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(54)

Lock assembly

(57) A lock assembly includes two mounting seats (10, 20) for mounting respectively on two objects (100, 200). Each mounting seat (10, 20) has a shackle engaging lobe (12, 22). A slide seat (30) is slidable between the mounting seats (10, 20) for selectively engaging the mounting seats (10, 20). A cover member (40) is pivoted to the slide seat (30) for pivoting between closed and open positions, and has another shackle engaging lobe (45). The lobe (45) on the cover member (40) is disposed between the lobes (12, 22) of the mounting seats (10, 20) to permit extension of a padlock shackle (52) through the three lobes (12, 22, 45) when the cover member (40) is in the closed position while the slide seat (30) engages the two mounting seats (10, 20). The cover member (40) is turned away from the lobes (12, 22) of the mounting seats (10, 20) to permit sliding movement of the slide seat (30) between the mounting seats (10, 20) when the cover member (40) is moved to the open position after removal of the shackle (52) from the lobes (12, 22, 45).

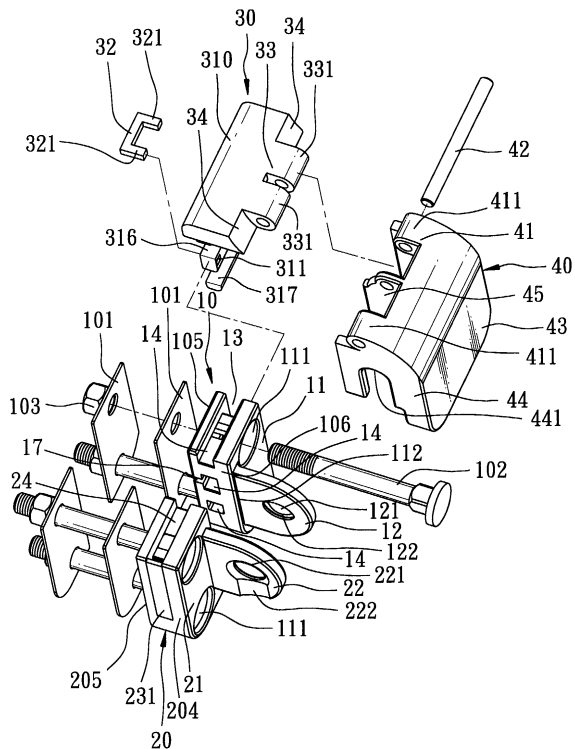


FIG. 1

Description

[0001] The present invention relates to a lock assembly which includes a shackle that can be substantially shielded to achieve an enhanced anti-theft effect.

[0002] Lock devices, such as padlocks, are in common use for locking together two objects. Typically, the objects are each provided with a lobe that has a hole formed therethrough. The shackle of a padlock extends through the holes in the lobes for locking together the objects, such as two door panels. To prevent the shackle from being sawn by a thief, the lobe on one of the door panels is provided with a bent guard plate extending integrally therefrom for protecting the shackle.

[0003] However, it is found that the bent guard plate often interferes with movement of one of the door panels relative to the other one of the door panels after the padlock is unlocked and is removed from the lobes, and is thus unsatisfactory. It is further found that the shackle is only partly shielded by the guard plate when the padlock is locked. The shackle is still accessible, and can be damaged, such as with the use of a hydraulic cutter.

[0004] Therefore, the main object of the present invention is to provide a lock assembly which includes a shackle or shackle members that can be substantially shielded when the lock assembly is in a locking state, and which eliminates the need for forming bent guard plates on lobes of adjacent objects that are to be locked together so as to avoid interference to relative movement of the adjacent objects.

[0005] According to a first aspect of the present invention, a lock assembly includes first and second mounting seats, a padlock, a slide seat, and a cover member. The first mounting seat is adapted to be mounted on a first object, and has a rear side wall adapted to face the first object, and a front side wall provided with a first lobe that is formed with a first shackle hole therethrough. The first mounting seat is further formed with a first slide channel. The second mounting seat is adapted to be mounted on a second object, and has a rear side wall adapted to face the second object, and a front side wall provided with a second lobe which is formed with a second shackle hole that is axially aligned with the first shackle hole. The second mounting seat is formed with a second slide channel which is aligned and communicated with the first slide channel. The padlock includes a lock body and a U-shaped shackle mounted on the lock body. The slide seat has a sliding rod which is slidable along the first and second slide channels between an engaging position, in which the sliding rod extends into the first and second slide channels for engaging the first and second mounting seats, and a disengaging position, in which the sliding rod is disposed in the first slide channel and is removed from the second slide channel for disengaging from the second mounting seat so as to permit movement of one of the first and second mounting seats with the corresponding object relative to the other one of the first and second mounting seats. The

cover member is mounted pivotally on the slide seat. The cover member confines an accommodating space, and is formed with a third lobe that is disposed in the accommodating space. The third lobe is formed with a third shackle hole therethrough. The cover member is pivotable relative to the slide seat for moving between a closed position and an open position. The first and second lobes extend into the accommodating space so as to be covered by the cover member and so as to dispose the third lobe between the first and second lobes and to enable the third shackle hole to align axially with the first and second shackle holes in order to permit extension of the shackle of the padlock through the first, second, and third shackle holes such that the shackle is shielded by the cover member when the cover member is moved to the closed position while the slide seat is disposed in the engaging position. The third lobe is turned away from the first and second lobes to permit sliding movement of the slide seat between the engaging and disengaging positions when the cover member is moved to the open position after removal of the shackle from the first, second and third lobes.

[0006] According to a second aspect of the present invention, a lock assembly includes first and second mounting seats, a padlock, a slide seat, and a cover member. The first mounting seat is adapted to be mounted on a first object, and has a rear side wall adapted to face the first object, and a front side wall provided with a first lobe that is formed with a first shackle hole therethrough. The first mounting seat is further formed with a first slide channel. The second mounting seat is adapted to be mounted on a second object, and has a rear side wall adapted to face the second object, and a front side wall provided with a second lobe which is formed with a second shackle hole that is axially aligned with the first shackle hole. The second mounting seat is formed with a second slide channel which is aligned and communicated with the first slide channel. The padlock includes a lock body and a shackle mounted on the lock body. The slide seat has a sliding rod which is slidable along the first and second slide channels between an engaging position, in which the sliding rod extends into the first and second slide channels for engaging the first and second mounting seats, and a disengaging position, in which the sliding rod is disposed in the first slide channel and is removed from the second slide channel for disengaging from the second mounting seat so as to permit movement of one of the first and second mounting seats with the corresponding object relative to the other one of the first and second mounting seats. The cover member is mounted pivotally on the slide seat. The cover member has an L-shaped configuration, and includes a first cover portion formed with a central opening, and a second cover portion extending transversely from the first cover portion. The cover member is pivotable relative to the slide seat for moving between a closed position and an open position. The first cover portion is moved to and covers the front side walls of the

first and second mounting seats, and enables the first and second lobes to extend through the central opening such that the first and second shackle holes are exposed from the first cover portion in order to permit extension of the shackle of the padlock through the first and second shackle holes when the cover member is moved to the closed position while the slide seat is disposed in the engaging position. The first cover portion is turned away from the first and second lobes to permit sliding movement of the slide seat between the engaging and disengaging positions when the cover member is moved to the open position after removal of the shackle from the first and second lobes.

[0007] According to a third aspect of the present invention, a lock assembly includes first and second mounting seats, a slide seat, and a lock device. The first mounting seat is adapted to be mounted on a first object, and has a rear side wall adapted to face the first object, and a front side wall formed with an L-shaped first shackle member. The first shackle member has a first section connected to the front side wall, and a distal second section extending transversely from the first section. The first shackle member cooperates with the front side wall to confine a first latch groove therebetween. The first mounting seat is further formed with a first slide channel. The second mounting seat is adapted to be mounted on a second object, and has a rear side wall adapted to face the second object, and a front side wall formed with an L-shaped second shackle member. The second shackle member has a first section connected to the front side wall of the second mounting seat, and a distal second section extending transversely from the first section of the second shackle member. The second sections of the first and second shackle members extend toward each other. The second shackle member cooperates with the front side wall of the second mounting seat to confine a second latch groove therebetween. The second mounting seat is formed with a second slide channel which is aligned and communicated with the first slide channel. The slide seat has a sliding rod which is slidable along the first and second slide channels between an engaging position, in which the sliding rod extends into the first and second slide channels for engaging the first and second mounting seats, and a disengaging position, in which the sliding rod extends into the first slide channel and is removed from the second slide channel for disengaging from the second mounting seat so as to permit movement of one of the first and second mounting seats with the corresponding object relative to the other one of the first and second mounting seats. The lock device has a lock casing mounted pivotally on the slide seat so as to be pivotable between open and closed positions, a key-operable lock core mounted in the lock casing, and a latch member mounted in the lock casing and having two opposite locking end portions and an intermediate portion between the locking end portions. The lock core has a central axis and one end that is provided with a latch engaging member. The in-

intermediate portion of the latch member engages the latch engaging member. The lock core is operable to operate the latch engaging member so as to enable the latch member to move between a locking position, in which the locking end portions of the latch member extend respectively into the first and second latch grooves and engage the second sections of the first and second shackle members to prevent the lock casing from moving pivotally to the open position when the lock casing is in the closed position while the slide seat is in the engaging position, and an unlocking position, in which the locking end portions of the latch member are moved outwardly and respectively of the first and second latch grooves and are disengaged from the first and second shackle members to permit pivoting movement of the lock casing to the open position when the lock casing is in the closed position while the slide seat is in the engaging position.

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

Figure 1 is an exploded perspective view of a first preferred embodiment of the lock assembly according to the present invention;

Figure 2 is an inverted partly exploded perspective view of the first preferred embodiment;

Figure 3 is a perspective view of the first preferred embodiment;

Figure 4 is a cross-sectional top view of the first preferred embodiment, where two mounting seats are shown to be mounted respectively on two door panels;

Figure 5 is a cross-sectional view, taking along line V-V of Figure 4;

Figure 6 is a schematic view illustrating how the shackle of a padlock can be shielded by a cover member in the first preferred embodiment when the padlock is in a locking state;

Figure 7 is a lateral side view of Figure 6;

Figure 8 is a lateral side view of the first preferred embodiment, illustrating upward turning of the cover member when the padlock is removed;

Figure 9 is a schematic front view of the first preferred embodiment, where the cover member is turned upward and a slide seat is slid rightward to disengage from a left one of the door panels;

Figure 10 is a sectional view of Figure 9, viewed from a front side of the lock assembly;

Figure 11 is a cross-sectional view of Figure 9, viewed from a bottom side of the lock assembly;

Figure 12 is a schematic front view of a second preferred embodiment of the lock assembly of the present invention when mounted on a left-side-turning door assembly, where a cover member thereof is shown to be turned downward after a slide seat is slid leftward;

Figure 13 is a cross-sectional view of Figure 12, viewed from a bottom side of the lock assembly; Figure 14 is a cross-sectional view of a third preferred embodiment of the lock assembly of the present invention, viewed from a bottom side of the lock assembly;

Figure 15 is a vertical sectional view of the third preferred embodiment, viewed from a front side of the lock assembly;

Figure 16 is a perspective view of a fourth preferred embodiment of the lock assembly according to the present invention, where a cover member is shown to be turned upwardly to an open position;

Figure 17 is another perspective view of the fourth preferred embodiment when incorporating a padlock, where the cover member is turned downwardly to a closed position;

Figure 18 is a partly-sectioned front view of the fourth preferred embodiment;

Figure 19 is a perspective view of a fifth preferred embodiment of the lock assembly according to the present invention, where a cover member is shown to be turned upwardly to an open position;

Figure 20 is another perspective view of the fifth preferred embodiment when incorporating a padlock, where the cover member is turned downwardly to a closed position;

Figure 21 is a partly-sectioned front view of the fifth preferred embodiment;

Figure 22 is an exploded perspective view of a sixth preferred embodiment of the lock assembly according to the present invention;

Figure 23 is a perspective view of the sixth preferred embodiment;

Figure 24 is a partly cut-away perspective view of the sixth preferred embodiment, where a lock device is shown to be in a locking state;

Figure 25 is a cross-sectional view of Figure 24, viewed from a bottom side of the lock assembly;

Figure 26 is a cross-sectional view, taking along line 26-26 in Figure 25;

Figure 27 is a cross-sectional view of the sixth preferred embodiment, viewed from a bottom side, where the lock device is shown to be in an unlocking state;

Figure 28 is a partly cut-away exploded perspective view of a seventh preferred embodiment of the lock assembly according to the present invention;

Figure 29 is a perspective view of the seventh preferred embodiment, where a lock device is shown to be in a locking state;

Figure 30 is a partly-cutaway perspective view of the embodiment shown in Figure 29;

Figure 31 is a cross-sectional view of Figure 30, viewed from a bottom side of the lock assembly;

Figure 32 is a cross-sectional view of the seventh preferred embodiment, where the lock device is shown to be in an unlocking state;

Figure 33 is a partly cut-away perspective view of the seventh preferred embodiment, where the lock device is shown to be in the unlocking state; and Figure 34 is a perspective view of the seventh preferred embodiment, where the lock device is shown to be in the unlocking state.

[0009] Before the present invention is described in greater detail, it should be noted that like elements are denoted by the same reference numerals throughout the disclosure.

[0010] Referring to Figures 1 to 3, the first preferred embodiment of the lock assembly according to the present invention is shown to include first and second mounting seats 10, 20, a padlock 50 (see Figure 6), a slide seat 30, and a cover member 40. Each of the first and second mounting seats 10, 20 is to be mounted on a respective one of two objects to be locked together, such as a door panel and a door frame. In the present embodiment, the lock assembly is illustrated as being used for locking together two door panels 100, 200 (see Figure 4). Each of the first and second mounting seats 10, 20 is formed with a pair of screw bolt holes 111 for extension of a pair of screw bolts 102 therethrough. A pair of clamping plates 101 are provided behind each of the first and second mounting seats 10, 20. Each of the door panels 100, 200 is disposed between the clamping plates 101 behind a corresponding one of the first and second mounting seats 10, 20 for clamping by the clamping plates 101. The screw bolts 102 extend through the door panels 100, 200, and each has one end engaging a respective nut 103 behind the clamping plates 101 for fastening the first and second mounting seats 10, 20 on the door panels 100, 200, respectively. Each of the first and second mounting seats 10, 20 has a rear side wall 105, 205 adapted to face the corresponding door panel 100, 200, a front side wall 11, 21 opposite to the rear side wall 105, 205, an inner side wall 106, 206 interconnecting inner edges of the front and rear side walls 11, 21, 105, 205, and an outer side wall 104, 204 interconnecting outer edges of the front and rear side walls 11, 21, 105, 205. The mounting seats 10, 20 are disposed on the door panels 100, 200 such that the inner side walls 106, 206 are disposed proximate to and confront each other. The front side wall 11 of the first mounting seat 10 is provided with a first lobe 12 that projects forwardly and that has an oval-shaped first shackle hole 121 formed therethrough. The first mounting seat 10 is further formed with three first slide channels 14 which extend horizontally from the inner side wall 106 toward the outer side wall 104 and which are displaced from one another in a vertical direction. The front side wall 21 of the second mounting seat 20 is provided with a second lobe 22 that has an oval-shaped second shackle hole 221 formed therethrough and aligned with the first shackle hole 121. Each of the first and second lobes 12, 22 has an outer side surface opposite to the other one of the first and second lobes

12, 22 and formed with an indented shackle recess 122, 222 which extends downwardly from the corresponding shackle hole 121, 221 to a lower edge of the corresponding lobe 12, 22. The second mounting seat 20 is further formed with three second slide channels 24 which extend horizontally from the inner side wall 206 toward the outer side wall 204 and which are displaced from one another in a vertical direction. The first slide channels 14 are aligned respectively with the second slide channels 24. Each of the first and second slide channels 14, 24 extends through the inner side wall 106, 206 of the corresponding one of the first and second mounting seats 10, 20. The outer side wall 104 of the first mounting seat 10 is formed with an entrance 13 communicated with each of the first slide channels 14. The outer side wall 204 of the second mounting seat 20 is provided with a cover plate 231 that defines a closed end of each of the second slide channels 24. In another embodiment, the coverplate 231 may be formed integrally with the second mounting seat 20, i.e., integral with the outer side wall 204 of the second mounting seat 20. The rear side wall 105, 205 of each of the first and second mounting seats 10, 20 is formed with a limiting hole 17, 27 that extends along and that is communicated with a middle one of the slide channels 14, 24 in a corresponding one of the mounting seats 10, 20. The limiting holes 17, 27 are aligned with each other. Referring to Figures 4 and 5, each limiting hole 17, 27 has a communicating end 171, 271 formed through the inner side wall 106, 206 of the corresponding mounting seat 10, 20, and an opposite limiting end 172, 272 that is proximate to the outer side wall 104, 204 of the corresponding mounting seat 10, 20 and that is not formed through the outer side wall 104, 204. Referring to Figures 1 and 4, the front side wall 11 of the first mounting seat 10 is further formed with a vertically extending positioning groove 112 which is disposed adjacent to an inner side surface of the first lobe 12 that faces the second lobe 22.

[0011] Referring back to Figures 1 to 3, the slide seat 30 has a horizontal top wall 310 formed with a first pivot portion 33 at one end, a connecting rod 319 extending downwardly from the top wall 310, and three parallel sliding rods 315, 316, 317 which are disposed horizontally below the top wall 310 and which are spaced apart vertically from one another. Each of the sliding rods 315, 316, 317 has a connecting end portion connected to the connecting rod 319, and a distal end portion distal from the connecting rod 319. During assembly, the sliding rods 315, 316, 317 are inserted into the first slide channels 14 via the entrance 13. The distal end portion of a middle one of the sliding rods 316 is formed with an engaging hole unit which consists of a pair of engaging holes 311. A stop member 32, which is formed as a U-shaped metal body, engages the engaging hole unit by extending two opposite ends 321 thereof into the pair of engaging holes 311 of the engaging hole unit through one of the limiting holes 17, 27 after the sliding rods 315, 316, 317 are inserted into the slide channels 14. The

stop member 32 thus projects from the middle one of the sliding rods 316, and projects into one of the limiting holes 17, 27. The sliding rods 315, 316, 317 are slidable along the first and second slide channels 14, 24. As best illustrated in Figure 4, the stop member 32 is movable with the middle one of the sliding rods 316 between the limiting ends 172, 272 of the limiting holes 17, 27, thereby preventing removal of the slide seat 30 from the first mounting seat 10, and thereby limiting sliding movement of the slide seat 30 between an engaging position and a disengaging position. In the engaging position, as shown in Figures 4 and 5, the sliding rods 315, 316, 317 extend into the first slide channels 14 and into the second slide channels 24 for engaging both the first and second mounting seats 10, 20, and the stop member 32 is disposed adjacent to the limiting end 272 of the limiting hole 27 in the second mounting seat 20. In the disengaging position, as shown in Figure 10, the sliding rods 315, 316, 317 extend only into the first slide channels 14 and are removed from the second slide channels 24 for disengaging from the second mounting seat 20, and the stop member 32 is disposed proximate to the limiting end 172 of the limiting hole 17 in the first mounting seat 10.

[0012] Referring back to Figures 1 to 3, the cover member 40 has an upper end formed with a second pivot portion 41 which is mounted pivotally on the first pivot portion 33 by means of a horizontal pivot axle 42 such that the cover member 40 is turnable relative to the slide seat 30 about an axis of the pivot axle 42 in an upward direction for moving to an open position and in a downward direction for moving to a closed position. The first pivot portion 33 on the slide seat 30 has a pair of inclined end walls 34 facing the second pivot portion 41, and a pair of pivot tubes 331 projecting integrally from the end walls 34 and formed with aligned pivot holes for extension of the pivot axle 42 therethrough. The inclined end walls 34 incline downwardly and forwardly. Each end wall 34 has a concave surface. The second pivot portion 41 of the cover member 40 is formed integrally with a pair of second pivot tubes 411 which flank the first pivot tubes 331 and which are disposed respectively adjacent to the inclined end walls 34. The cover member 40 is further formed with a third lobe 45 inserted into a clearance formed between the first pivot tubes 331. The second pivot tubes 411 and the third lobe 45 are formed with aligned pivot holes which are aligned with the pivot holes in the first pivot tubes 331 for extension of the pivot axle 42 therethrough. In case there is a thief who tried to damage the lock assembly by cutting the pivot tubes 331, 411 using a saw, the inclined end walls 34 would abut against the saw and may cause bending of the saw during the cutting operation, thereby preventing the thief from successfully damaging the lock assembly.

[0013] The cover member 40 is generally formed as a hollow casing with a convex front cover plate 43 and a pair of spaced-apart side cover plates 44 which extend transversely from opposite left and right edges of the

front cover plate 43. The side cover plates 44 cooperate with the front cover plate 43 to confine an accommodating space 432. The accommodating space 432 opens downwardly and rearwardly when the cover member 40 is turned downwardly to the closed position. The third lobe 45 is disposed in the accommodating space 432, and extends integrally and rearwardly from an inner surface of the front cover plate 43. The third lobe 45 is formed with a third shackle hole 451. Each of the side cover plates 44 is formed with a slot 441 that has a size corresponding to the size of the shackle 52 of the padlock 50 and that permits extension of the shackle 52 therethrough. When the cover member 40 is turned to the closed position after the slide seat 30 is moved to the engaging position, the first and second lobes 12, 22 extend into the accommodating space 432, and the third lobe 45 extends into a clearance formed between the first and second lobes 12, 22 and is positioned in the positioning groove 112 to enable axial alignment of the third shackle hole 451 with the first and second shackle holes 121, 221. At this time, the shackle 52 of the padlock 50 is extendible through the shackle holes 121, 451, 221 for locking together the first and second mounting seats 10, 20 and the cover member 40, thereby locking together the first and second door panels 100, 200. When the cover member 40 is turned upwardly to the open position after the padlock 50 is unlocked using a corresponding key and is removed from the lobes 12, 22, 45, the third lobe 45 is moved upwardly away from the first and second lobes 12, 22 for removal from the clearance between the first and second lobes 12, 22 so as to permit sliding movement of the slide seat 30 to the disengaging position, where the slide seat 30 is disengaged from the second mounting seat 20 to permit movement of the second mounting seat 20 together with the second door panel 200 relative to the first mounting seat 10 and the first door panel 100.

[0014] In use, the slide seat 30 is initially slid to the first mounting seat 10 and is disposed in the disengaging position, as shown in Figure 10. To lock the door panels 100, 200 to each other, the door panels 100, 200 are disposed side by side to align the shackle holes 121, 221 in the first and second lobes 12, 22 with each other. The slide seat 30 is then slid from the first mounting seat 10 toward the second mounting seat 20 with the cover member 40 turned to the open position, such that the sliding rods 315, 316, 317 are extended from the first slide channels 14 into the second slide channels 24 to dispose the slide seat 30 in the engaging position, as shown in Figure 5. The cover member 40 is then turned downwardly to the closed position, where the third lobe 45 is disposed between the first and second lobes 12, 22, and where the shackle hole 451 in the third lobe 45 is aligned with the shackle holes 121, 221 in the first and second lobes 12, 22, as shown in Figures 3 and 4. The shackle 52 of the padlock 50, which is in an unlocking state, is extended into the accommodating space 432 through the slots 441, and is extended through the

shackle holes 121, 451, 221. The padlock 50 is then locked by simply forcing the padlock 51 upward to engage the shackle 52 with a lock body 51 of the padlock 50 in a known manner, thereby locking together the first and second door panels 100, 200, as shown in Figures 6 and 7. At this time, the shackle 52 is partially buried in the shackle recesses 122, 222, and is substantially shielded by the cover member 40. With the formation of the shackle recesses 122, 222, the lobes 12, 22 can be made thicker to have a higher strength so as to obtain an enhanced anti-theft effect. As the slots 441 in the side cover plates 44 correspond in size with the cross-section of the shackle 52, it is difficult to extend a cutting tool, such as a hydraulic cutter, into the accommodating space 432 through any of the slots 441 to cut the shackle 52. The padlock 50 can thus be effectively prevented from being destroyed by cutting.

[0015] Referring to Figures 7 and 8, when the padlock 50 is unlocked using the corresponding key, one end of the shackle 52 is disengaged from the lock body 51 of the padlock 50. The shackle 52 is then removed from the lobes 12, 22, 45, and thus from the first and second mounting seats 10, 20 and the cover member 40. Thereafter, the cover member 40 is turned upwardly for moving to the open position. The slide seat 30 is then slid horizontally toward the first mounting seat 10 for disengaging from the second mounting seat 20, as shown in Figure 10. When the slide seat 30 is moved to the disengaging position, the cover member 40 may be turned downwardly again, and the shackle 52 of the padlock 50 may be extended once again through the third lobe 45 such that the padlock 50 can be carried by the first door panel 100 without interfering with movement of the second door panel 200, as shown in Figures 9 and 11.

[0016] The door assembly to which the present embodiment is applied is in the form of a right-side-turning door, in which the right side door panel, i.e., the first door panel 100, is turnable relative to a door frame or a fixed left-side door panel, i.e., the second door panel 200, about a vertical axis. In this case, the entrance 13 for access into the first and second slide channels 14, 24 is formed in the outer side wall 104 of the first mounting seat 10, and the slide seat 30 is slid rightwardly to the first mounting seat 10 after the padlock 50 is removed so as to prevent the cover member 40 and the slide seat 30 from hindering or interfering with turning movement of the first door panel 100 relative to the second door panel 200.

[0017] Referring to Figures 12 and 13, a second preferred embodiment of the lock assembly of the present invention is shown to be applied to a left-side-turning door assembly, in which a left-side door panel, i.e., the second door panel 200, is turnable relative to a door frame or a fixed right-side door panel, i.e., the first door panel 100. In this embodiment, the outer side wall 104' of the first mounting seat 10' is sealed, and an entrance 23 for access into the slide channels 24, 14 is formed in the outer side wall 204' of the second mounting seat 20'.

The connecting rod 319 is disposed at a left end of the slide seat 30' to interconnect left end portions of the sliding rods. The slide seat 30' is slid leftwardly to the second mounting seat 20' after removal of the padlock 50 (see Figure 7) so as to prevent the cover member 40 and the slide seat 30' from interfering with movement of the second door panel 200 relative to the first door panel 100.

[0018] It has thus been shown that, with the use of the slide seat 30, 30', which is slidable horizontally, and the cover member 40, which is turnable upwardly and downwardly, the cover member 40 can be prevented from interfering with movement of one of the door panels 100, 200 relative to the other. Moreover, since the slots 441 are sized to permit extension of the shackle 52 while preventing a cutting tool from extending thereinto for cutting the shackle 52, the shackle 52 of the padlock 50 can be safely protected by the cover member 40.

[0019] Referring to Figures 14 and 15, a third preferred embodiment of the present invention is shown to be adapted to be applied to a door assembly with a door panel 100' turnable relative to a fixed door frame 300. In this case, both the first and second mounting seats 10, 20' are mounted on the door panel 100'. The slide seat 30a similarly has a top wall 310a, a connecting rod 319a extending downwardly from the top wall 310a, and three horizontally extending sliding rods 315a, 316a, 317a disposed below the top wall 310a and connected to the connecting rod 319a. Each of the sliding rods 315a, 316a, 317a has a connecting end portion connected to the connecting rod 319a, a distal latch end 315b, 316b, 317b opposite to the connecting end portion, and an intermediate portion. The intermediate portion of a middle one of the sliding rods 316a is similarly provided with a stop member 32 to limit sliding movement of the slide seat 30a between the engaging and disengaging positions. A latch seat 60 is adapted to be mounted fixedly on the door frame 300, and is formed with three rectangular latch holes 61 aligned respectively with the second slide channels 24. In the present embodiment, the outer side wall 204' of the second mounting seat 20' is open, and the sliding rods 315a, 316a, 317a of the slide seat 30a extend longer through the outer side wall 204' of the second mounting seats 20', and project relative to the outer side wall 204' when the slide seat 30a is moved to the engaging position. At this time, the latch ends 315b, 316b, 317b of the sliding rods 315a, 316a, 317a are extendible respectively into the latch holes 61 for locking the door panel 100' to the door frame 300.

[0020] Referring to Figures 16 to 18, a fourth preferred embodiment of the lock assembly according to the present invention is shown to include a first mounting seat 10, a second mounting seat 20, a slide seat 30, a cover member 40b, and a padlock 50b with a U-shaped shackle 52b. Each of the first and second mounting seats 10, 20 and the slide seat 30 has a structure similar to that in the first preferred embodiment shown in Figure 1. The cover member 40b is mounted pivotally on the

slide seat 30 so as to be turnable downwardly to a closed position, and to be turnable upwardly to an open position. The cover member 40b has an L-shaped configuration, and includes a first cover portion 41b formed with a central opening 411b, and a second cover portion 42b extending transversely from the first cover portion 41b and formed with a notch 421b communicated with the central opening 411b. When the cover member 40b is turned downwardly to the closed position while the slide seat 30 is slid to the engaging position, the first cover portion 41b is moved to the front side walls 11, 21 of the first and second mounting seats 10, 20, covers the front side walls 11, 21, and enables the first and second lobes 12, 22 to extend through the central opening 411b such that the first and second shackle holes 121, 221 are exposed from the first cover portion 41b. In this manner, the first and second lobes 12, 22 are bound to each other by the first cover portion 41b. At this time, the shackle 52b of the padlock 50b is extendible through the first and second shackle holes 121, 221, with the padlock 50b initially operated to be in an unlocking state. The padlock 50b has a lock body 51b with a U-shaped casing that includes a pair of lateral guarding portions 53b that guard lateral sides of the shackle 52b. When the padlock 50b is subsequently operated to be in the locking state, the shackle 52b is partially buried in the shackle recesses 122, 222, and is substantially shielded in all directions by the guarding portions 53b of the lock body 51b, the first and second lobes 12, 22, and the first cover portion 41b of the cover member 40b, cooperatively, as shown in Figures 17 and 18. In this state, the first and second lobes 12, 22 are extended into the notch 421b in the second cover portion 42b of the cover member 40b. The first cover portion 41b is clamped between the padlock 50b and the front side walls 11, 21 of the first and second mounting seats 10, 20, and is prevented from upward turning for moving to the open position.

[0021] Referring to Figures 19 to 21, the fifth preferred embodiment of the lock assembly of the present invention is generally similar to the previous embodiment in construction, and includes first and second mounting seats 10c, 20c, a slide seat 30, a cover member 40c, and a padlock 50c. The padlock 50c includes a U-shaped lock body 51c and a shackle 52c formed as an elongated bar. The first and second lobes 12c, 22c on the first and second mounting seats 10c, 20c are not formed with shackle recesses. The cover member 40c similarly has an L-shaped configuration, and includes a first cover portion 41c for covering front side walls 11c, 21c of the first and second mounting seats 10c, 20c, and a second cover portion 42c transverse to the first cover portion 41c. The first and second lobes 12c, 22c are extended through a central opening 411c in the first cover portion 41c, and the shackle 52c of the padlock 50c is extendible through shackle holes 121c, 221c in the first and second lobes 12c, 22c when the cover member 40c is moved to the closed position while the slide seat 30c is slid to the engaging position for locking together the

first and second mounting seats 10c, 20c and the cover member 40c. Likewise, in this state, the first cover portion 41c is clamped between the padlock 50c and the front side walls 11c, 21c of the first and second mounting seats 10c, 20c to prevent upward turning of the cover member 40c to the open position. In the present embodiment, the second cover portion 42c is formed with a pair of protecting rims 421c which extend downwardly when the cover member 40c is moved to the closed position in order to cover and protect an upper end portion of the lock body 51c of the padlock 50c.

[0022] Referring to Figures 22 to 24, the sixth preferred embodiment of the lock assembly according to the present invention is shown to include a first mounting seat 10d, a second mounting seat 20d, a slide seat 30d, and a lock device 40d. Each of the first and second mounting seats 10d, 20d is adapted to be mounted on a respective one of two objects, such as two door panels, that are to be locked together. Each of the first and second mounting seats 10d, 20d has a rear side wall 105d, 205d adapted to face the corresponding door panel, a front side wall 11d, 21d opposite to the rear side wall 105d, 205d, an inner side wall 106d, 206d interconnecting inner edges of the front and rear side walls 11d, 21d, 105d, 205d, and an outer side wall 104d, 204d interconnecting outer edges of the front and rear side walls 11d, 21d, 105d, 205d. The mounting seats 10d, 20d are disposed on the door panels such that the inner side walls 106d, 206d are disposed proximate to and confront each other. The front side wall 11d of the first mounting seat 10d is formed with an L-shaped first shackle bar 12d which has a first section 122d connected to the front side wall 11d and perpendicular to the front side wall 11d, and a distal second section 121d extending transversely from the first section 122d. The first shackle bar 12d cooperates with the front side wall 11d to define a first latch groove 113d therebetween. The first mounting seat 10d is further formed with three first slide channels 14d which extend horizontally from the inner side wall 106d toward the outer side wall 104d and which are displaced from one another in a vertical direction. The front side wall 21d of the second mounting seat 20d is formed with an L-shaped second shackle bar 22d which has a first section 222d connected to the front side wall 21d and perpendicular to the front side wall 21d, and a distal second section 221d extending transversely from the first section 222d toward the first shackle bar 12d. The second shackle bar 22d cooperates with the front side wall 21d to define a second latch groove 213d therebetween. The second mounting seat 20d is further formed with three second slide channels 24d which extend horizontally from the inner side wall 206d toward the outer side wall 204d and which are displaced from one another in a vertical direction. The second slide channels 24d are aligned respectively with the first slide channels 14d. Each of the first and second slide channels 14d, 24d extends through the inner side wall 106d, 206d of the corresponding one of the first and second

mounting seats 10d, 20d. The outer side wall 104d of the first mounting seat 10d is formed with an entrance 13d communicated with the first slide channels 14. The outer side wall 204d of the second mounting seat 20d defines a closed end of each of the second slide channels 24d. Referring to Figures 22 and 25, the rear side wall 105d, 205d of each of the first and second mounting seats 10d, 20d is formed with a limiting hole 17d, 27d that extends along and that is communicated with a middle one of the slide channels 14d, 24d in a corresponding one of the mounting seats 10d, 20d. The limiting holes 17d, 27d are aligned with each other. Each limiting hole 17d, 27d has a communicating end 171d, 271d formed through the inner side wall 106d, 206d of the corresponding mounting seat 10d, 20d, and an opposite limiting end 172d, 272d that is proximate to the outer side wall 104d, 204d of the corresponding mounting seat 10d, 20d and that is not formed through the outer side wall 104d, 204d.

[0023] The slide seat 30d has a horizontal top wall 310d, a connecting rod 319d extending downwardly from the top wall 310d, and three parallel sliding rods 315d, 316d, 317d which are disposed horizontally below the top wall 310d and which are spaced apart vertically from one another. Each of the sliding rods 315d, 316d, 317d has a connecting end portion connected to the connecting rod 319d, and a distal end portion distal from the connecting rod 319. During assembly, the sliding rods 315d, 316d, 317d are inserted into the first slide channels 14d through the entrance 13d. The distal end portion of a middle one of the sliding rods 316d is formed with an engaging hole unit which consists of a pair of engaging holes 311d. A stop member 32, which is formed as a U-shaped metal body, engages the engaging hole unit by extending two opposite ends 321 thereof into the pair of engaging holes 311d through one of the limiting holes 17d, 27d after the sliding rods 315d, 316d, 317d are inserted into the slide channels 14d. The stop member 32 thus projects from the middle one of the sliding rods 316d, and projects into one of the limiting holes 17d, 27d. The sliding rods 315d, 316d, 317d are slidable along the first and second slide channels 14d, 24d. The stop member 32 is movable with the middle one of the sliding rods 316d between the limiting ends 172d, 272d of the limiting holes 17d, 27d, thereby preventing removal of the slide seat 30d from the first mounting seat 10d, and thereby limiting sliding movement of the slide seat 30d between an engaging position and a disengaging position. In the engaging position, the sliding rods 315d, 316d, 317d extend into the first slide channels 14d and into the second slide channels 24d for engaging both the first and second mounting seats 10d, 20d, and the stop member 32 is disposed adjacent to the limiting end 272d of the limiting hole 27d in the second mounting seat 20, as shown in Figure 25. In the disengaging position, the sliding rods 315d, 316d, 317d extend only into the first slide channels 14d and are removed from the second slide channels 24d for disengaging from the sec-

ond mounting seat 20d, and the stop member 32 is disposed proximate to the limiting end 172d of the limiting hole 17d in the first mounting seat 10d.

[0024] The lock device 40d includes a lock casing 400d mounted pivotally on one end of the top wall 310d of the slide seat 30d so as to be turnable upwardly to an open position and downwardly to a closed position. The lock casing 400d has a convex front side wall 407d formed with a lock core mounting hole 41d which has a key-operable lock core 50d mounted therein. The lock core 50d has one end provided with a latch engaging member 51d which is formed with a rectangular coupling hole 52d. The lock core 50d is operable by its corresponding key to rotate the latch engaging member 51d about an axis of the lock core 50d. A latch member 44d is mounted rotatably inside the lock casing 400d. The latch member 44d has two opposite locking end portions 441d and an intermediate portion 440d which interconnects the locking end portions 441d and which is thinner relative to the locking end portions 441d so as to define a recess 442d between the locking end portions 441d for receiving the latch engaging member 51d of the lock core 50d. The intermediate portion 440d is formed with a rectangular coupling protrusion 443d which extends into and which is coupled with the coupling hole 52d in the latch engaging member 51d such that the latch member 44d is co-rotatable with the latch engaging member 51d for moving between locking and unlocking positions when the lock core 50d is operated by its corresponding key. The lock casing 400d has a mounting beam 43d formed with a mounting hole 431d that is coaxial with the lock core 50d. The intermediate portion 440d of the latch member 44d is further formed with a cylindrical mounting stud 445d on one side opposite to the coupling protrusion 443d. The mounting stud 445d extends rotatably into the mounting hole 431d for mounting the latch member 44d rotatably in the lock casing 400d.

[0025] Referring to Figures 24 and 25, when the latch member 44d is in the locking position while the slide seat 30d is moved to the engaging position, the locking end portions 441d of the latch member 44d extend into the first and second latch grooves 113d, 213d and engage the second sections 121d, 221d of the first and second shackle members 12d, 22d, respectively, to prevent the lock casing 400d from turning upwardly to the open position. The lock device 40d thus engages the first and second shackle members 12d, 22d under this state for locking together the first and second mounting seats 10d, 20d.

[0026] Referring to Figure 27, when the latch member 44d is moved to the unlocking position while the slide seat 30d is in the engaging position, the locking end portions 444d of the latch member 44d are moved respectively and outwardly of the first and second latch grooves 113d, 213d, and are disengaged from the second sections 121d, 221d of the first and second shackle members 12d, 22d to permit upward turning of the lock casing

400d to the open position. When the lock casing 400d is moved to the open position, the slide seat 30d is movable from the engaging position to the disengaging position to permit relative movement of one of the first and second mounting seats 10d, 20d with its corresponding door panel relative to the other one of the first and second mounting seats 10d, 20d.

[0027] Referring to Figures 22, 26 and 27, the lock device 40d is provided with a lock core retaining unit which includes a retaining block 45d and a threaded rod 46d. The lock core 50d has a shell formed with a retaining groove 53d. The retaining block 45d is mounted slidably in the lock casing 400d, and is slidable along a parallel pair of slide grooves 401d formed in the lock casing 400d. The slide grooves 401d are transverse to the axis of the lock core 50d. The retaining block 45d has a first end formed as a retaining protrusion 451d, a second end 454d opposite to the first end, and a convex side wall 453d extending from the second end 454d toward the first end. The threaded rod 46d is mounted threadedly in a threaded hole 402d formed in the lock casing 400d, and has a headed operating end 461d and a distal end 462d opposite to the operating end 461d. During assembly of the lock device 40d, the distal end 462d of the threaded rod 46d slides along the convex side wall 463d and finally abuts against the second end 454d of the retaining block 45d so as to guide sliding movement of the retaining block 45d along the slide grooves 401d to enable the retaining protrusion 451d to extend into and engage the retaining groove 53d of the lock core 50e for retaining the lock core 50d in the lock core mounting hole 41d in the lock casing 400d. The operating end 461d of the threaded rod 46d is accessible when the lock device 40d is unlocked and when the lock casing 400d is turned to the open position. At this time, the operating end 461d of the threaded rod 46d is operable for unthreading from the threaded hole 402d such that the distal end 462d of the threaded rod 46d ceases to abut against the second end 454d of the retaining block 45d to enable disengagement of the lock core 50d from the retaining block 45d, thereby permitting removal of the lock core 50d from the lock casing 400d for replacement purposes.

[0028] Referring to Figures 28 to 30, a seventh preferred embodiment of the lock assembly according to the present invention is shown to include first and second mounting seats 10d, 20d, a slide seat 30d, and a lock device 40e. The first and second mounting seats 10d, 20d and the slide seat 30d have structures similar to those in the previous embodiment. The lock device 40e includes a lock casing 400e mounted pivotally on the slide seat 30d so as to be turnable upwardly to an open position and downwardly to a closed position, as with the previous embodiment. The lock casing 400e has a front side wall 407e which faces forwardly when the lock casing 400e is turned downwardly to the closed position and which is formed with a lock core mounting hole 41e that has a lock core 50e mounted therein, and

a bottom side wall 408e which faces downwardly when the lock casing 400e is moved to the closed position and which is formed with a bottom opening 409e. The lock core 50e has a cylindrical lock core body 51e with an end wall that is formed with an eccentric drive pin 511e which is eccentric to an axis of the lock core body 51e. The lock core 50e further includes a retaining member 52e which is formed with a retaining pin 521e that extends radially with respect to the axis of the lock core body 51e. The retaining member 52e is biased by a spring 53e such that the retaining pin 521e projects radially from a shell 500e of the lock core 50e and engages a retaining hole 411e formed in the lock casing 400e and communicated with the lock core mounting hole 41e so as to retain the lock core 50e in the lock core mounting hole 41e of the lock casing 400e. The retaining member 52e engages the eccentric drive pin 511e of the lock core body 51e and is movable by the drive pin 511e, when the lock core 50e is operated by its corresponding key, for retracting into the shell 500e of the lock core 50e. The lock core 50e has a latch engaging rod 54e extending from the lock shell 500e, and a compression spring 55e which is sleeved on the latch engaging rod 54e and which applies a biasing force that pushes the lock core 50e to extend outwardly of the lock casing 400e through the lock core mounting hole 41e. The lock device 40e further includes a latch member 44e received in the lock casing 400e. The latch member 44e is formed with a central engaging hole 441e for engaging a distal end of the latch engaging rod 54e. The latch member 44e is connected fixedly to an operating rod 442e which extends through the bottom opening 409e in the lock casing 400e and which has a distal end disposed externally of the lock casing 400e. The operating rod 442e is disposed immediately below the latch member 44e, and extends downwardly from the latch member 44e when the lock casing 400e is moved to the closed position.

[0029] Referring to Figures 30 and 31, when the lock device 40e is in a locking state, the retaining pin 521e projects radially out of the lock shell 500e and engages the retaining hole 411e in the lock casing 400e to retain the lock core 50e in the lock core mounting hole 41e in the lock casing 400e. The distal end of the latch engaging rod 54e extends into the engaging hole 441e in the latch member 44e, and engages the latch member 44e. At this time, two opposite locking end portions of the latch member 44e extend respectively into the first and second latch grooves 113d, 213d and engage the first and second shackle members 12d, 22d for locking together the first and second mounting seats 10d, 20d.

[0030] Referring to Figures 32 to 34, when the lock core 50e is subsequently operated using its corresponding key, the lock core body 51e is rotated to enable the drive pin 511e to move the retaining member 52e so as to retract the retaining pin 521e into the lock shell 500e. At this time, the lock core 50e is pushed to extend outwardly of the lock casing 400e through the lock core

mounting hole 41e due to the biasing action of the compression spring 55e. This results in corresponding movement of the latch engaging rod 54e such that the distal end of the latch engaging rod 54e is removed from the engaging hole 441e and is disengaged from the latch member 44e. At this time, the latch member 44e falls downwardly within the lock casing 400e by virtue of gravity, and is disengaged from the first and second shackle members 12d, 22d of the first and second mounting seats 10d, 20d, as best illustrated in Figure 33. The lock device 40e is thus converted to an unlocking state, where the first and second shackle members 12d, 22d are disengaged from the lock device 40e, and the lock casing 400e is turnable upwardly to the open position. To lock the lock device 40e once again, the distal end of the operating rod 442e is pushed upwardly to move the latch member 44e toward the latch engaging rod 54e so as to once again extend the latch member 44e into the first and second latch grooves 113d, 213d after the slide seat 30 is moved to the engaging position and the lock casing 400e is turned downwardly to the closed position. Then, the lock core 50e is operated for retraction into the lock casing 400e so as to enable the distal end of the latch engaging rod 54e to engage the engaging hole 441e in the latch member 44e.

[0031] It has thus been shown that, when the lock device 40e is in the locking state, the shackle members 12d, 22d are entirely shielded and protected by the lock casing 400. An enhanced anti-theft effect is thus obtained.

Claims

1. A lock assembly characterized by:

a first mounting seat (10) adapted to be mounted on a first object (100), said first mounting seat (10) having a rear side wall (105) adapted to face the first object (100), and a front side wall (11) provided with a first lobe (12) that is formed with a first shackle hole (121) there-through, said first mounting seat (10) being further formed with a first slide channel (14);

a second mounting seat (20) adapted to be mounted on a second object (200), said second mounting seat (20) having a rear side wall (205) adapted to face the second object (200), and a front side wall (21) provided with a second lobe (22) which is formed with a second shackle hole (221) that is axially aligned with said first shackle hole (121), said second mounting seat (20) being formed with a second slide channel (24) which is aligned and communicated with said first slide channel (14);

an padlock (50) including a lock body (51) and a U-shaped shackle (52) mounted on said lock body (51);

a slide seat (30) having a sliding rod (316) which is slidable along said first and second slide channels (14, 24) between an engaging position, in which said sliding rod (316) extends into said first and second slide channels (14, 24) for engaging said first and second mounting seats (10, 20), and a disengaging position, in which said sliding rod (316) is disposed in said first slide channel (14) and is removed from said second slide channel (24) for disengaging from said second mounting seat (20) so as to permit movement of one of said first and second mounting seats (10, 20) with the corresponding object (100, 200) relative to the other one of said first and second mounting seats (10, 20); and
 a cover member (40) mounted pivotally on said slide seat (30), said cover member (40) confining an accommodating space (432) and being formed with a third lobe (45) that is disposed in said accommodating space (432), said third lobe (45) being formed with a third shackle hole (451) therethrough, said cover member (40) being pivotable relative to said slide seat (30) for moving between a closed position and an open position, said first and second lobes (12, 22) extending into said accommodating space (432) so as to be covered by said cover member (40) and so as to dispose said third lobe (45) between said first and second lobes (12, 22) and to enable said third shackle hole (451) to align axially with said first and second shackle holes (121, 221) in order to permit extension of said shackle (52) of said padlock (50) through said first, second, and third shackle holes (121, 221, 451) such that said shackle (52) is shielded by said cover member (40) when said cover member (40) is moved to said closed position while said slide seat (30) is disposed in said engaging position, said third lobe (45) being turned away from said first and second lobes (12, 22) to permit sliding movement of said slide seat (30) between said engaging and disengaging positions when said cover member (40) is moved to the open position after removal of said shackle (52) from said first, second and third lobes (12, 22, 45).

2. The lock assembly as claimed in Claim 1, **characterized in that** each of said first and second slide channels (14, 24) extends in a horizontal direction.
3. The lock assembly as claimed in Claim 2, further **characterized in that** said rear side wall (105, 205) of each of said first and second mounting seats (10, 20) is formed with an elongated limiting hole (17, 27) therethrough, said limiting hole (17, 27) extending along and being communicated with said slide

channel (14, 24) in a corresponding one of said first and second mounting seats (10, 20), said limiting hole (17) in said first mounting seat (10) being aligned with said limiting hole (27) in said second mounting seat (20), each of said first and second mounting seats (10, 20) having an inner side wall (106, 206) proximate to the other one of said first and second mounting seats (10, 20), and an outer side wall (104, 204) opposite to said inner side wall (106, 206), said limiting hole (17, 27) in each of said first and second mounting seats (10, 20) having a communicating end (171, 271) formed through said inner side wall (106, 206) in the corresponding one of said first and second mounting seats (10, 20), and a limiting end (172, 272) opposite to said communicating end (171, 271), said limiting end (172, 272) being disposed proximate to said outer side wall (104, 204) of the corresponding one of said first and second mounting seats (10, 20), said sliding rod (316) being provided with a stop member (32) which projects into said limiting hole (17, 27) in one of said first and second mounting seats (10, 20) and which is movable along said limiting holes (17, 27) in said first and second mounting seats (10, 20) between said limiting ends (172, 272) of said limiting holes (17, 27) for limiting movement of said slide seat (30) between said engaging and disengaging positions.

4. The lock assembly as claimed in Claim 3, further **characterized in that** said slide seat (30) has a top wall (310) formed with a first pivot portion (33) for connecting pivotally with said cover member (40), and a connecting rod (319) extending downwardly from said top wall (310), said sliding rod (316) being disposed below said top wall (310) and having a connecting end connected to said connecting rod (319), and a distal end which is distal from said connecting rod (319) and which is formed with an engaging hole unit for engaging said stop member (32).
5. The lock assembly as claimed in Claim 4, further **characterized in that** said stop member (32) is formed as a U-shaped body with two opposite ends (321), said engaging hole unit including a pair of engaging holes (311) for engaging said opposite ends (321) of said stop member (32).
6. The lock assembly as claimed in Claim 4, further **characterized in that** said cover member (40) has an upper end formed with a second pivot portion (41) which is mounted pivotally on said first pivot portion (33) for pivoting about a horizontal axis, said cover member (40) being turnable upwardly relative to said slide seat (30) for moving to said open position, and being turnable downwardly relative to said slide seat (30) for moving to said closed position,

said accommodating space (432) opening in downward and rearward directions when said cover member (40) is moved to said closed position.

7. The lock assembly as claimed in Claim 6, further **characterized in that** said first pivot portion (33) of said slide seat (30) has a pair of inclined end walls (34) facing said second pivot portion (41) of said cover member (40), and a pair of first pivot tubes (331) disposed between and projecting from said inclined end walls (34), each of said inclined end walls (34) inclining downwardly and forwardly and having a concave surface, said second pivot portion (41) having a pair of second pivot tubes (411) that flank said first pivot tubes (331) and that are disposed respectively adjacent to said concave surfaces of said inclined end walls (34), said first and second pivot tubes (331, 411) being formed with aligned pivot holes, said lock assembly being further **characterized by** a pivot axle (42) extending through said pivot holes in said first and second pivot tubes (331, 411) for connecting pivotally said first and second pivot portions (33, 41). 5
8. The lock assembly as claimed in Claim 3, further **characterized in that** said slide seat (30a) has a top wall (310a) formed with a first pivot portion for connecting pivotally with said cover member (40), and a connecting rod (319a) extending downwardly from said top wall (310a), said sliding rod (316a) being disposed below said top wall (310a) and having a connecting end connected to said connecting rod (319a), a distal latch end (316b) opposite to said connecting rod (319a), and an intermediate portion between said connecting end and said latch end (316b) and formed with an engaging hole unit for engaging said stop member (32), said lock assembly being further **characterized by** a latch seat (60) adapted to be mounted on a third object (300) and formed with a latch hole (61) aligned and communicated with said second slide channel (24), said latch end (316b) of said sliding rod (316a) extending through and projecting relative to said outer side wall (204') of said second mounting seat (20') and being extendible into said latch hole (61) for engaging said latch seat (60) when said slide seat (30a) is moved to the engaging position. 10 15 20 25 30 35 40 45
9. The lock assembly as claimed in Claim 1, **characterized in that** said cover member (40) includes a front cover plate (43) with an inner surface facing said accommodating space (432) and two opposite edges, and a pair of side cover plates (44) extending rearwardly from said opposite edges of said front cover plate (43) and cooperating with said front cover plate (43) to confine said accommodating space (432), said third lobe (45) extending rearwardly from said inner surface of said front cover 50 55

plate (43), each of said side cover plates (44) being formed with a slot (441) that has a size corresponding to size of said shackle (52) of said padlock (50) and that permits extension of said shackle (52) therethrough.

10. The lock assembly as claimed in Claim 1, **characterized in that** each of said first and second lobes (12, 22) has an outer side surface opposite to the other one of said first and second lobes (12, 22), and a lower edge, said outer side surface being formed with an indented shackle recess (122, 222) that extends downwardly from said shackle hole (121, 221) in the corresponding one of said first and second lobes (12, 22) to said lower edge of the corresponding one of said first and second lobes (12, 22), said shackle (52) being partially received in said shackle recesses (122, 222) of said first and second lobes (12, 22) when said shackle (52) is extended through said first, second, and third lobes (12, 22, 45) while said padlock (50) is locked.
11. The lock assembly as claimed in Claim 1, **characterized in that** each of said first and second lobes (12, 22) has an outer side surface opposite to the other one of said first and second lobes (12, 22), and an inner side surface confronting the other one of said first and second lobes (12, 22), said front side wall (11) of one of said first and second mounting seats (10, 20) being formed with a positioning groove (112) adjacent to said inner side surface of a corresponding one of said first and second lobes (12, 22), said third lobe (45) extending into said positioning groove (112) when said slide seat (30) is disposed in the engaging position while said cover member (40) is moved to the closed position.
12. A lock assembly **characterized by**:
 - a first mounting seat (10) adapted to be mounted on a first object, said first mounting seat (10) having a rear side wall (105) adapted to face the first object, and a front side wall (11) provided with a first lobe (12) that is formed with a first shackle hole (121) therethrough, said first mounting seat (10) being further formed with a first slide channel (14);
 - a second mounting seat (20) adapted to be mounted on a second object, said second mounting seat (20) having a rear side wall (205) adapted to face the second object, and a front side wall (21) provided with a second lobe (22) which is formed with a second shackle hole (221) that is axially aligned with said first shackle hole (121), said second mounting seat (20) being formed with a second slide channel (24) which is aligned and communicated with said first slide channel (14);

a padlock (50b) including a lock body and a shackle (52b) mounted on said lock body;
 a slide seat (30) having a sliding rod (316) which is slidable along said first and second slide channels (14, 24) between an engaging position, in which said sliding rod (316) extends into said first and second slide channels (14, 24) for engaging said first and second mounting seats (10, 20), and a disengaging position, in which said sliding rod (316) is disposed in said first slide channel (14) and is removed from said second slide channel (24) for disengaging from said second mounting seat (20) so as to permit movement of one of said first and second mounting seats (10, 20) with the corresponding object relative to the other one of said first and second mounting seats (10, 20); and
 a cover member (40b) mounted pivotally on said slide seat (30), said cover member (40b) having an L-shaped configuration and including a first cover portion (41b) formed with a central opening (411b), and a second cover portion (42b) extending transversely from said first cover portion (41b), said cover member (40b) being pivotable relative to said slide seat (30) for moving between a closed position and an open position, said first cover portion (41b) being moved to and covering said front side walls (11, 21) of said first and second mounting seats (10, 20) and enabling said first and second lobes (12, 22) to extend through said central opening (411b) such that said first and second shackle holes (121, 221) are exposed from said first cover portion (41b) in order to permit extension of said shackle (52b) of said padlock (50b) through said first and second shackle holes (121, 221) when said cover member (40b) is moved to said closed position while said slide seat (30) is disposed in said engaging position, said first cover portion (41b) being turned away from said first and second lobes (12, 22) to permit sliding movement of said slide seat (30) between said engaging and disengaging positions when said cover member (40b) is moved to the open position after removal of said shackle (52b) from said first and second lobes (12, 22).

13. The lock assembly as claimed in Claim 12, **characterized in that** said shackle (52b) has a U-shaped configuration, each of said first and second lobes (12, 22) having an outer side surface opposite to the other one of said first and second lobes (12, 22) and further having a lower edge, said outer side surface being formed with an indented shackle recess (122, 222) that extends downwardly from the corresponding one of said first and second shackle holes (121, 221) to said lower edge of the corresponding

one of said first and second lobes (12, 22), said shackle (52b) being partially received in said shackle recesses (122, 222) of said first and second lobes (12, 22) when said shackle (52b) is extended through said first and second lobes (12, 22) while said padlock (50b) is locked.

14. The lock assembly as claimed in Claim 12, **characterized in that** said lock body (51c) has a U-shaped configuration, and said shackle (52c) is in the form of an elongated bar.

15. A lock assembly **characterized by:**

a first mounting seat (10d) adapted to be mounted on a first object, said first mounting seat (10d) having a rear side wall (105d) adapted to face the first object, and a front side wall (11d) formed with an L-shaped first shackle member (12d) that has a first section (122d) connected to said front side wall (11d), and a distal second section (121d) extending transversely from said first section (122d), said first shackle member (12d) cooperating with said front side wall (11d) to confine a first latch groove (113d) therebetween, said first mounting seat (10d) being further formed with a first slide channel (14d);

a second mounting seat (20d) adapted to be mounted on a second object, said second mounting seat (20d) having a rear side wall (205d) adapted to face the second object, and a front side wall (21d) formed with an L-shaped second shackle member (22d) which has a first section (222d) connected to said front side wall (21d) of said second mounting seat (20d), and a distal second section (221d) extending transversely from said first section (222d), said second sections (121d, 221d) of said first and second shackle members (12d, 22d) extending toward each other, said second shackle member (22d) cooperating with said front side wall (21d) of said second mounting seat (20d) to confine a second latch groove (213d) therebetween, said second mounting seat (20d) being formed with a second slide channel (24d) which is aligned and communicated with said first slide channel (14d);

a slide seat (30d) having a sliding rod (316d) which is slidable along said first and second slide channels (14d, 24d) between an engaging position, in which said sliding rod (316d) extends into said first and second slide channels (14d, 24d) for engaging said first and second mounting seats (10d, 20d), and a disengaging position, in which said sliding rod (316d) extends into said first slide channel (14d) and is removed from said second slide channel (24d)

for disengaging from said second mounting seat (20d) so as to permit movement of one of said first and second mounting seats (10d, 20d) with the corresponding object relative to the other one of said first and second mounting seats (10d, 20d); and

a lock device (40d) having a lock casing (400d) mounted pivotally on said slide seat (30d) so as to be pivotable between open and closed positions, a key-operable lock core (50d) mounted in said lock casing (400d), and a latch member (44d) mounted in said lock casing (400d) and having two opposite locking end portions (441d) and an intermediate portion (440d) between said locking end portions (441d), said lock core (50d) having a central axis and one end that is provided with a latch engaging member (51d), said intermediate portion (440d) of said latch member (44d) engaging said latch engaging member (51d), said lock core (50d) being operable to operate said latch engaging member (51d) so as to enable said latch member (44d) to move between a locking position, in which said locking end portions (441d) of said latch member (44d) extend respectively into said first and second latch grooves (113d, 213d) and engage said second sections (121d, 221d) of said first and second shackle members (12d, 22d) to prevent said lock casing (400d) from moving pivotally to said open position when said lock casing (400d) is in the closed position while said slide seat (30d) is in the engaging position, and an unlocking position, in which said locking end portions (441d) of said latch member (44d) are moved outwardly and respectively of said first and second latch grooves (113d, 213d) and are disengaged from said first and second shackle members (12d, 22d) to permit pivoting movement of said lock casing (400d) to said open position when said lock casing (400d) is in the closed position while said slide seat (30d) is in the engaging position.

16. The lock assembly as claimed in Claim 15, **characterized in that** said lock casing (400d) includes a mounting beam (43d) formed with a mounting hole (431d), said intermediate portion (440d) of said latch member (44d) being formed with a mounting stud (445d) extending rotatably into said mounting hole (431d) so as to be mounted rotatably in said lock casing (400d).

17. The lock assembly as claimed in Claim 15, **characterized in that** said latch engaging member (51d) of said lock core (50d) is formed with a rectangular coupling hole (52d), said intermediate portion (440d) of said latch member (44d) being formed with a rectangular coupling protrusion (443d) which

engages said coupling hole (52d) so as to be co-rotatable with said latch engaging member (51d) of said lock core (50d), said latch member (44d) being rotatable about an axis of said lock core (50d) for moving between said locking and unlocking positions.

18. The lock assembly as claimed in Claim 15, **characterized in that** said lock core (50d) has a side wall formed with a retaining groove (53d), said lock device (40d) further including a lock core retaining unit which is mounted in said lock casing (400d) and which includes a retaining block (45d) having a first end formed with a retaining protrusion (451d) that extends into said retaining groove (53d) and a second end (454d) opposite to said first end, and a screw rod (46d) mounted threadedly in said lock casing (400d) and having a distal end (462d) abutting against said second end (454d) of said retaining block (45d) so as to ensure engagement between said retaining protrusion (451d) and said retaining groove (53d), said screw rod (46d) being accessible when said lock casing (400d) is moved to said open position and being operable for unthreading from said lock casing (400d) such that said distal end (462d) ceases to abut against said second end (454d) of said retaining block (45d) so as to enable disengagement of said lock core (50d) from said retaining block (45d), thereby permitting removal of said lock core (50d) from said lock casing (400d).

19. The lock assembly as claimed in Claim 15, **characterized in that** said lock casing (400e) has a front side wall (407e) which faces forwardly when said lock casing (400e) is moved to the closed position and which is formed with a lock core mounting hole (41e) that receives said lock core (50e), said lock casing (400e) further having a bottom side wall (408e) which faces downwardly when said lock casing (400e) is moved to the closed position and which is formed with a bottom opening (409e), said lock device (40e) further including a biasing spring (55e) for biasing said lock core (50e) to extend outwardly from said lock core mounting hole (41e), said lock core (50e) being provided with a spring-loaded retaining pin (521e) which projects radially from said lock core (50e) for engaging said lock casing (400e) so as to retain said lock core (50e) in said lock casing (400e) when said lock core (50e) is in a locking state, said retaining pin (521e) being retracted into said lock core (50e) when said lock core (50e) is operated by a corresponding key and is converted to an unlocking state, thereby enabling said lock core (50e) to extend out of said lock core mounting hole (41e) due to biasing action of said biasing spring (55e) to cause said latch engaging member (54e) to be disengaged from said latch member

(44e), said lock device (40e) further including an operating rod (442e) which has one end connected fixedly to said latch member (44e) and which extends through said bottom opening (409e), said operating rod (442e) extending downwardly from said latch member (44e) when said lock casing (400e) is moved to the closed position, said latch member (44e) falling downwardly within said lock casing (400e) by virtue of gravity and being disengaged from said first and second shackle members (12d, 22d) when said latch engaging member (54e) of said lock core (50e) is disengaged from said latch member (44e), thereby permitting turning of said lock casing (400e) between said open and closed positions.

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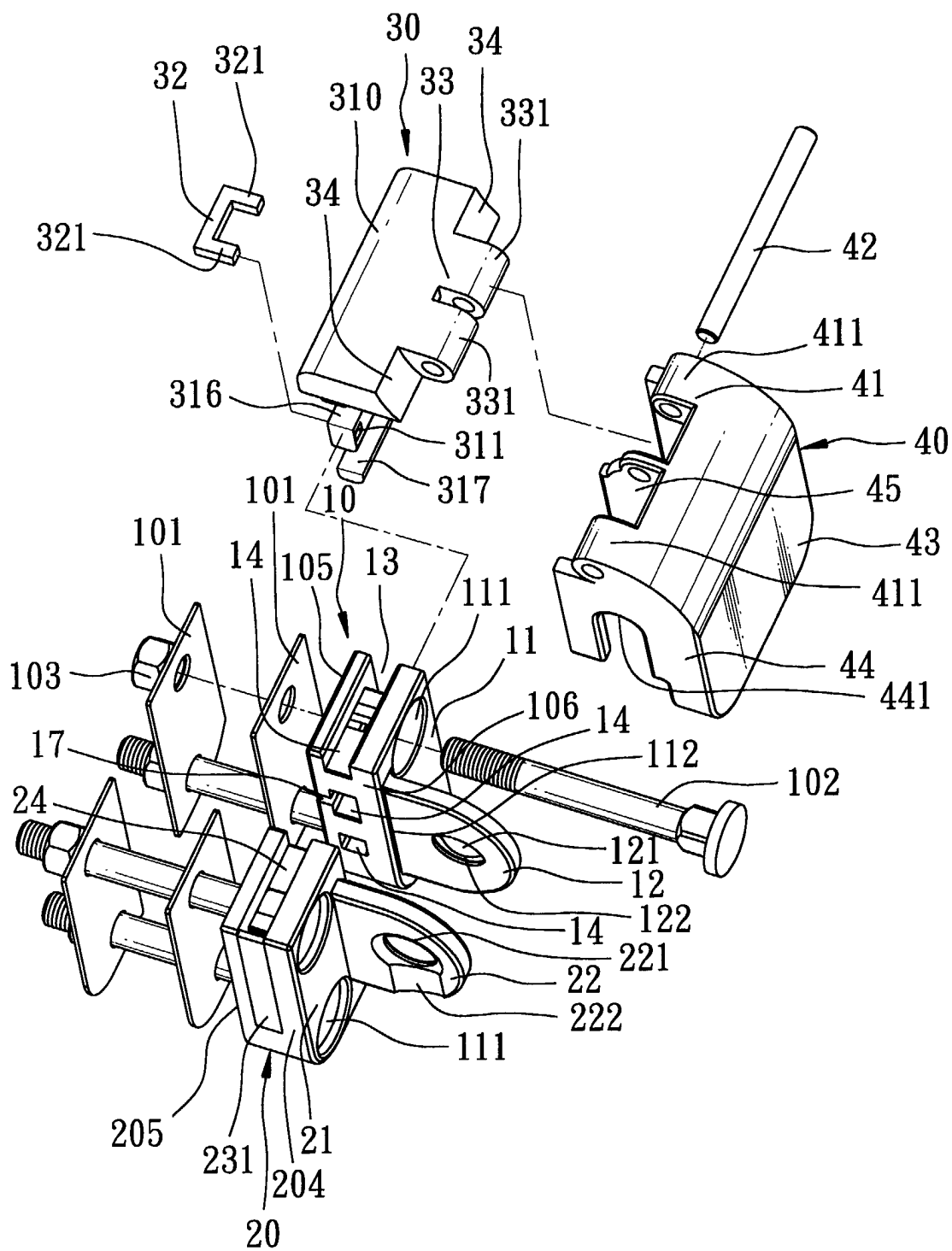
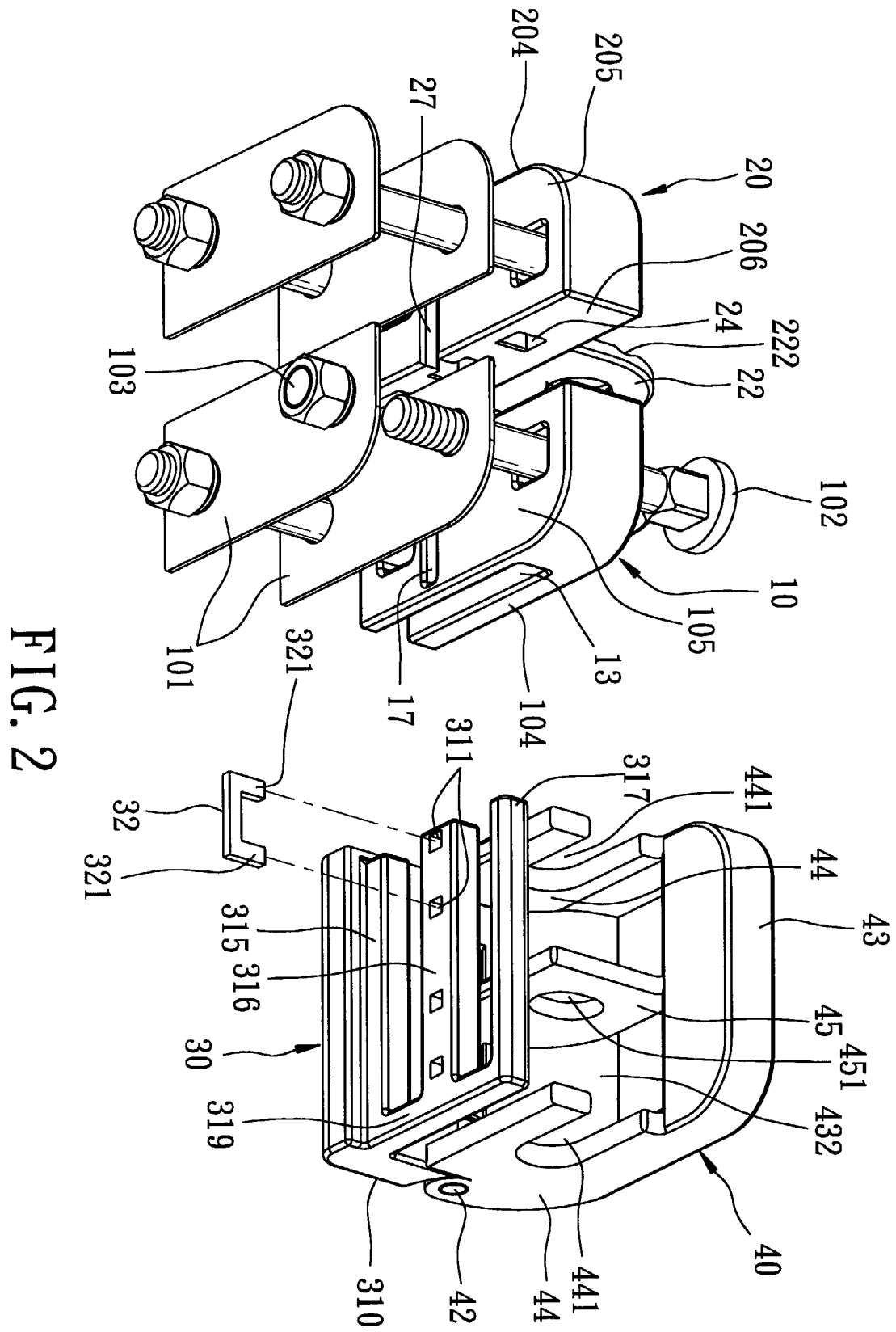


FIG. 1



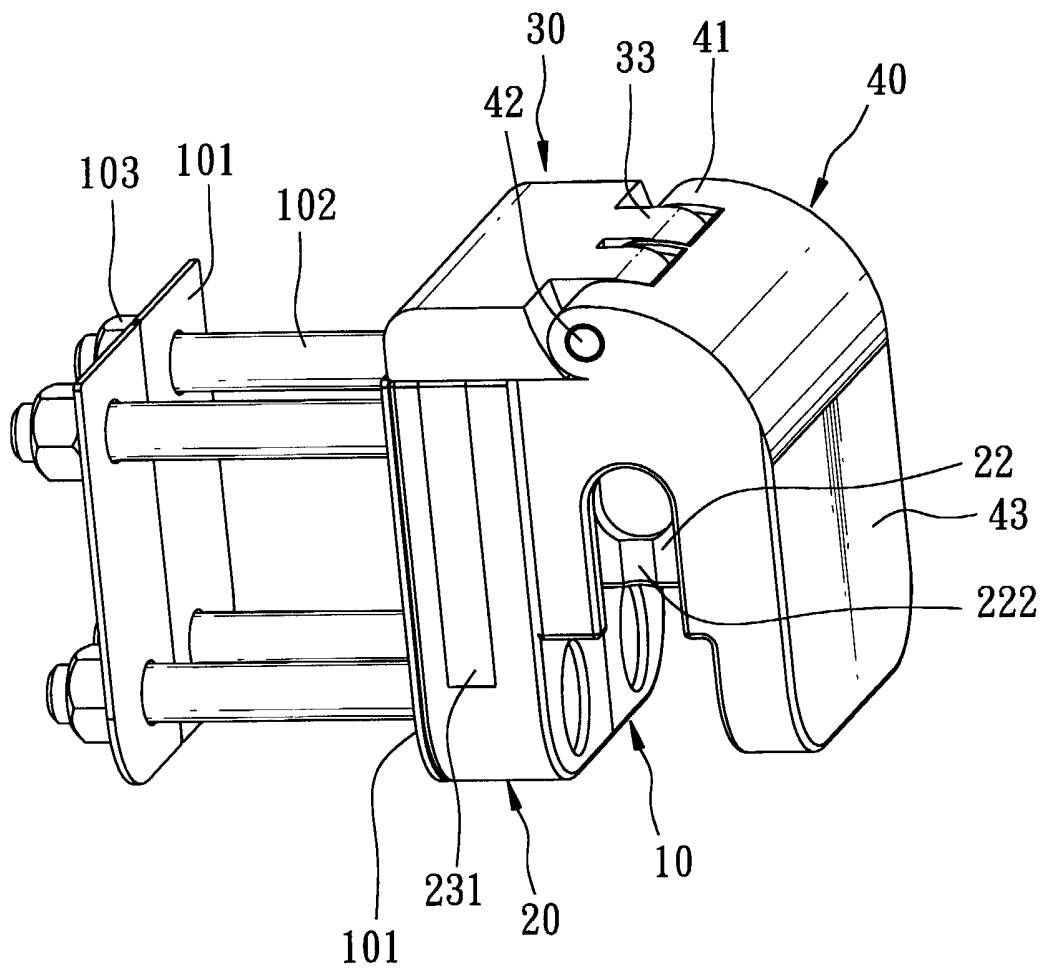


FIG. 3

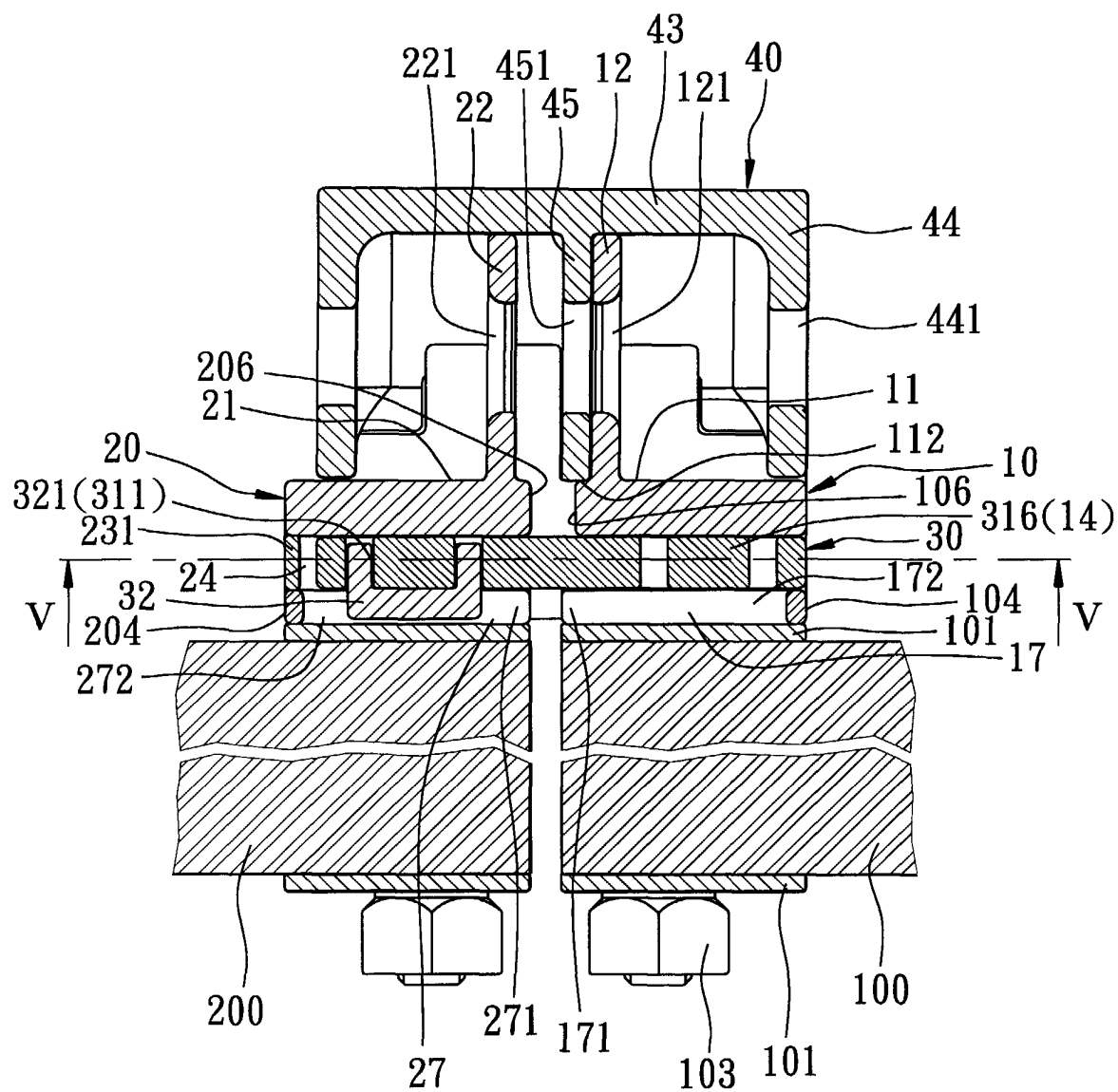


FIG. 4

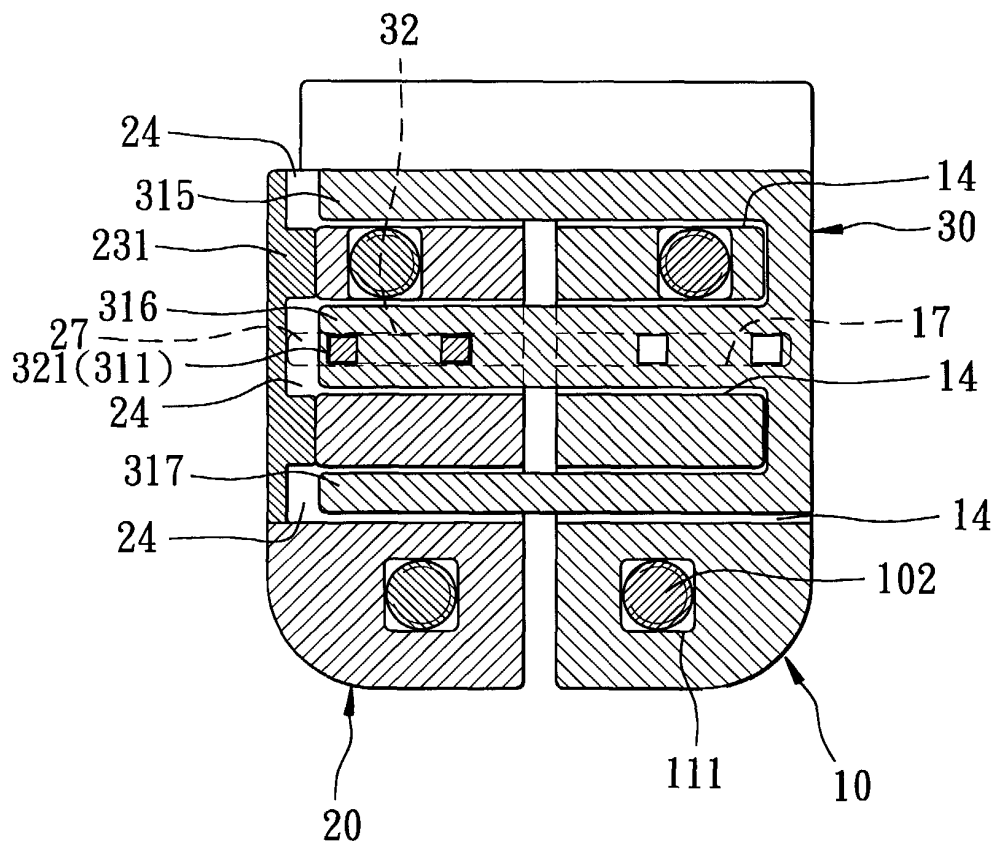


FIG. 5

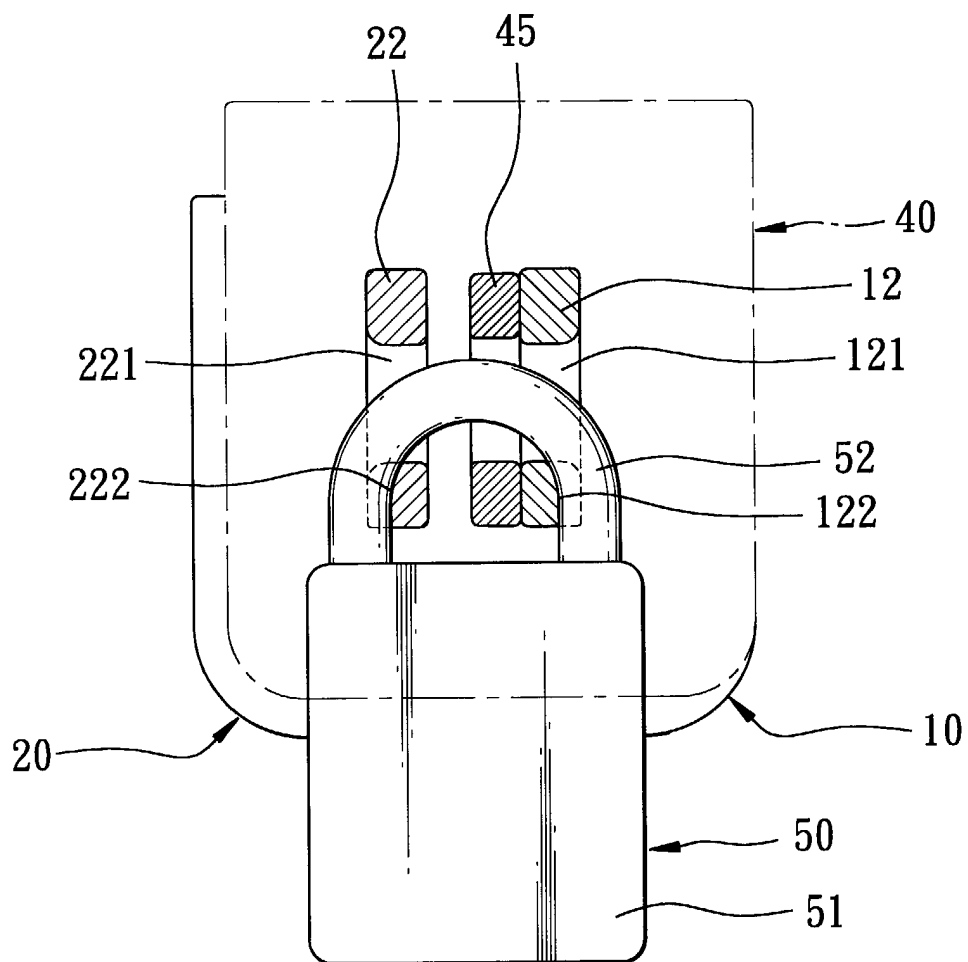


FIG. 6

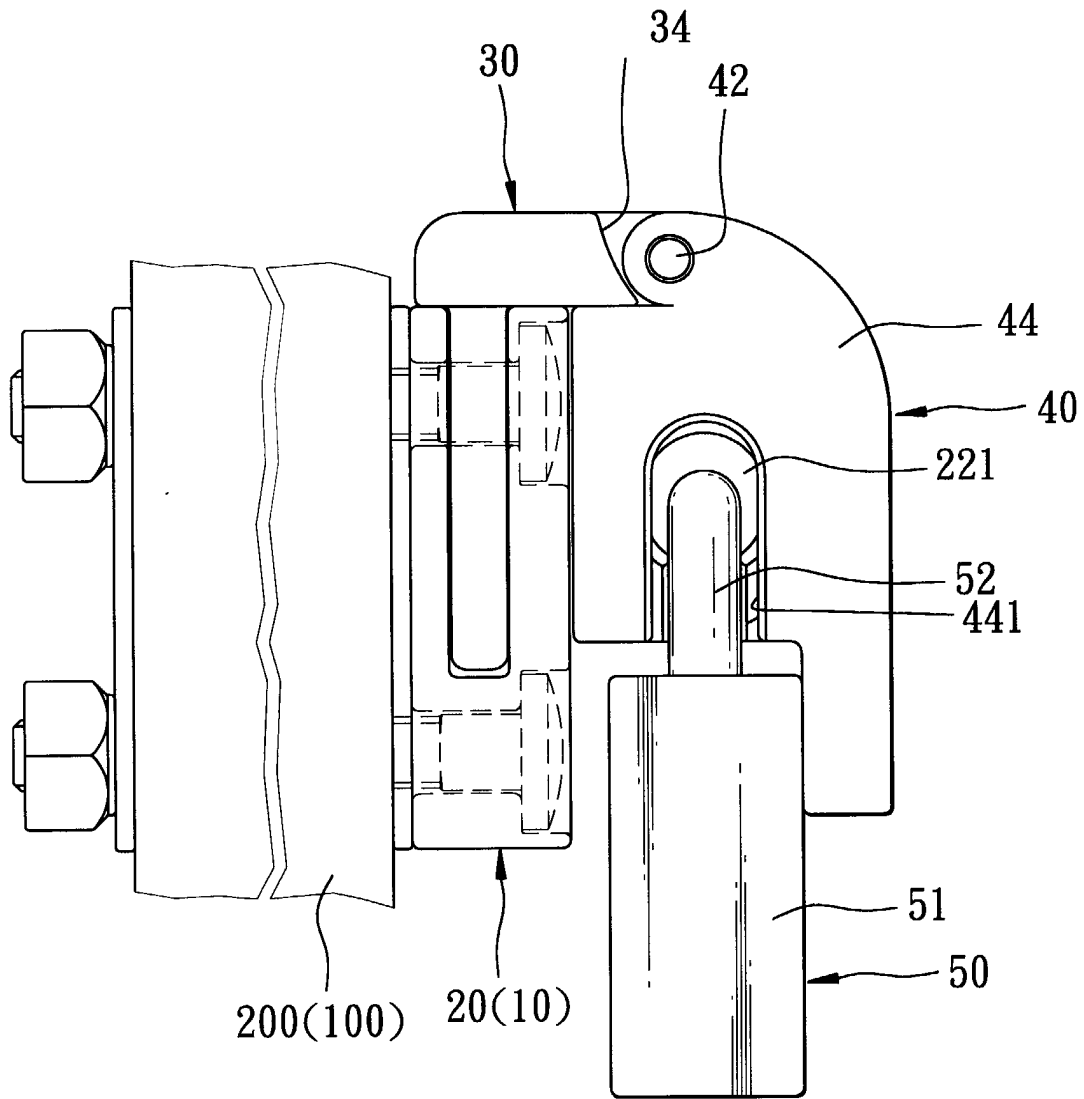
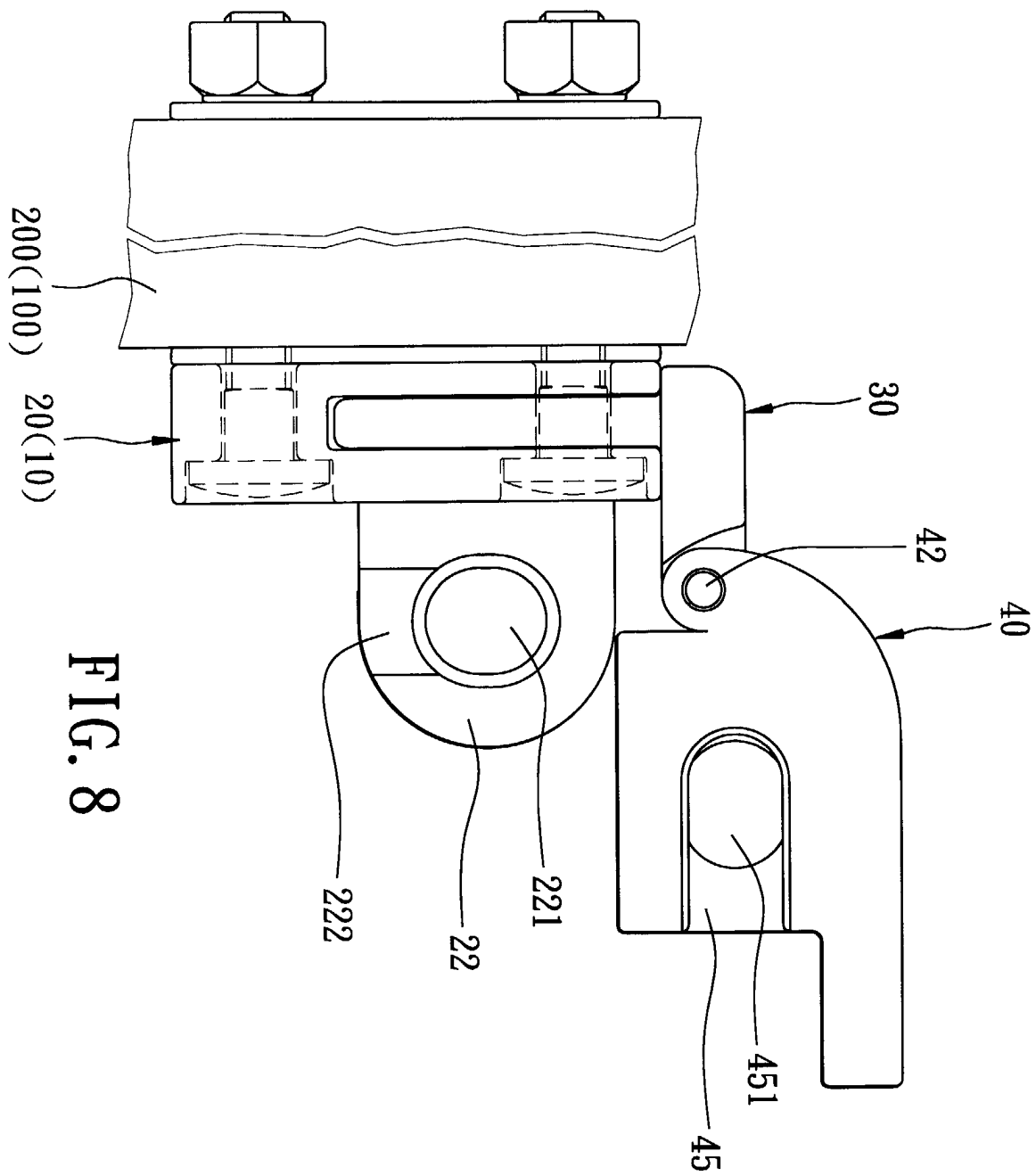


FIG. 7



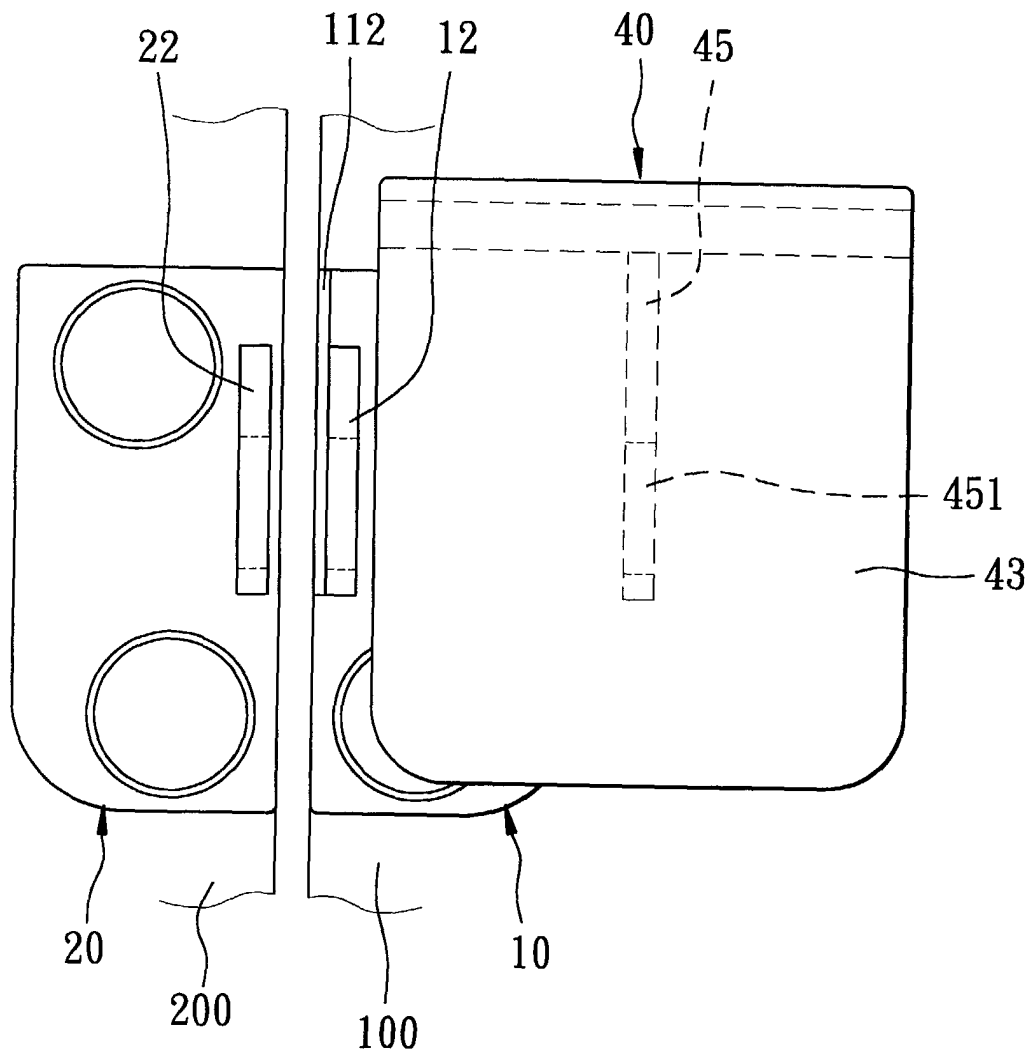


FIG. 9

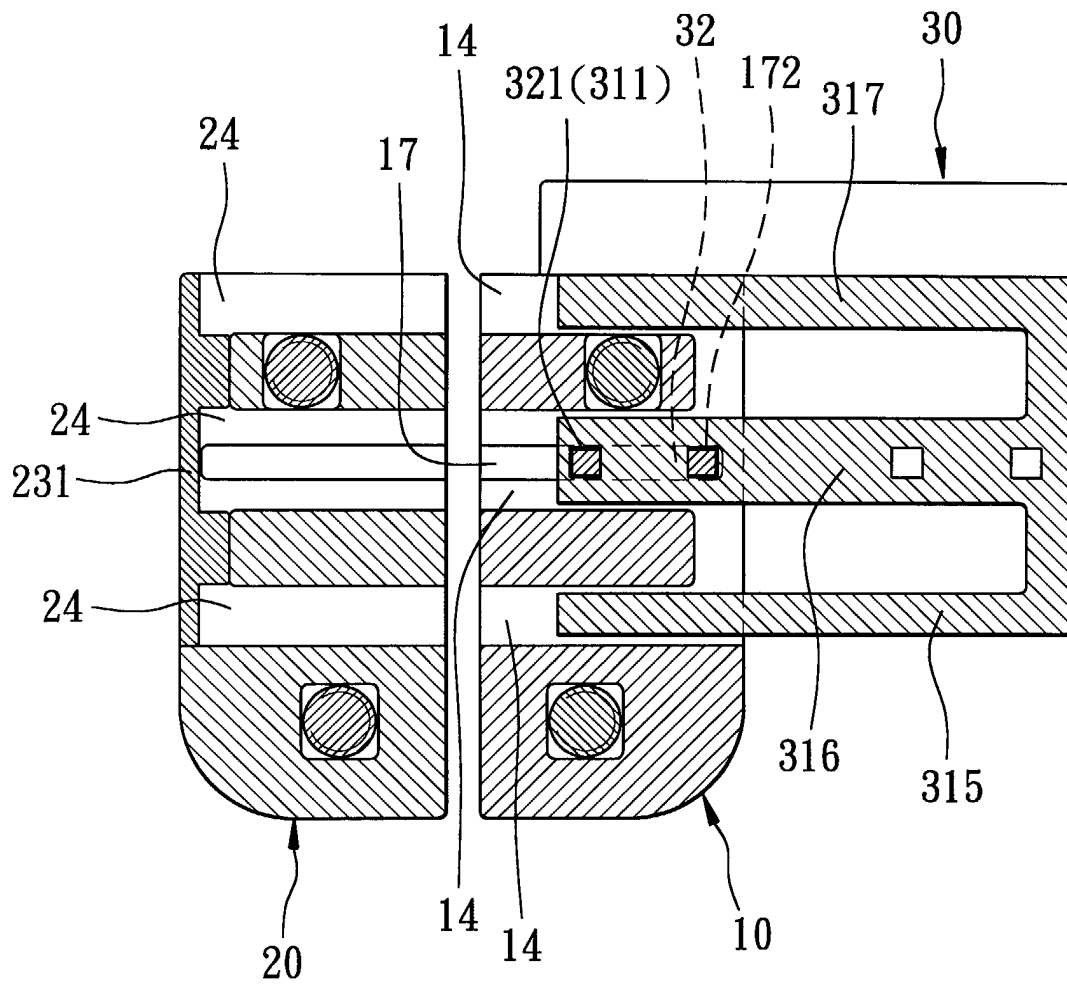


FIG. 10

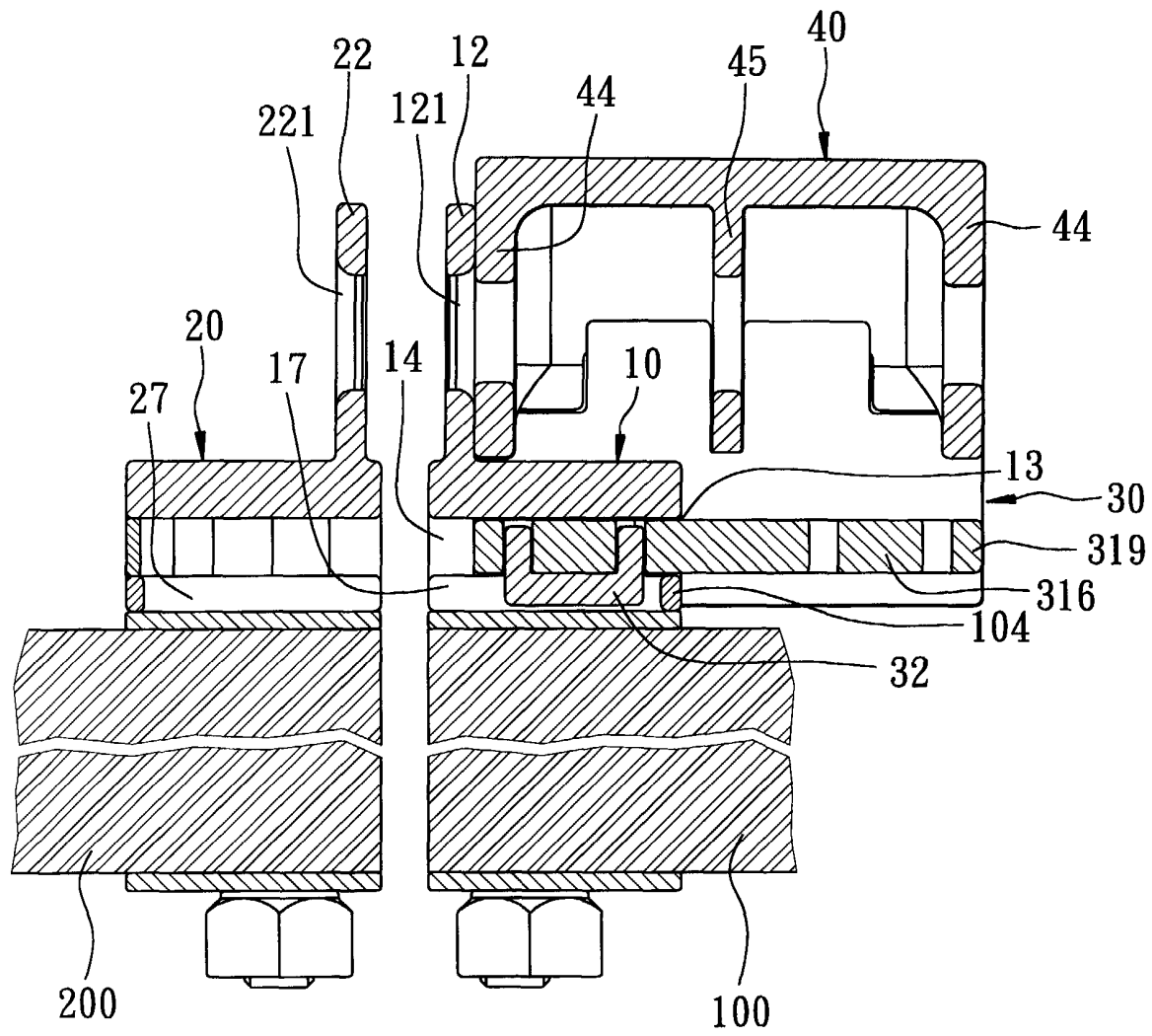


FIG. 11

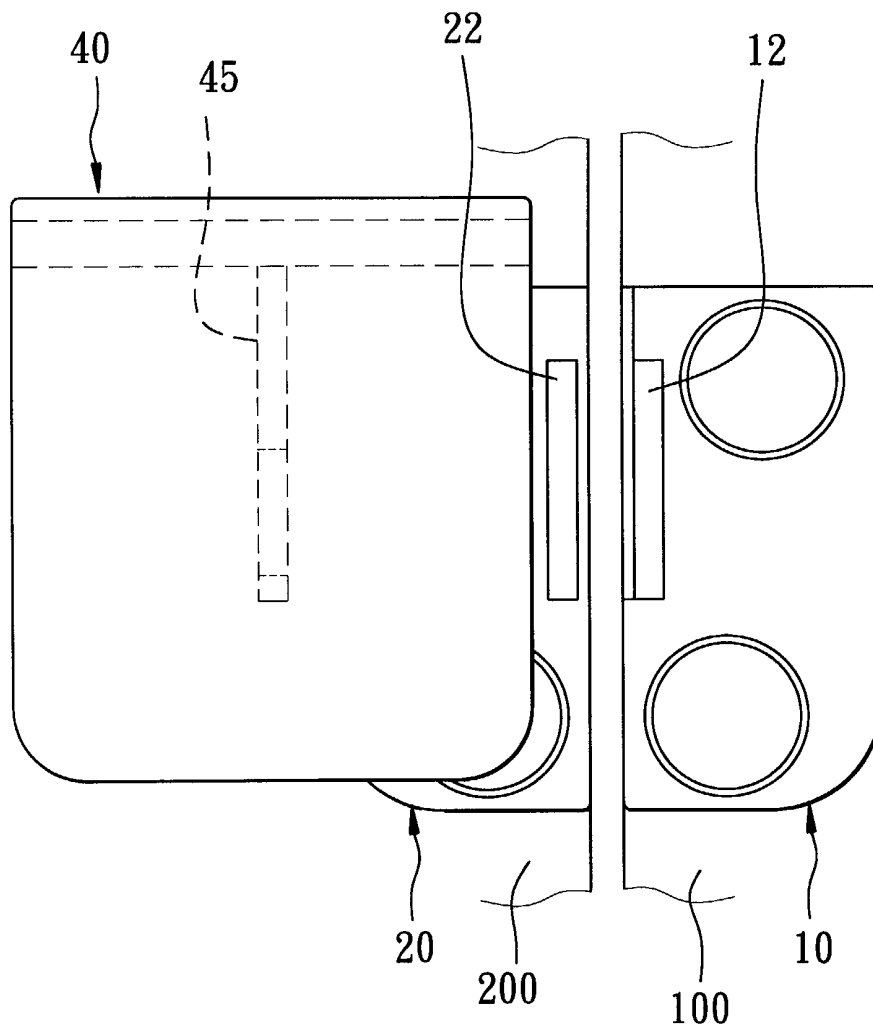


FIG. 12

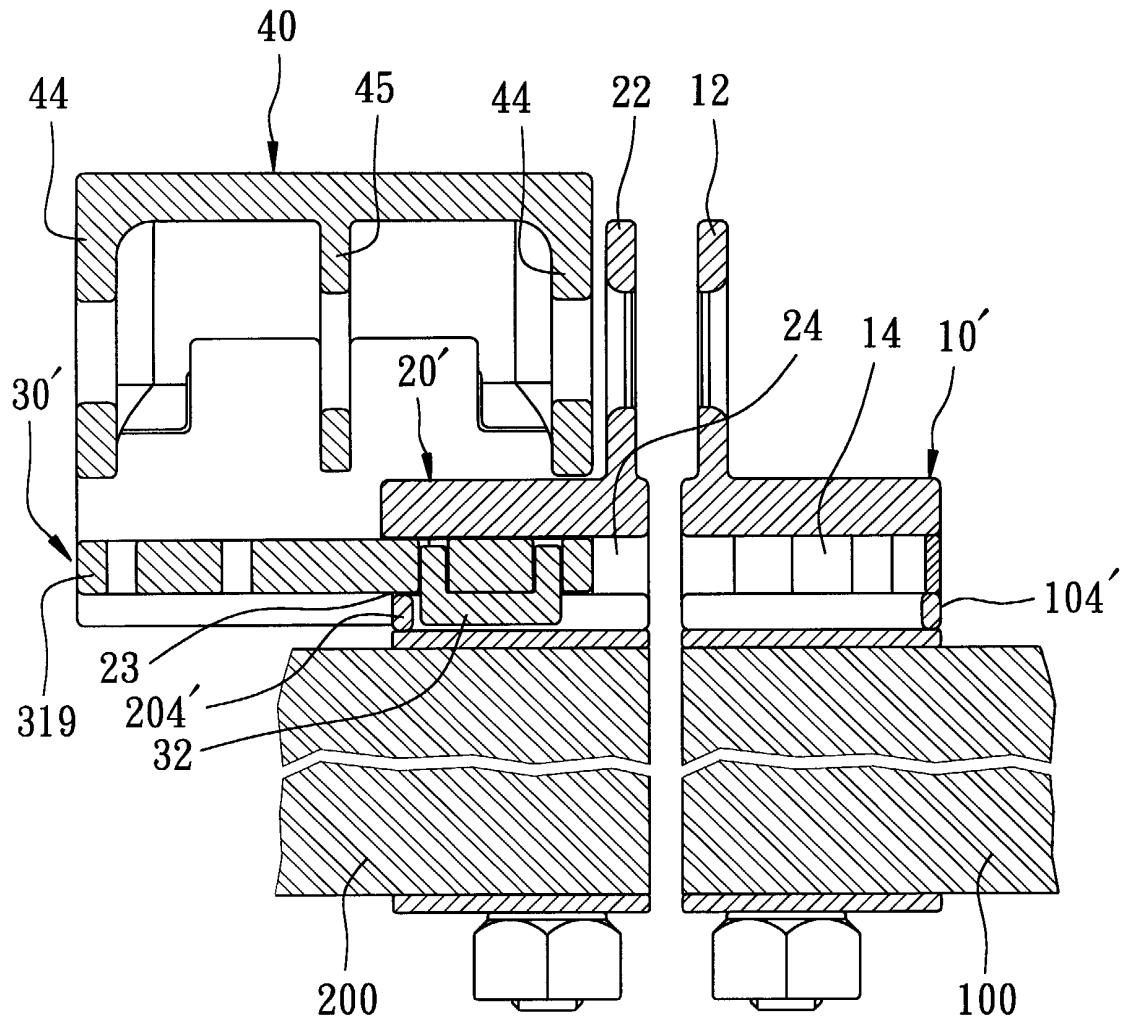


FIG. 13

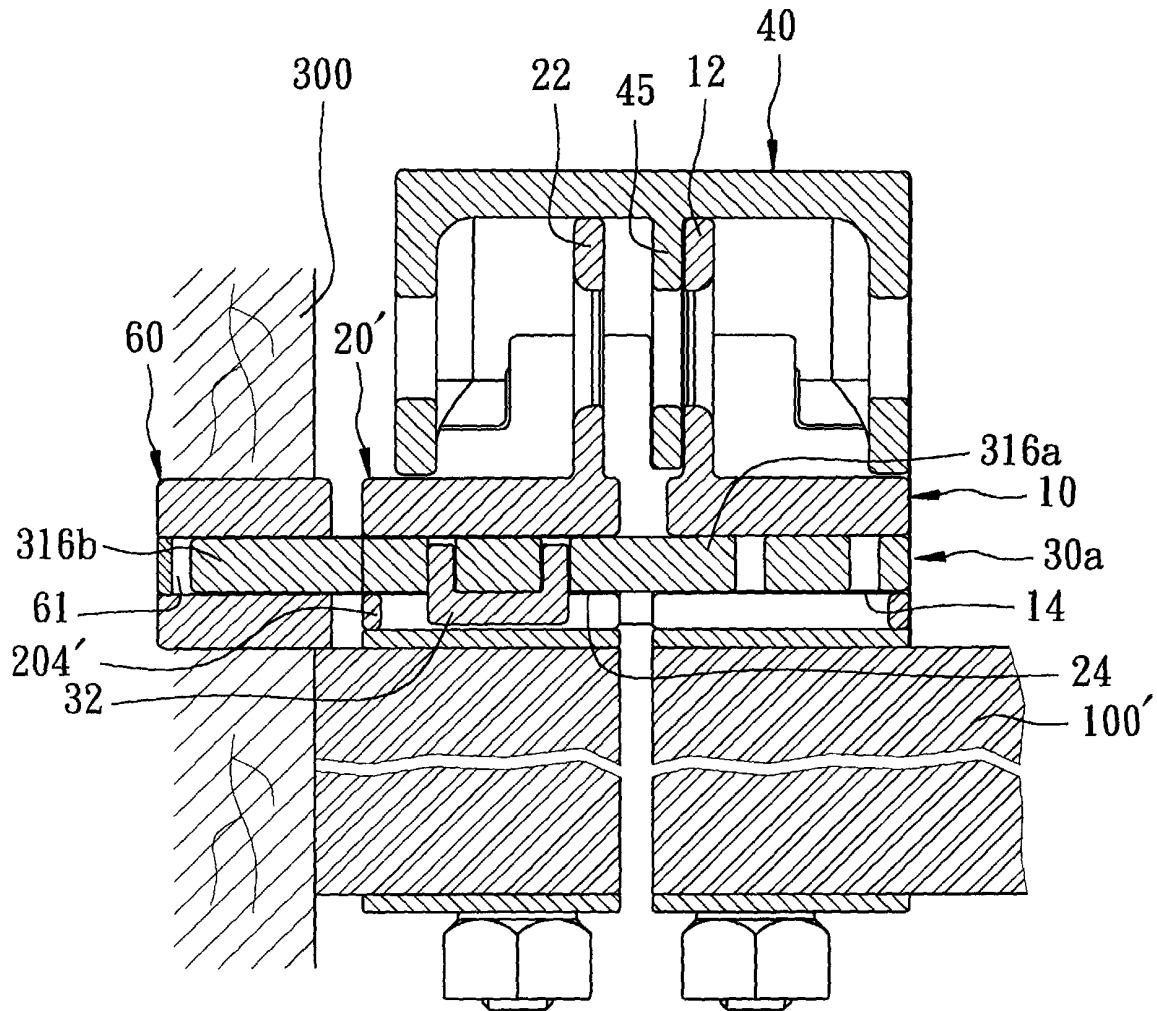


FIG. 14

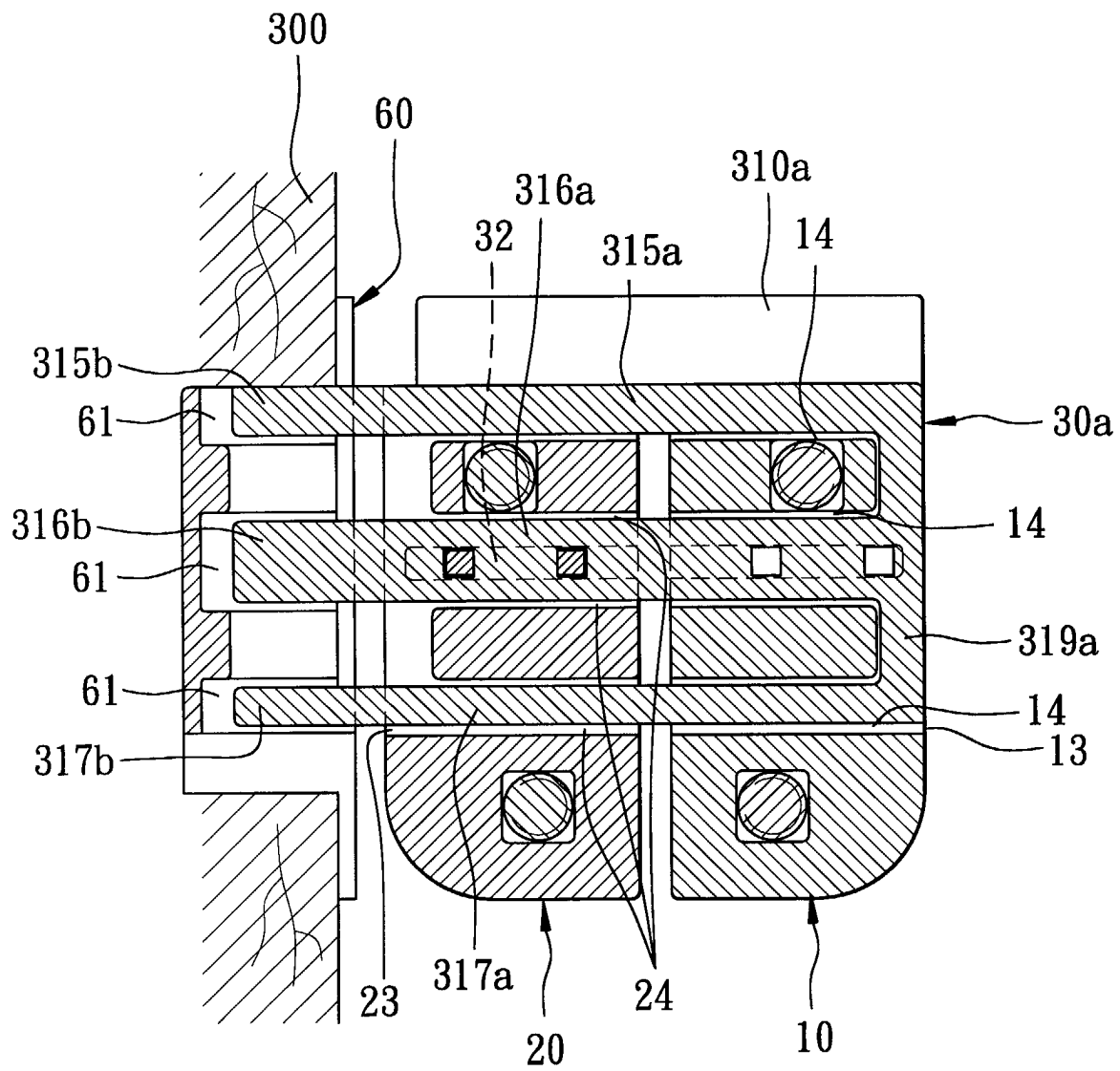


FIG. 15

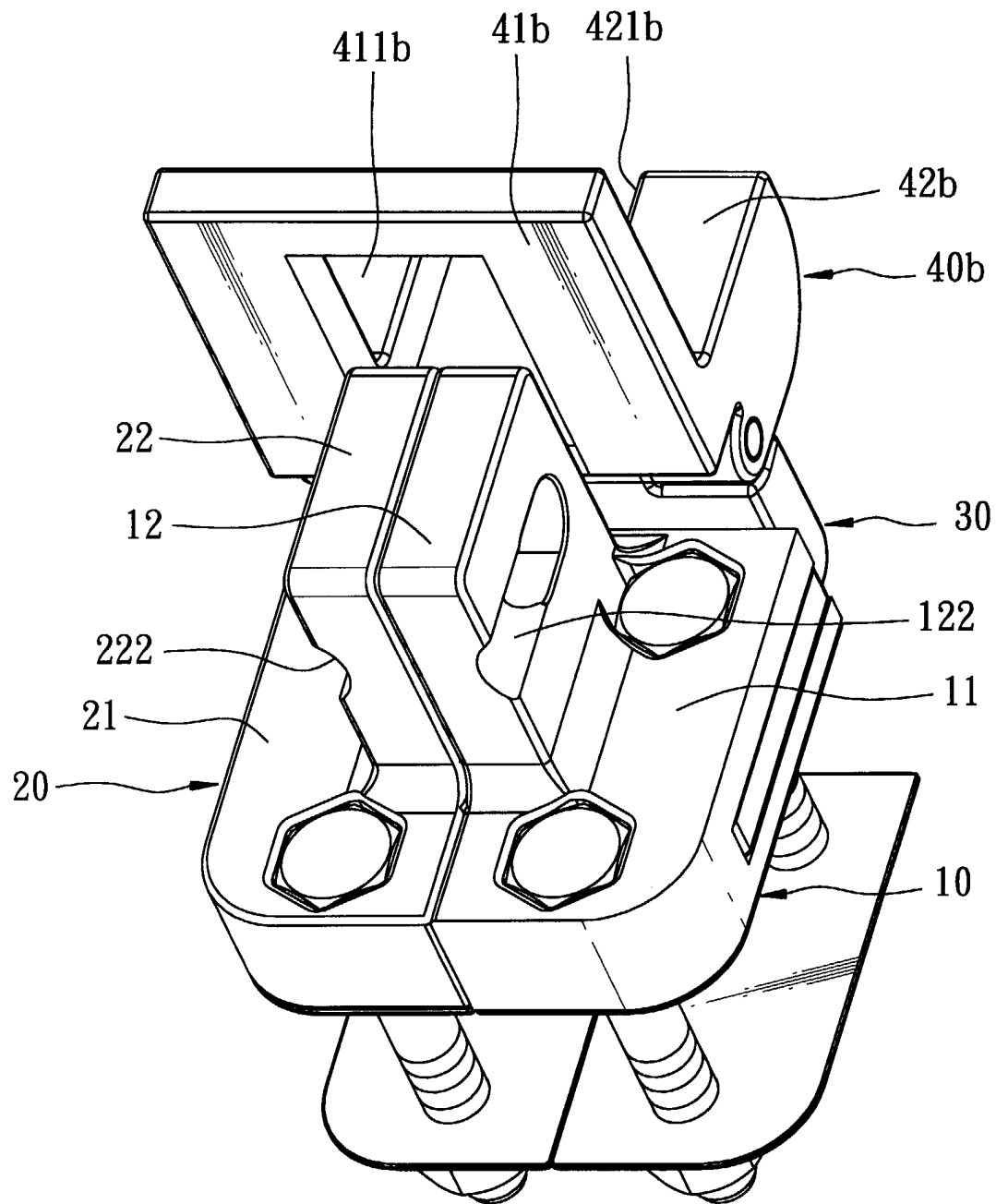


FIG. 16

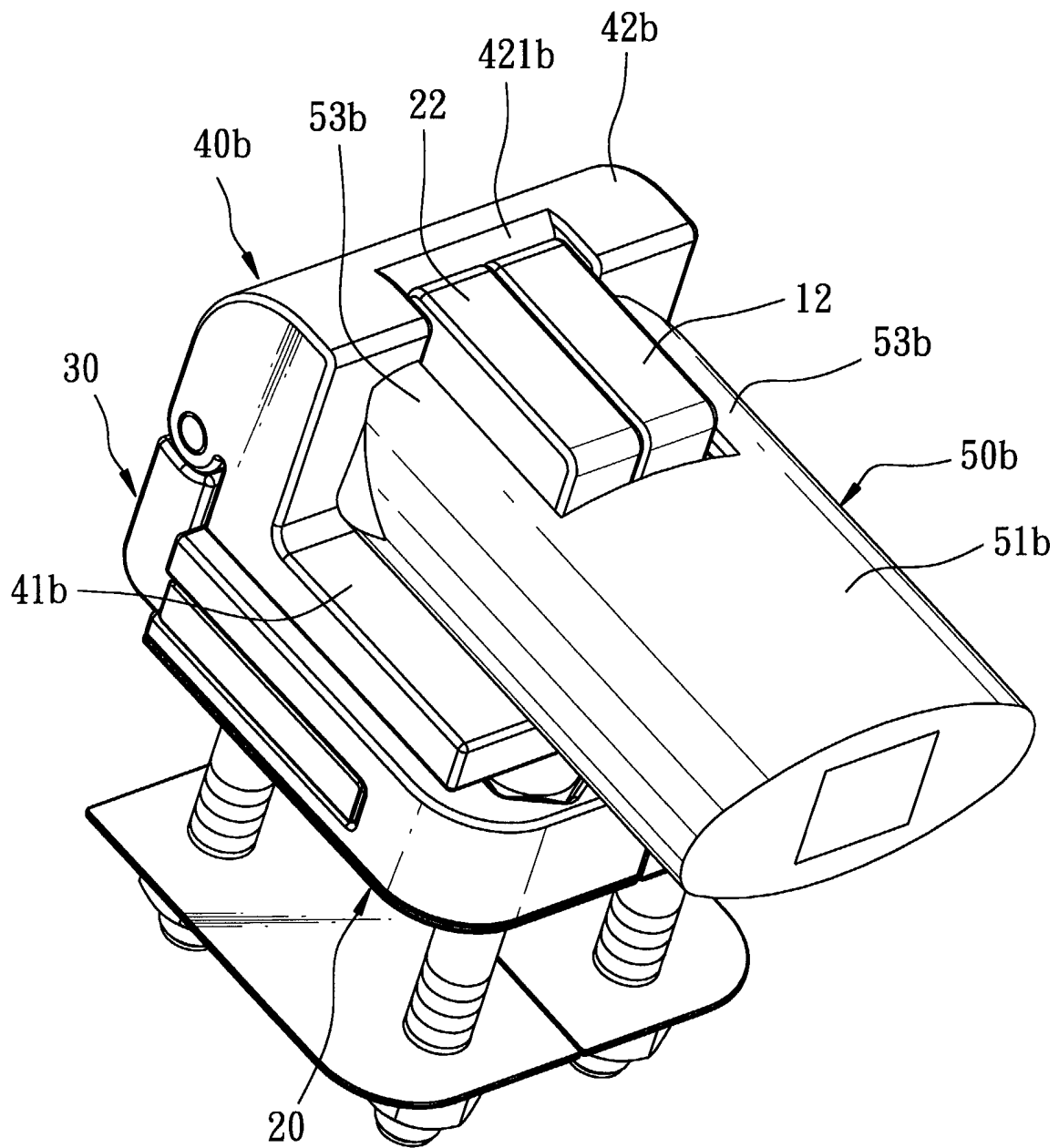


FIG. 17

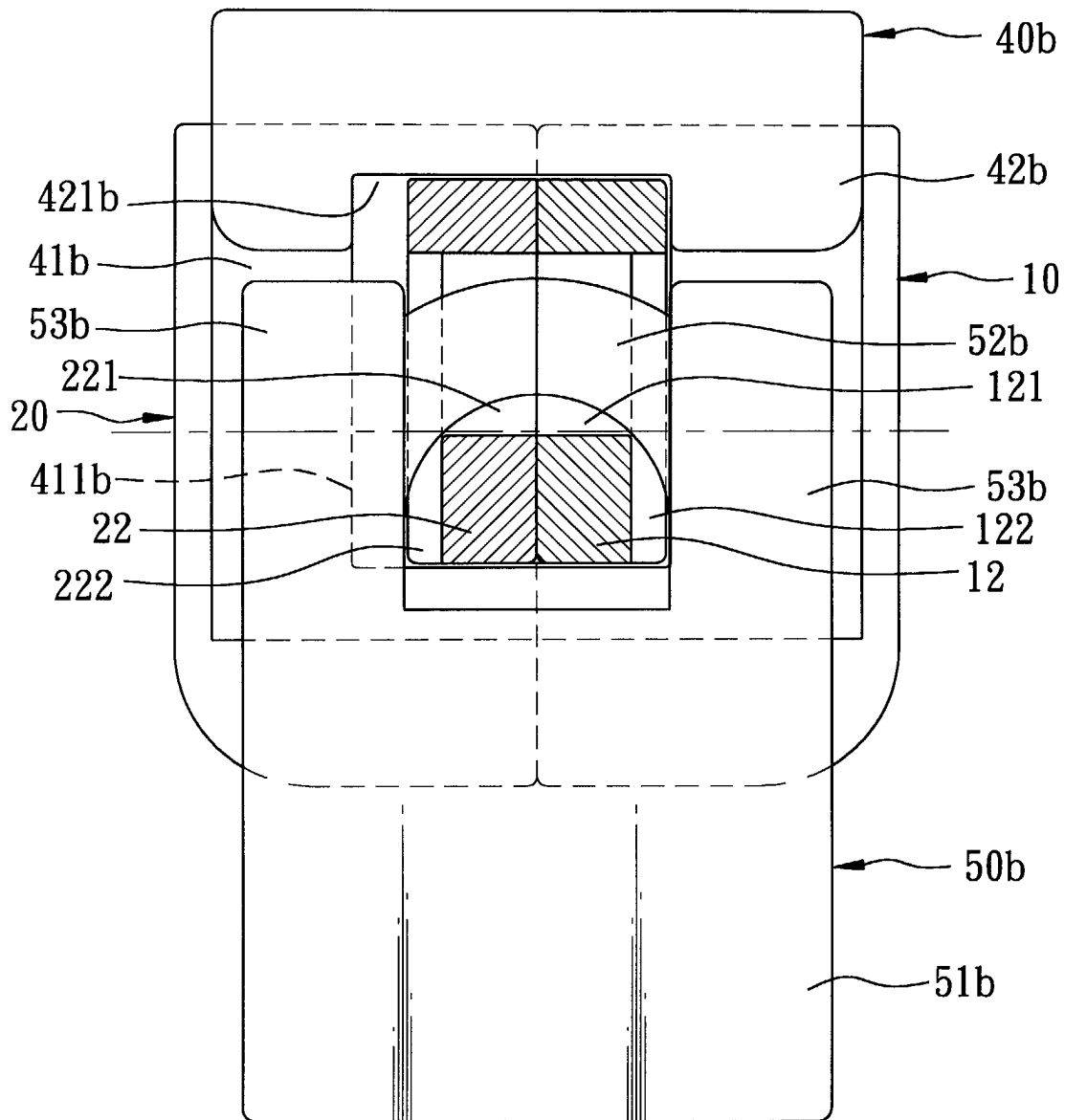


FIG. 18

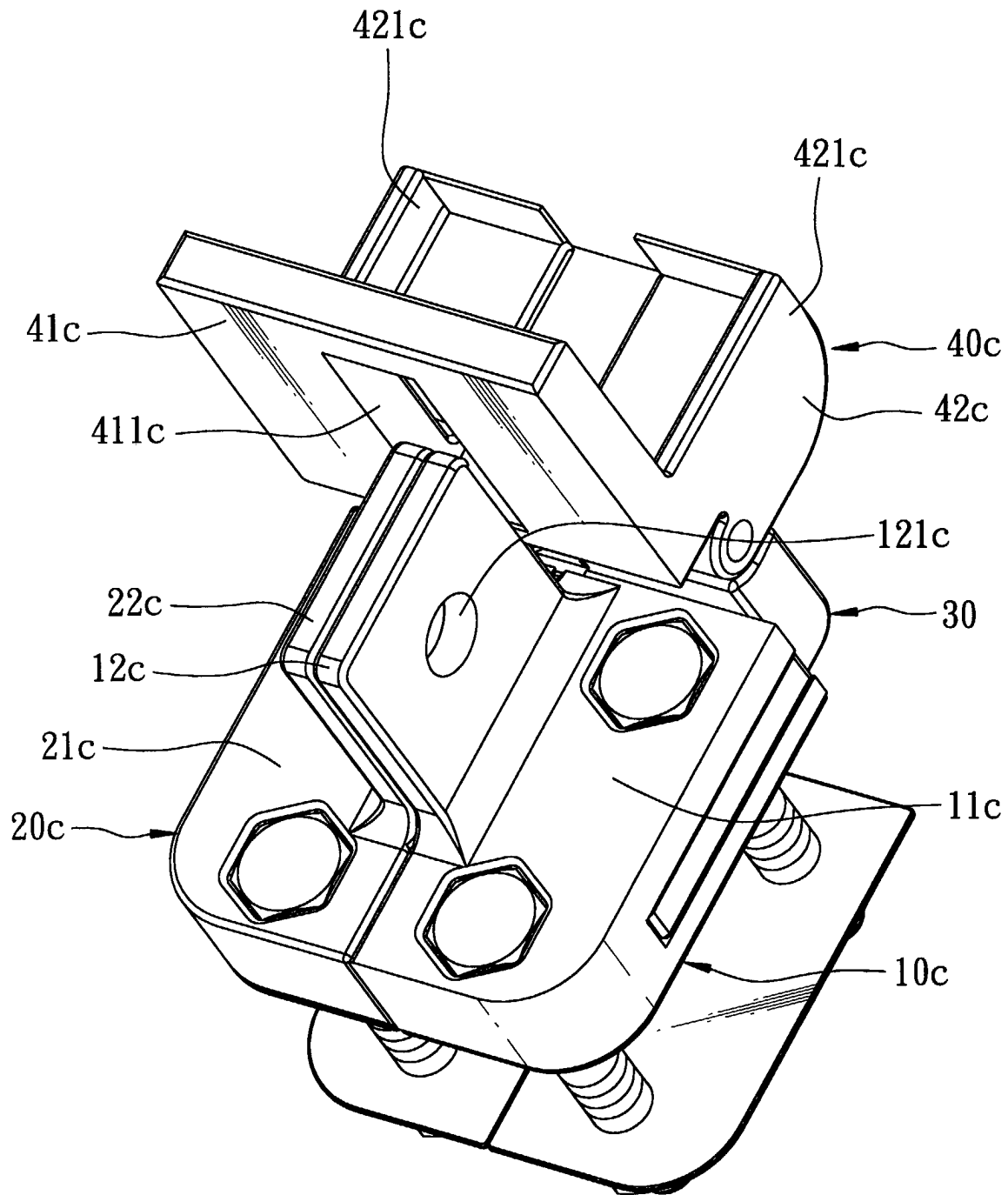


FIG. 19

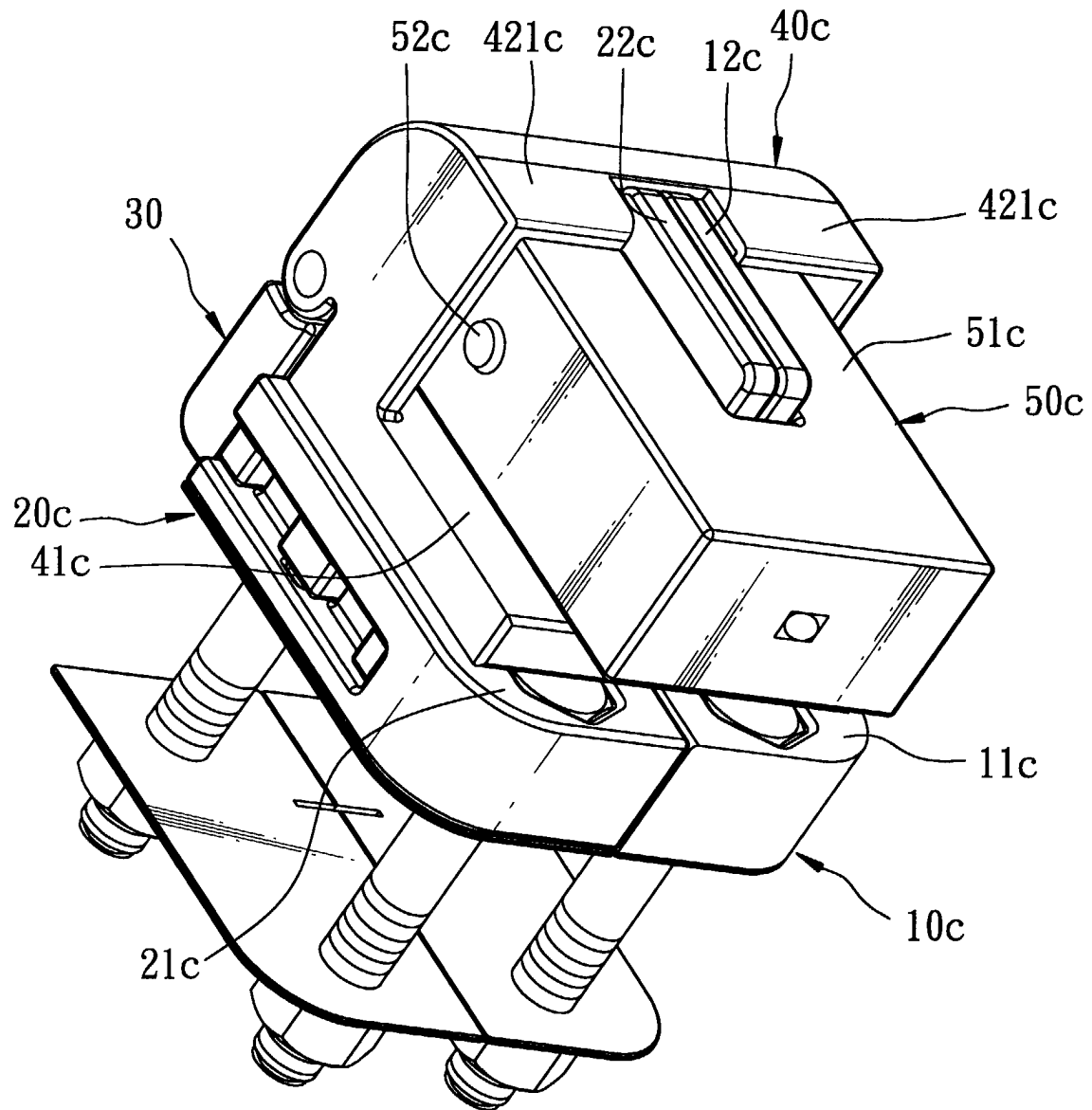


FIG. 20

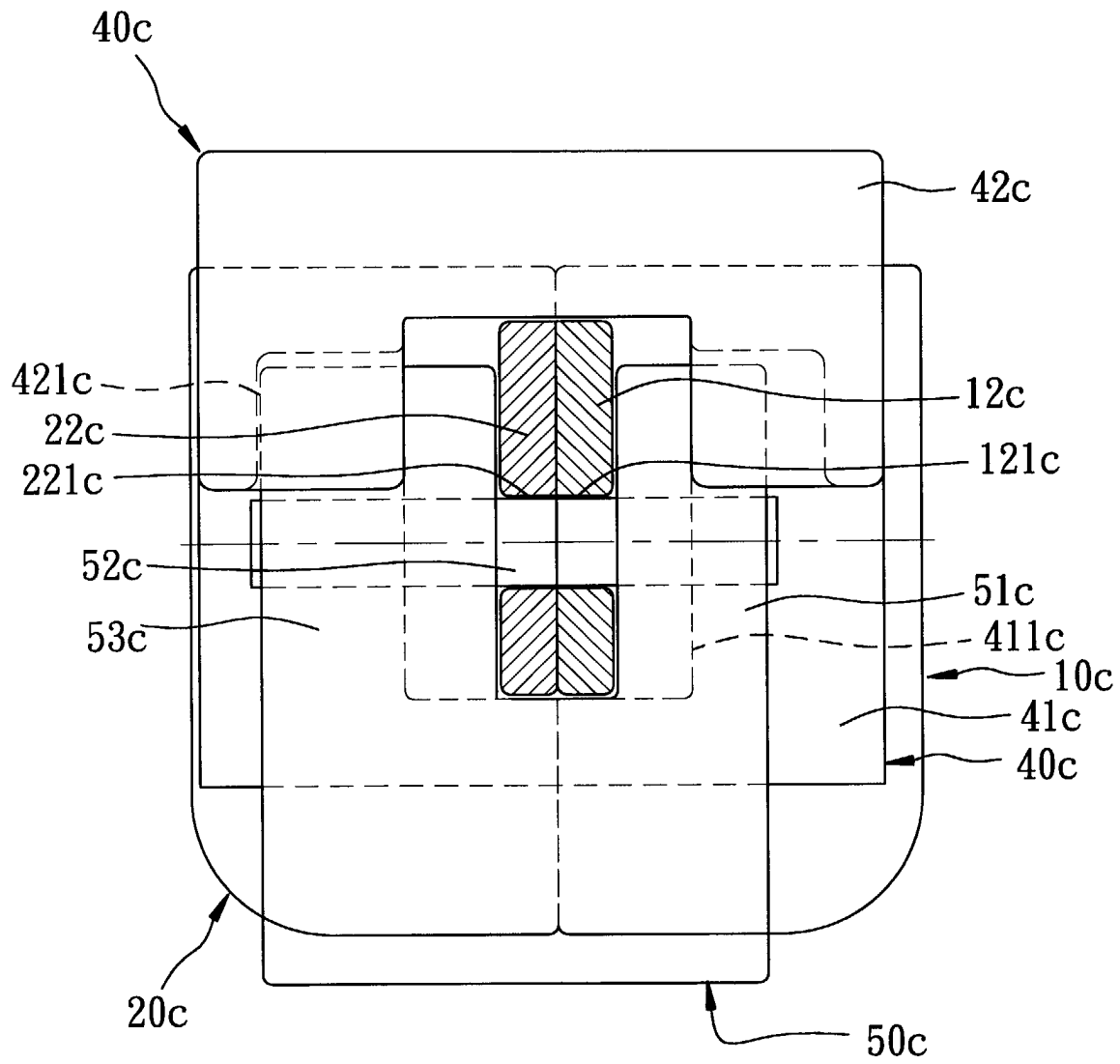


FIG. 21

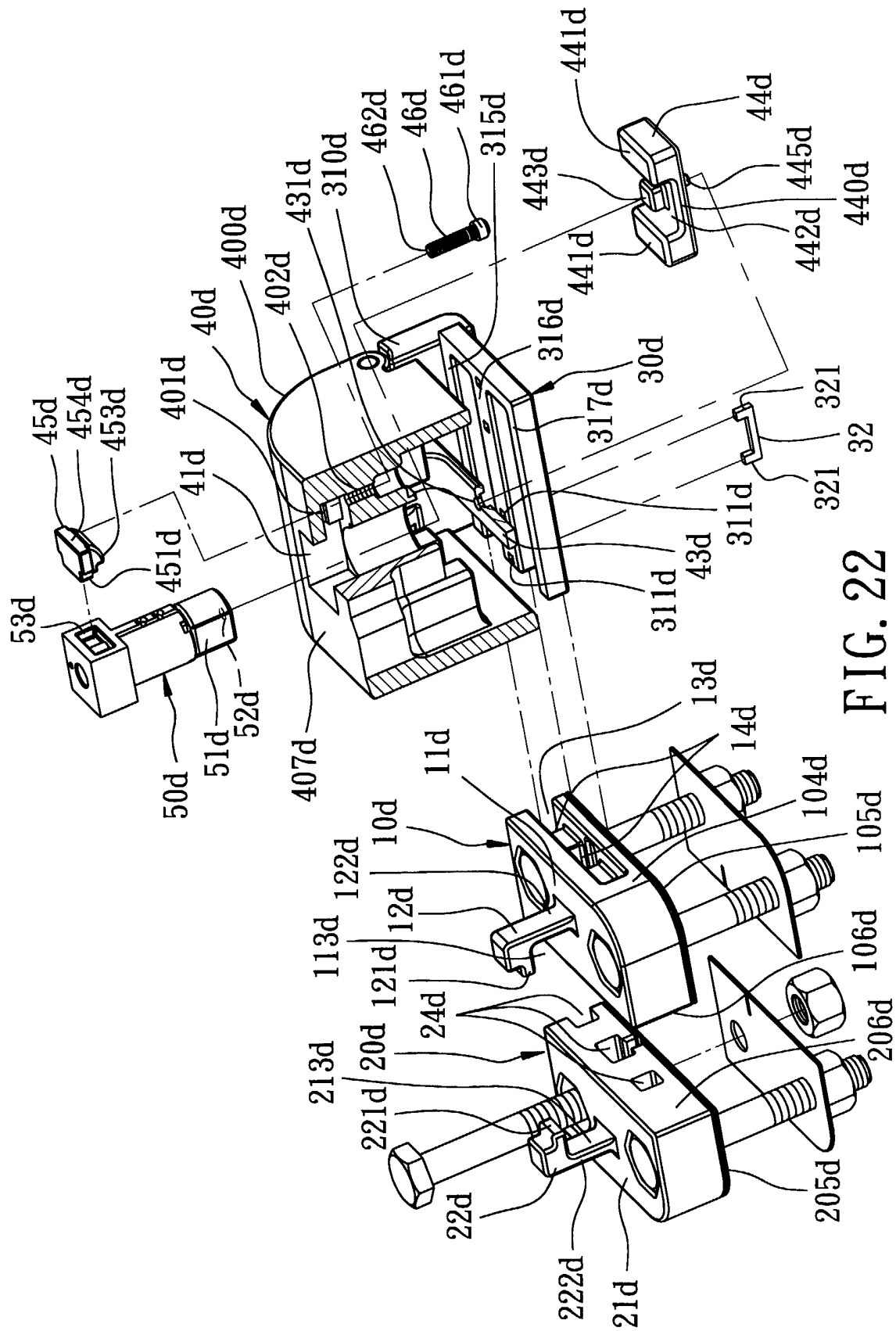


FIG. 22

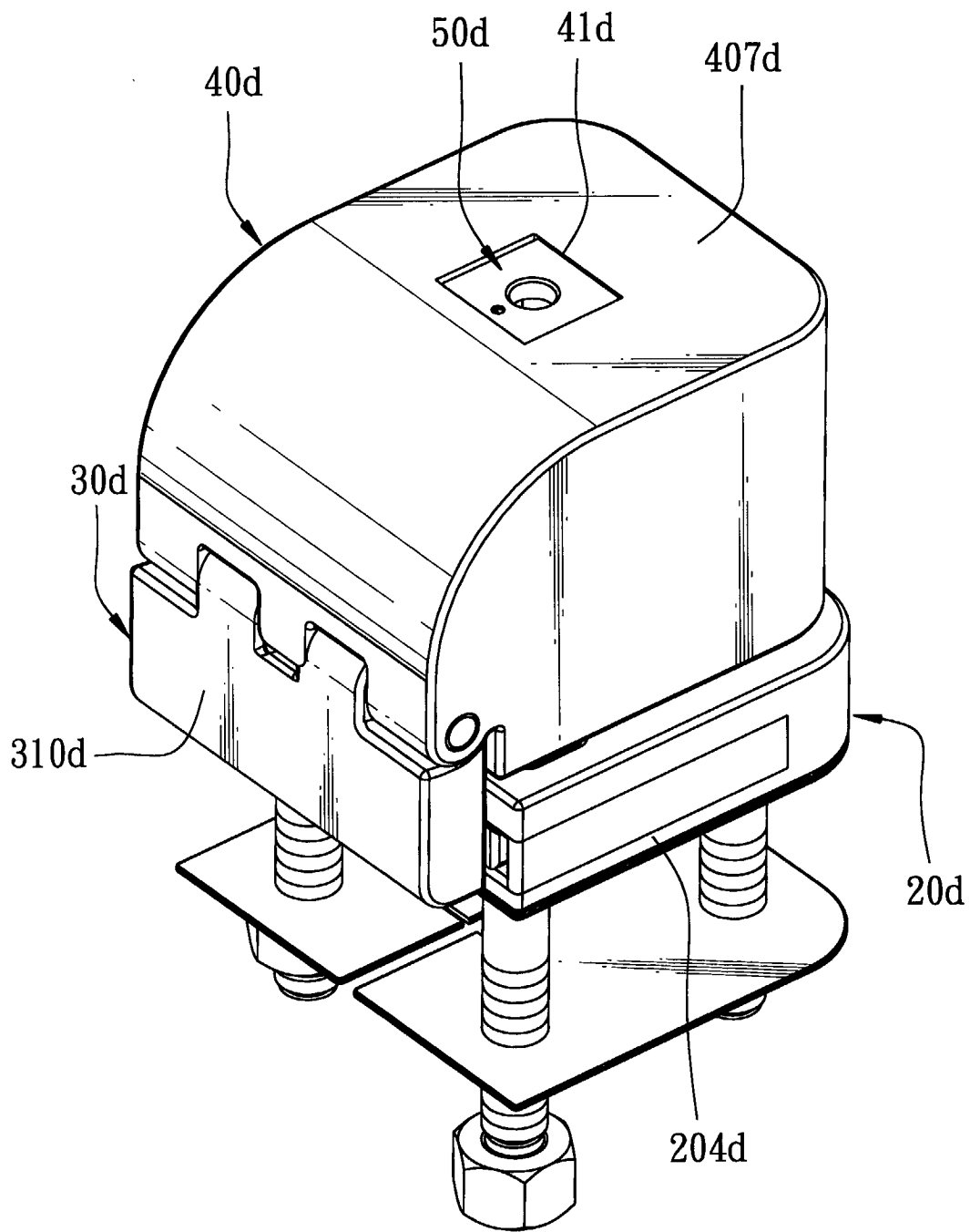


FIG. 23

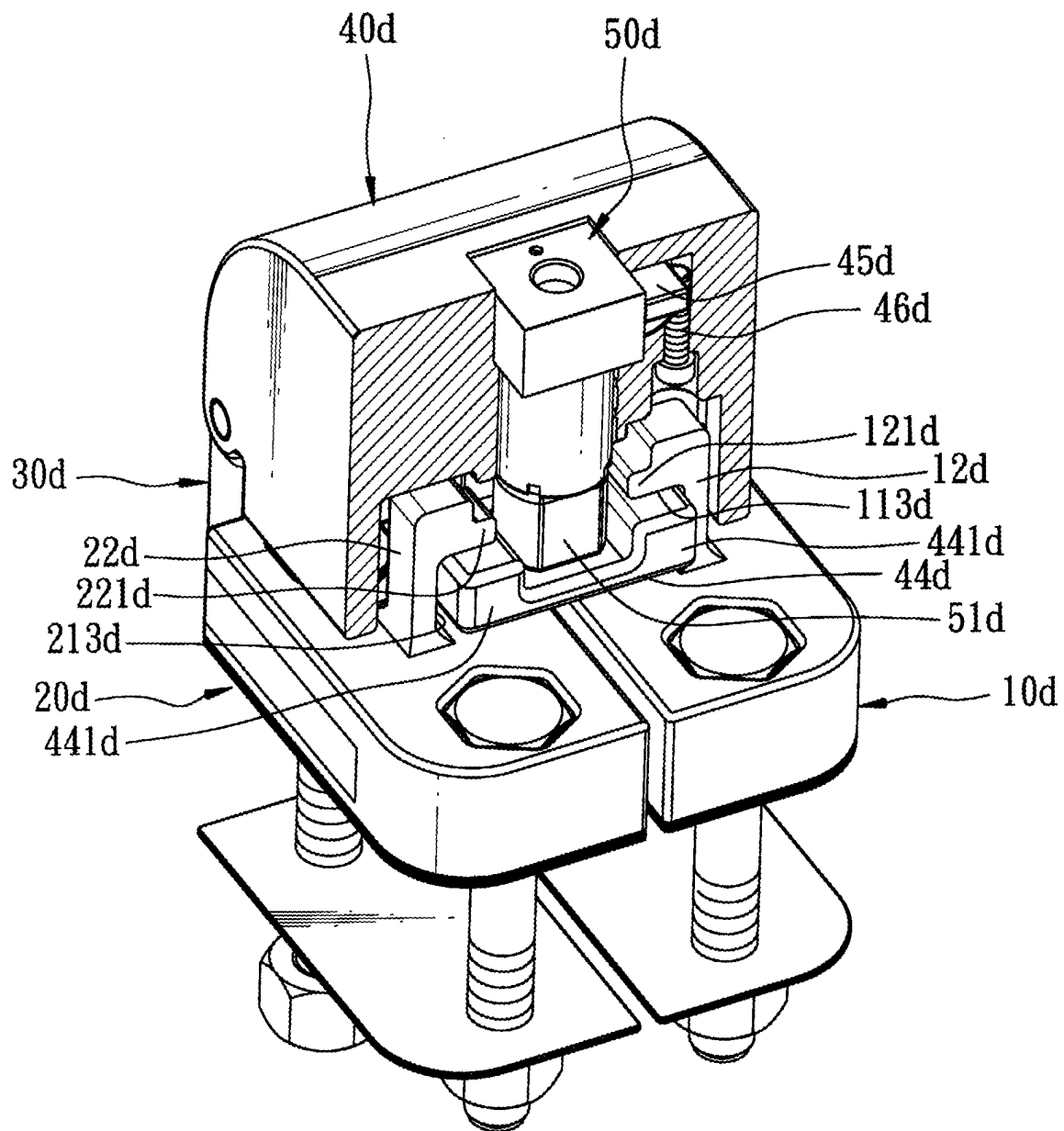


FIG. 24

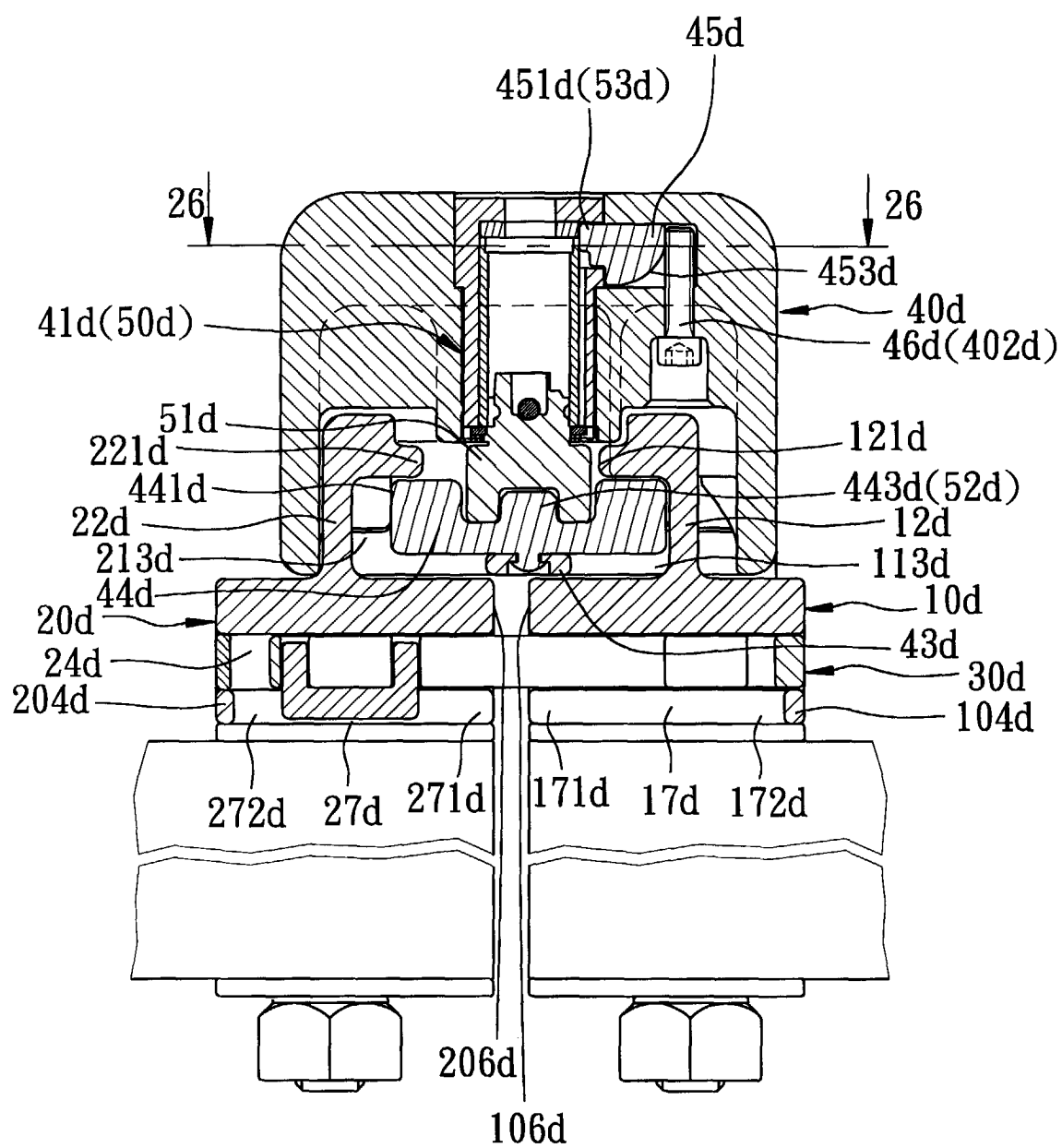


FIG. 25

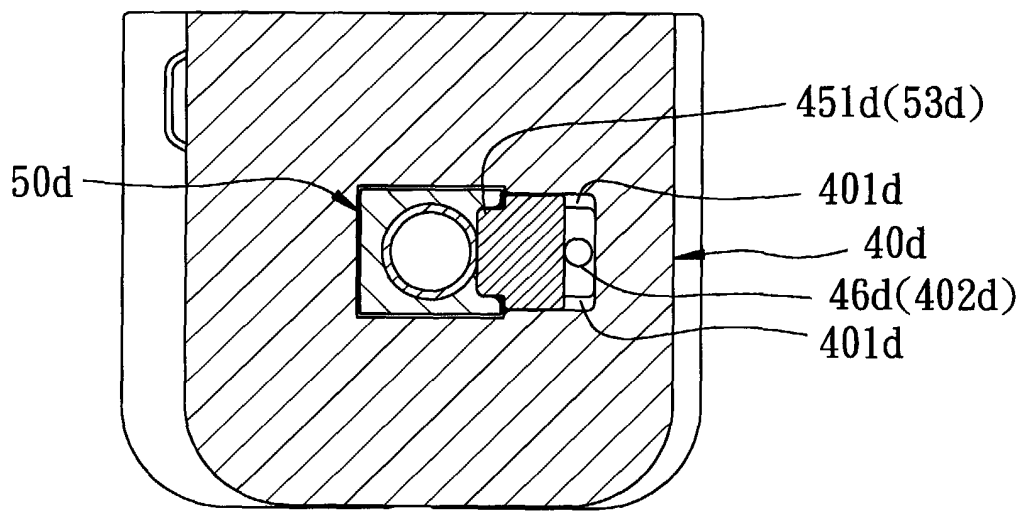


FIG. 26

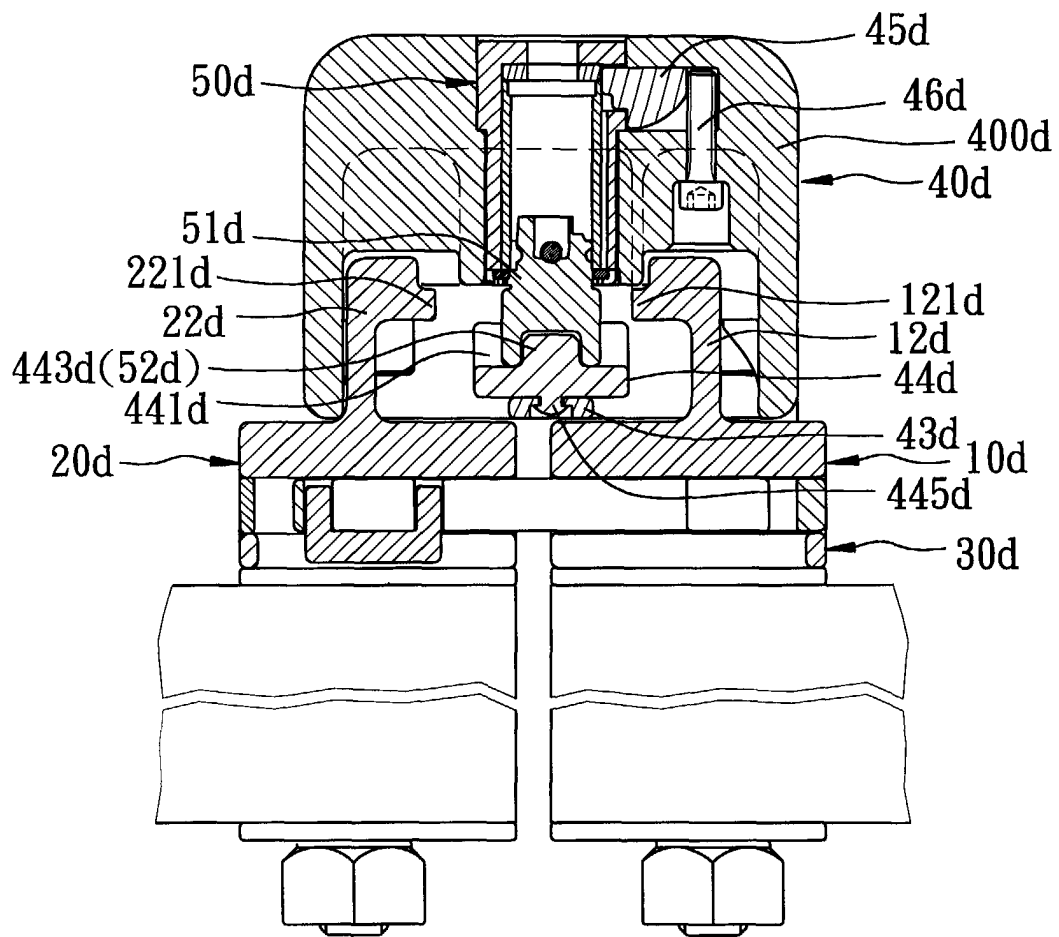


FIG. 27

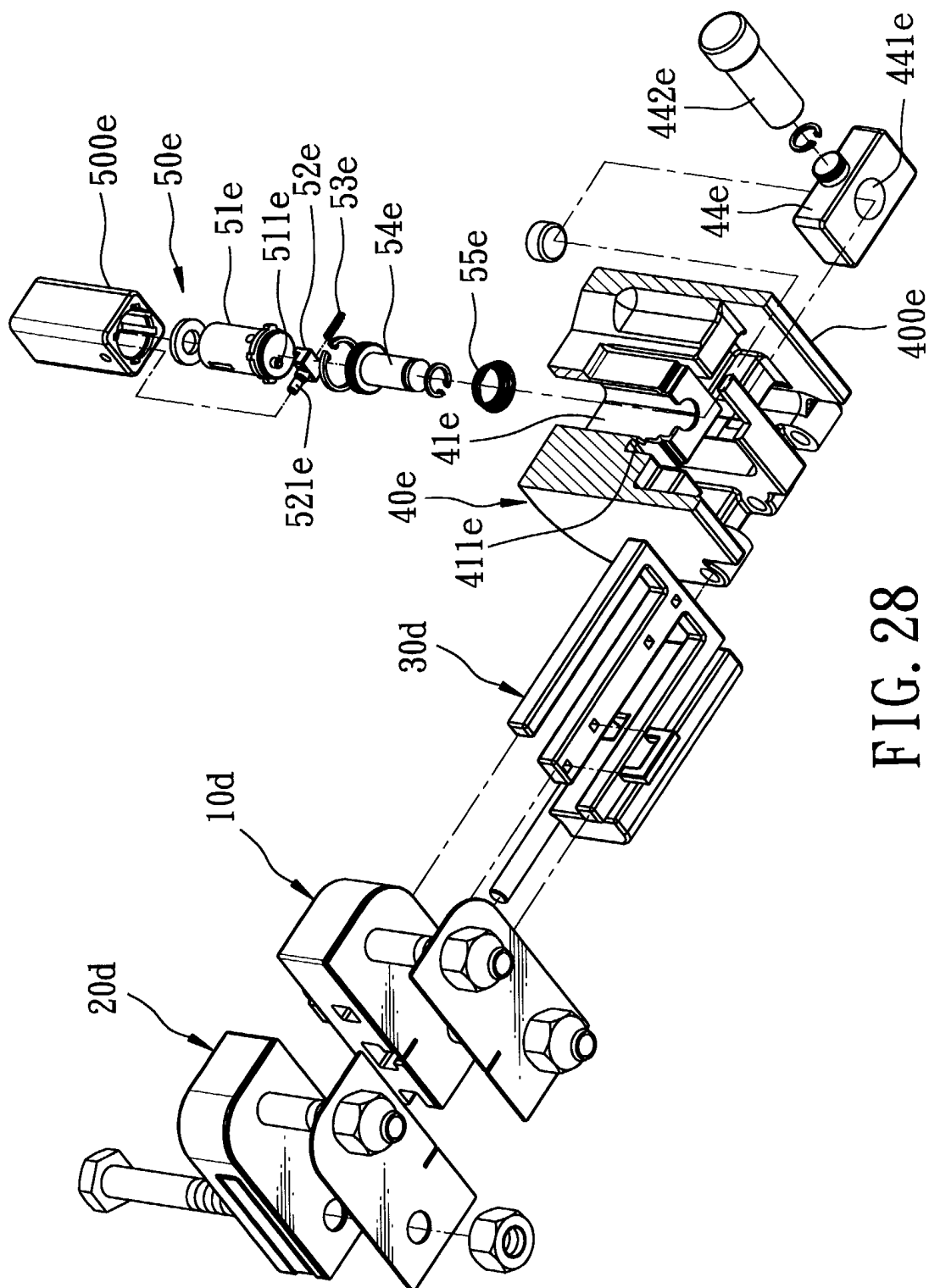


FIG. 28

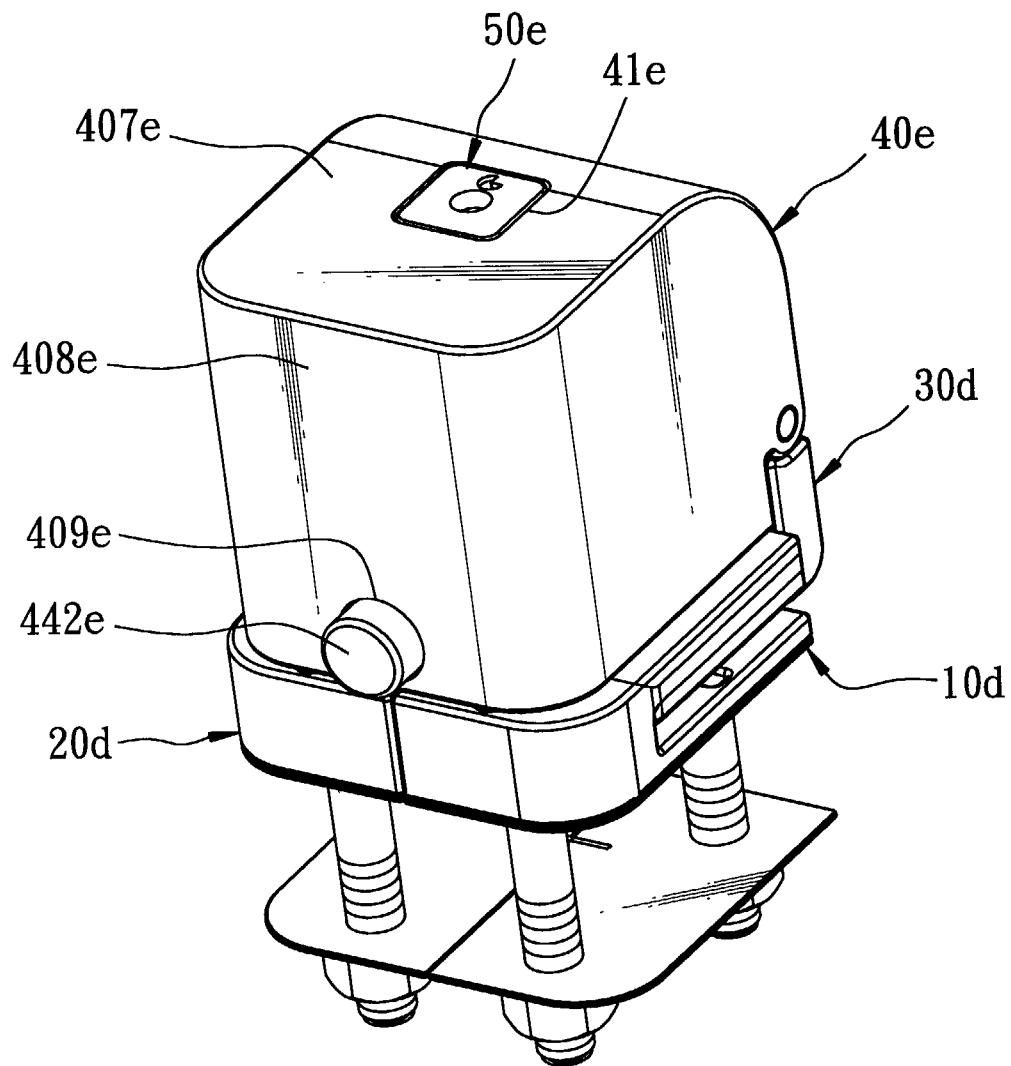


FIG. 29

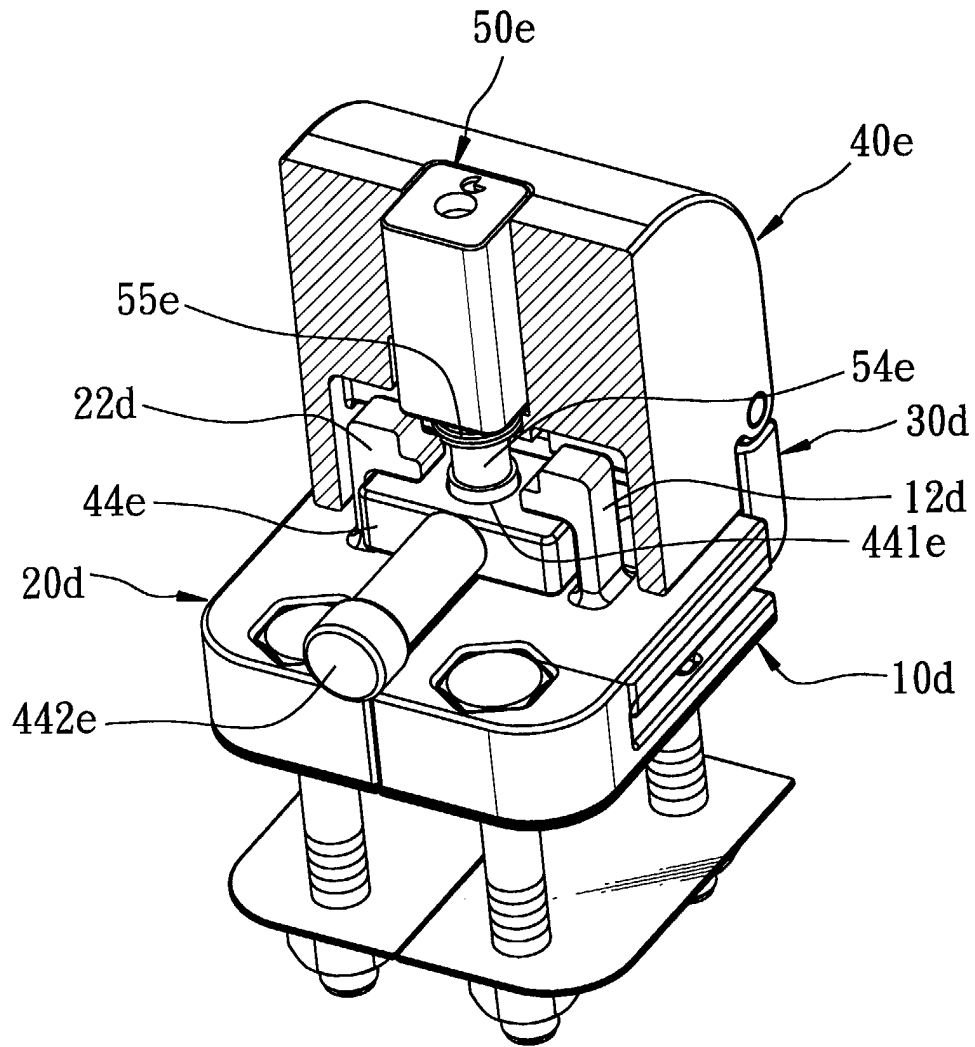


FIG. 30

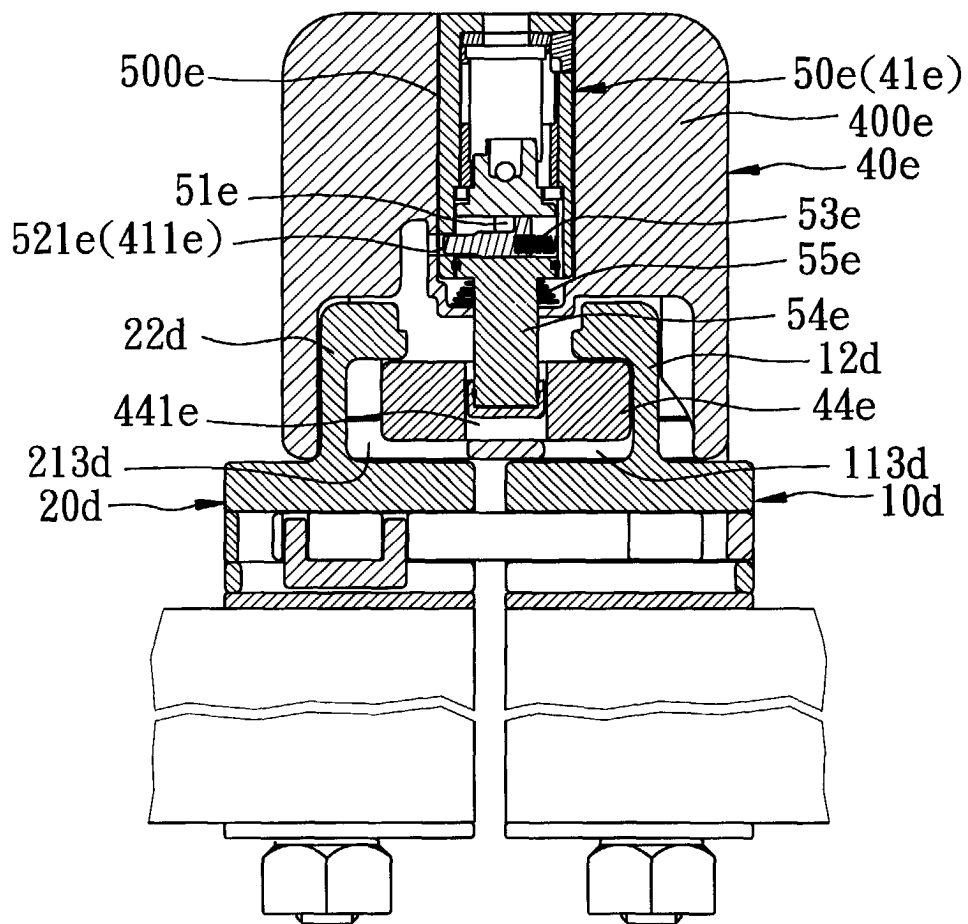


FIG. 31

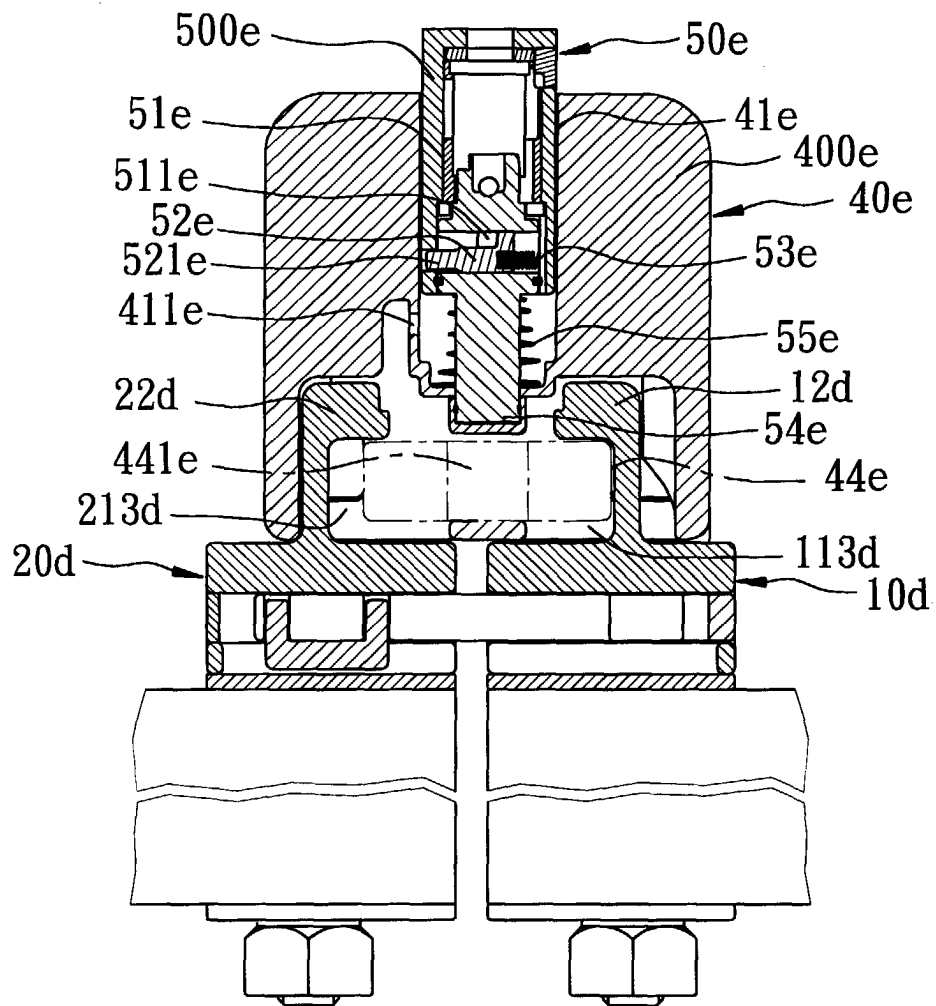


FIG. 32

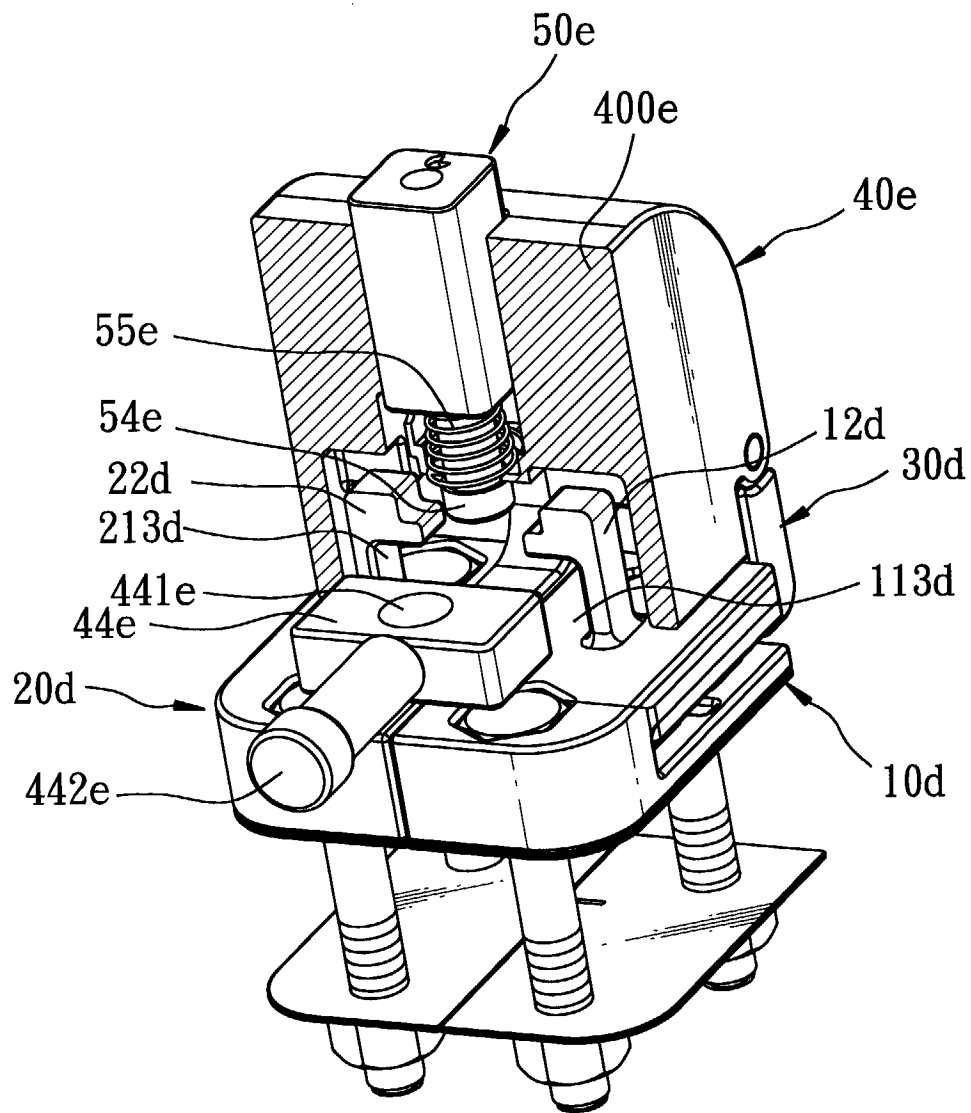


FIG. 33

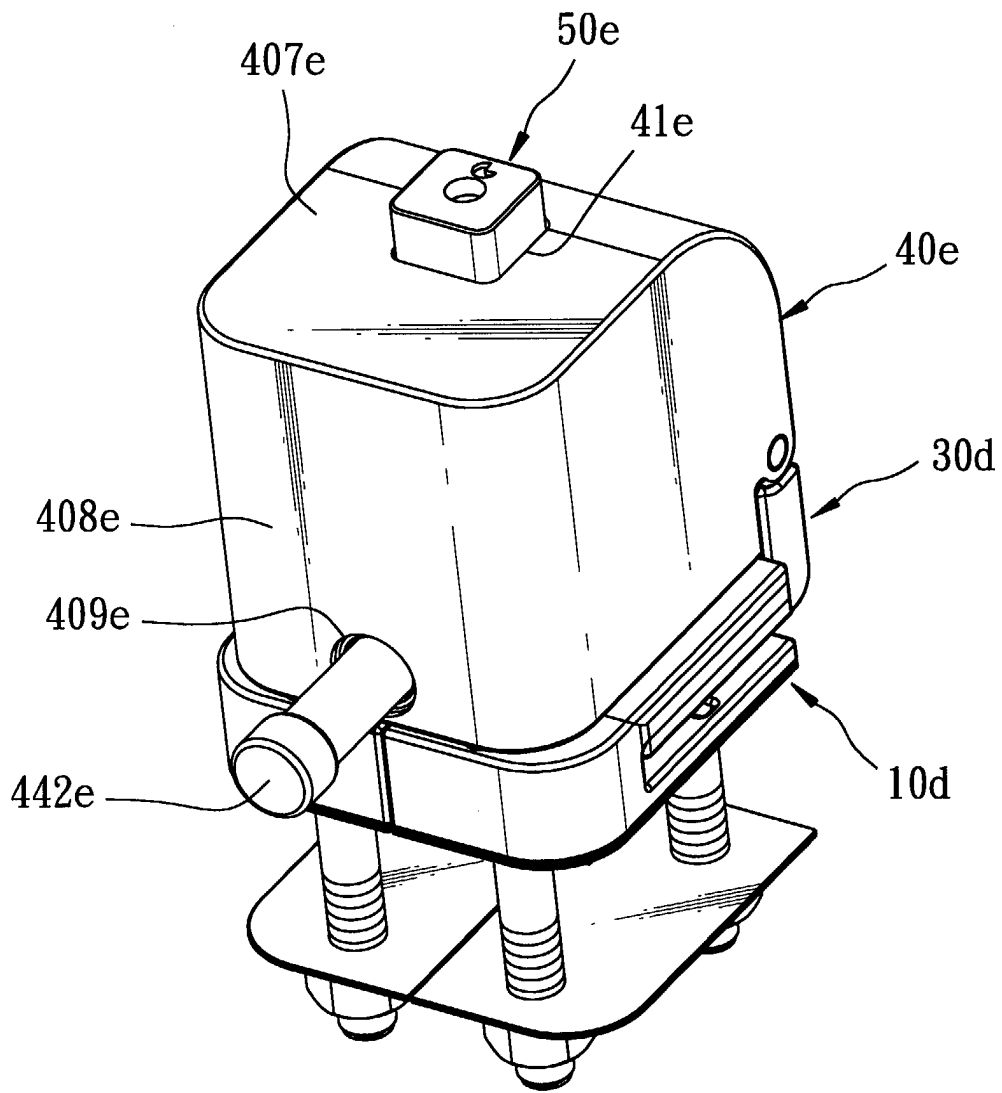


FIG. 34



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 25 2637

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 436 310 A (HARTWELL CORP) 10 July 1991 (1991-07-10) * the whole document *	1,12,14	E05B67/38
A	EP 0 281 333 A (ANDERSON EDMUND) 7 September 1988 (1988-09-07) * the whole document *	1,12	
A	US 4 852 920 A (DEFORREST SR WILLIAM) 1 August 1989 (1989-08-01) * the whole document *	1,12	
A	US 6 494 064 B1 (PENA SANTIAGO) 17 December 2002 (2002-12-17) * the whole document *	1,12	
A	US 5 307 653 A (DAVIS RICHARD W) 3 May 1994 (1994-05-03) * the whole document *	1,12	
A	US 4 437 692 A (HALOPOFF DAVID) 20 March 1984 (1984-03-20) * the whole document *	1,12	TECHNICAL FIELDS SEARCHED (Int.Cl.7) E05B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		26 September 2003	Henkes, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)



European Patent
Office

Application Number
EP 03 25 2637

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-14



European Patent
Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 03 25 2637

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-14

Lock assembly having first and second mounting seats, to be mounted on different object to be attached to each other (e.g. wings) including apertured lobes for locking with a shackled padlock and with a sliding and pivoting covermember protecting the padlock against attack.

2. claims: 15-19

Lock assembly having first and second mounting seats, to be mounted on different objects to be attached to each other (e.g. wings) including particularly designed locking fingers, that in order to achieve locking cooperates with a sliding and pivoting covermember and a shackleless padlockbody, the covermember protecting the padlock against attack.

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

EP 03 25 2637

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

26-09-2003

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