring to Figures 10 and 15, the first leaf unit 31, the first actuating unit 4 and the damping unit 5 cooperatively form a first hinge assembly 100. In one embodiment, a plurality of the first hinge assemblies 100 may be connected between the first and second objects 21, 22. The damping unit 5 generates a relatively small damping force so as to facilitate the conversion of the first and second objects 21, 22 to a state illustrated in Figure 15, and generates a much greater damping force when the angle between the first and second leaves 311, 312 is nearly 0 degree so as to prevent severe collision

between the first and second objects 21, 22.

[0049] Referring to Figure 11, the first torque-controlling member 43 can be rotated in the first rotational direction relative to the first tubular member 41 by a tool (not shown) to adjust the relative position between the first and second engaging teeth 412, 432 so as to adjust the magnitude of the resultant restoring torque generated by the first torsion spring 44 for collaborating with the damping unit 5.

[0050] The mounting bolt 591 can be turned by a tool (not shown) to move the needle 592 relative to the polygonal rod section 563 of the follower member 56 along the axis (X) to adjust the gap between the sleeve piece 595 and the valve seat 571 and the gap defined between the pin 594 and the inner surrounding surface of the needle 592 and corresponding in position to the first communicating hole 5925, so as to adjust the damping force generated by the damping unit 5 during the conversion of the hinge assemblage between the open state and the initial state.

[0051] Referring to Figure 17, the mounting bolt 591 can be turned to move to an inner-limit position relative to the follower member 56 such that the sleeve piece 595 is substantially retained in the valve seat 571 of the one-way valve 57 to considerably narrow the gap between the sleeve piece 595 and the valve seat 571 and the gap defined between the pin 594 and the inner surrounding surface of the needle 592 and corresponding in position to the first communicating hole 5925, so that the first and second leaves 311, 312 are difficult to be pivoted relative to each other. Referring to Figure 16, if the mounting bolt 591 is turned to move to the inner-limit position relative to the follower member 56 when the hinge assemblage is in the open state, the hinge assemblage can be maintained in the open state when the external forces are removed for repair or other demands.

[0052] If the mounting bolt 591 is turned to move to an outer-limit position relative to the follower member 56 so as to considerably enlarge the gap between the sleeve piece 595 and the valve seat 571 and the gap defined between the pin 594 and the inner surrounding surface of the needle 592 and corresponding in position to the first communicating hole 5925, the damping force generated by the damping unit 5 becomes rather small such that the first and second leaves 311, 312 are easy to be pivoted relative to each other.

[0053] Referring to Figures 19 and 20, the second embodiment of a hinge assemblage includes a leaf mechanism 3, a damping unit 5 and a second actuating unit 6. The leaf mechanism 3 and the damping unit 5 of the second embodiment are similar to that of the first embodiment.

[0054] The second actuating unit 6 includes a second tubular member 61 that is inserted into the corresponding first and second barrels 313, 314 and that is co-rotatable with the first leaf 311 and the first barrels 313, a connecting axle 68 that extends into the second tubular member 61 and that is rotatable relative to the second tubular

member 61, a friction member 64 that is connected fixedly to the second tubular member 61, a slide sleeve 63 that is co-rotatably sleeved on the connecting axle 68, a spring washer assembly 62 that is disposed in the second tubular member 61 and that pushes the slide sleeve 63 against the friction member 64, a brake-conditioning member 65 that engages threadably the second tubular member 61 and that pushes the spring washer assembly 62 against the slide sleeve 63, two pad members 66 and two bolts 67. The spring washer assembly 62, the slide sleeve 63, the friction member 64 and the brake-conditioning member 65 cooperatively serve as an actuating module.

[0055] The second tubular member 61 has two second threaded through holes 611 that are respectively registered with the first threaded through holes 3132 of the corresponding first barrel 313. A frictional force generated between the slide sleeve 63 and the friction member 64 serves as an actuating force for condition of the speed of the relative pivotal movement between the first and second leaves 311, 312. The pad members 66 are respectively disposed in the second threaded through holes 611 of the second tubular member 61. Each of the bolts 67 engages threadably a respective one of the first threaded through holes 3132 of the corresponding first barrel 313 and a corresponding one of the second threaded through holes 611 of the second tubular member 61 to press the corresponding pad member 66 against the brake-conditioning member 65 for preventing relative movement between the brake-conditioning member 65 and the second tubular member 61. The connecting axle 68 extends through the slide sleeve 63 and the friction member 64, engages the limiting grooves 3141 (see Figure 3) of the corresponding second barrels 314 so as to be co-rotatable with the corresponding second barrels 314, and is co-rotatable with the slide sleeve 63 and the polygonal rod section 563 of the follower member 56 of the damping unit 5.

[0056] The first leaf unit 31, the second actuating unit 6 and the damping unit 5 cooperatively form a first hinge assembly 100. The damping unit 5 generates a relatively small damping force so as to facilitate the conversion of the first and second objects 21, 22 to the state illustrated in Figure 15. During the conversion of the hinge assemblage between the open state and the initial state, the frictional force generated between the slide sleeve 63 and the friction member 64 serves as an actuating force that retards the relative rotation between the follower member 56 and the oil tube 51, so as to condition the speed of the relative pivotal movement between the first and second leaves 311, 312.

[0057] The brake-conditioning member 65 can be turned by a tool (not shown) to move relative to the second tubular member 61 to adjust the biasing force exerted by the spring washer assembly 62 so as to adjust the frictional force generated between the slide sleeve 63 and the friction member 64 during the conversion of the hinge assemblage between the open state and the initial

state.

[0058] Referring to Figures 21 and 22, the third embodiment of the hinge assemblage according to the invention includes a first hinge assembly 100 (see Figures 11 or 20) and two additional first actuating units 4, 4'. The leaf mechanism 3 of the third embodiment further includes a second leaf unit 32. The second leaf unit 32 and the additional first actuating units 4, 4' cooperatively form a second hinge assembly 200.

[0059] Referring further to Figure 18, the second leaf unit 32 is similar to the first leaf unit 31, and includes a first leaf 321 fixed to the first object 21, a second leaf 322 fixed to the second object 22, a plurality of first barrels 323 fixed to the first leaf 321, and a plurality of second barrels 324 fixed to the second leaf 322. The first barrels 323 and the second barrels 324 are disposed along an axis (X) in an alternating arrangement.

[0060] The additional first actuating units 4, 4' are inserted into the first and second barrels 323, 324. The first tubular members 41 of the additional first actuating units 4, 4' are co-rotatable with the first barrels 323 and the first leaf 321. The first end portions 421, 421' of the connecting axles 42, 42' of the additional first actuating units 4, 4' are co-rotatably interengaged, so that the connecting axles 42, 42' are co-rotatable with the second barrels 324 and the second leaf 322. The first torsion springs 44, 44' of the additional first actuating units 4, 4' are respectively configured as right-hand and left-hand coil springs.

[0061] When external forces are applied to pivot the first and second leaves 321, 322 relative to each other about the axis (X), each of the first torsion springs 44, 44' of the additional first actuating units 4, 4' is deformed to exert an actuating force. Therefore, the second hinge assembly 200 is able to provide a resultant restoring torque two times the restoring torque provided by the first hinge assembly 100 in Figure 11.

[0062] Referring to Figures 23 and 24, the fourth embodiment of the hinge assemblage according to the invention includes a first hinge assembly 100 (see Figures 11 or 20), an additional first actuating unit 4 and an additional second actuating unit 6. The leaf mechanism 3 of the fourth embodiment further includes a third leaf unit 33. The third leaf unit 33 and the additional first and second actuating units 4, 6 cooperatively form a third hinge assembly 300.

[0063] Referring further to Figure 18, the third leaf unit 33 is similar to the first leaf unit 31, and includes a first leaf 331 fixed to the first object 21, a second leaf 332 fixed to the second object 22, a plurality of first barrels 333 fixed to the first leaf 331, and a plurality of second barrels 334 fixed to the second leaf 332. The first barrels 333 and the second barrels 334 are disposed along an axis (X) in an alternating arrangement.

[0064] The additional first actuating unit 4 is inserted into the corresponding first and second barrels 333, 334. The first tubular member 41 of the additional first actuating unit 4 is co-rotatable with the first leaf 331 and the first barrels 333. The connecting axle 42 of the additional

first actuating unit 4 is co-rotatable with the second leaf 332 and the second barrels 334.

[0065] The second tubular member 61 of the additional second actuating unit 6 is inserted into the corresponding first and second barrels 333, 334, and is co-rotatable with the first leaf 331 and the first barrels 333. The connecting axle 68 of the additional second actuating unit 6 extends through the friction member 64 and the slide sleeve 63 to engage the first end portion 421 of the connecting axle 42 of the additional first actuating unit 4, and is co-rotatable with the connecting axle 42 and the slide sleeve 63 about the axis (X).

[0066] When external forces are applied to pivot the first and second leaves 321, 322 relative to each other about the axis (X), the first torsion springs 44 of the additional first actuating unit 4 is deformed to exert an actuating force so as to generate a resultant restoring torque. The spring washer assembly 62 pushes the slide sleeve 63 against the friction member 64 to generate a frictional force between the slide sleeve 63 and the friction member 64 that serves as another actuating force for retarding the relative rotation between the first tubular member 41 and the connecting axle 42 of the additional first actuating unit 4, so as to condition the speed of the relative pivotal movement between the first and second leaves 311, 312.

[0067] It should be noted that, in one embodiment, the hinge assemblage of this invention may include any number of the first, second and third hinge assemblies 100, 200, 300 so as to pivotally interconnect the first and second objects 21, 22.

[0068] Referring to Figures 25 to 28, the fifth embodiment of a hinge assemblage is similar to the first embodiment, and includes a leaf mechanism 3, a first actuating unit 4 and a damping unit 5. The damping unit 5 further includes a one-way valve assembly 57' and a throttle assembly 7 to respectively substitute the one-way valve assembly 57 and the throttle assembly 59 of the first embodiment (see Figure 3).

[0069] The follower member 56 further has an oil path 566 that is formed through the main body 560 and that fluidly communicates with the first and second oil chambers 501, 502, an oil groove 567 that is formed in the inner surface of the follower member 56 and that fluidly communicates with the second oil chamber 502, and two communicating holes 565 that are formed in the polygonal rod section 563 and that fluidly communicate with the communicating passage 564 formed therethrough and the first oil chamber 501.

[0070] The one-way valve assembly 57' includes a valve member 576, an annular gasket 577 and a positioning ring 578. The valve member 576 may be configured as a plate, a bolt or a ball. The positioning ring 578 positions the annular gasket 577 relative to the follower member 56, such that the valve member 576 is permitted to move within a space defined between the follower member 56 and the annular gasket 577 for removably blocking the oil path 566.

[0071] The throttle assembly 7 extends along the axis (X) through the sleeve member 53, the second acting member 55, the follower member 56 and the one-way valve assembly 57', and includes a mounting bolt 71, a first needle 72, a second needle 73, a pin 74, a securing member 75, two back-up rings 76 and a sealing ring 77. The mounting bolt 71 extends along the axis (X) through the second acting member 55 and the sleeve member 53, and engages threadably the sleeve member 53. The first needle 72 is movably mounted to the mounting bolt 71 and extends along the axis (X) into the follower member 56. The second needle 73 is disposed in the communicating passage 564 of the follower member 56, and is threaded to the first needle 72. The pin 74 is threaded to the second needle 73. The securing member 75 is threaded to the inner threaded portion 5643 of the follower member 56. The back-up rings 76 are disposed between the first and second needles 72, 73. The sealing ring 77 is forcibly clamped between the back-up rings 76 for air-tight contact with the inner surface of the follower member 56. The follower member 56 and the throttle assembly 7 are configured such that the fluid communication between the oil groove 567 and one of the communicating holes 565 proximate to the oil groove 567 is permitted so as to form an oil passageway when the one of the communicating holes 565 corresponds in position to the back-up rings 76 and the sealing ring 77, and the fluid communication between the oil groove 567 and the one of the communicating holes 565 is blocked when the one of the communicating holes 565 corresponds in position to an outer surrounding surface of the second needle 73. The one-way valve assembly 57' and the throttle assembly 7 cooperatively serve as a hydraulic module.

[0072] When external forces are applied to pivot the first and second leaves 311, 312 relative to each other such that the hinge assemblage is converted from the initial state to the open state, the follower member 56 is pushed by the cam surface 551 of the second acting member 55 to compress the first oil chamber 501. At this time, the oil in the first oil chamber 501 flows into the second oil chamber 502 via the oil path 566 and via the one of the communicating holes 565 and the oil groove 567 until the one of the communicating holes 565 corresponds in position to the outer surrounding surface of the second needle 73. The oil flowing from the first oil chamber 501 and through the oil path 566 pushes the valve member 576 so as to unblock the oil path 566.

[0073] When the external forces are removed, the cam surface 541 of the first acting member 54 pushes the follower member 56 toward the second acting member 55 so as to compress the second oil chamber 502. The oil in the second oil chamber 502 is prevented from flowing into the oil path 566 by the valve member 576, and is only permitted to flow into the first oil chamber 501 via the oil groove 567 and the one of the communicating holes 565 corresponds in position to the back-up rings 76 and the sealing ring 77. As a result, the damping force generated by the hydraulic module during the conversion

of the hinge assemblage from the open state to the initial state is greater than the damping force generated by the hydraulic module during the conversion of the hinge assemblage from the initial state to the open state.

[0074] It should be noted that, during the conversion of the hinge assemblage from the open state to the initial state, if the first and second leaves 311, 312 cannot pivot relative to each other due to the misalignment among the one of the communicating holes 565 and the back-up rings 76 and the sealing ring 77, the mounting bolt 71 can be turned to move relative to the follower member 56 so as to move the back-up rings 76 and the sealing ring 77 to correspond in position to the one of the communicating holes 565, and to permit the fluid communication between the oil groove 567 and the one of the communicating holes 565.

[0075] Referring to Figures 29 to 32, the sixth embodiment of the hinge assemblage according to the invention includes a leaf mechanism 3 that includes a first leaf unit 31, a second actuating unit 6 and a damping unit 8.

[0076] The damping unit 8 includes an oil tube 81, a first acting member 82, a hydraulic module 83, a follower member 84, a spacing block 85, an oil spring 86, a cap 87 and a washer 88.

[0077] The oil tube 81 is inserted into the corresponding first and second barrels 313, 314, and has two diametrically opposite limiting surface portions 811 that are formed on an outer surface thereof, and that respectively abut against the limiting surface portions 3131 of each of the corresponding first barrels 313, such that the oil tube 81 is co-rotatable with the first barrels 313 and the first leaf 311.

[0078] The first acting member 82 is disposed fixedly in the oil tube 81, and has an inclined cam surface 821.

[0079] The hydraulic module 83 includes a main body 831 that is movably threaded within the oil tube 81, a sleeve 832 that is connected fixedly to an end of the main body 831 distal from the first acting member 82, and an adjusting bolt 833 that engages threadably the sleeve 832. The main body 831 has a protrusion 8311 that protrudes toward the first acting member 82 for being depressed, such that the main body 831 generates a damping force upon the depression of the protrusion 8311. The sleeve 832 is for being operated to move the main body 831 relative to the oil tube 81, so as to adjust a distance between the protrusion 8311 and the first acting member 82. The adjusting bolt 833 can be turned by a tool (not shown) to move relative to the sleeve 832, so as to adjust the damping coefficient of the main body 831 to adjust the magnitude of the damping force generated by the main body 831 upon the depression of the protrusion 8311.

[0080] The follower member 84 is movable relative to the oil tube 81 along the axis (X), and has a main body 840 that is disposed between the first acting member 82 and the hydraulic module 83 and that has an abutment surface 841 facing toward the cam surface 821 of the first acting member 82, and a polygonal rod section 842

that extends out of the oil tube 81 through the first acting member 82, and that is coupled to the connecting axle 68 of the second actuating unit 6 in such a manner that the polygonal rod section 842 and the connecting axle 68 are co-rotatable about the axis (X), and are movable relative to each other along the axis (X). Therefore, the follower member 84 is co-rotatable with the second barrels 314 about the axis (X).

[0081] The spacing block 85 is connected fixedly to the follower member 84 for depressing the protrusion 8311 of the hydraulic module 83 upon the movement of the follower member 84 relative to the oil tube 81.

[0082] The oil spring 86 resiliently biases the follower member 84 toward the first acting member 82.

[0083] The cap 87 is mounted to an end of the oil tube 81 distal from the first acting member 82.

[0084] The washer 88 has opposite ends respectively abutting against the main body 831 of the hydraulic module 83 and the oil spring 86.

[0085] When the hinge assemblage is converted from the open state (see Figure 31) to the initial state (see Figure 32), the cam surface 821 of the first acting member 82 pushes the abutment surface 841 of the follower member 84 so as to move the follower member 84 toward the protrusion 8311 of the hydraulic module 83. When the hinge assemblage is converted from the initial state (see Figure 32) to the open state (see Figure 31), the first acting member 82 is rotated relative to the follower member 84 so as to permit the follower member 84 to be moved away from the hydraulic module 83 by the oil spring 86. Therefore, the hydraulic module 83 is for damping the movement of the follower member 84 when the hinge assemblage is converted from the open state to the initial state, and would not damp the movement of the follower member 84 away from the hydraulic module 83.

[0086] Moreover, the sleeve 832 can be turned by a tool (not shown) to move the main body 831 toward the spacing block 85, so that the spacing block 85 and the protrusion 8311 are in contact when the first and second leaves 311, 312 are rotated to form a predetermined angle therebetween. Upon the adjustment of the relative position of the main body 831, during the conversion of the hinge assemblage from the open state to the initial state, the follower member 84 may move the spacing block 85 to depress the protrusion 8311 so that the main body 831 generates a damping force for preventing severe collision between the first and second objects 21, 22 when the angle between the first and second leaves 311, 312 is nearly 0 degree (see Figure 32), or when the angle between the first and second leaves 311, 312 is nearly 90 degrees (see Figure 33).

[0087] In a variation of the embodiment, the first acting member 82 and the follower member 84 may be configured such that the cam surface 821 of the first acting member 82 pushes the abutment surface 841 of the follower member 84 so as to move the follower member 84 toward the protrusion 8311 of the hydraulic module 83

when the hinge assemblage is converted from the initial state to the open state, and that the first acting member 82 is rotated relative to the follower member 84 so as to permit the follower member 84 to be moved away from the hydraulic module 83 by the oil spring 86 when the hinge assemblage is converted from the open state to the initial state. Therefore, the hydraulic module 83 is for damping the movement of the follower member 84 when the hinge assemblage is converted from the initial state to the open state.

[0088] Referring to Figure 34, the seventh embodiment of the hinge assemblage according to the invention is similar to the first embodiment, and further includes a damping unit 8 to substitute the damping unit 5 (see Figure 3).

[0089] To sum up, the advantages of the invention are as follows:

1. The leaf units 31, 32, 33, the hydraulic units 5, 8 and the first and second actuating units 4, 6 of this disclosure are modularized, so that a user can construct a hinge assembly according to particular demand by selecting and assembling suitable ones of the aforesaid units.
2. Since an angle formed between the first and second leaves of the leaf units 31, 32, 33 is 0 degree when the hinge assemblage is at the initial state, the hinge assemblage can only be converted from the initial state. Therefore, whether the first and second objects 21, 22 constitute a right-handed door or a left-handed door, a user can install the hinge assemblage of the disclosure between the first and second objects 21, 22 without confusion.
3. Each of the hydraulic units 5, 8 of this disclosure generates different damping forces in response to the movement of the follower member 56, 84 thereof in different directions. Therefore, the hinge assemblage of this disclosure is subjected to different damping forces when it is converted from the initial state to the open state and when it is converted from the open state to the initial state.
4. Each of the hydraulic units 5, 8 and the first and second actuating units 4, 6 of this disclosure can be manually adjusted without disassembling the corresponding hinge assembly 100, 200, 300. Therefore, the characteristic of the hinge assembly 100, 200, 300 can be easily adjusted.

[0090] In the description above, for the purposes of explanation, numerous specific details have been set forth in order to provide a thorough understanding of the embodiments. It will be apparent, however, to one skilled in the art, that one or more other embodiments may be practiced without some of these specific details. It should also be appreciated that reference throughout this specification to "one embodiment," "an embodiment," an embodiment with an indication of an ordinal number and so forth means that a particular feature, structure, or char-

acteristic may be included in the practice of the disclosure. It should be further appreciated that in the description, various features are sometimes grouped together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure and aiding in the understanding of various inventive aspects. However, the invention is solely defined by the appended claims.

Claims

1. A hinge assemblage adapted for pivotally interconnecting first and second objects (21, 22), comprising:

a leaf mechanism (3) including a first leaf unit (31), said first leaf unit (31) including a first leaf (311) adapted to be fixed to the first object (21), a second leaf (312) adapted to be fixed to the second object (22) and pivotable relative to said first leaf (311), a plurality of first barrels (313) fixed to said first leaf (311), and a plurality of second barrels (314) fixed to said second leaf (312), said first barrels (313) and said second barrels (314) being disposed along an axis (X) in an alternating arrangement, said hinge assemblage being operable to convert between an initial state and an open state, an angle formed between said first and second leaves (311, 312) when said hinge assemblage is in the initial state being different from that angle formed between said first and second leaves (311, 312) when said hinge assemblage is in the open state; an actuating unit (4, 6) mounted to said first and second barrels (313, 314) of said first leaf unit (31), and including a tubular member (41, 61), a connecting axle (42, 68) and an actuating module, said tubular member (41, 61) being co-rotatable with said first leaf (311) and said first barrels (313) of said first leaf unit (31), said connecting axle (42, 68) extending into said tubular member (41, 61) and being co-rotatable with said second leaf (312) and said second barrels (314) of said first leaf unit (31), said actuating module being disposed in said tubular member (41, 61) and generating an actuating force during the conversion of said hinge assemblage between the initial and open states; and a damping unit (8) mounted to said first and second barrels (313, 314) of said first leaf unit (31), and including an oil tube (81), a first acting member (82), a follower member (84) and a hydraulic module (83), said oil tube (81) being co-rotatable with said first leaf (311) and said first barrels (313) of said first leaf unit (31), said first acting member (82) being disposed fixedly in said oil tube (81) and having an inclined cam surface (821), said follower member (84) being movable relative to said oil tube (81) along the axis (X),

and having a main body that is disposed in said oil tube (81) and that has a first abutment surface (841) facing toward said cam surface (821) of said first acting member (82), and a rod section (842) that extends through said first acting member (82) and out of the oil tube (81) to engage said connecting axle (42, 68) of said actuating unit (4, 6) such that said follower member (84) is co-rotatable with said connecting axle (42, 68) of said actuating unit (4, 6), said follower member (84) being guided by said first acting member (82) to move relative to the oil tube (81) in a first direction during the conversion of said hinge assemblage from the initial state to the open state, and in a second direction opposite to the first direction during the conversion of said hinge assemblage from the open state to the initial state, said hydraulic module (83) being disposed in said oil tube (81) for generating a damping force upon the movement of said follower member (84) relative to said oil tube (81), said hydraulic module (83) being configured such that the damping force generated by said hydraulic module (83) during the conversion of said hinge assemblage from the initial state to the open state is different from the damping force generated by said hydraulic module during the conversion of said hinge assemblage from the open state to the initial state, said damping unit (8) further including a spacing block (85) and an oil spring (86), said hydraulic module (83) being disposed at a side of said follower member (84) distal from said first acting member (82), said spacing block (85) being disposed between said hydraulic module (83) and said follower member (84), said oil spring (86) resiliently biasing said follower member (84) toward said first acting member (82).

2. The hinge assemblage as claimed in claim 1, **characterized in that** said actuating unit (4,) further includes a torque-controlling member (43) and a torsion spring (44) that cooperatively serve as said actuating module, said torque-controlling member (43) being disposed adjacent to one end of said tubular member (41), said connecting axle (42) being disposed adjacent to the other end of said tubular member (41) distal from said torque-controlling member (43), and having a first end portion (421) that is co-rotatably coupled to said rod section (563, 842) of said follower member (56, 84), said torsion spring (44) being retained in said tubular member (41), surrounding said connecting axle (42), and having two opposite end sections (441, 442) that are respectively connected fixedly to said torque-controlling member (43) and said connecting axle (42), when external forces are applied to convert said hinge assemblage from the initial state to the open state, said

torsion spring (44) being deformed to exert the actuating force so as to generate a resultant restoring torque for converting said hinge assemblage from the open state to the initial state when the external forces are removed.

3. The hinge assemblage as claimed in claim 2, further **characterized in that** said actuating unit (4) further includes a resilient member (45), said tubular member (41) further having a plurality of first engaging teeth (412) that are formed on an inner surface thereof and that surround the axis (X), said connecting axle (42) further having a second end portion (422) that extends into said tubular member (41), said torque-controlling member (43) having an insertion hole (431) that extends along the axis (X) and that permits said second end portion (422) of said connecting axle (42) to be inserted therinto, and a plurality of second engaging teeth (432) that are formed on an outer surface thereof and that are removably engaged with said first engaging teeth (412) of said tubular member (41), said resilient member (45) being disposed in said insertion hole (431) of said torque-controlling member (43), and having two opposite ends that respectively abut against said torque-controlling member (43) and said second end portion (422) of said connecting axle (42) for resiliently biasing said torque-controlling member (43) and said connecting axle (42) away from each other, said first and second engaging teeth (412, 432) being configured such that said tubular member (41) and said torque-controlling member (43) are co-rotatable when said tubular member (41) is rotated in a first rotational direction or when said torque-controlling member (43) is rotated in a second rotational direction opposite to the first rotational direction, and that said torque-controlling member (43) is rotatable relative to said tubular member (41) so as to adjust the relative position between said first and second engaging teeth (412, 432) when said torque-controlling member (43) is rotated in the first rotational direction.
4. The hinge assemblage as claimed in claim 1, **characterized in that** said actuating unit (6) further includes a spring washer assembly (62), a slide sleeve (63), a friction member (64) and a brake-conditioning member (65) that cooperatively serve as said actuating module, said friction member (64) being connected fixedly to said tubular member (61), said slide sleeve (63) being co-rotatably sleeved on said connecting axle (68), said spring washer assembly (62) being disposed in said tubular member (61) and pushing said slide sleeve (63) against said friction member (64), said brake-conditioning member (65) engaging threadably said tubular member (61) and pushing said spring washer assembly (62) against said slide sleeve (63), a frictional force generated between said slide sleeve (63) and said friction mem-

ber (64) during the conversion of said hinge assemblage between the initial and open states serving as the actuating force for condition of the speed of the relative pivotal movement between said first and second leaves (311, 312).

5. The hinge assemblage as claimed in claim 4, further **characterized in that** said actuating unit (6) further includes a pad member (66) and a bolt (67), one of said first barrels (313) having a first threaded through hole (3132), said tubular member (61) having a second threaded through hole (611) that is registered with said first threaded through hole (3132), said pad member (66) being disposed in said second threaded through hole (611), said bolt (67) engaging threadably said first threaded through hole (3132) and said second threaded through hole (611) to press said pad member (66) against said brake-conditioning member (65) for preventing relative movement between said brake-conditioning member (65) and said tubular member (61).
6. The hinge assemblage as claimed in claim 1, further **characterized in that** said damping unit (8) further includes a cap (87) that is mounted to an end of said oil tube (81), said spacing block (85) being connected fixedly to said follower member (84), said hydraulic module (83) including a main body (831) that is movably threaded within said oil tube (81), a sleeve (832) that is connected fixedly to an end of said main body (831) distal from said first acting member (82), and an adjusting bolt (833) that engages threadably said sleeve (832), said main body (831) having a protrusion (8311) that protrudes toward said first acting member (82) for being depressed by said spacing block (85) such that said main body (831) generates a damping force upon the depression of said protrusion (8311), said sleeve (832) being operable to move said main body (831) relative to said oil tube (81) so as to adjust a distance between said protrusion (8311) and said first acting member (82), said adjusting bolt (833) being operable to move relative to said sleeve (832) so as to adjust said damping coefficient of said main body (831) and to adjust the magnitude of the damping force generated by said main body (831) upon the depression of said protrusion (8311).
7. The hinge assemblage as claimed in claim 1, further **characterized by** two additional actuating units (4, 4'), said leaf mechanism (3) further including a second leaf unit (32), said second leaf (32) unit including a first leaf (321) adapted to be fixed to the first object (21), a second leaf (322) adapted to be fixed to the second object (22) and pivotable relative to said first leaf (321), a plurality of first barrels (323) fixed to said first leaf (321), and a plurality of second barrels (324) fixed to said second leaf (322), said first barrels

(323) and said second barrels (324) being disposed along the axis (X) in an alternating arrangement, each of said additional actuating units (4, 4') being mounted to said first and second barrels (323, 324) of said second leaf unit (32), and including a tubular member (41) that is co-rotatable with said first leaf (321) and said first barrels (323) of said second leaf unit (32), a connecting axle (42, 42') that extends into an end of said tubular member (41) and that is co-rotatable with said second leaf (322) and said second barrels (324) of said second leaf unit (32), a torque-controlling member (43) that is disposed at the other end of said tubular member (41) distal from said connecting axle (42, 42'), and a torsion spring (44, 44'), said torque-controlling member (43) and said torsion spring (44, 44') of each of said additional actuating units (4, 4') cooperatively serving as an actuating module, said connecting axle (42, 42') of each of said additional actuating units (4, 4') having a first end portion (421, 421') that is co-rotatably coupled to said first end portion (421, 421') of said connecting axle (42, 42') of the other one of said additional actuating units (4, 4'), said torsion spring (44, 44') of each of said additional actuating units (4, 4') being retained in the corresponding tubular member (41), surrounding the corresponding connecting axle (42, 42'), and having two opposite end sections that are respectively fixed to the corresponding torque-controlling member (43) and the corresponding connecting axle (42, 42'), said torsion springs (44, 44') of said additional actuating units (4, 4') being respectively configured as right-hand and left-hand coil springs, when external forces are applied to convert said hinge assemblage from the initial state to the open state, said torsion spring (44, 44') of each of said additional actuating units (4, 4') being deformed to exert a restoring force so as to generate a resultant restoring torque for converting said hinge assemblage from the open state to the initial state when the external forces are removed.

8. The hinge assemblage as claimed in claim 1, further **characterized by** a first actuating unit (4) and a second actuating unit (6), said leaf mechanism (3) further including a third leaf unit (33), said third leaf unit (33) including a first leaf (331) adapted to be fixed to the first object (21), a second leaf (332) adapted to be fixed to the second object (22) and pivotable relative to said first leaf (331), a plurality of first barrels (333) fixed to said first leaf (331), and a plurality of second barrels (334) fixed to said second leaf (332), said first barrels (333) and said second barrels (334) being disposed along the axis in an alternating arrangement, said first actuating unit (4) being mounted to said first and second barrels (333, 334) of said third leaf unit (33), and including a first tubular member (41) that is co-rotatable with said first leaf (331) and said first barrels (333) of said third leaf unit

(3), a first connecting axle (42) that extends into an end of said first tubular member (41) and that is co-rotatable with said second leaf (332) and said second barrels (334) of said third leaf unit (33), a first torque-controlling member (43) that is disposed at the other end of said first tubular member (41) distal from said first connecting axle (42), and a torsion spring (44), said first torque-controlling member (43) and said torsion spring (44) of said first actuating unit (4) cooperatively serving as an actuating module, said first connecting axle (42) of said first actuating unit (4) having a first end portion (421) that is co-rotatably coupled to one of said second barrels (334) of said third leaf unit (33), said torsion spring (44) of said first actuating units (4) being retained in said first tubular member (41), surrounding said first connecting axle (42) of said first actuating unit (4), and having two opposite end sections that are respectively fixed to said first torque-controlling member (43) and said first connecting axle (42), said second actuating unit (6) including a second tubular member (61) that is mounted to said first and second barrels (333, 334) of said third leaf unit (33) and that is co-rotatable with said first leaf (331) and said first barrels (333) of said third leaf unit (33), a second connecting axle (68) that is co-rotatably coupled to said first connecting axle (42) of said first actuating unit (4), a friction member (64) that is connected fixedly to said second tubular member (61) and that permits said second connecting axle (68) to extend therethrough, a slide sleeve (63) that is co-rotatably sleeved on said connecting axle (68), a spring washer assembly (62) that is disposed in said second tubular member (61) and that pushes said slide sleeve (63) against said friction member (64), and a brake-conditioning member (65) that engages threadably said second tubular member (61) and that pushes said spring washer assembly (62) against said slide sleeve (63), said spring washer assembly (62) cooperating with said slide sleeve (63), said friction member (64) and said brake-conditioning member (65) of said second actuating unit (6) to serve as said actuating module, when external forces are applied to convert said hinge assemblage from the initial state to the open state, said torsion spring (44) of said first actuating unit (4) being deformed to exert a restoring force so as to generate a resultant restoring torque for converting said hinge assemblage from the open state to the initial state when the external forces are removed, a frictional force generated between said slide sleeve (63) and said friction member (64) during the conversion of said hinge assemblage between the initial and open states serving as an actuating force for condition of the speed of the relative pivotal movement between said first and second leaves (331, 332).

9. The hinge assemblage as claimed in claim 8, **char-**

acterized in that said second actuating unit (6) further includes a pad member (66) and a bolt (67), one of said first barrels (331) of said third leaf unit (33) having a first threaded through hole, said second tubular member (61) of said second actuating unit (6) having a second threaded through hole (611) that is registered with said first threaded through hole, said pad member (66) being disposed in said second threaded through hole (611), said bolt (67) engaging threadably said first threaded through hole and said second threaded through hole (611) to press said pad member (66) against said brake-conditioning member (65) for preventing relative movement between said brake-conditioning member (65) and said second tubular member (61).

10. The hinge assemblage as claimed in claim 7, **characterized in that** each of said additional actuating units (4, 4') further includes a resilient member (45), said tubular member (41) of each of said additional actuating units (4, 4') further having a plurality of first engaging teeth (412) that are formed on an inner surface thereof and that surround the axis (X), said connecting axle (42, 42') of each of said additional actuating units (4, 4') further having a second end portion (422) that extends into said corresponding tubular member (41), said torque-controlling member (43) of each of said additional actuating units (4, 4') having an insertion hole (431) that extends along the axis (X) and that permits said second end portion (422) of said corresponding connecting axle (42, 42') to be inserted therein, and a plurality of second engaging teeth (432) that are formed on an outer surface thereof and that are removably engaged with said first engaging teeth (412) of said corresponding tubular member (41), said resilient member (45) of each of said additional actuating units (4, 4') being disposed in said insertion hole (431) of said corresponding torque-controlling member (43), and having two opposite ends that respectively abut against said corresponding torque-controlling member (43) and said second end portion (422) of said corresponding connecting axle (42), for each of said additional actuating units (4, 4'), said first and second engaging teeth (412, 432) being configured such that said tubular member (41) and said torque-controlling member (43) are co-rotatable when said tubular member (41) is rotated in a first rotational direction or when said torque-controlling member (43) is rotated in a second rotational direction opposite to the first rotational direction, and that said torque-controlling member (43) is rotatable relative to said tubular member (41) so as to adjust the relative position between said first and second engaging teeth (412, 432) when said torque-controlling member (43) is rotated in the first rotational direction.

11. The hinge assemblage as claimed in claim 8, **char-**

acterized in that said first actuating unit (4) further includes a first resilient member (45), said first tubular member (41) further having a plurality of first engaging teeth (412) that are formed on an inner surface thereof and that surround the axis (X), said first connecting axle (42) further having a second end portion (422) that extends into said first tubular member (41), said first torque-controlling member (43) having an insertion hole (431) that extends along the axis (X) and that permits said second end portion (422) of said first connecting axle (42) to be inserted therein, and a plurality of second engaging teeth (432) that are formed on an outer surface thereof and that are removably engaged with said first engaging teeth (412) of said first tubular member (41), said first resilient member (45) being disposed in said insertion hole (431) of said first torque-controlling member (43), and having two opposite ends that respectively abut against said first torque-controlling member (43) and said second end portion (422) of said first connecting axle (42) for resiliently biasing said first torque-controlling member (43) and said first connecting axle (42) away from each other, said first and second engaging teeth (412, 432) being configured such that said first tubular member (41) and said first torque-controlling member (43) are co-rotatable when said first tubular member (41) is rotated in a first rotational direction or when said first torque-controlling member (43) is rotated in a second rotational direction opposite to the first rotational direction, and that said first torque-controlling member (43) is rotatable relative to said first tubular member (41) so as to adjust the relative position between said first and second engaging teeth (412, 432) when said first torque-controlling member (43) is rotated in the first rotational direction.

Patentansprüche

1. Scharniermontage, die angepasst ist, um erste und zweite Objekte (21, 22) schwenkbar miteinander zu verbinden, umfassend:

einen Flügelmechanismus (3), der eine erste Flügeleinheit (31) beinhaltet, wobei die erste Flügeleinheit (31) einen ersten Flügel (311) beinhaltet, der angepasst ist, um an dem ersten Objekt (21) befestigt zu werden, einen zweiten Flügel (312), der angepasst ist, um an dem zweiten Objekt (22) befestigt zu werden, und in Bezug auf den ersten Flügel (311) schwenkbar zu sein, eine Vielzahl von ersten Rollen (313), die an dem ersten Flügel (311) befestigt sind, und eine Vielzahl von zweiten Rollen (314), die an dem zweiten Flügel (312) befestigt sind, wobei die ersten Rollen (313) und die zweiten Rollen (314) entlang einer Achse (X) in einer abwech-

selnden Anordnung angebracht sind, wobei die Scharniermontage betätigbar ist, um zwischen einem ursprünglichen Zustand und einem offenen Zustand umgestellt zu werden, wobei sich ein Winkel, der zwischen dem ersten und zweiten Flügel (311, 312) gebildet wird, wenn die Scharniermontage in dem ursprünglichen Zustand ist, von jenem Winkel unterscheidet, der zwischen dem ersten und zweiten Flügel (311, 312) gebildet wird, wenn die Scharniermontage in dem offenen Zustand ist;

eine Betätigungseinheit (4, 6), die an dem ersten und zweiten Schaft (313, 314) der ersten Flügeleinheit (31) montiert ist, und ein rohrförmiges Element (41, 61), eine Verbindungsachse (42, 68) und ein Betätigungsmodul beinhaltet, wobei das rohrförmige Element (41, 61) gemeinsam mit dem ersten Flügel (311) und den ersten Schäften (313) der ersten Flügeleinheit (31) drehbar ist, sich die Verbindungsachse (42, 68) in das rohrförmige Element (41, 61) erstreckt, und gemeinsam mit dem zweiten Flügel (312) und den zweiten Schäften (314) der ersten Flügeleinheit (31) drehbar ist, wobei das Betätigungsmodul in dem rohrförmigen Element (41, 61) angebracht ist, und eine Betätigungskraft während der Umstellung der Scharniermontage zwischen dem ursprünglichen und offenen Zustand generiert; und

eine Dämpfungseinheit (8), die an dem ersten und zweiten Schaft (313, 314) der ersten Flügeleinheit (31) montiert ist, und ein Ölrohr (81), ein erstes Betätigungselement (82), ein Nachlaufelement (84) und ein Hydraulikmodul (83) beinhaltet, wobei das Ölrohr (81) gemeinsam mit dem ersten Flügel (311) und den ersten Schäften (313) der ersten Flügeleinheit (31) drehbar ist, wobei das erste Betätigungselement (82) feststehend in dem Ölrohr (81) angebracht ist, und eine geneigte Nockenoberfläche (821) aufweist, wobei das Nachlaufelement (84) in Bezug auf das Ölrohr (81) entlang der Achse (X) beweglich ist, und einen Hauptkörper aufweist, der in dem Ölrohr (81) angebracht ist, und eine erste Anschlagoberfläche (841) aufweist, die zur Nockenoberfläche (821) des ersten Betätigungselements (82) zeigt, und einen Stangenabschnitt (842), der sich durch das erste Betätigungselement (82) hindurch, und aus dem Ölrohr (81) heraus erstreckt, um in die Verbindungsachse (42, 68) der Betätigungseinheit (4, 6) einzugreifen, sodass das Nachlaufelement (84) gemeinsam mit der Verbindungsachse (42, 68) der Betätigungseinheit (4, 6) drehbar ist, wobei das Nachlaufelement (84) durch das erste Betätigungselement (82) geführt wird, um sich in Bezug auf das Ölrohr (81) in einer ersten Richtung während der Umstellung der Scharnier-

montage von dem ursprünglichen Zustand in den offenen Zustand, und in einer zweiten Richtung, entgegengesetzt zur ersten Richtung, während der Umstellung der Scharniermontage von dem offenen Zustand in den ursprünglichen Zustand zu bewegen, wobei das Hydraulikmodul (83) in dem Ölrohr (81) angebracht ist, um eine Dämpfungskraft bei der Bewegung des Nachlaufelements (84) in Bezug auf das Ölrohr (81) zu generieren, wobei das Hydraulikmodul (83) konfiguriert ist, sodass sich die Dämpfungskraft, die von dem Hydraulikmodul (83) während der Umstellung der Scharniermontage von dem ursprünglichen Zustand in den offenen Zustand generiert wird, von der Dämpfungskraft unterscheidet, die von dem Hydraulikmodul während der Umstellung der Scharniermontage von dem offenen Zustand in den ursprünglichen Zustand generiert wird, wobei die Dämpfungseinheit, (8) weiter einen Abstandsblock (85) und eine Ölfeder (86) beinhaltet, wobei das Hydraulikmodul (83) an einer Seite des Nachlaufelements (84), distal von dem ersten Betätigungselement (82) angebracht ist, wobei der Abstandsblock (85) zwischen dem Hydraulikmodul (83) und dem Nachlaufelement (84) angebracht ist, die Ölfeder (86) das Nachlaufelement (84) elastisch zum ersten Betätigungselement (82) hin vorspannt.

2. Scharniermontage nach Anspruch 1, **dadurch gekennzeichnet, dass** die Betätigungseinheit (4) weiter ein Momentsteuerungselement (43) und eine Torsionsfeder (44) beinhaltet, welche zusammenwirkend als Betätigungsmodul dienen, wobei das Momentsteuerungselement (43) angrenzend an ein Ende des rohrförmigen Elements (41) angebracht ist, die Verbindungsachse (42) angrenzend an das andere Ende des rohrförmigen Elements (41) distal von dem Momentsteuerungselement (43) angebracht ist, und einen ersten Endabschnitt (421) aufweist, der gemeinsam drehbar mit dem Stangenabschnitt (563, 842) des Nachlaufelements (56, 84) gekoppelt ist, die Torsionsfeder (44) in dem rohrförmigen Element (41) zurückgehalten wird, die Verbindungsachse (42) umgibt, und zwei gegenüberliegende Endabschnitte (441, 442) aufweist, die jeweils feststehend mit dem Momentsteuerungselement (43) und der Verbindungsachse (42) verbunden sind, wenn Kräfte von außen angelegt werden, um die Scharniermontage von dem ursprünglichen Zustand in den offenen Zustand umzustellen, wobei die Torsionsfeder (44) verformt wird, um die Betätigungskraft auszuüben, um ein resultierendes Rückstellmoment zum Umstellen der Scharniermontage von dem offenen Zustand in den ursprünglichen Zustand zu generieren, wenn die Kräfte von außen aufgehoben werden.

3. Scharniermontage nach Anspruch 2, weiter **dadurch gekennzeichnet, dass** die Betätigungseinheit (4) weiter ein elastisches Element (45) beinhaltet, das rohrförmige Element (41) weiter eine Vielzahl von ersten Eingriffszähnen (412) aufweist, die auf einer inneren Oberfläche davon gebildet sind, und die die Achse (X) umgeben, wobei die Verbindungsachse (42) weiter einen zweiten Endabschnitt (422) aufweist, der sich in das rohrförmige Element (41) erstreckt, das Momentsteuerungselement (43) ein Einführungsloch (431) aufweist, das sich entlang der Achse (X) erstreckt, und das es erlaubt, dass der zweite Endabschnitt (422) der Verbindungsachse (42) darin eingeführt wird, und eine Vielzahl von zweiten Eingriffszähnen (432), die an einer äußeren Oberfläche davon gebildet sind, und die trennbar in die ersten Eingriffszähne (412) des rohrförmigen Elements (41) eingegriffen sind, wobei das elastische Element (45) in dem Einführungsloch (431) des Momentsteuerungselements (43) angebracht ist, und zwei gegenüberliegende Enden aufweist, die jeweils an dem Momentsteuerungselement (43) und dem zweiten Endabschnitt (422) der Verbindungsachse (42) anschlagen, um das Momentsteuerungselement (43) und die Verbindungsachse (42) elastisch voneinander weg vorzuspannen, wobei die ersten und zweiten Eingriffszähne (412, 432) konfiguriert sind, sodass das rohrförmige Element (41) und das Momentsteuerungselement (43) gemeinsam drehbar sind, wenn das rohrförmige Element (41) in eine erste Drehrichtung gedreht wird, oder wenn das Momentsteuerungselement (43) in eine zweite Drehrichtung, entgegengesetzt zur ersten Drehrichtung, gedreht wird, und das Momentsteuerungselement (43) in Bezug auf das rohrförmige Element (41) drehbar ist, um die Position zwischen den ersten und zweiten Eingriffszähnen (412, 432) zueinander anzupassen, wenn das Momentsteuerungselement (43) in die erste Drehrichtung gedreht wird.
4. Scharniermontage nach Anspruch 1, **dadurch gekennzeichnet, dass** die Betätigungseinheit (6) weiter eine Federscheibenanordnung (62), eine Gleithülse (63), ein Reibungselement (64) und ein Bremskonditionierungselement (65) beinhaltet, die zusammenwirkend als Betätigungsmodul fungieren, wobei das Reibungselement (64) feststehend mit dem rohrförmigen Element (61) verbunden ist, die Gleithülse (63) gemeinsam drehend an die Verbindungsachse (68) gemufft ist, die Federscheibenanordnung (62) in dem rohrförmigen Element (61) angebracht ist, und die Gleithülse (63) gegen das Reibungselement (64) drückt, das Bremskonditionierungselement (65) mittels Gewinde in das rohrförmige Element (61) eingreift, und die Federscheibenanordnung (62) gegen die Gleithülse (63) drückt, eine Reibungskraft, die bei der Umstellung der Scharniermontage zwischen dem ursprünglichen und offenen

Zustand zwischen der Gleithülse (63) und dem Reibungselement (64) generiert wird, als die Betätigungskraft zum Konditionieren der Geschwindigkeit der Schwenkbewegung zwischen dem ersten und zweiten Flügel (311, 312) zueinander fungiert.

5. Scharniermontage nach Anspruch 4, weiter **dadurch gekennzeichnet, dass** die Betätigungseinheit (6) weiter ein Kissen­element (66) und einen Bolzen (67) beinhaltet, einer von den ersten Schäften (313) ein erstes Durchgangsloch mit Gewinde (3132) aufweist, das rohrförmige Element (61) ein zweites Durchgangsloch mit Gewinde (611) aufweist, das mit dem ersten Durchgangsloch mit Gewinde (3132) eingetragen ist, wobei das Kissen­element (66) in dem zweiten Durchgangsloch mit Gewinde (611) angebracht ist, der Bolzen (67) mittels Gewinde in das erste Durchgangsloch mit Gewinde (3132) und das zweite Durchgangsloch mit Gewinde (611) eingreift, um das Kissen­element gegen das Bremskonditionierungselement (65) zu pressen, um eine Bewegung zwischen dem Bremskonditionierungselement (65) und dem rohrförmigen Element (61) zueinander zu verhindern.
6. Scharniermontage nach Anspruch 1, weiter **dadurch gekennzeichnet, dass** die Dämpfungseinheit (8) weiter eine Kappe (87) beinhaltet, die an ein Ende des Ölhohres (81) montiert wird, wobei der Abstandsblock (85) feststehend mit dem Nachlaufelement (84) verbunden ist, das Hydraulikmodul (83) einen Hauptkörper (831) beinhaltet, der beweglich innerhalb des Ölhohres (81) geschraubt wird, eine Hülse (832), die feststehend mit einem Ende des Hauptkörpers (831) distal von dem ersten Betätigungselement (82) verbunden ist, und einen Anpassungsbolzen (833) der mittels Gewinde in die Hülse (832) eingreift, wobei der Hauptkörper (831) einen Vorsprung (8311) aufweist, der zum ersten Betätigungselement (82) hin vorspringt, um durch den Abstandsblock (85) eingedrückt zu werden, sodass der Hauptkörper (831) beim Eindringen des Vorsprungs (8311) eine Dämpfungskraft generiert, wobei die Hülse (832) betätigbar ist, um den Hauptkörper (831) in Bezug auf das Ölhohr (81) zu bewegen, um einen Abstand zwischen dem Vorsprung (8311) und dem ersten Betätigungselement (82) anzupassen, der Anpassungsbolzen (833) betätigbar ist, um sich in Bezug auf die Hülse (832) zu bewegen, um den Dämpfungskoeffizienten des Hauptkörpers (831) anzupassen, und um die Größe der Dämpfungskraft, die von dem Hauptkörper (831) beim Eindringen des Vorsprungs (8311) generiert wird, anzupassen.
7. Scharniermontage nach Anspruch 1, weiter durch zwei zusätzliche Betätigungseinheiten (4, 4') gekennzeichnet, wobei der Flügelmechanismus (3) weiter eine zweite Flügelleinheit (32) beinhaltet, die

einen ersten Flügel (321) beinhaltet, der angepasst ist, um an dem ersten Objekt (21) befestigt zu werden, einen zweiten Flügel (322), der angepasst ist, um an dem zweiten Objekt (22) befestigt zu werden, und in Bezug auf den ersten Flügel (321) schwenkbar zu sein, eine Vielzahl von ersten Schäften (323), die an dem ersten Flügel (321) befestigt sind, und eine Vielzahl von zweiten Schäften (324), die an dem zweiten Flügel (322) befestigt sind, wobei die ersten Schäfte (323) und die zweiten Schäfte (324) entlang der Achse (X) in einer abwechselnden Anordnung angebracht sind, wobei jede der zusätzlichen Betätigungseinheiten (4, 4') an den ersten und zweiten Schäften (323, 324) der zweiten Flügereinheit (32) montiert sind, und ein rohrförmiges Element (41) beinhalten, das gemeinsam mit dem ersten Flügel (321) und den ersten Schäften (323) der zweiten Flügereinheit (32) drehbar sind, eine Verbindungsachse (42, 42'), die sich in ein Ende des rohrförmigen Elements (41) erstreckt, und gemeinsam mit dem zweiten Flügel (322) und den zweiten Schäften (324) der zweiten Flügereinheit (32) drehbar ist, ein Momentsteuerungselement (43), das an dem anderen Ende des rohrförmigen Elements (41) distal von der Verbindungsachse (42, 42') angebracht ist, und eine Torsionsfeder (44, 44'), wobei das Momentsteuerungselement (43) und die Torsionsfeder (44, 44') einer jeden der zusätzlichen Betätigungseinheiten (4, 4') zusammenwirkend als Betätigungsmodul fungieren, die Verbindungsachse (42, 42') einer jeden der zusätzlichen Betätigungseinheiten (4, 4') einen ersten Endabschnitt (421, 421') aufweist, der gemeinsam drehend mit dem ersten Endabschnitt (421, 421') der Verbindungsachse (42, 42') der anderen der zusätzlichen Betätigungseinheiten (4, 4') gekoppelt ist, die Torsionsfeder (44, 44') einer jeden der zusätzlichen Betätigungseinheiten (4, 4') in dem entsprechenden rohrförmigen Element (41) zurückgehalten wird, die entsprechende Verbindungsachse (42, 42') umgibt, und zwei gegenüberliegende Endabschnitte aufweist, die jeweils an dem entsprechenden Momentsteuerungselement (43) und der entsprechenden Verbindungsachse (42, 42') befestigt sind, die Torsionsfedern (44, 44') der zusätzlichen Betätigungseinheiten (4, 4') jeweils als Spiralfedern mit Rechtswindung und Linkswindung konfiguriert sind, wenn Kräfte von außen angelegt werden, um die Scharniermontage von dem ursprünglichen Zustand in den offenen Zustand umzustellen, wobei die Torsionsfedern (44, 44') einer jeden der zusätzlichen Betätigungseinheiten (4, 4') verformt werden, um eine Rückstellkraft auszuüben, um ein resultierendes Rückstellmoment zum Umstellen der Scharniermontage von dem offenen Zustand in den ursprünglichen Zustand zu generieren, die Kräfte von außen aufgehoben werden.

8. Scharniermontage nach Anspruch 1, weiter durch

eine erste Betätigungseinheit (4) und eine zweite Betätigungseinheit (6) gekennzeichnet, wobei der Flügelmechanismus (3) weiter eine dritte Flügereinheit (33) beinhaltet, wobei die dritte Flügereinheit (33) einen ersten Flügel (331) beinhaltet, der angepasst ist, um an dem ersten Objekt (21) befestigt zu werden, einen zweiten Flügel (332), der angepasst ist, um an dem zweiten Objekt (22) befestigt zu werden, und in Bezug auf den ersten Flügel (331) schwenkbar ist, eine Vielzahl von ersten Schäften (333), die an dem ersten Flügel (331) befestigt sind, und eine Vielzahl von zweiten Schäften (334), die an dem zweiten Flügel (332) befestigt sind, wobei die ersten Schäfte (333) und die zweiten Schäfte (334) entlang der Achse in einer abwechselnden Anordnung angebracht sind, wobei die Betätigungseinheit (4) an den ersten und zweiten Schäften (333, 334) der dritten Flügereinheit (33) befestigt ist, und ein erstes rohrförmiges Element (41) beinhaltet, das gemeinsam mit dem ersten Flügel (331) und den ersten Schäften (333) der dritten Flügereinheit (33) drehbar ist, eine erste Verbindungsachse (42), die sich in ein Ende des rohrförmigen Elements (41) erstreckt, und gemeinsam mit dem zweiten Flügel (332) und den zweiten Schäften (334) der dritten Flügereinheit (33) drehbar ist, ein erstes Momentsteuerungselement (43), das an dem anderen Ende des rohrförmigen Elements (41) distal von der ersten Verbindungsachse (42) angebracht ist, und eine Torsionsfeder (44), wobei das Momentsteuerungselement (43) und die Torsionsfeder (44) der ersten Betätigungseinheit (4) zusammenwirkend als Betätigungsmodul fungieren, die erste Verbindungsachse (42) der ersten Betätigungseinheit (4) einen ersten Endabschnitt (421) aufweist, der gemeinsam drehend mit einem von den zweiten Schäften (334) der dritten Flügereinheit (33) gekoppelt ist, die Torsionsfeder (44) der ersten Betätigungseinheiten (4) in dem rohrförmigen Element (41) zurückgehalten wird, die Verbindungsachse (42) umgibt, und zwei gegenüberliegende Endabschnitte aufweist, die jeweils an dem ersten Momentsteuerungselement (43) und der ersten Verbindungsachse (42) befestigt ist, die zweite Betätigungseinheit (6) ein zweites rohrförmiges Element (61) beinhaltet, das an den ersten und zweiten Schäften (333, 334) der dritten Flügereinheit (33) montiert ist, und gemeinsam mit dem ersten Flügel (331) und den ersten Schäften (333) der dritten Flügereinheit (33) drehbar ist, eine zweite Verbindungsachse (68), die gemeinsam drehbar mit der ersten Verbindungsachse (42) der ersten Betätigungseinheit (4) gekoppelt ist, ein Reibungselement (64), das feststehend mit dem zweiten rohrförmigen Element (61) verbunden ist, und es der zweiten Verbindungsachse (68) erlaubt, sich dort hindurch zu erstrecken, eine Gleithülse (63), die gemeinsam drehend an die Verbindungsachse (68) gemufft ist, eine Federscheibenanordnung (62), die in dem zweiten rohrförmigen

Element (61) angebracht ist, und die Gleithülse (63) gegen das Reibungselement (64) drückt, und ein Bremskonditionierungselement (65), das mittels Gewinde in das rohrförmige Element (61) eingreift, und die Federscheibenanordnung (62) gegen die Gleithülse (63) drückt, wobei die Federscheibenanordnung (62) mit der Gleithülse (63), dem Reibungselement (64) und dem Bremskonditionierungselement (65) der zweiten Betätigungseinheit (6) zusammenwirkt, um als Betätigungsmodul zu fungieren, wenn Kräfte von außen angelegt werden, um die Scharniermontage von dem ursprünglichen Zustand in den offenen Zustand umzustellen, wobei die Torsionsfeder (44) der ersten Betätigungseinheit (4) verformt wird, um eine Rückstellkraft auszuüben, um ein resultierendes Rückstellmoment zum Umstellen der Scharniermontage von dem offenen Zustand in den ursprünglichen Zustand zu generieren, die Kräfte von außen aufgehoben werden, eine Reibungskraft, die zwischen der Gleithülse (63) und dem Reibungselement (64) beim Umstellen der Scharniermontage zwischen dem ursprünglichen und offenen Zustand generiert wird, als Betätigungskraft zum Konditionieren der Geschwindigkeit der Schwenkbewegung zwischen dem ersten und zweiten Flügel (331, 332) zueinander fungiert.

9. Scharniermontage nach Anspruch 8, **dadurch gekennzeichnet, dass** die zweite Betätigungseinheit (6) weiter ein Kissen­element (66) und einen Bolzen (67) beinhaltet, einer von den ersten Schäften (331) der dritten Flüg­eleinheit (33) ein erstes Durchgangsloch mit Gewinde aufweist, das zweite rohrförmige Element (61) ein zweites Durchgangsloch mit Gewinde (611) aufweist, das mit dem ersten Durchgangsloch mit Gewinde eingetragen ist, wobei das Kissen­element (66) in dem zweiten Durchgangsloch mit Gewinde (611) angebracht ist, der Bolzen (67) mittels Gewinde in das erste Durchgangsloch mit Gewinde und das zweite Durchgangsloch mit Gewinde (611) eingreift, um das Kissen­element gegen das Bremskonditionierungselement (65) zu pressen, um eine Bewegung zwischen dem Bremskonditionierungselement (65) und dem rohrförmigen Element (61) zueinander zu verhindern.

10. Scharniermontage nach Anspruch 7, **dadurch gekennzeichnet, dass** jede der zusätzlichen Betätigungseinheiten (4, 4') weiter ein elastisches Element (45) beinhaltet, das rohrförmige Element (41) jeder der zusätzlichen Betätigungseinheiten (4, 4') weiter eine Vielzahl von ersten Eingriffszähnen (412) aufweist, die an einer inneren Oberfläche davon gebildet sind, und die die Achse (X) umgeben, wobei die Verbindungsachse (42, 42') jeder der zusätzlichen Betätigungseinheiten (4, 4') weiter einen zweiten Endabschnitt (422) aufweist, der sich in das entsprechende rohrförmige Element (41) erstreckt, das Mo-

mentsteuerungselement (43) jeder der zusätzlichen Betätigungseinheiten (4, 4') ein Einführungsloch (431) aufweist, das sich entlang der Achse (X) erstreckt, und das es erlaubt, dass der zweite Endabschnitt (422) der entsprechenden Verbindungsachse (42, 42') darin eingeführt wird, und eine Vielzahl von zweiten Eingriffszähnen (432), die an einer äußeren Oberfläche davon gebildet sind, und die trennbar in die ersten Eingriffszähne (412) des entsprechenden rohrförmigen Elements (41) eingegriffen sind, wobei das elastische Element (45) jeder der zusätzlichen Betätigungseinheiten (4, 4') in dem Einführungsloch (431) des entsprechenden Momentsteuerungselements (43) angebracht sind, und zwei gegenüberliegende Enden aufweisen, die jeweils an dem entsprechenden Momentsteuerungselement (43) und dem zweiten Endabschnitt (422) der entsprechenden Verbindungsachse (42) anschlagen, für jede der zusätzlichen Betätigungseinheiten (4, 4') die ersten und zweiten Eingriffszähne (412, 432) konfiguriert sind, sodass das rohrförmige Element (41) und das Momentsteuerungselement (43) gemeinsam drehbar sind, wenn das rohrförmige Element (41) in eine erste Drehrichtung gedreht wird, oder wenn das Momentsteuerungselement (43) in eine zweite Drehrichtung, entgegengesetzt zur ersten Drehrichtung, gedreht wird, und das Momentsteuerungselement (43) in Bezug auf das rohrförmige Element (41) drehbar ist, um die Position zwischen den ersten und zweiten Eingriffszähnen (412, 432) zueinander anzupassen, wenn das Momentsteuerungselement (43) in die erste Drehrichtung gedreht wird.

11. Scharniermontage nach Anspruch 8, **dadurch gekennzeichnet, dass** die erste Betätigungseinheit (4) weiter ein erstes elastisches Element (45) beinhaltet, wobei das erste rohrförmige Element (41) weiter eine Vielzahl von ersten Eingriffszähnen (412) aufweist, die an einer inneren Oberfläche davon gebildet sind, und die die Achse (X) umgeben, wobei die erste Verbindungsachse (42) weiter einen zweiten Endabschnitt (422) aufweist, der sich in das erste rohrförmige Element (41) erstreckt, das erste Momentsteuerungselement (43) ein Einführungsloch (431) aufweist, das sich entlang der Achse (X) erstreckt, und das es erlaubt, dass der zweite Endabschnitt (422) der ersten Verbindungsachse (42) darin eingeführt wird, und eine Vielzahl von zweiten Eingriffszähnen (432), die an einer äußeren Oberfläche davon gebildet sind, und die trennbar in die ersten Eingriffszähne (412) des ersten rohrförmigen Elements (41) eingegriffen sind, wobei das erste elastische Element (45) in dem Einführungsloch (431) des ersten Momentsteuerungselements (43) angebracht ist, und zwei gegenüberliegende Enden aufweist, die jeweils an dem ersten Momentsteuerungselement (43) und dem zweiten Endabschnitt

(422) der ersten Verbindungsachse (42) anschlagen, um das erste Momentsteuerungselement (43) und die erste Verbindungsachse (42) elastisch voneinander weg vorzuspannen, wobei die ersten und zweiten Eingriffszähne (412, 432) konfiguriert sind, sodass das erste rohrförmige Element (41) und das erste Momentsteuerungselement (43) gemeinsam drehbar sind, wenn das erste rohrförmige Element (41) in eine erste Drehrichtung gedreht wird, oder wenn das erste Momentsteuerungselement (43) in eine zweite Drehrichtung, entgegengesetzt zur ersten Drehrichtung, gedreht wird, und das erste Momentsteuerungselement (43) in Bezug auf das erste rohrförmige Element (41) drehbar ist, um die Position zwischen den ersten und zweiten Eingriffszähnen (412, 432) zueinander anzupassen, wenn das erste Momentsteuerungselement (43) in die erste Drehrichtung gedreht wird.

Revendications

1. Assemblage de charnière adapté pour interconnecter de manière pivotante des premier et deuxième objets (21, 22), comprenant :

un mécanisme de lames (3) comportant une première unité de lames (31), ladite première unité de lames (31) comportant une première lame (311) adaptée pour se fixer au premier objet (21), une deuxième lame (312) adaptée pour se fixer au deuxième objet (22) et pouvant pivoter par rapport à ladite première lame (311), une pluralité de premiers canons (313) fixés à ladite première lame (311), et une pluralité de deuxièmes canons (314) fixés à ladite deuxième lame (312), lesdits premiers canons (313) et lesdits deuxièmes canons (314) étant disposés le long d'un axe (X) en agencement alterné, ledit assemblage de charnière pouvant fonctionner pour des passages entre un état initial et un état ouvert, un angle formé entre lesdites première et deuxième lames (311, 312) lorsque ledit assemblage de charnière est à l'état initial étant différent de l'angle formé entre lesdites première et deuxième lames (311, 312) lorsque ledit assemblage de charnière est à l'état ouvert ; une unité d'actionnement (4, 6) montée sur lesdits premiers et deuxièmes canons (313, 314) de ladite première unité de lames (31) et comportant un élément tubulaire (41, 61), une tige de connexion (42, 68) et un module d'actionnement, ledit élément tubulaire (41, 61) pouvant tourner en co-rotation avec ladite première lame (311) et lesdits premiers canons (313) de ladite première unité de lames (31), ladite tige de connexion (42, 68) s'étendant dans ledit élément tubulaire (41, 61) et pouvant tourner en co-rotation

avec ladite deuxième lame (312) et lesdits deuxièmes canons (314) de ladite première unité de lames (31), ledit module d'actionnement étant disposé dans ledit élément tubulaire (41, 61) et générant une force d'actionnement pendant les passages dudit assemblage de charnière entre l'état initial et l'état ouvert ; et une unité d'amortissement (8) montée sur lesdits premiers et deuxièmes canons (313, 314) de ladite première unité de lames (31) et comportant un tube d'huile (81), un premier élément actionneur (82), un élément suiveur (84) et un module hydraulique (83), ledit tube d'huile (81) pouvant tourner en co-rotation avec ladite première lame (311) et lesdits premiers canons (313) de ladite première unité de lames (31), ledit premier élément actionneur (82) étant disposé fixement dans ledit tube d'huile (81) et ayant une surface de came (821) inclinée, ledit élément suiveur (84) étant mobile par rapport audit tube d'huile (81) le long de l'axe (X), et ayant un corps principal qui est disposé dans ledit tube d'huile (81) et qui a une première surface de butée (841) faisant face à ladite surface de came (821) dudit premier élément actionneur (82), et une section de barre (842) qui s'étend à travers ledit premier élément actionneur (82) et hors du tube d'huile (81) pour se mettre en prise avec ladite tige de connexion (42, 68) de ladite unité d'actionnement (4, 6) de sorte que ledit élément suiveur (84) puisse tourner en co-rotation avec ladite tige de connexion (42, 68) de ladite unité d'actionnement (4, 6), ledit élément suiveur (84) étant guidé par ledit premier élément actionneur (82) pour se déplacer par rapport au tube d'huile (81) dans une première direction pendant le passage dudit assemblage de charnière de l'état initial à l'état ouvert, et dans une deuxième direction opposée à la première direction pendant le passage dudit assemblage de charnière de l'état ouvert à l'état initial, ledit module hydraulique (83) étant disposé dans ledit tube d'huile (81) pour générer une force d'amortissement lors du déplacement dudit élément suiveur (84) par rapport audit tube d'huile (81), ledit module hydraulique (83) étant configuré de sorte que la force d'amortissement générée par ledit module hydraulique (83) pendant le passage dudit assemblage de charnière de l'état initial à l'état ouvert soit différente de la force d'amortissement générée par ledit module hydraulique pendant le passage dudit assemblage de charnière de l'état ouvert à l'état initial, ladite unité d'amortissement (8) comportant en outre un bloc d'espacement (85) et un ressort à huile (86), ledit module hydraulique (83) étant disposé d'un côté dudit élément suiveur (84) distalement par rapport audit premier élément ac-

tionneur (82), ledit bloc d'espacement (85) étant disposé entre ledit module hydraulique (83) et ledit élément suiveur (84), ledit ressort à huile (86) sollicitant élastiquement ledit élément suiveur (84) vers ledit premier élément actionneur (82).

2. Assemblage de charnière selon la revendication 1, **caractérisé en ce que** ladite unité d'actionnement (4) comporte en outre un élément de commande de couple (43) et un ressort de torsion (44) qui servent en coopération de module d'actionnement, ledit élément de commande de couple (43) étant disposé de manière adjacente à une extrémité dudit élément tubulaire (41), ladite tige de connexion (42) étant disposée de manière adjacente à l'autre extrémité dudit élément tubulaire (41), distalement par rapport audit élément de commande de couple (43), et ayant une première partie d'extrémité (421) qui est couplée en co-rotation à ladite section de barre (563, 842) dudit élément suiveur (56, 84), ledit ressort de torsion (44) étant retenu dans ledit élément tubulaire (41) entourant ladite tige de connexion (42), et ayant deux sections d'extrémité (441, 442) opposées qui sont respectivement connectées fixement audit élément de commande de couple (43) et à ladite tige de connexion (42), lorsque des forces externes sont appliquées pour faire passer ledit assemblage de charnière de l'état initial à l'état ouvert, ledit ressort de torsion (44) se déformant pour exercer la force d'actionnement de manière à générer un couple de rappel résultant pour faire passer ledit assemblage de charnière de l'état ouvert à l'état initial lorsque les forces externes sont supprimées.
3. Assemblage de charnière selon la revendication 2, **caractérisé en outre en ce que** ladite unité d'actionnement (4) comporte en outre un élément élastique (45), ledit élément tubulaire (41) ayant en outre une pluralité de premières dents de mise en prise (412) qui sont formées sur une surface intérieure de celui-ci et qui entourent l'axe (X), ladite tige de connexion (42) ayant en outre une deuxième partie d'extrémité (422) qui s'étend dans ledit élément tubulaire (41), ledit élément de commande de couple (43) ayant un trou d'insertion (431) qui s'étend le long de l'axe (X) et qui permet à ladite deuxième partie d'extrémité (422) de ladite tige de connexion (42) de s'y insérer, et une pluralité de deuxièmes dents de mise en prise (432) qui sont formées sur une surface extérieure de celui-ci et qui sont mises en prise de manière amovible avec lesdites premières dents de mise en prise (412) dudit élément tubulaire (41), ledit élément élastique (45) étant disposé dans ledit trou d'insertion (431) dudit élément de commande de couple (43) et ayant deux extrémités opposées qui viennent respectivement en butée contre ledit élément de commande de couple (43) et ladite deuxiè-

me partie d'extrémité (422) de ladite tige de connexion (42) pour solliciter élastiquement ledit élément de commande de couple (43) et ladite tige de connexion (42) en les éloignant l'un de l'autre, lesdites premières et deuxièmes dents de mise en prise (412, 432) étant configurées de sorte que ledit élément tubulaire (41) et ledit élément de commande de couple (43) puissent tourner en co-rotation lorsque ledit élément tubulaire (41) est mis en rotation dans une première direction de rotation ou lorsque ledit élément de commande de couple (43) est mis en rotation dans une deuxième direction de rotation opposée à la première direction de rotation, et de sorte que ledit élément de commande de couple (43) puisse tourner par rapport audit élément tubulaire (41) de manière à régler la position relative entre lesdites premières et deuxièmes dents de mise en prise (412, 432) lorsque ledit élément de commande de couple (43) est mis en rotation dans la première direction de rotation.

4. Assemblage de charnière selon la revendication 1, **caractérisé en ce que** ladite unité d'actionnement (6) comporte en outre un ensemble rondelle de ressort (62), un manchon coulissant (63), un élément de friction (64) et un élément de conditionnement de frein (65) qui servent en coopération de module d'actionnement, ledit élément de friction (64) étant connecté fixement audit élément tubulaire (61), ledit manchon coulissant (63) étant emmanché en co-rotation sur ladite tige de connexion (68), ledit ensemble rondelle de ressort (62) étant disposé dans ledit élément tubulaire (61) et poussant ledit manchon coulissant (63) contre ledit élément de friction (64), ledit élément de conditionnement de frein (65) se mettant en prise par filetage avec ledit élément tubulaire (61) et poussant ledit ensemble rondelle de ressort (62) contre ledit manchon coulissant (63), une force de friction générée entre ledit manchon coulissant (63) et ledit élément de friction (64) pendant les passages dudit assemblage de charnière entre l'état initial et l'état ouvert servant de force d'actionnement pour conditionner la vitesse du déplacement pivotant relatif entre lesdites première et deuxième lames (311, 312).
5. Assemblage de charnière selon la revendication 4, **caractérisé en outre en ce que** ladite unité d'actionnement (6) comporte en outre un élément de tampon (66) et un boulon (67), l'un desdits premiers canons (313) ayant un premier trou traversant taraudé (3132), ledit élément tubulaire (61) ayant un deuxième trou traversant taraudé (611) qui est enregistré avec ledit premier trou traversant taraudé (3132), ledit élément de tampon (66) étant disposé dans ledit deuxième trou traversant taraudé (611), ledit boulon (67) se mettant en prise par filetage avec ledit premier trou traversant taraudé (3132) et ledit

deuxième trou traversant taraudé (611) pour presser ledit élément de tampon (66) contre ledit élément de conditionnement de frein (65) pour empêcher tout déplacement relatif entre ledit élément de conditionnement de frein (65) et ledit élément tubulaire (61).

6. Assemblage de charnière selon la revendication 1, **caractérisé en outre en ce que** ladite unité d'amortissement (8) comporte en outre un capuchon (87) qui est monté sur une extrémité dudit tube d'huile (81), ledit bloc d'espacement (85) étant connecté fixement audit élément suiveur (84), ledit module hydraulique (83) comportant un corps principal (831) qui est fileté de manière mobile à l'intérieur dudit tube d'huile (81), un manchon (832) qui est connecté fixement à une extrémité dudit corps principal (831), distalement par rapport audit premier élément actionneur (82), et un boulon de réglage (833) qui se met en prise par filetage avec ledit manchon (832), ledit corps principal (831) ayant une saillie (8311) qui fait saillie vers ledit premier élément actionneur (82) pour être enfoncée par ledit bloc d'espacement (85) de sorte que ledit corps principal (831) génère une force d'amortissement lors de l'enfoncement de ladite saillie (8311), ledit manchon (832) pouvant fonctionner pour déplacer ledit corps principal (831) par rapport audit tube d'huile (81) de manière à régler une distance entre ladite saillie (8311) et ledit premier élément actionneur (82), ledit boulon de réglage (833) pouvant fonctionner pour se déplacer par rapport audit manchon (832) de manière à régler ledit coefficient d'amortissement dudit corps principal (831) et à régler l'ampleur de la force d'amortissement générée par ledit corps principal (831) lors de l'enfoncement de ladite saillie (8311).
7. Assemblage de charnière selon la revendication 1, **caractérisé en outre par** deux unités d'actionnement (4, 4') supplémentaires, ledit mécanisme de lames (3) comportant en outre une deuxième unité de lames (32), ladite deuxième unité de lames (32) comportant une première lame (321) adaptée pour se fixer au premier objet (21), une deuxième lame (322) adaptée pour se fixer au deuxième objet (22) et pouvant pivoter par rapport à ladite première lame (321), une pluralité de premiers canons (323) fixés à ladite première lame (321), et une pluralité de deuxièmes canons (324) fixés à ladite deuxième lame (322), lesdits premiers canons (323) et lesdits deuxièmes canons (324) étant disposés le long de l'axe (X) en agencement alterné, chacune desdites unités d'actionnement (4, 4') supplémentaires étant montée sur lesdits premiers et deuxièmes canons (323, 324) de ladite deuxième unité de lames (32) et comportant un élément tubulaire (41) qui peut tourner en co-rotation avec ladite première lame (321) et lesdits premiers canons (323) de ladite deuxième unité de lames (32), une tige de connexion

(42, 42') qui s'étend dans une extrémité dudit élément tubulaire (41) et qui peut tourner en co-rotation avec ladite deuxième lame (322) et lesdits deuxièmes canons (324) de ladite deuxième unité de lames (32), un élément de commande de couple (43) qui est disposé sur l'autre extrémité dudit élément tubulaire (41), distalement par rapport à ladite tige de connexion (42, 42'), et un ressort de torsion (44, 44'), ledit élément de commande de couple (43) et ledit ressort de torsion (44, 44') de chacune desdites unités d'actionnement (4, 4') supplémentaires servant en coopération de module d'actionnement, ladite tige de connexion (42, 42') de chacune desdites unités d'actionnement (4, 4') supplémentaires ayant une première partie d'extrémité (421, 421') qui est couplée en co-rotation à ladite première partie d'extrémité (421, 421') de ladite tige de connexion (42, 42') de l'autre desdites unités d'actionnement (4, 4') supplémentaires, ledit ressort de torsion (44, 44') de chacune desdites unités d'actionnement (4, 4') supplémentaires étant retenu dans l'élément tubulaire (41) correspondant entourant la tige de connexion (42, 42') correspondante, et ayant deux sections d'extrémité opposées qui sont respectivement fixées à l'élément de commande de couple (43) correspondant et à la tige de connexion (42, 42') correspondante, lesdits ressorts de torsion (44, 44') desdites unités d'actionnement (4, 4') supplémentaires étant respectivement configurés sous forme de ressorts hélicoïdaux droite et gauche, lorsque des forces externes sont appliquées pour faire passer ledit assemblage de charnière de l'état initial à l'état ouvert, ledit ressort de torsion (44, 44') de chacune desdites unités d'actionnement (4, 4') supplémentaires se déformant pour exercer une force de rappel de manière à générer un couple de rappel résultant pour faire passer ledit assemblage de charnière de l'état ouvert à l'état initial lorsque les forces externes sont supprimées.

8. Assemblage de charnière selon la revendication 1, **caractérisé en outre par** une première unité d'actionnement (4) et une deuxième unité d'actionnement (6), ledit mécanisme de lames (3) comportant en outre une troisième unité de lames (33), ladite troisième unité de lames (33) comportant une première lame (331) adaptée pour se fixer au premier objet (21), une deuxième lame (332) adaptée pour se fixer au deuxième objet (22) et pouvant pivoter par rapport à ladite première lame (331), une pluralité de premiers canons (333) fixés à ladite première lame (331), et une pluralité de deuxièmes canons (334) fixés à ladite deuxième lame (332), lesdits premiers canons (333) et lesdits deuxièmes canons (334) étant disposés le long de l'axe en agencement alterné, ladite première unité d'actionnement (4) étant montée sur lesdits premiers et deuxièmes canons (333, 334) de ladite troisième unité de lames

(33) et comportant un premier élément tubulaire (41) qui peut tourner en co-rotation avec ladite première lame (331) et lesdits premiers canons (333) de ladite troisième unité de lames (3), une première tige de connexion (42) qui s'étend dans une extrémité dudit premier élément tubulaire (41) et qui peut tourner en co-rotation avec ladite deuxième lame (332) et lesdits deuxièmes canons (334) de ladite troisième unité de lames (33), un premier élément de commande de couple (43) qui est disposé sur l'autre extrémité dudit premier élément tubulaire (41), distalement par rapport à ladite première tige de connexion (42), et un ressort de torsion (44), ledit premier élément de commande de couple (43) et ledit ressort de torsion (44) de ladite première unité d'actionnement (4) servant en coopération de module d'actionnement, ladite première tige de connexion (42) de ladite première unité d'actionnement (4) ayant une première partie d'extrémité (421) qui est couplée en co-rotation à d'un desdits deuxièmes canons (334) de ladite troisième unité de lames (33), ledit ressort de torsion (44) desdites premières unités d'actionnement (4) étant retenu dans ledit premier élément tubulaire (41), entourant ladite première tige de connexion (42) de ladite première unité d'actionnement (4), et ayant deux sections d'extrémité opposées qui sont respectivement fixées audit premier élément de commande de couple (43) et à ladite première tige de connexion (42), ladite deuxième unité d'actionnement (6) comportant un deuxième élément tubulaire (61) qui est monté sur lesdits premiers et deuxièmes canons (333, 334) de ladite troisième unité de lames (33) et qui peut tourner en co-rotation avec ladite première lame (331) et lesdits premiers canons (333) de ladite troisième unité de lames (33), une deuxième tige de connexion (68) qui est couplée en co-rotation à ladite première tige de connexion (42) de ladite première unité d'actionnement (4), un élément de friction (64) qui est connecté fixement audit deuxième élément tubulaire (61) et qui permet à ladite deuxième tige de connexion (68) de le traverser, un manchon coulissant (63) qui est emmanché en co-rotation sur ladite tige de connexion (68), un ensemble rondelle de ressort (62) qui est disposé dans ledit deuxième élément tubulaire (61) et qui pousse ledit manchon coulissant (63) contre ledit élément de friction (64), et un élément de conditionnement de frein (65) qui se met en prise par filetage avec ledit deuxième élément tubulaire (61) et qui pousse ledit ensemble rondelle de ressort (62) contre ledit manchon coulissant (63), ledit ensemble rondelle de ressort (62) coopérant avec ledit manchon coulissant (63), ledit élément de friction (64) et ledit élément de conditionnement de frein (65) de ladite deuxième unité d'actionnement (6) pour servir de module d'actionnement, lorsque des forces externes sont appliquées pour faire passer ledit assemblage de charnière de l'état initial à l'état ouvert, ledit res-

sort de torsion (44) de ladite première unité d'actionnement (4) se déformant pour exercer une force de rappel de manière à générer un couple de rappel résultant pour faire passer ledit assemblage de charnière de l'état ouvert à l'état initial lorsque les forces externes sont supprimées, une force de friction générée entre ledit manchon coulissant (63) et ledit élément de friction (64) pendant les passages dudit assemblage de charnière entre l'état initial et l'état ouvert servant de force d'actionnement pour conditionner la vitesse du déplacement pivotant relatif entre lesdites première et deuxième lames (331, 332).

9. Assemblage de charnière selon la revendication 8, **caractérisé en ce que** ladite deuxième unité d'actionnement (6) comporte en outre un élément de tampon (66) et un boulon (67), un desdits premiers canons (331) de ladite troisième unité de lames (33) ayant un premier trou traversant taraudé, ledit deuxième élément tubulaire (61) de ladite deuxième unité d'actionnement (6) ayant un deuxième trou traversant taraudé (611) qui est enregistré avec ledit premier trou traversant taraudé, ledit élément de tampon (66) étant disposé dans ledit deuxième trou traversant taraudé (611), ledit boulon (67) se mettant en prise par filetage avec ledit premier trou traversant taraudé et ledit deuxième trou traversant taraudé (611) pour presser ledit élément de tampon (66) contre ledit élément de conditionnement de frein (65) pour empêcher tout déplacement relatif entre ledit élément de conditionnement de frein (65) et ledit deuxième élément tubulaire (61).
10. Assemblage de charnière selon la revendication 7, **caractérisé en ce que** chacune desdites unités d'actionnement (4, 4') supplémentaires comporte en outre un élément élastique (45), ledit élément tubulaire (41) de chacune desdites unités d'actionnement (4, 4') supplémentaires ayant en outre une pluralité de premières dents de mise en prise (412) qui sont formées sur une surface intérieure de celui-ci et qui entourent l'axe (X), ladite tige de connexion (42, 42') de chacune desdites unités d'actionnement (4, 4') supplémentaires ayant en outre une deuxième partie d'extrémité (422) qui s'étend dans ledit élément tubulaire (41) correspondant, ledit élément de commande de couple (43) de chacune desdites unités d'actionnement (4, 4') supplémentaires ayant un trou d'insertion (431) qui s'étend le long de l'axe (X) et qui permet à ladite deuxième partie d'extrémité (422) de ladite tige de connexion (42, 42') correspondante de s'y insérer, et une pluralité de deuxièmes dents de mise en prise (432) qui sont formées sur une surface extérieure de celui-ci et qui sont mises en prise de manière amovible avec lesdites premières dents de mise en prise (412) dudit élément tubulaire (41) correspondant, ledit élément élastique (45) de chacune desdites unités d'actionnement (4,

4') supplémentaires étant disposé dans ledit trou d'insertion (431) dudit élément de commande de couple (43) correspondant et ayant deux extrémités opposées qui viennent respectivement en butée contre ledit élément de commande de couple (43) 5
correspondant et ladite deuxième partie d'extrémité (422) de ladite tige de connexion (42) correspondante, pour chacune desdites unités d'actionnement (4, 4') supplémentaires, lesdites premières et deuxièmes dents de mise en prise (412, 432) étant configurées de sorte que ledit élément tubulaire (41) et ledit élément de commande de couple (43) puissent tourner en co-rotation lorsque ledit élément tubulaire (41) est mis en rotation dans une première direction de rotation ou lorsque ledit élément de commande de couple (43) est mis en rotation dans une deuxième direction de rotation opposée à la première direction de rotation, et que ledit élément de commande de couple (43) puisse tourner par rapport audit élément tubulaire (41) de manière à régler la position relative entre lesdites premières et deuxièmes dents de mise en prise (412, 432) lorsque ledit élément de commande de couple (43) est mis en rotation dans la première direction de rotation. 10
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11. Assemblage de charnière selon la revendication 8, **caractérisé en ce que** ladite première unité d'actionnement (4) comporte en outre un premier élément élastique (45), ledit premier élément tubulaire (41) ayant en outre une pluralité de premières dents de mise en prise (412) qui sont formées sur une surface intérieure de celui-ci et qui entourent l'axe (X), ladite première tige de connexion (42) ayant en outre une deuxième partie d'extrémité (422) qui s'étend dans ledit premier élément tubulaire (41), ledit premier élément de commande de couple (43) ayant un trou d'insertion (431) qui s'étend le long de l'axe (X) et qui permet à ladite deuxième partie d'extrémité (422) de ladite première tige de connexion (42) de s'y insérer, et une pluralité de deuxièmes dents de mise en prise (432) qui sont formées sur une surface extérieure de celui-ci et qui sont mises en prise de manière amovible avec lesdites premières dents de mise en prise (412) dudit premier élément tubulaire (41), ledit premier élément élastique (45) étant disposé dans ledit trou d'insertion (431) dudit premier élément de commande de couple (43) et ayant deux extrémités opposées qui viennent respectivement en butée contre ledit premier élément de commande de couple (43) et ladite deuxième partie d'extrémité (422) de ladite première tige de connexion (42) pour solliciter élastiquement ledit premier élément de commande de couple (43) et ladite première tige de connexion (42) en les éloignant l'un de l'autre, lesdites premières et deuxièmes dents de mise en prise (412, 432) étant configurées de sorte que ledit premier élément tubulaire (41) et ledit premier élément de commande de couple (43) puissent tourner en 30
35
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45
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co-rotation lorsque ledit premier élément tubulaire (41) est mis en rotation dans une première direction de rotation ou lorsque ledit premier élément de commande de couple (43) est mis en rotation dans une deuxième direction de rotation opposée à la première direction de rotation, et que ledit premier élément de commande de couple (43) puisse tourner par rapport audit premier élément tubulaire (41) de manière à régler la position relative entre lesdites premières et deuxièmes dents de mise en prise (412, 432) lorsque ledit premier élément de commande de couple (43) est mis en rotation dans la première direction de rotation.

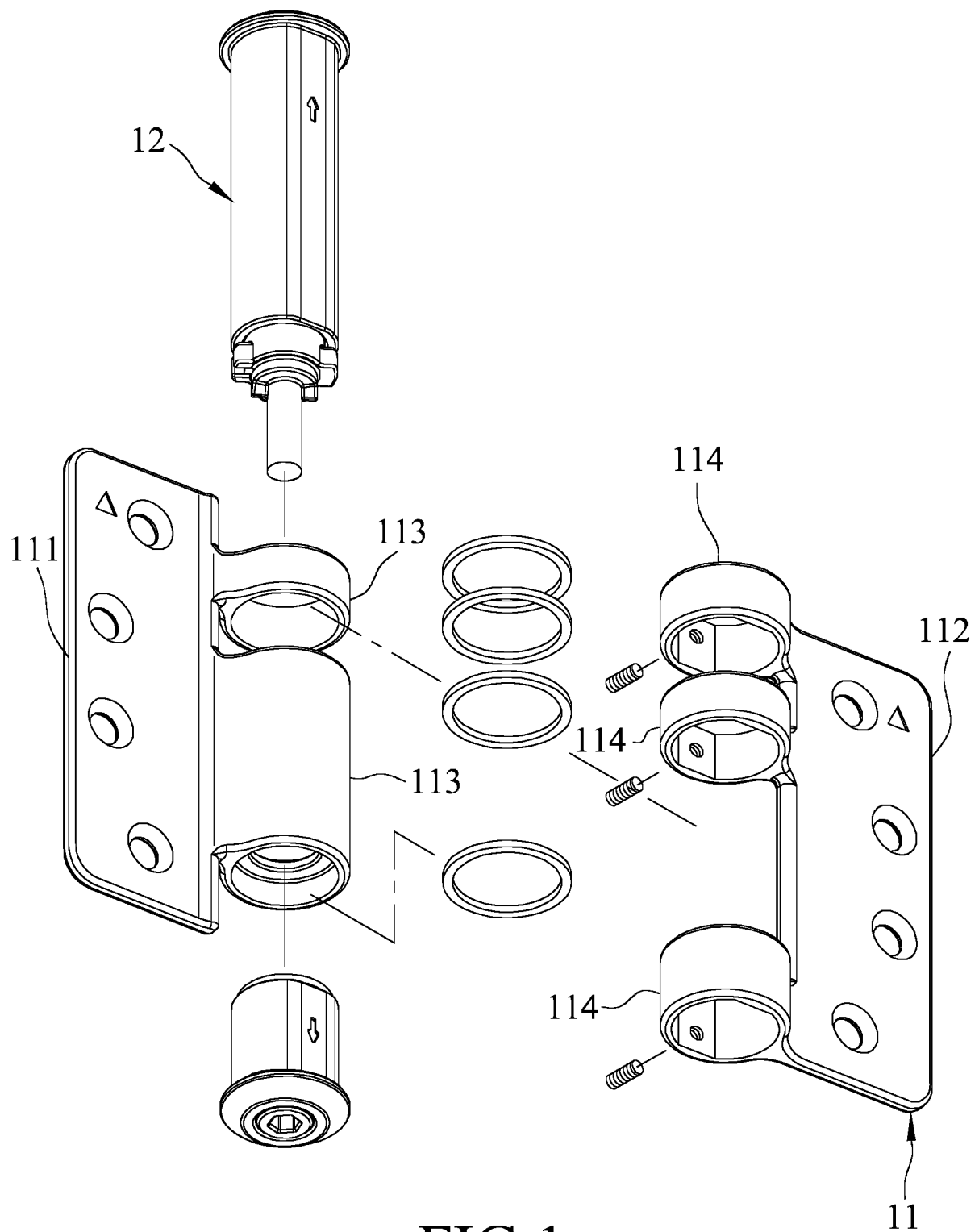


FIG.1
PRIOR ART

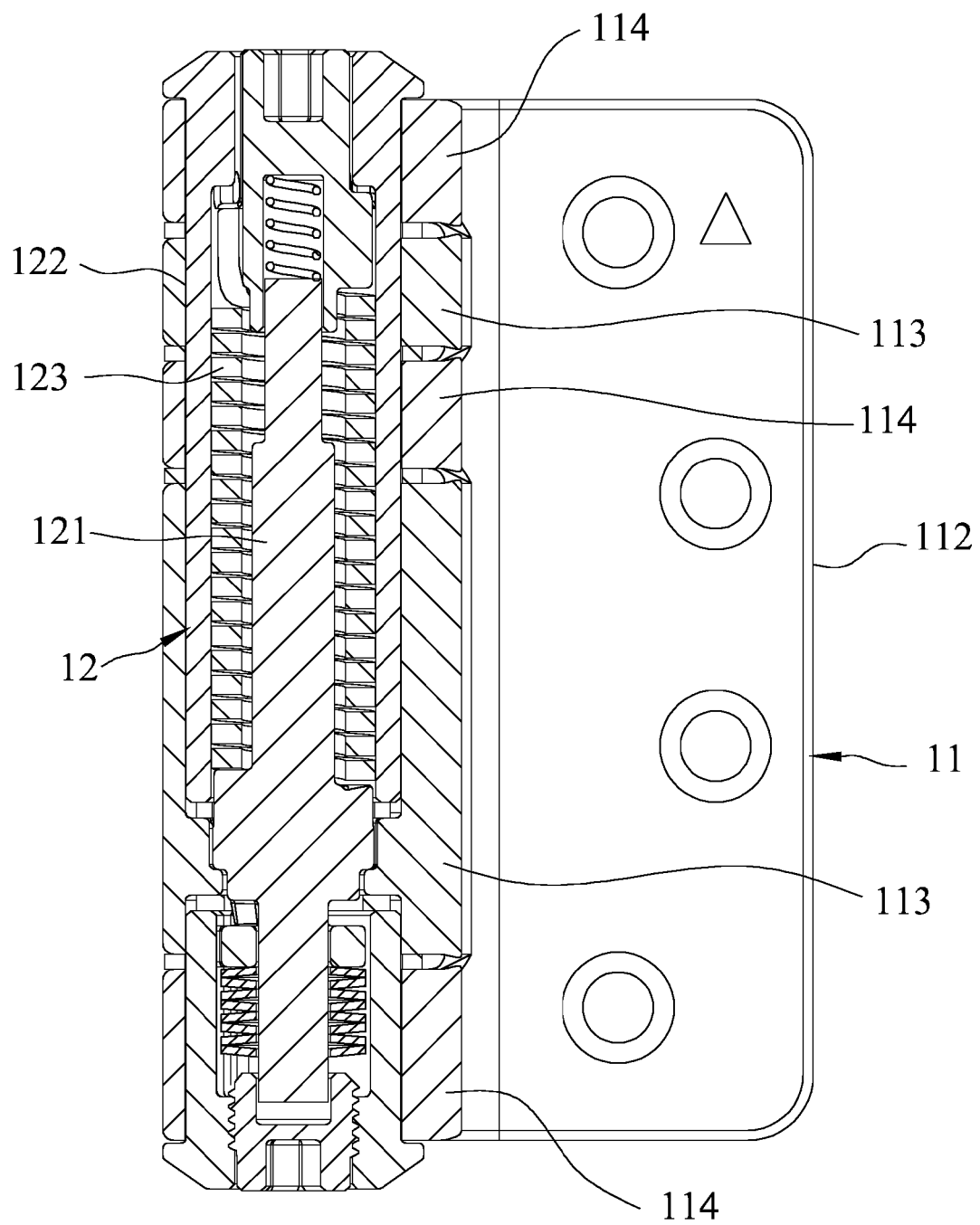


FIG.2
PRIOR ART

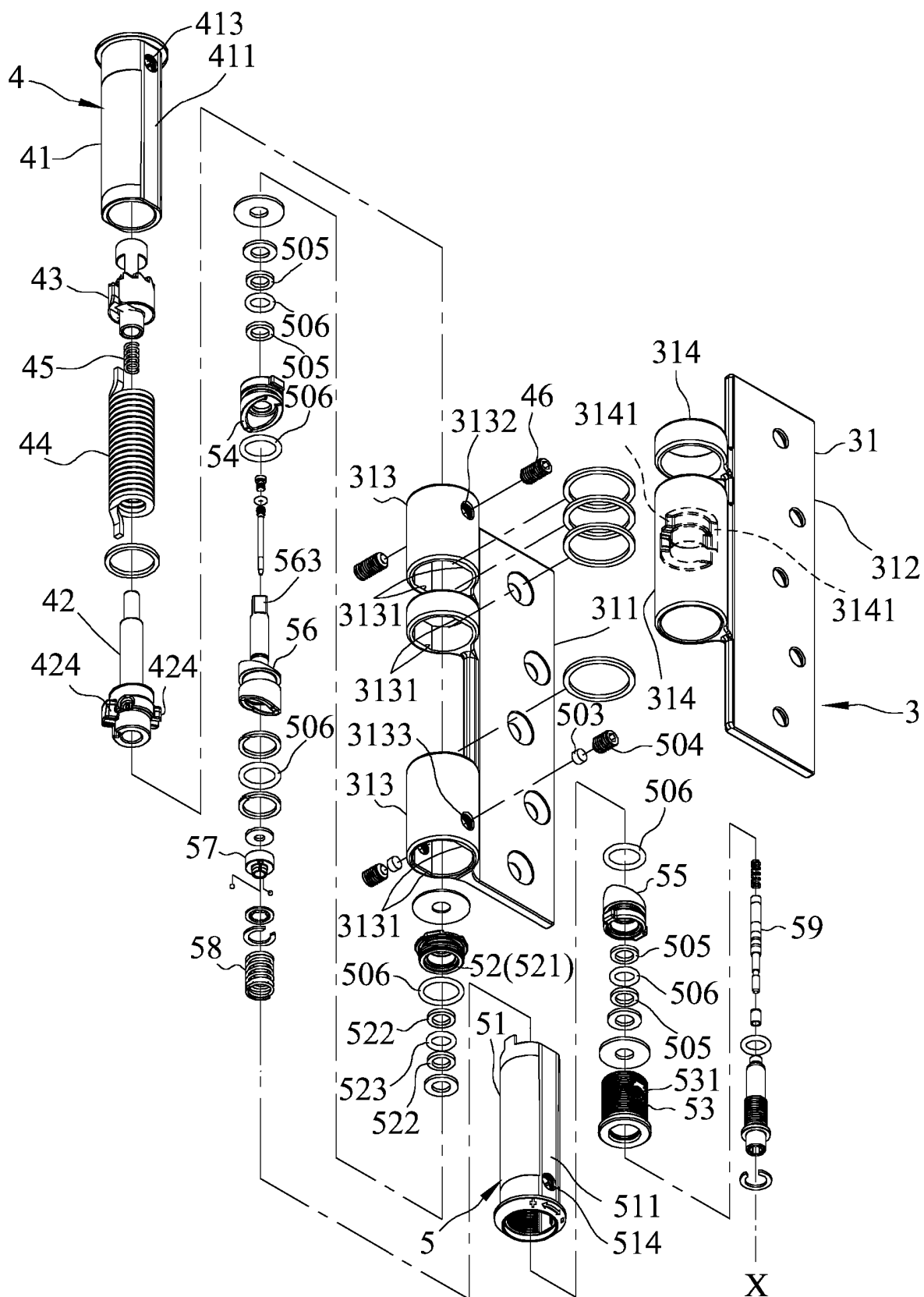


FIG.3

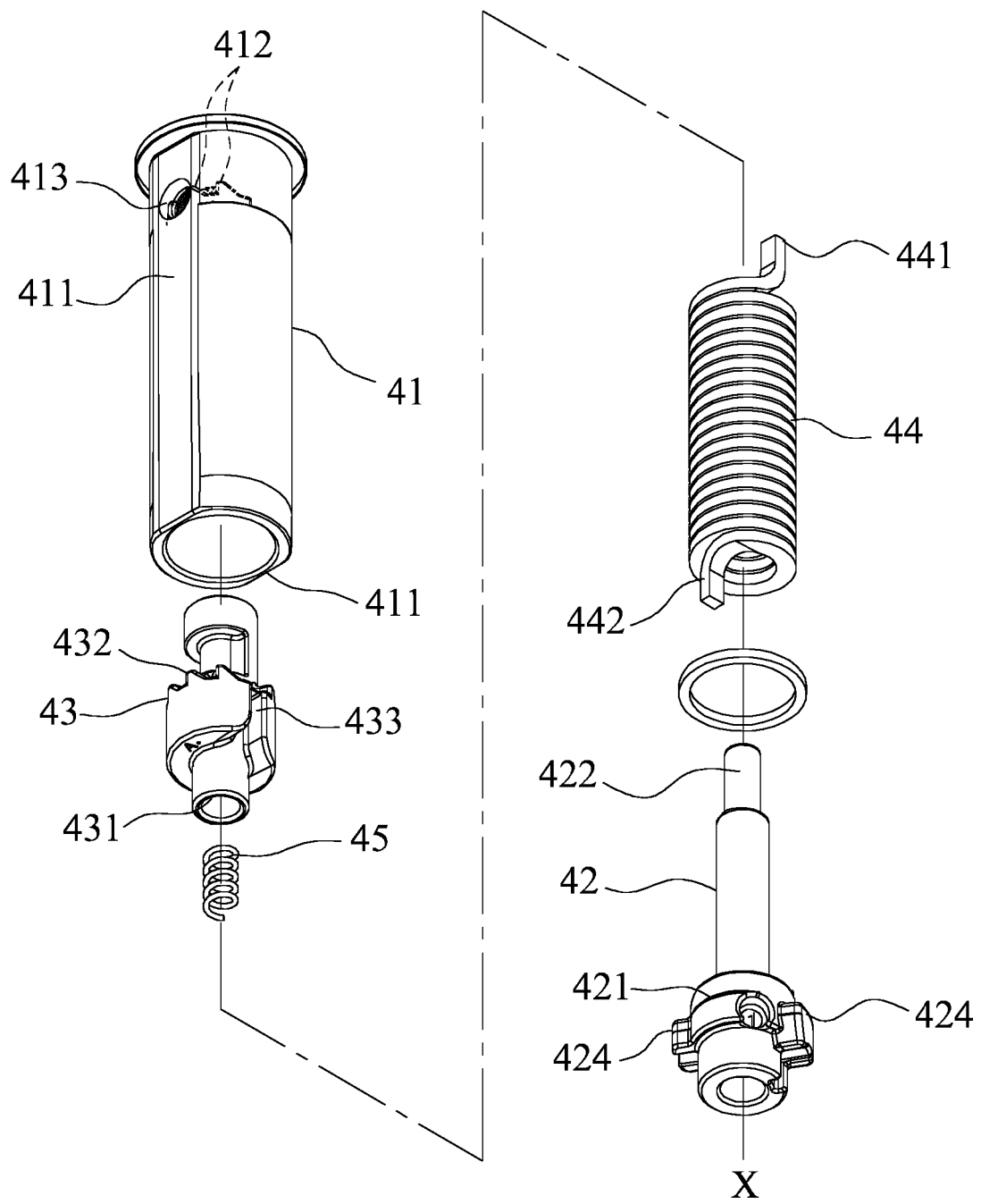


FIG.4

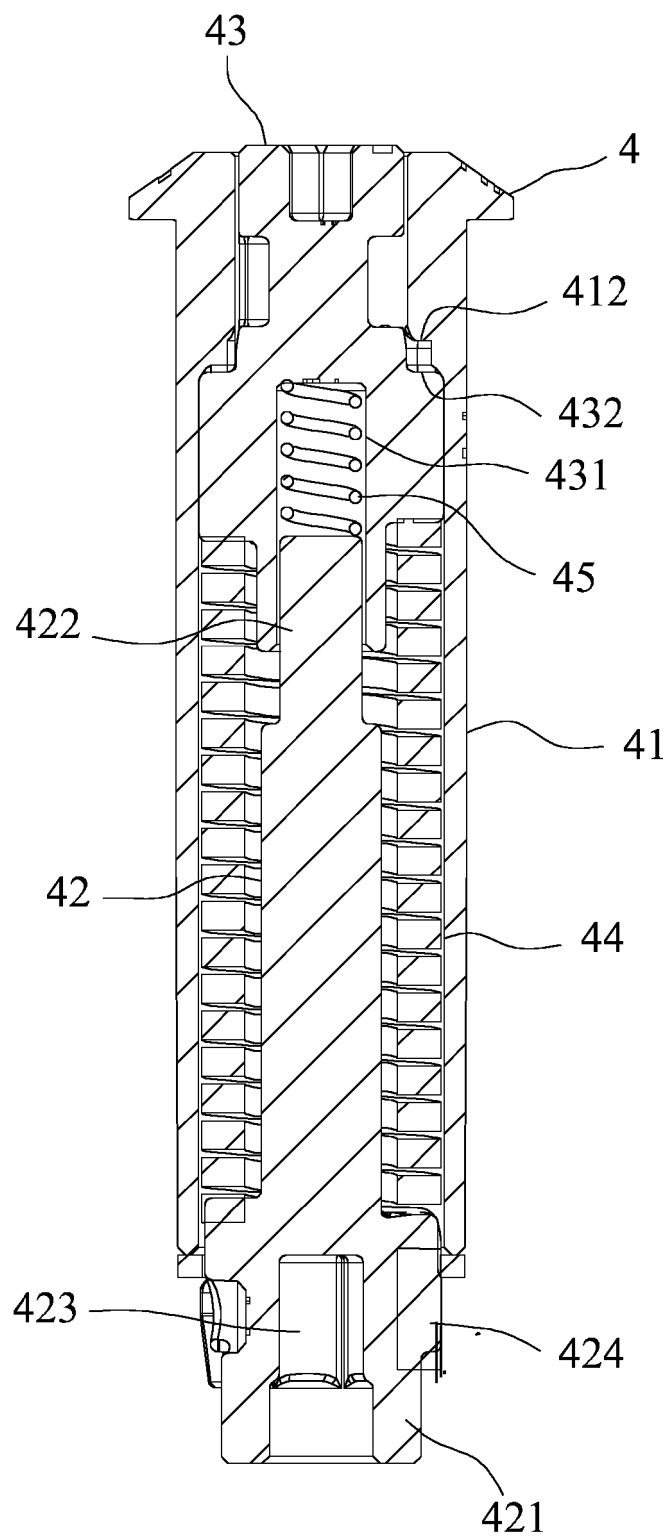


FIG.5

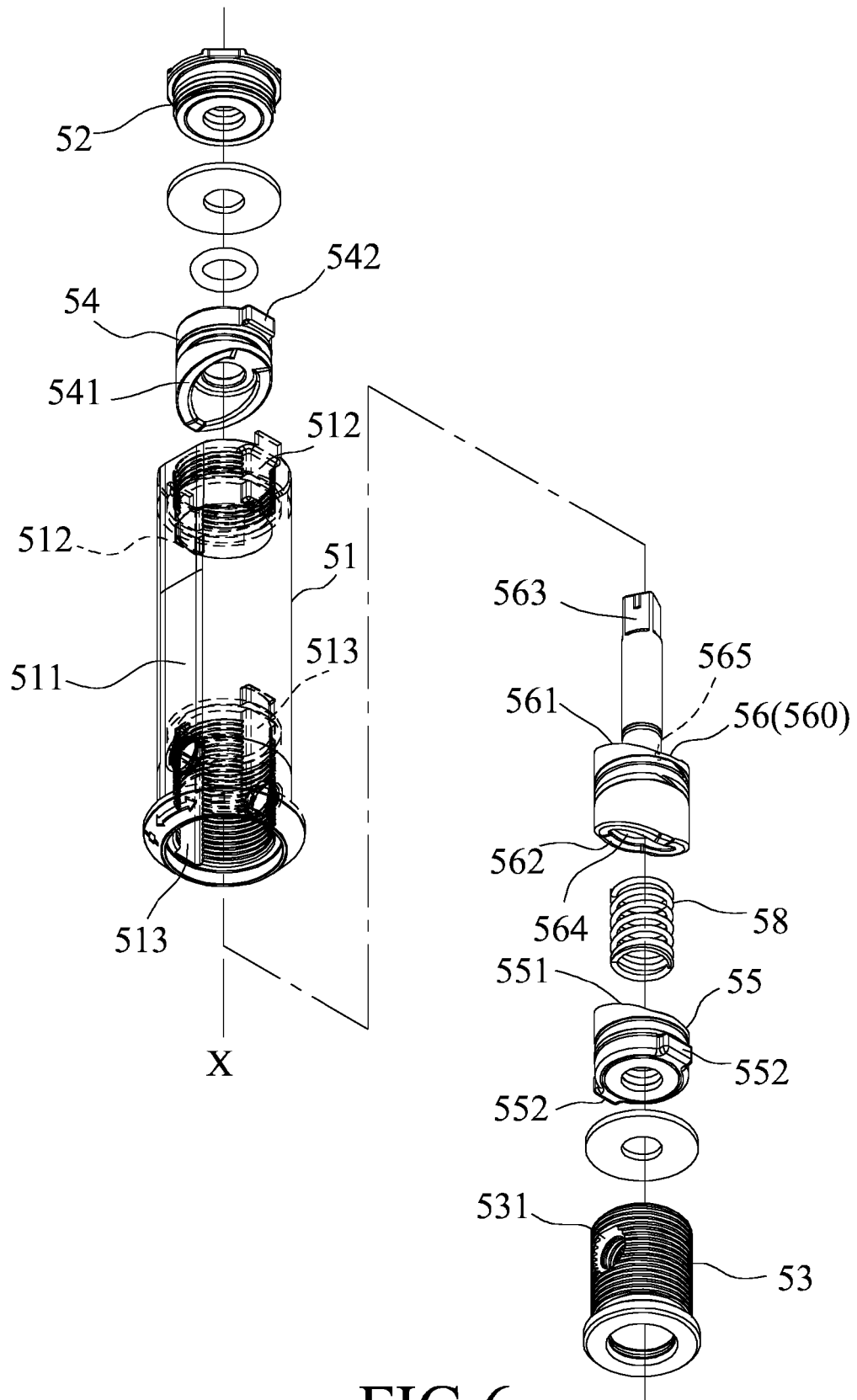


FIG.6

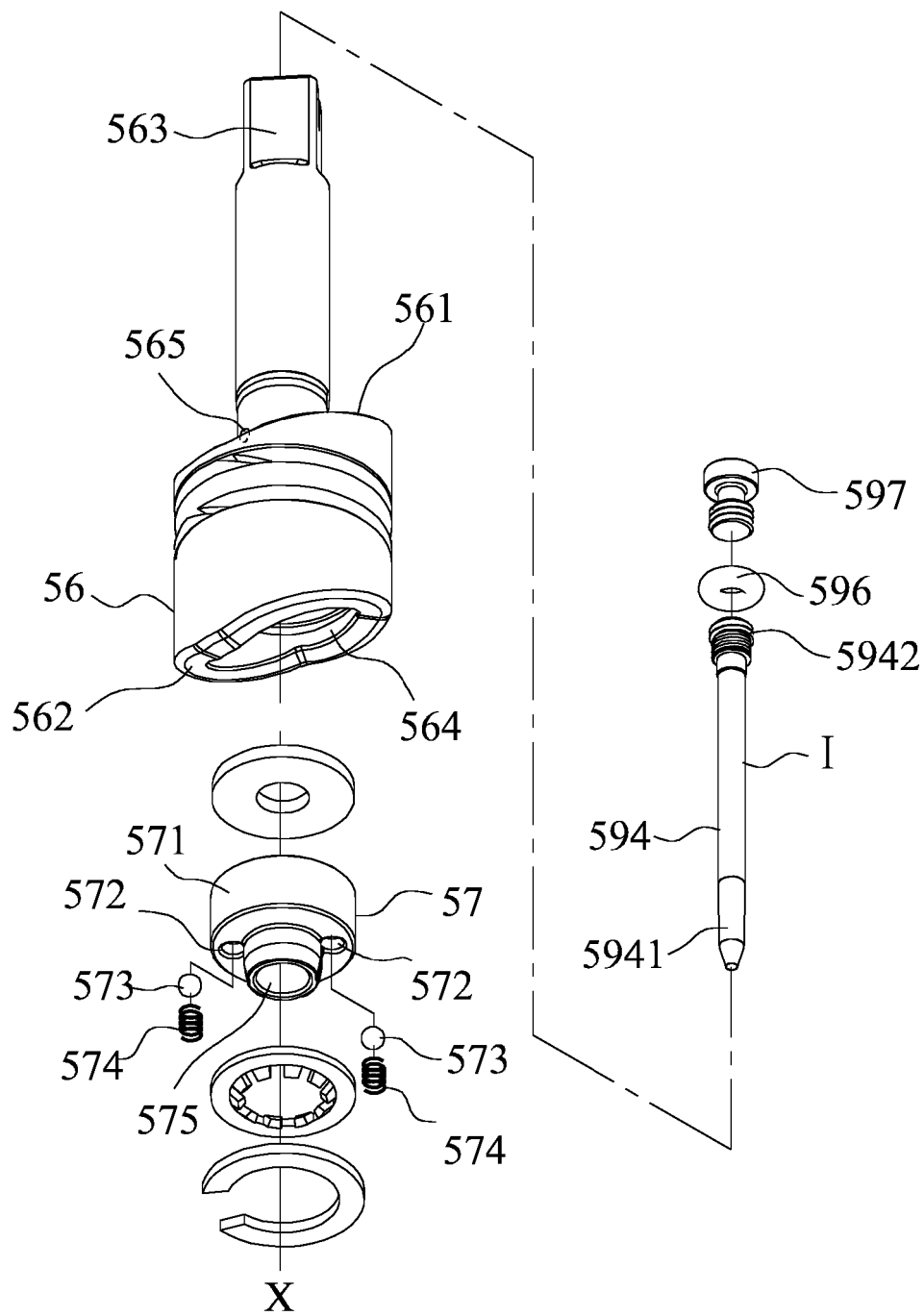


FIG.7

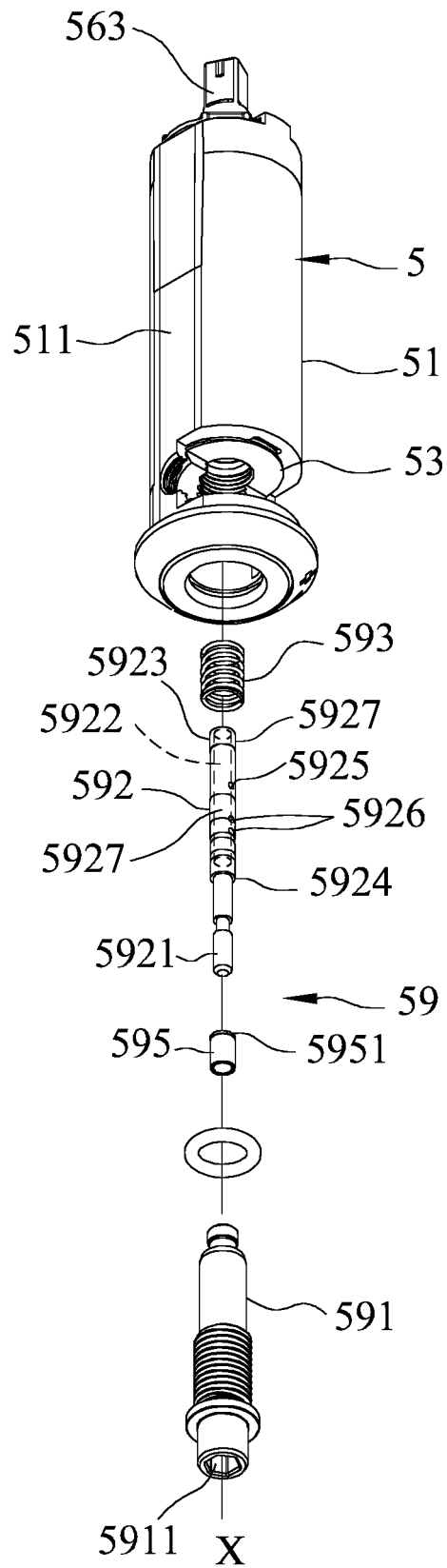


FIG.8

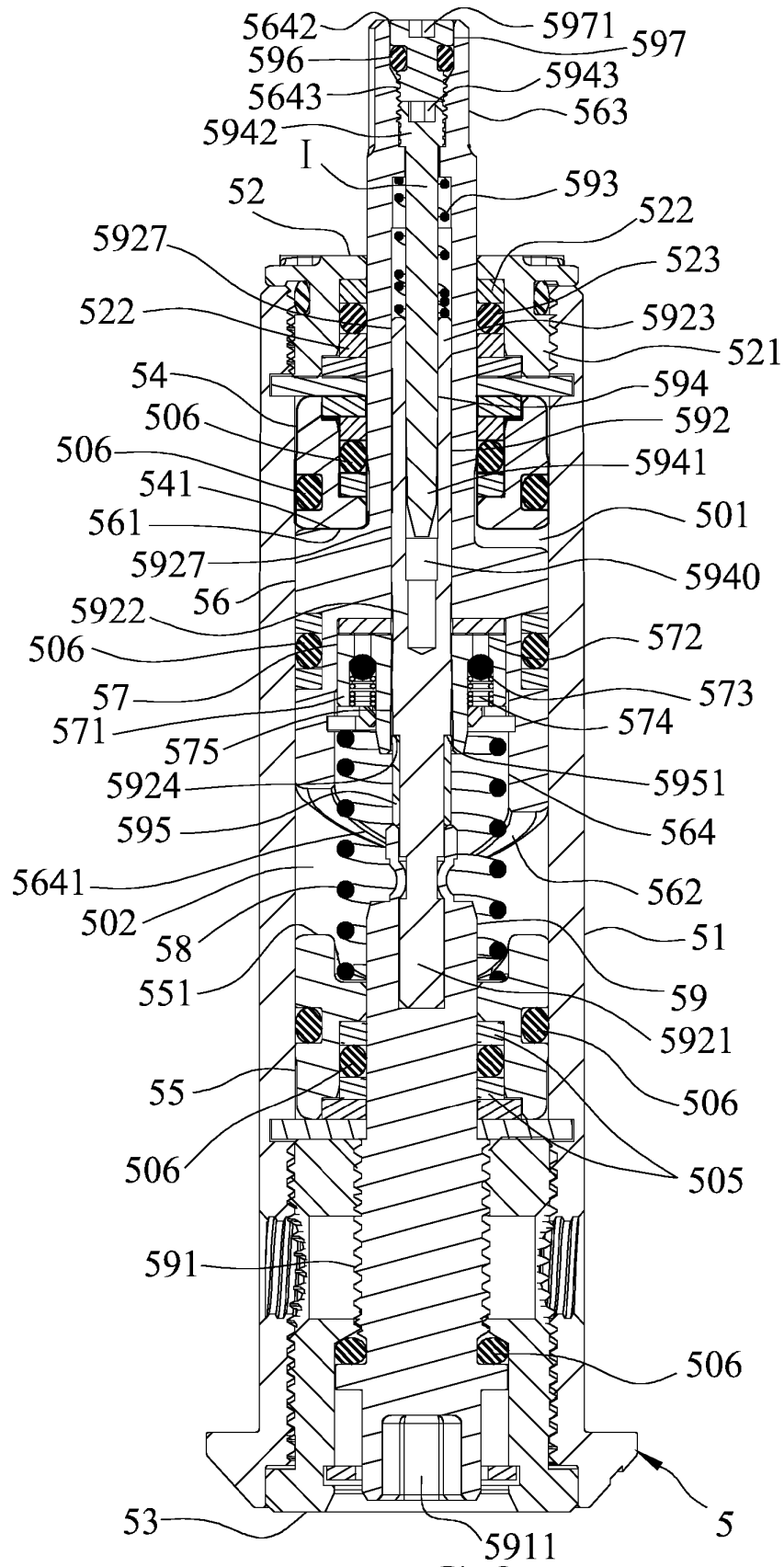


FIG. 9

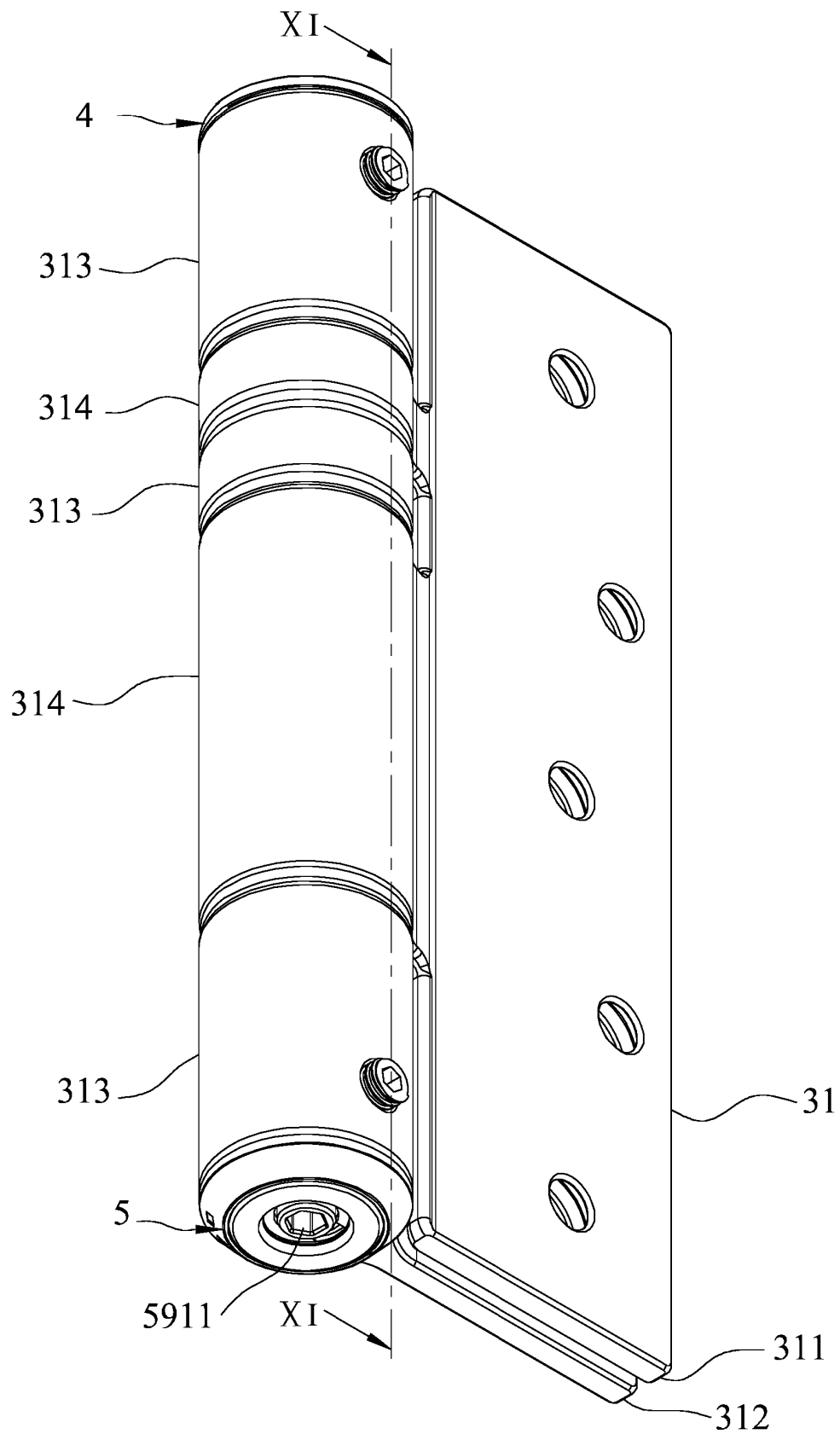


FIG.10

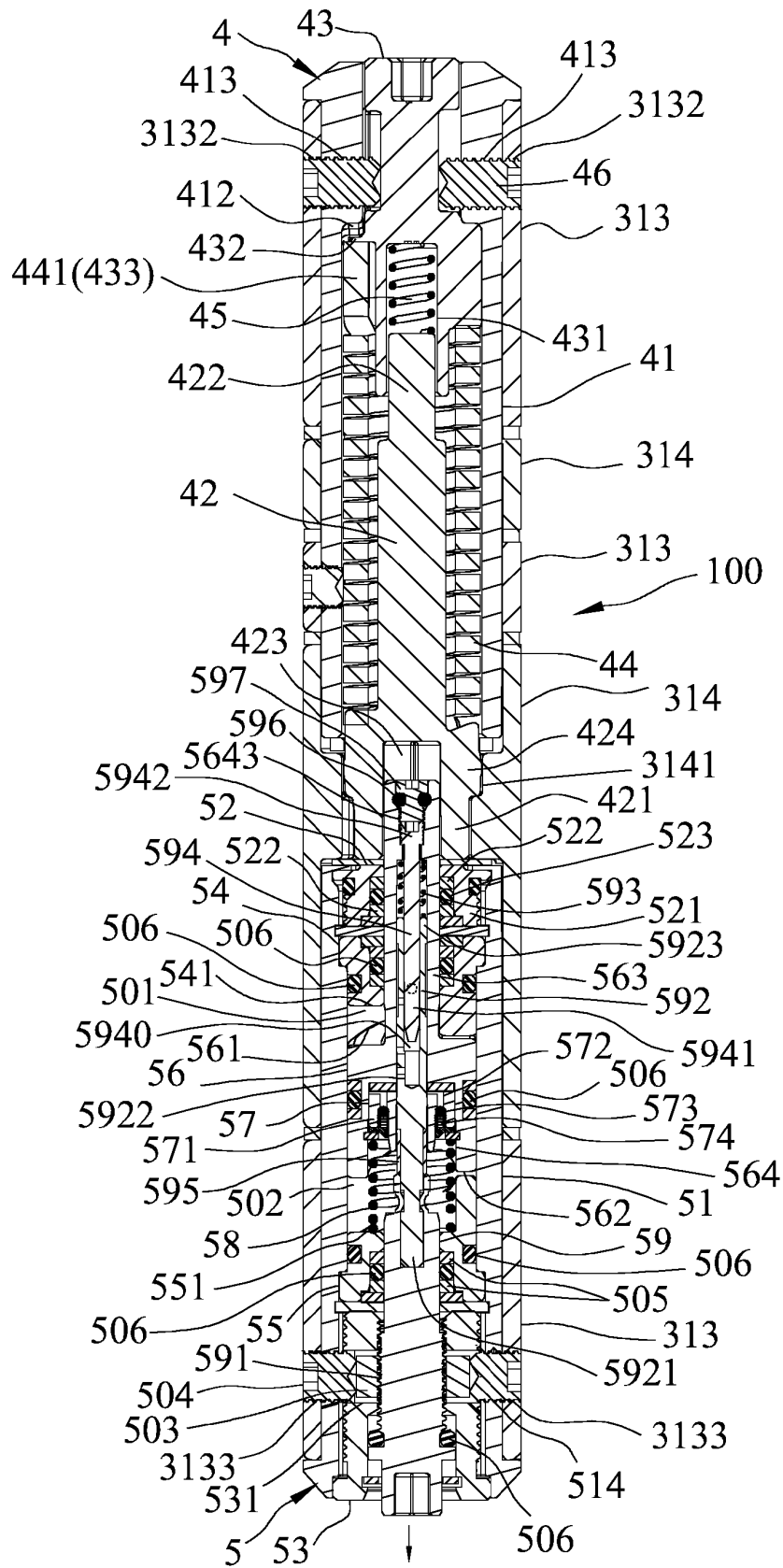
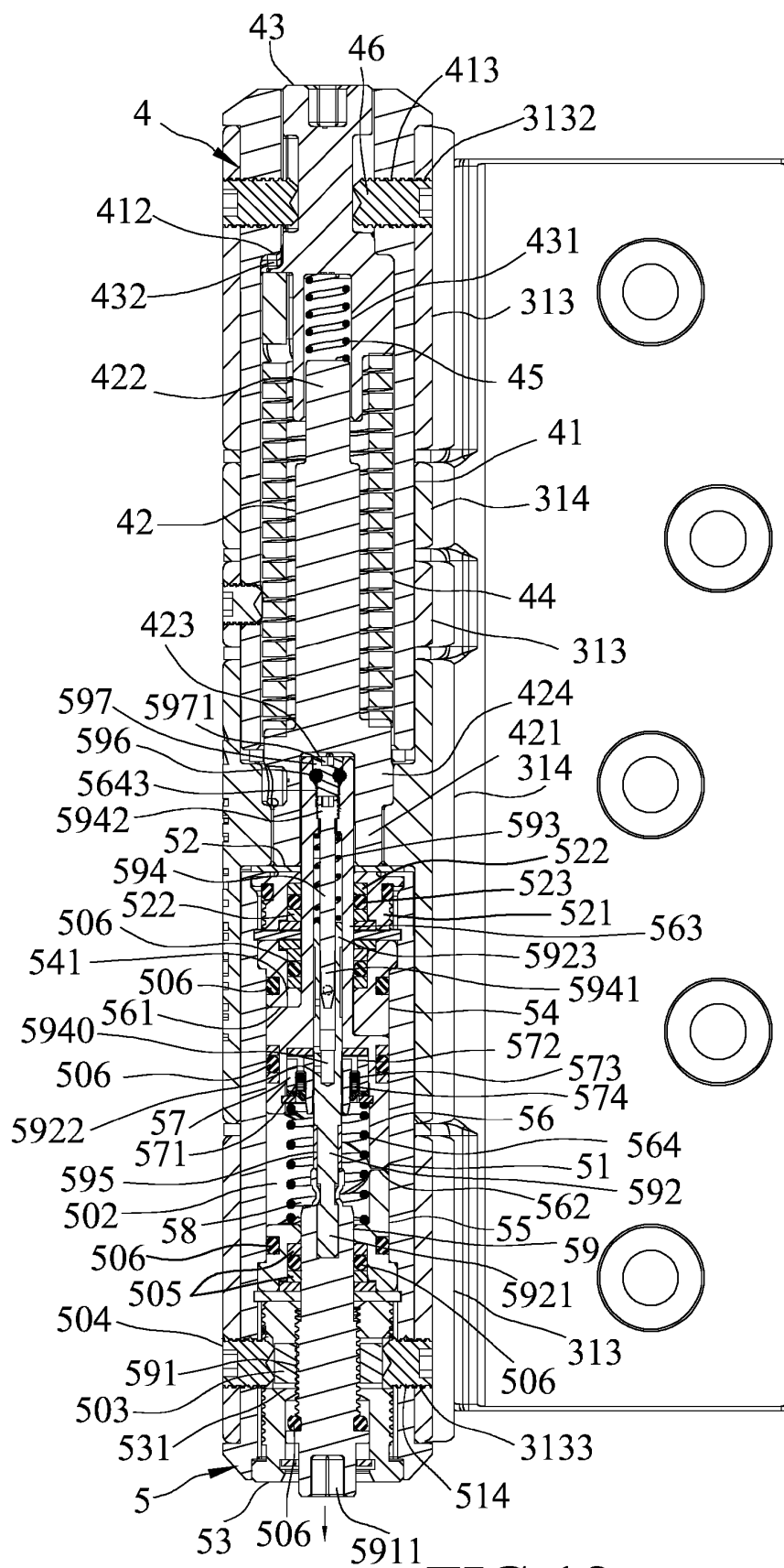


FIG.11



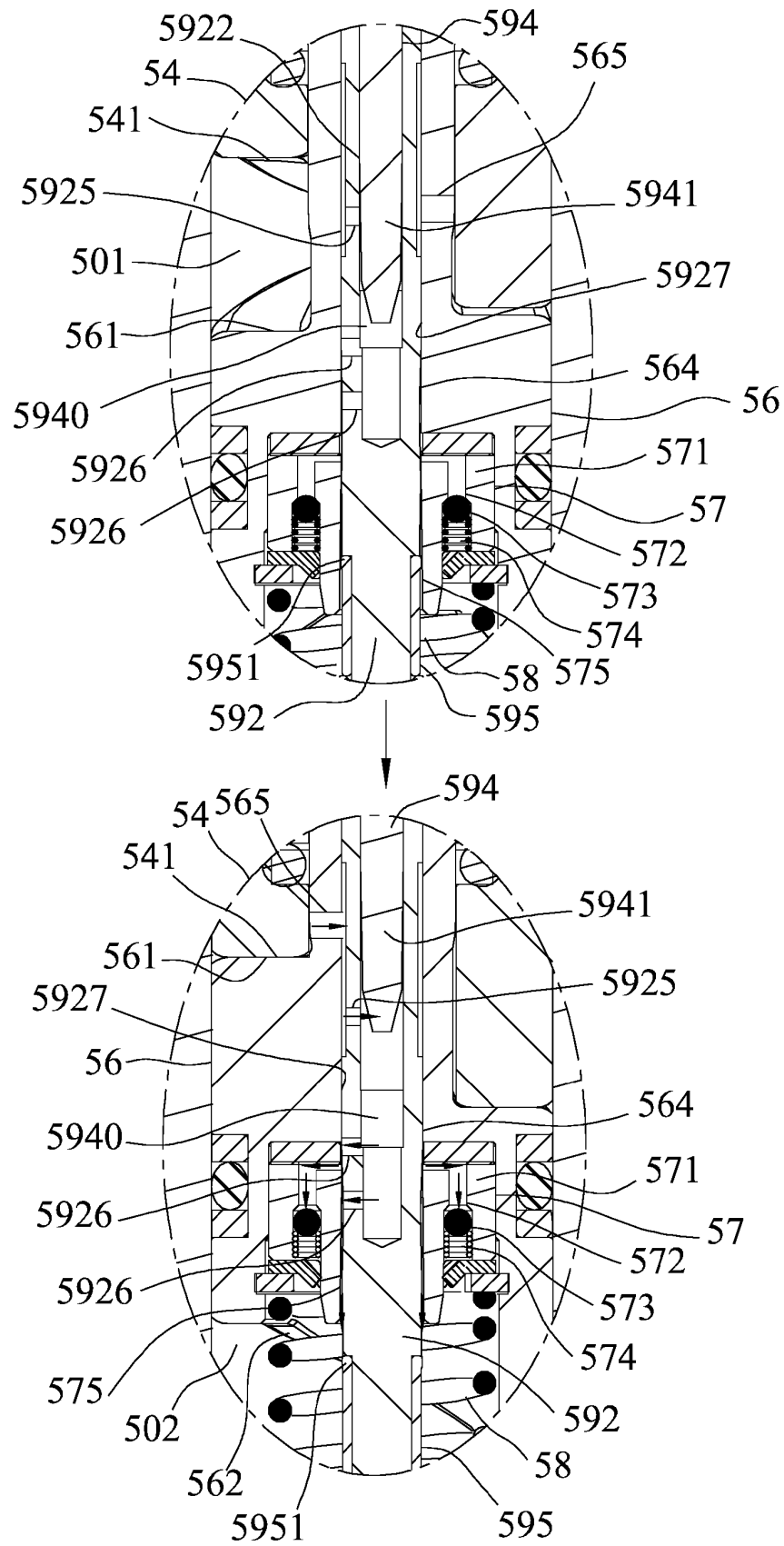
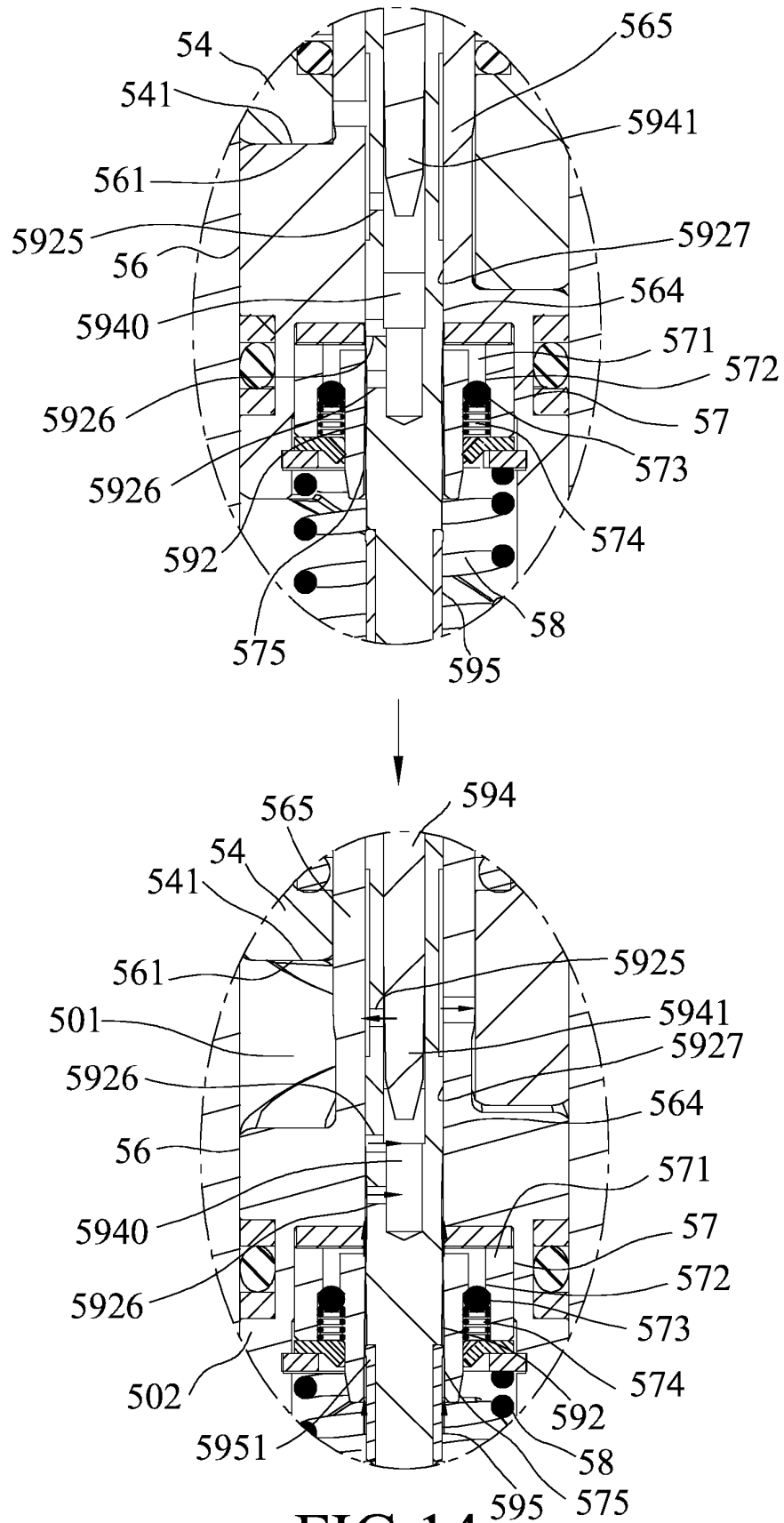


FIG.13



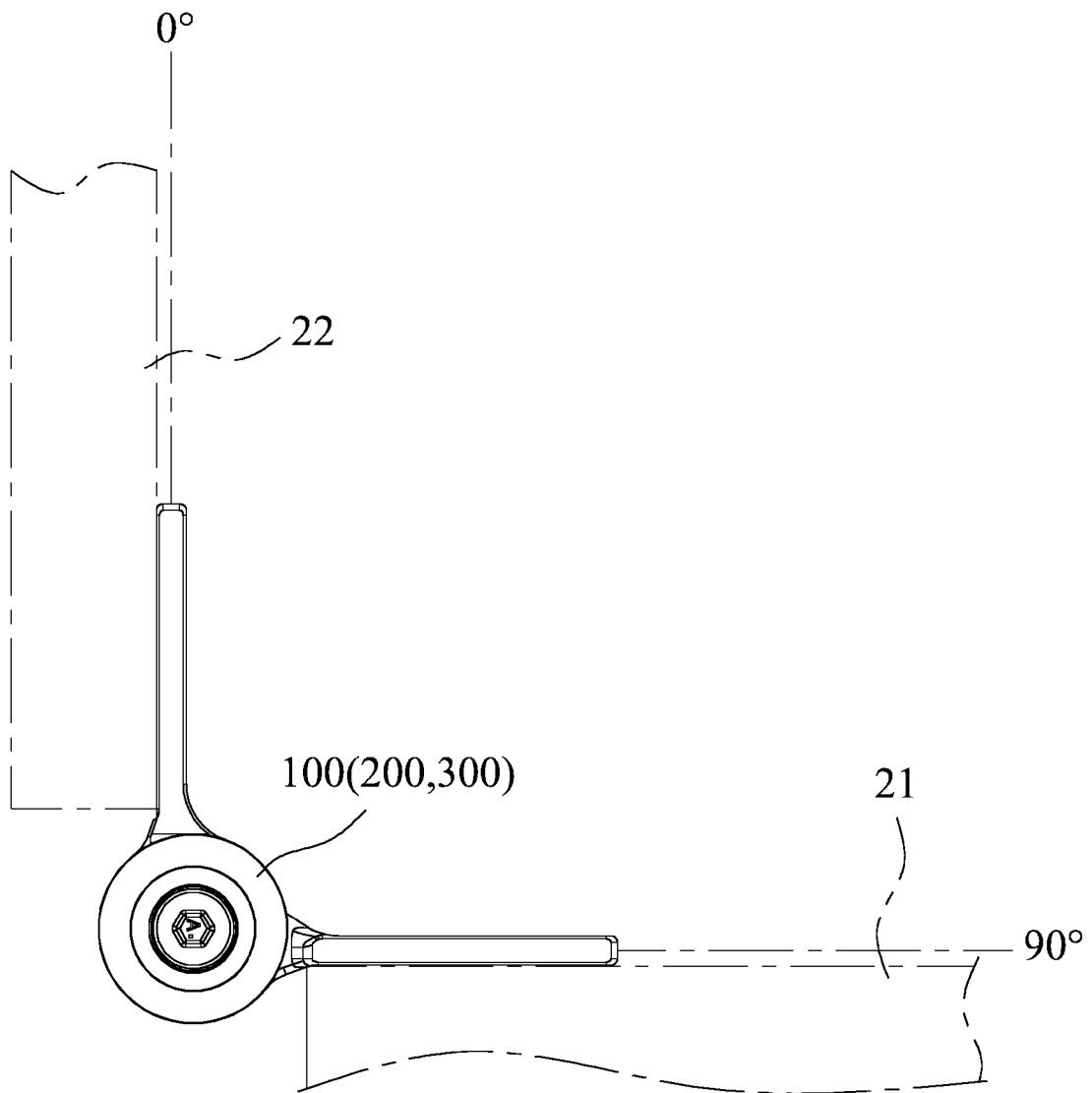


FIG.15

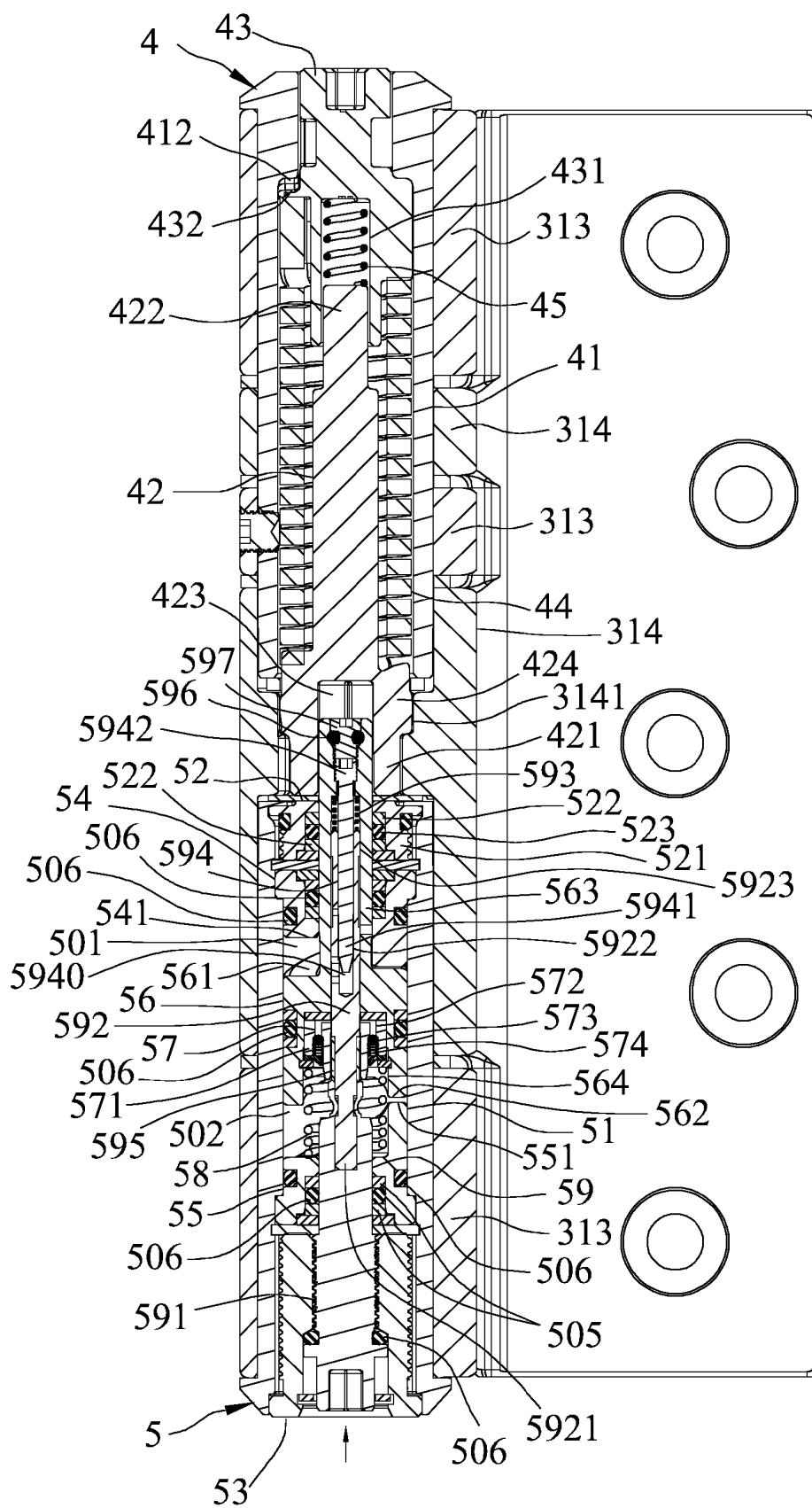


FIG.16

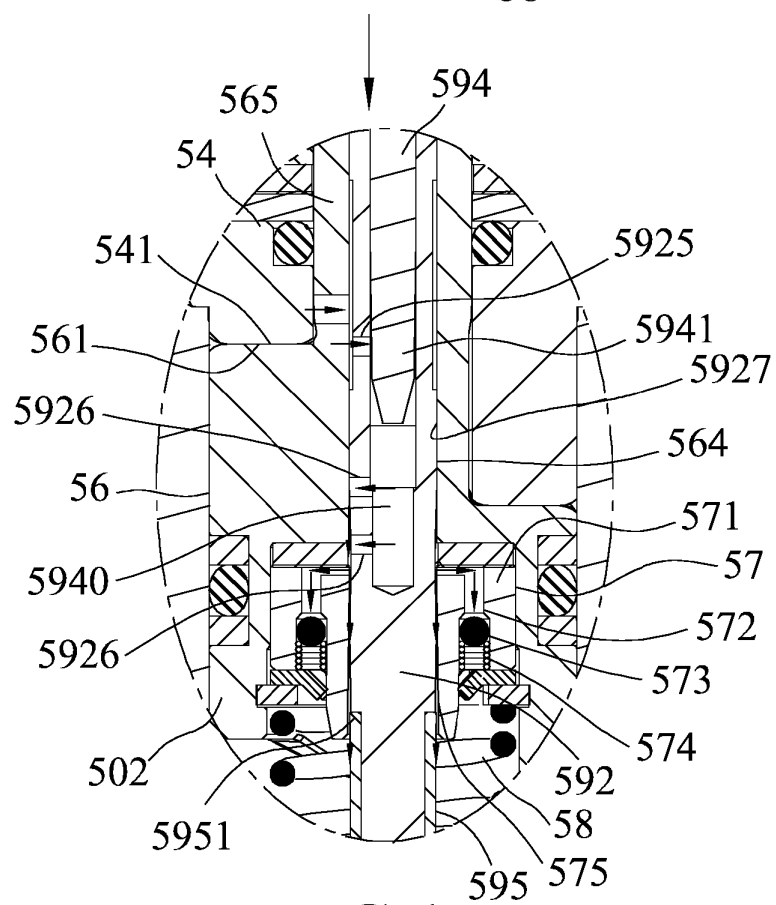
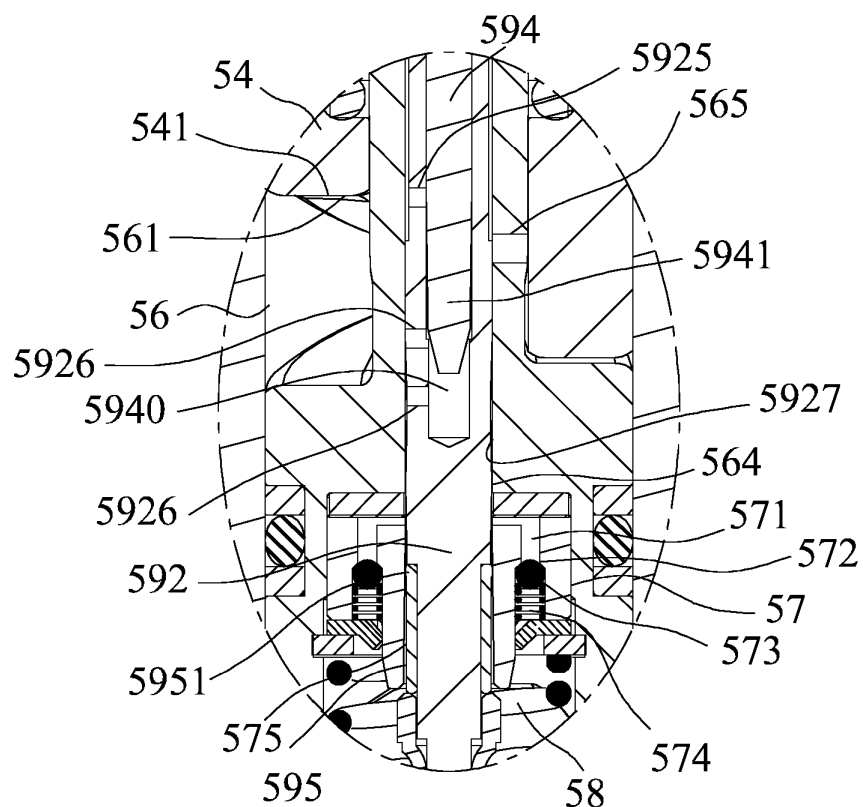


FIG.17

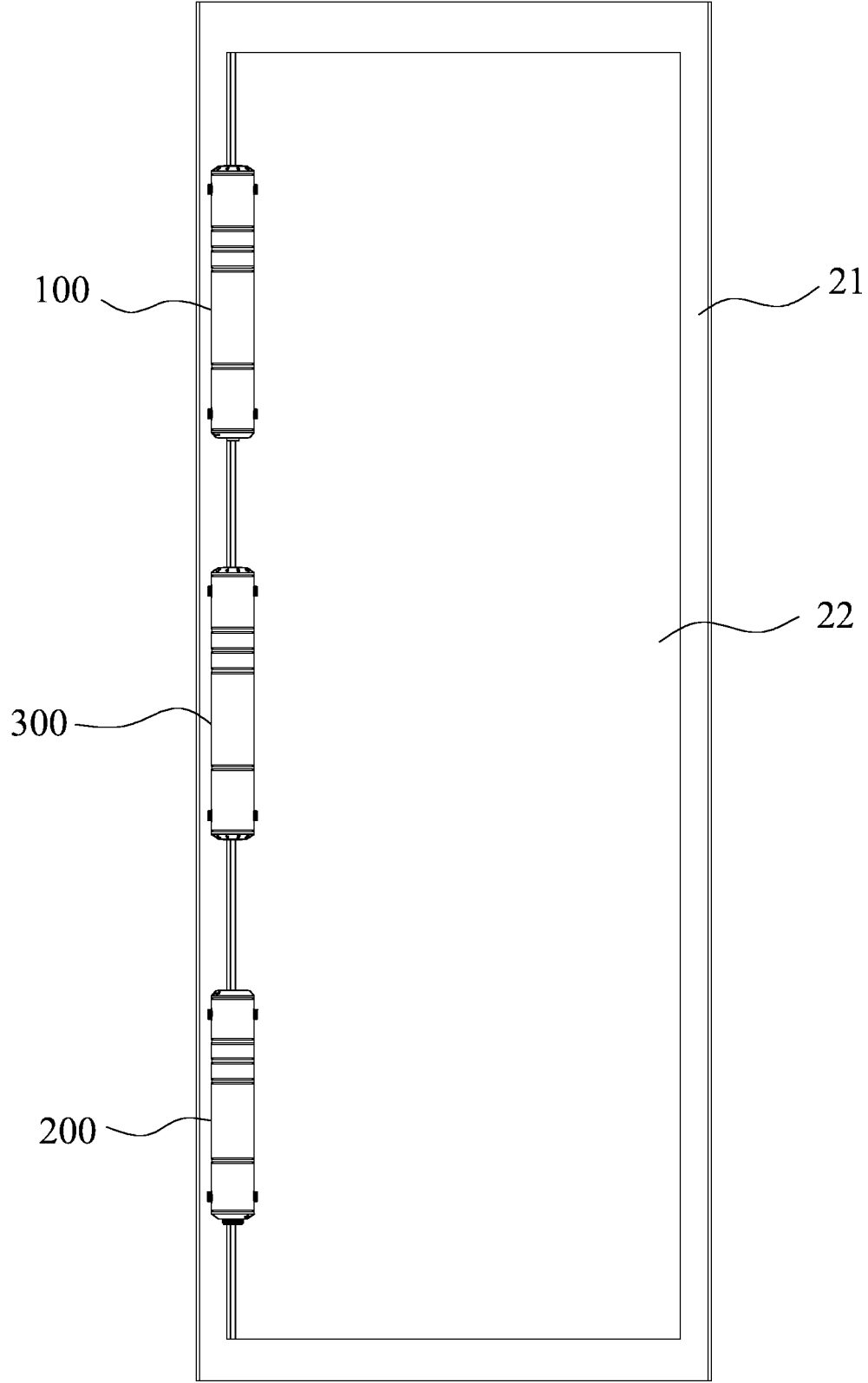


FIG.18

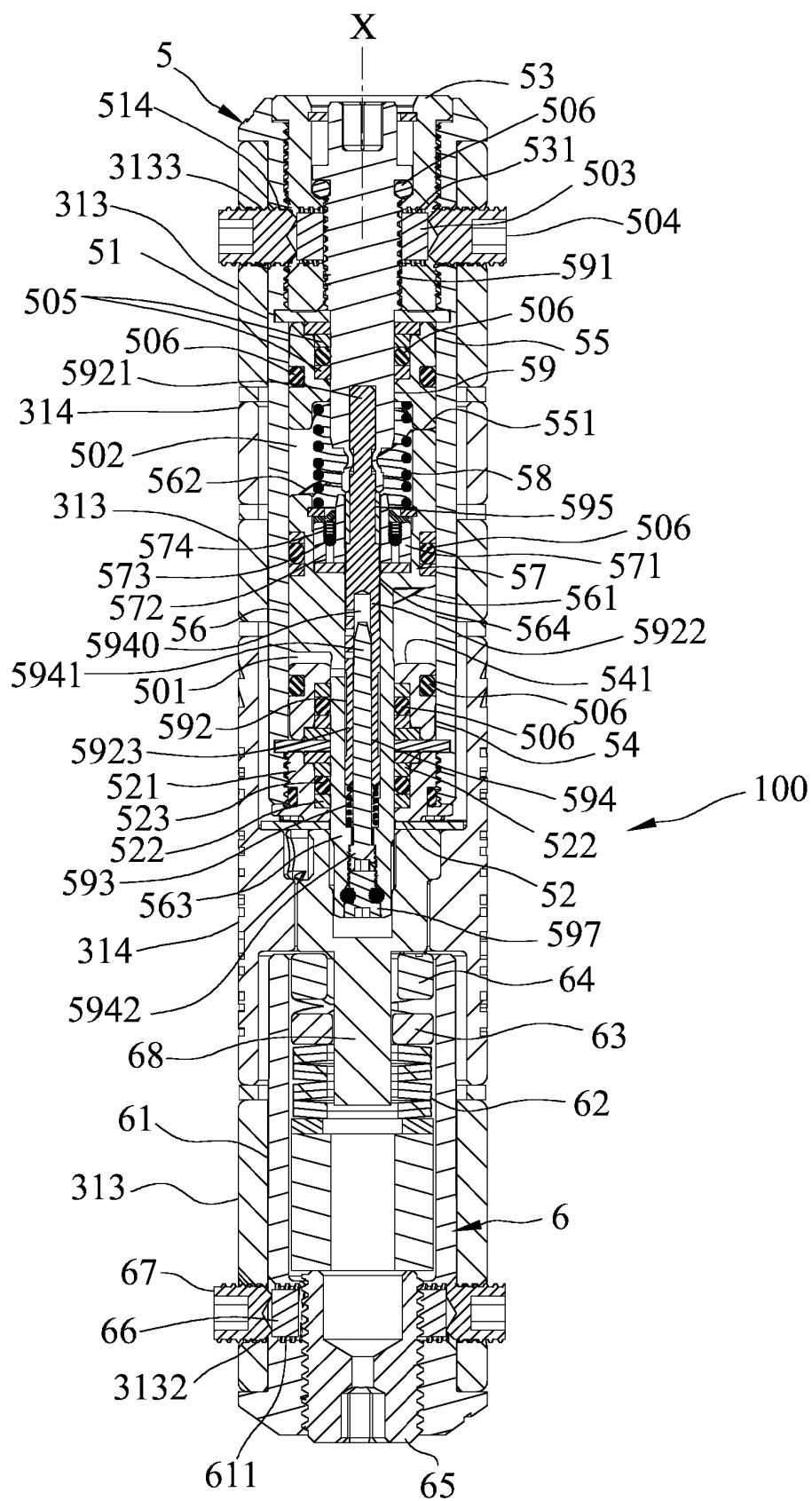


FIG.19

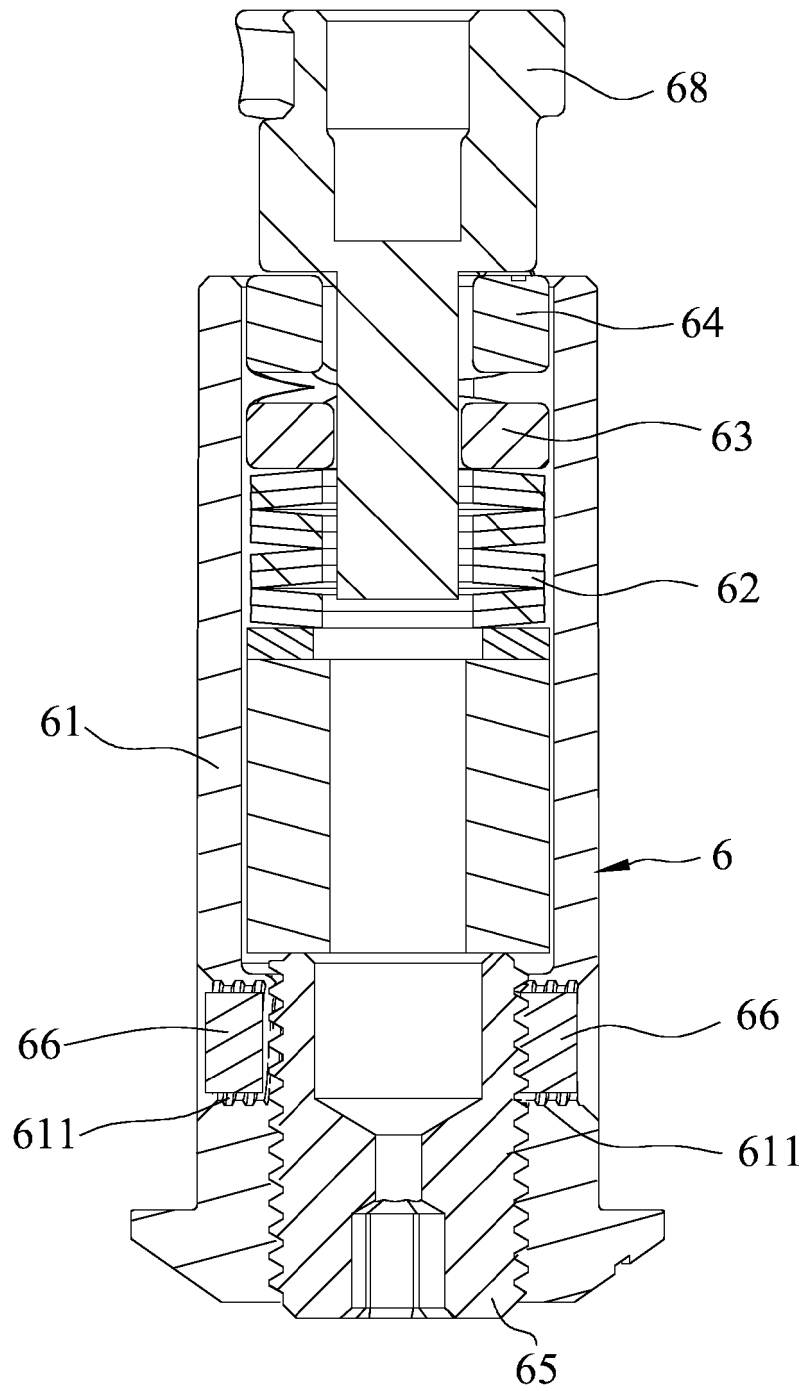
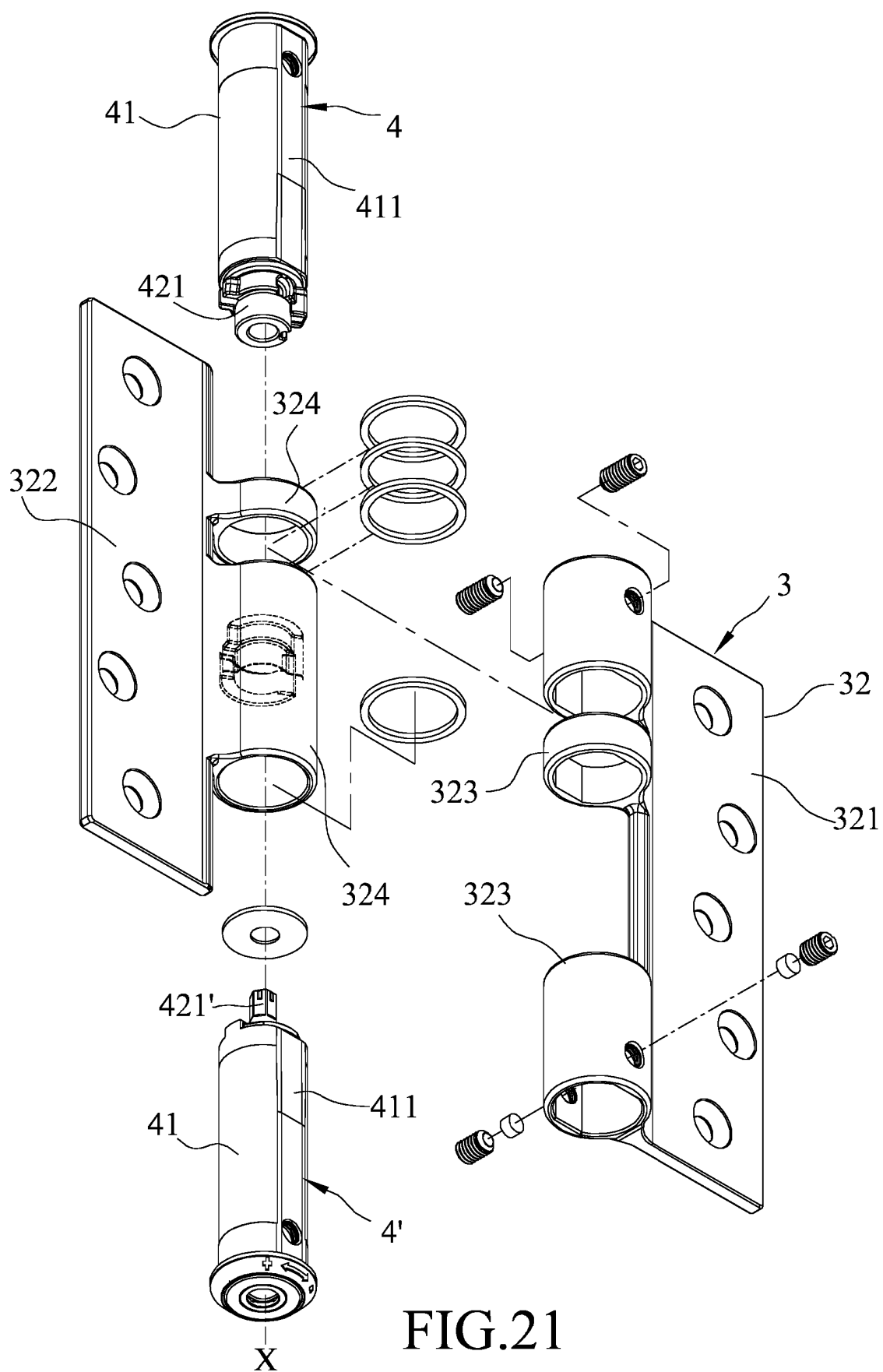


FIG.20



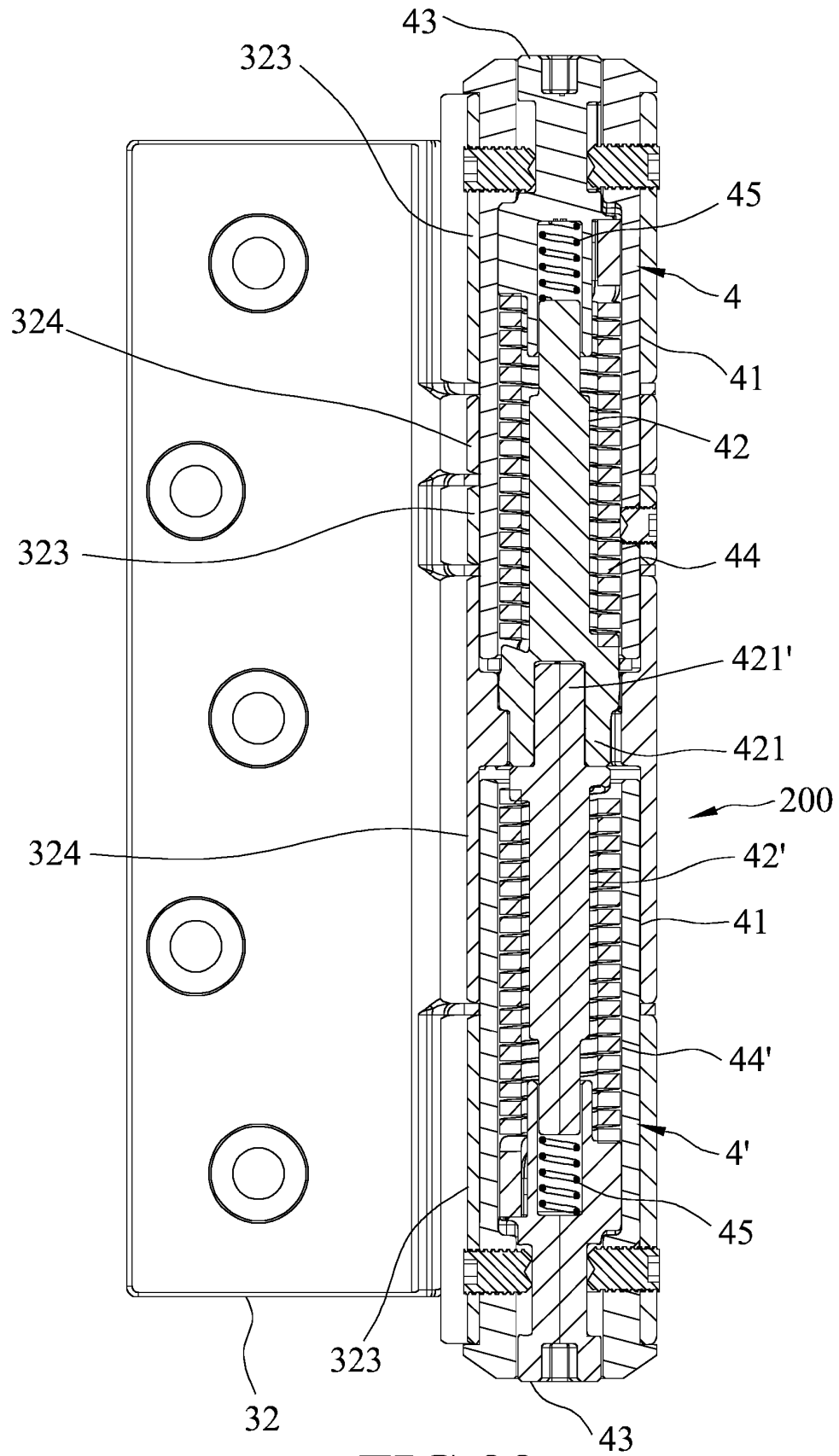


FIG.22

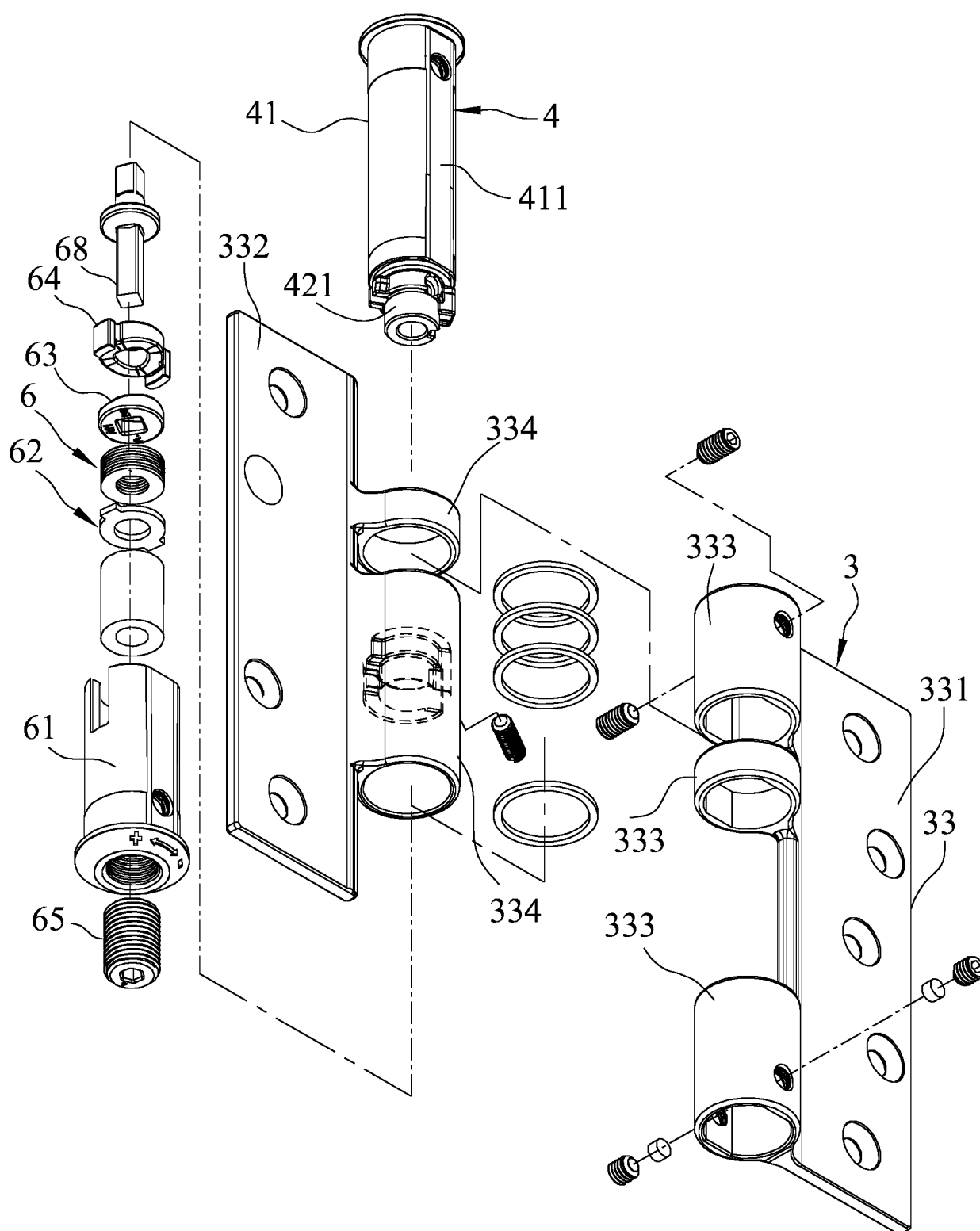


FIG.23

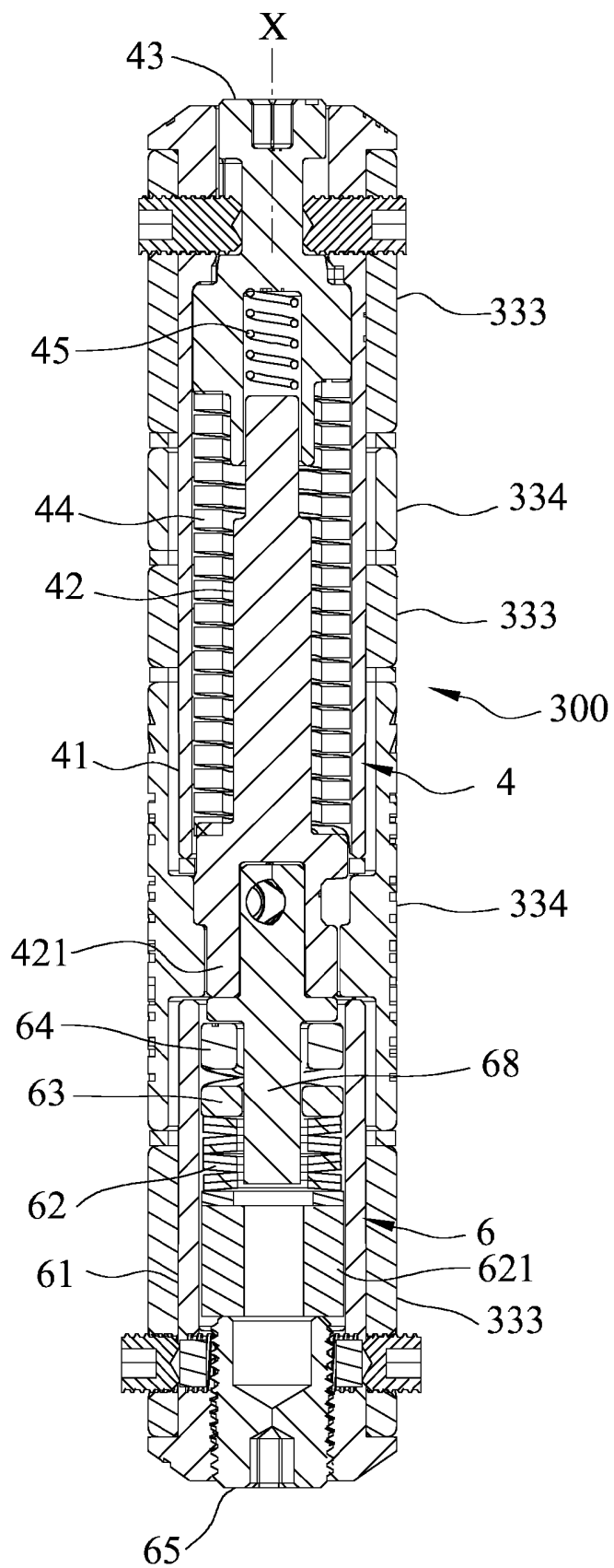


FIG.24

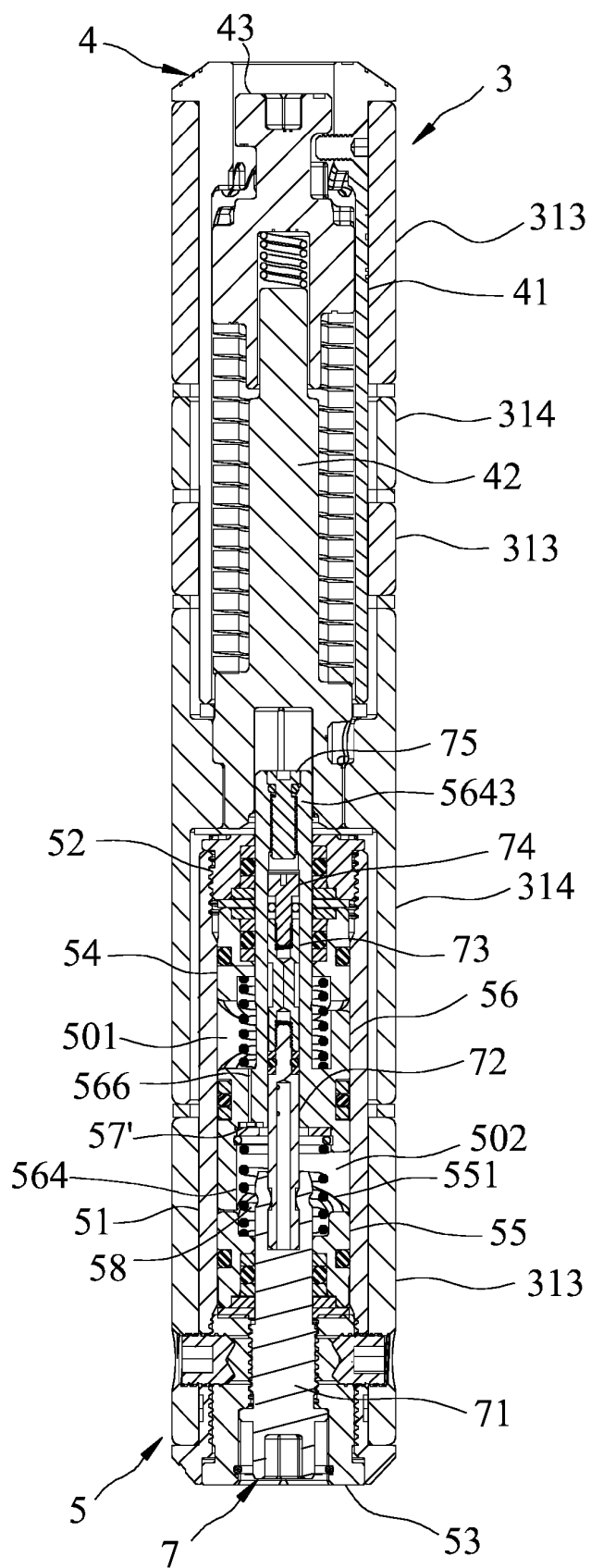


FIG.25

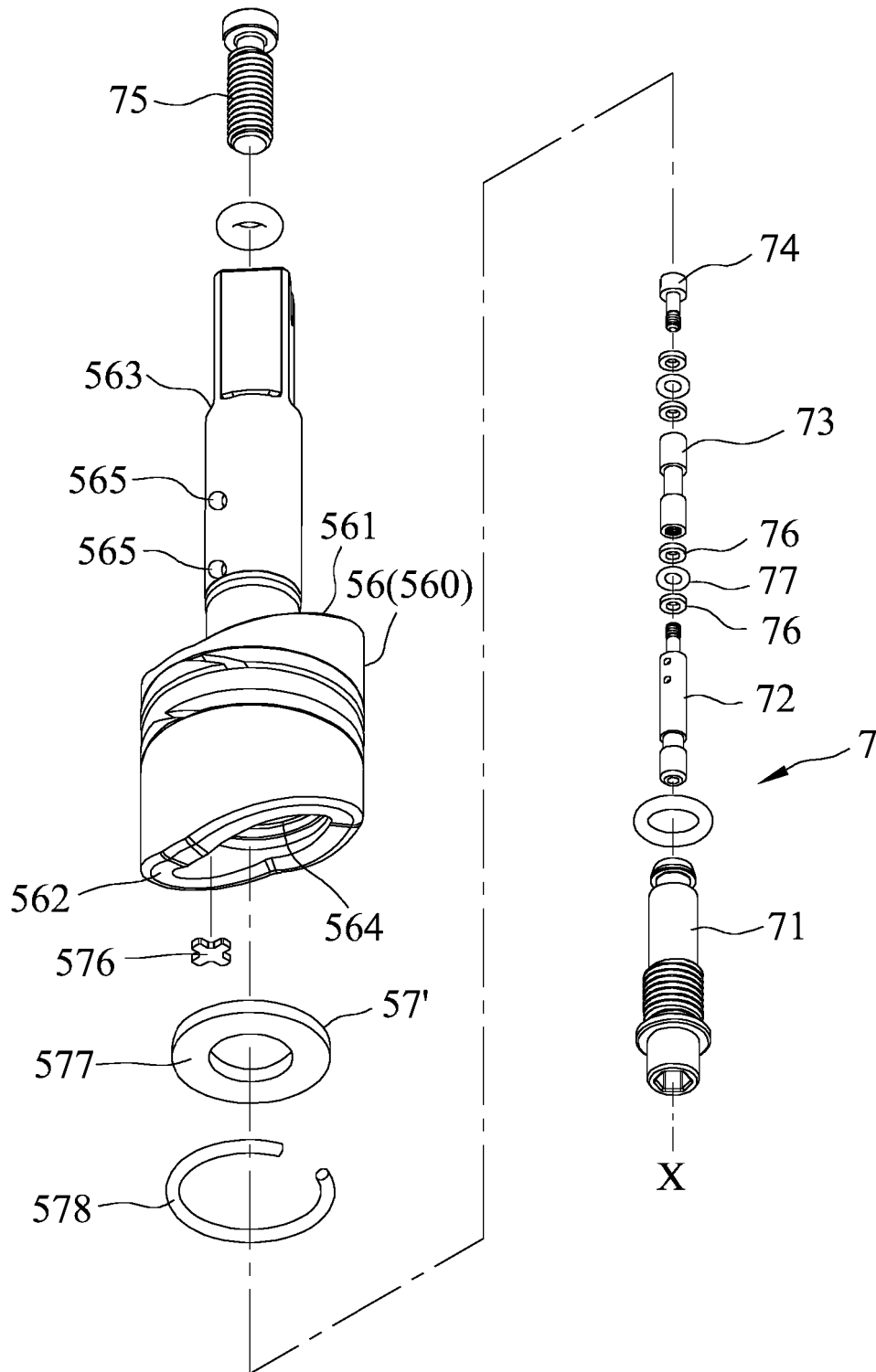


FIG.26

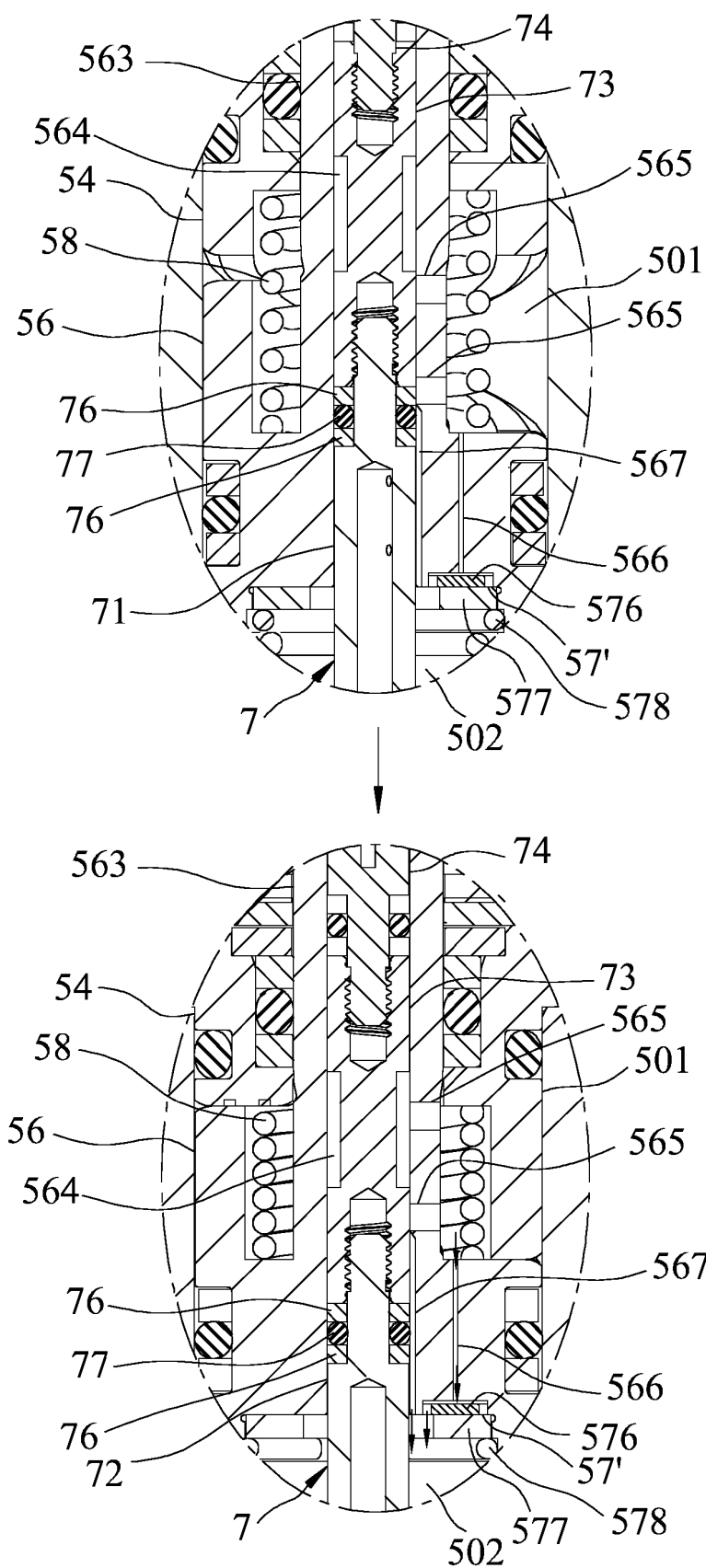


FIG.27

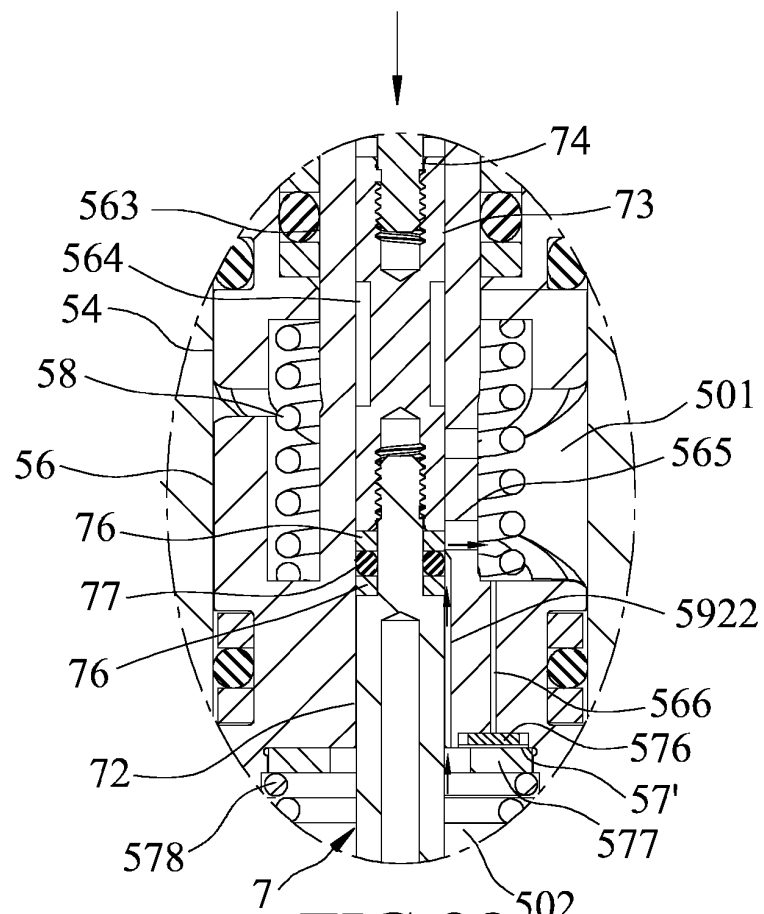
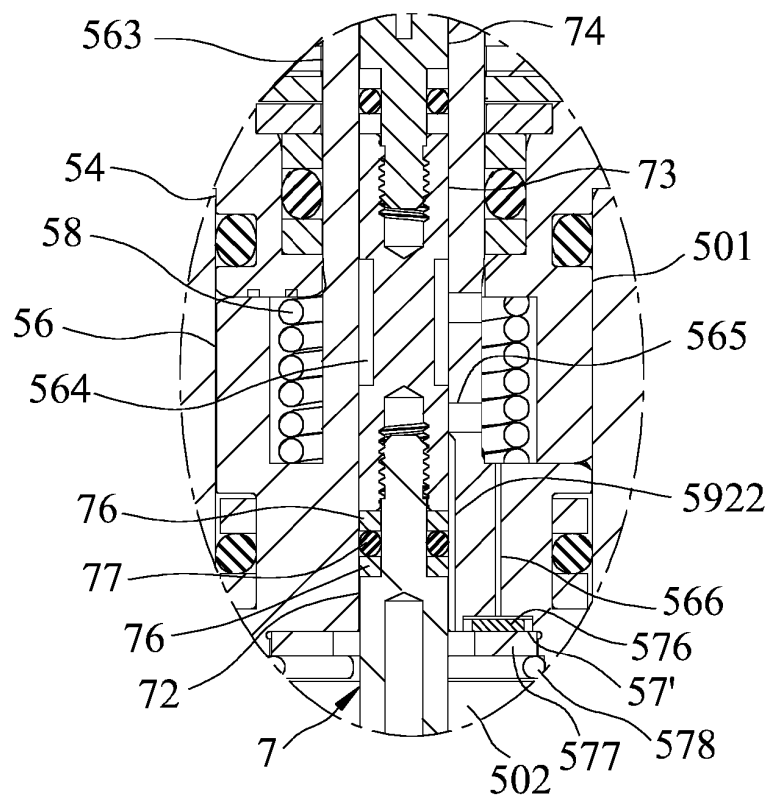


FIG.28

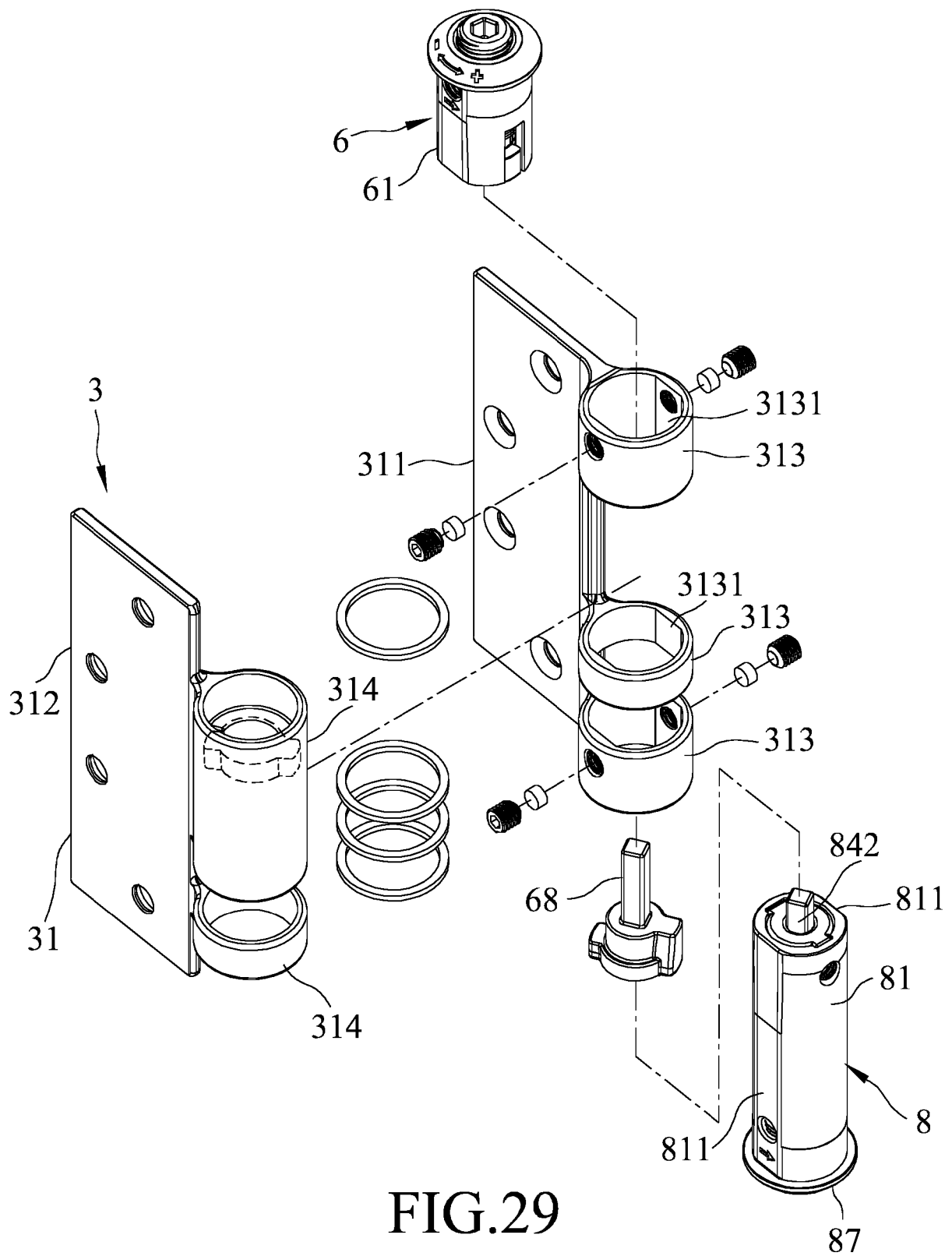


FIG.29

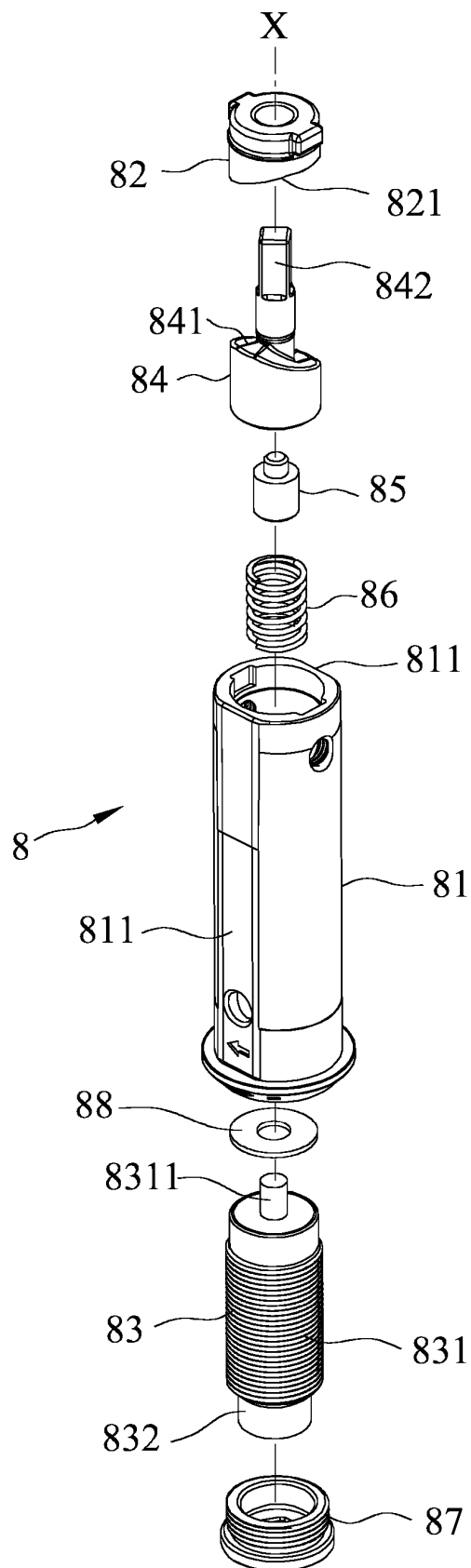


FIG.30

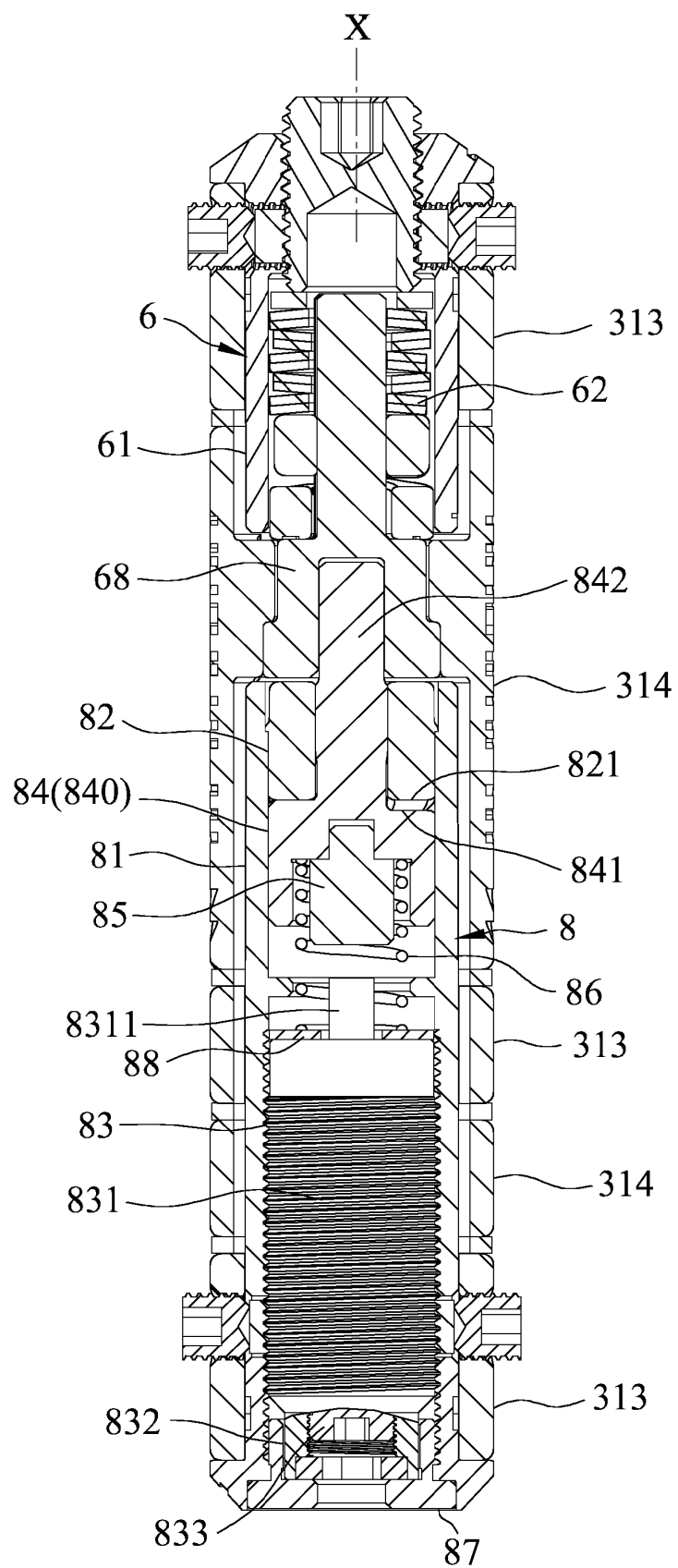


FIG.31

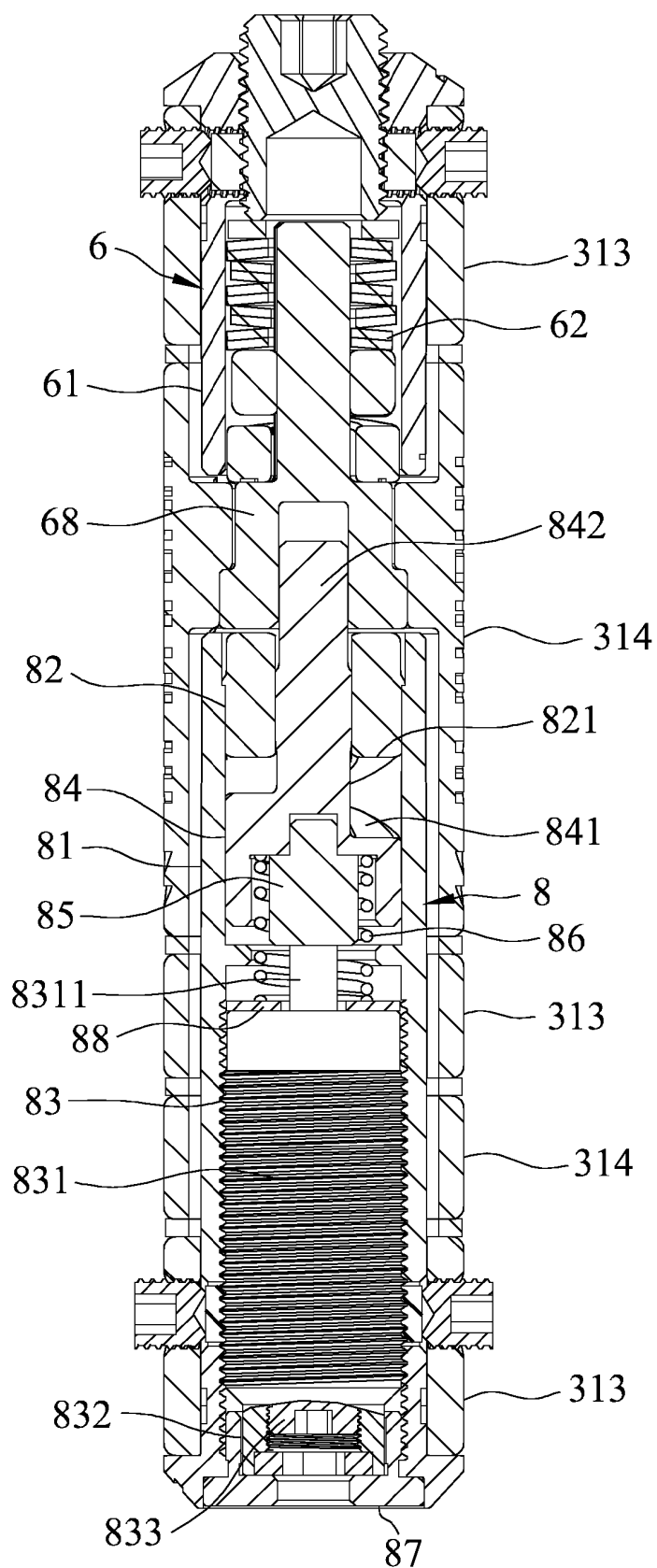


FIG.32

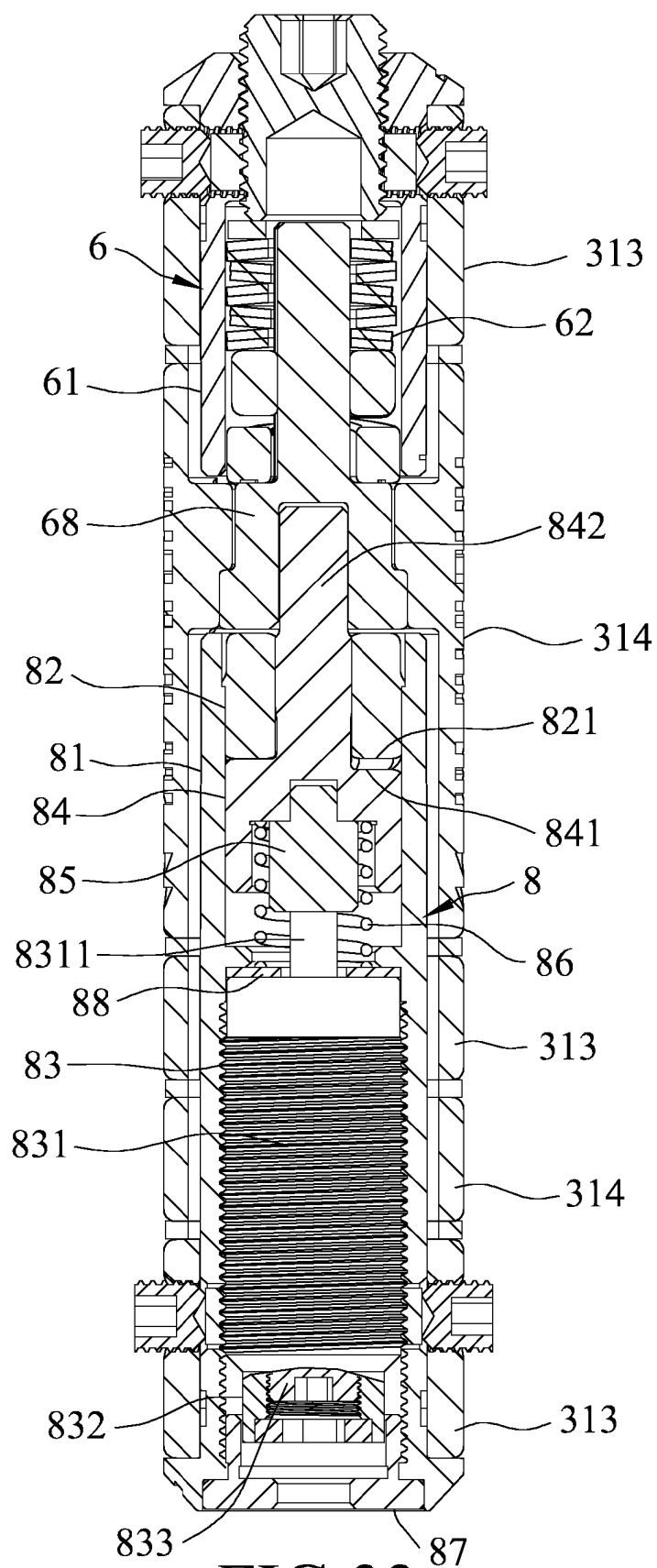


FIG.33

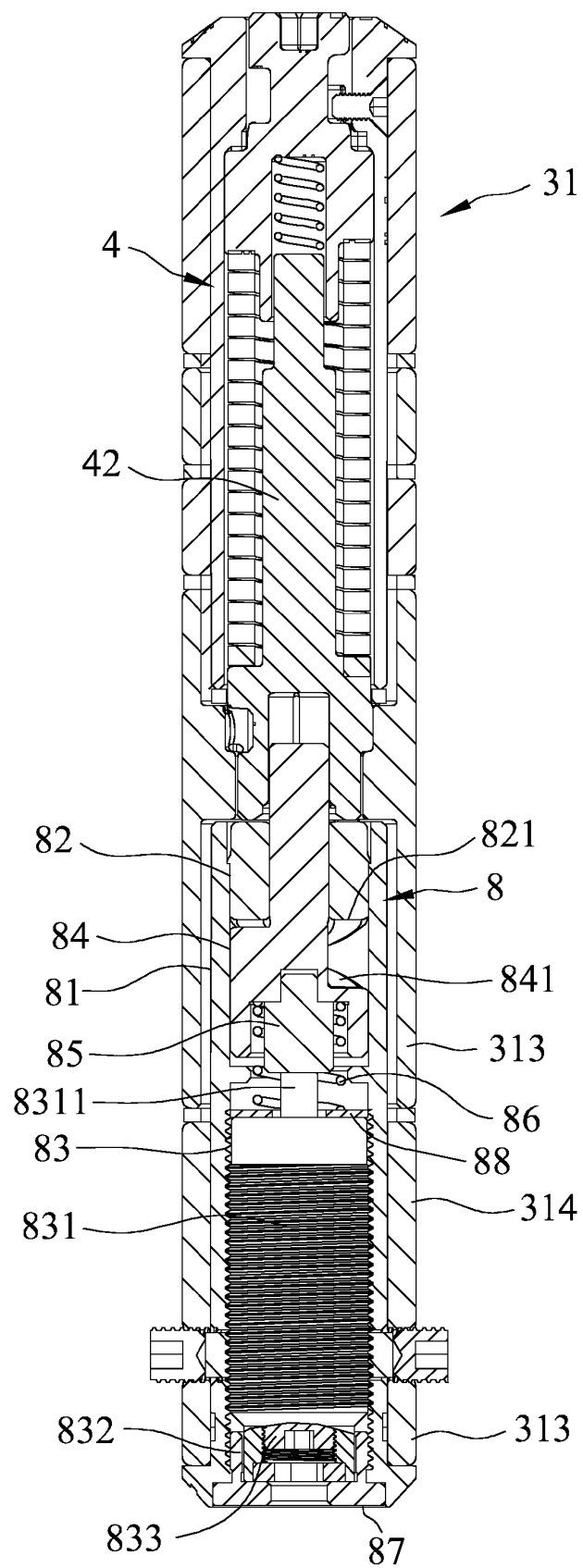


FIG.34

REFERENCES CITED IN THE DESCRIPTION

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