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(54) **Baby crib**

(57) A baby crib includes an upper frame (1), two folding joints (2), two legs (3) and a bar linkage (7). The upper frame (1) includes a first and a second handrail portion (11, 12), the second handrail portion (12) being detachably connected with two ends of the first handrail portion (11) via two coupling assemblies (8), wherein at least one of the two coupling assemblies (8) includes a first engaging structure (81) provided on the first handrail portion (11), and a second engaging structure (82) provided on the second handrail portion (12) and adapted

to engage with the first engaging structure (81). The two folding joints (2) are respectively affixed with two opposite sides of the first handrail portion (81). The two legs (3) are respectively connected pivotally with the two folding joints (2), each of the two legs (3) having an upper segment (31) and a lower segment (32) that are connected with each other via a height adjustment mechanism (33). The bar linkage (7) extends transversally between the two legs (7), and has two opposite ends respectively connected with the two legs (3).

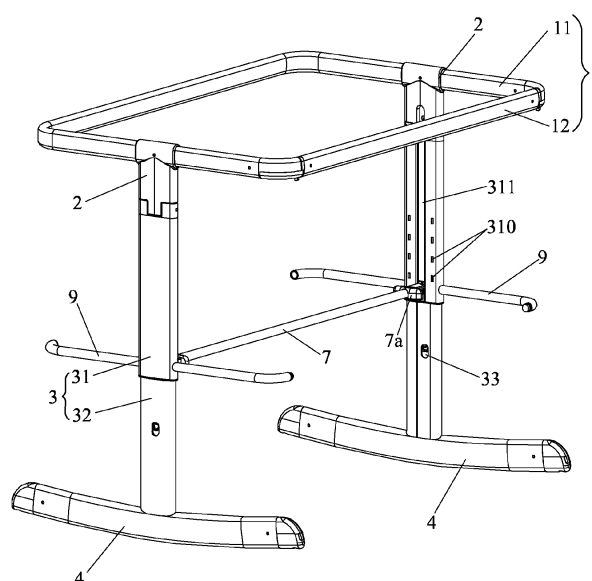


FIG. 1

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority of China Patent Application No. 201210065519.9 filed on January 12, 2012, and China Patent Application No. 201210289214.6 filed on August 14, 2012.

BACKGROUND

[0002] 1. Field of the Invention

[0003] The present inventions relate to baby cribs.

[0004] 2. Description of the Related Art

[0005] For facilitating storage, baby cribs may usually have a collapsible structure. In China Patent Publication No. CN2469810Y, the disclosure of which is incorporated herein by reference, a collapsible baby crib is described as including an assembly of horizontal bar linkages that are pivotally joined with a hub disposed at a center on the bottom of the baby crib. The bar linkages can be pivoted relative to the hub to collapse the baby crib in a compact form.

[0006] In China Patent Publication No. CN2800955Y, the disclosure of which is also incorporated herein by reference, another crib frame is described as including four corner legs. The crib frame also includes two folding joints disposed at two opposite sides and extending vertically. Each of the folding joints is connected with two legs adjacent thereto. The legs are assembled in two pairs that can be movable parallel to a horizontal plane toward each other to collapse the baby crib in sideways manner. A pad may also be disposed on support structures assembled with the legs for receiving the placement of the child thereon. The pad may be adjustable vertically to set a desired height at which the child rests in the baby crib.

[0007] China Patent Publication No. CN201070162U, the disclosure of which is also incorporated herein by reference, describes the structure of another baby crib that includes four corner legs provided with a support structure, and a resting pad disposed on the support structure. The baby crib also has an enclosure that surrounds the four sides of the resting pad and connects with the corner legs. Two hinge structures can be disposed on two opposite sides of the enclosure, and can be operable to cause two adjacent legs to move parallel to a horizontal plane toward the two other opposite legs for collapsing the baby crib in a sideways manner.

[0008] While the current design approaches can collapse the baby crib, the construction of the folding structures may be relatively heavy in weight and complex to implement. Therefore, there is a need for an improved baby crib that can be easily collapsed, and address at least the foregoing issues.

SUMMARY

[0009] The present application describes a baby crib that is relative simple in construction, and can be easily collapsed into a compact form facilitating storage. The baby crib includes an upper frame, two folding joints, two legs and a bar linkage. The upper frame includes a first and a second handrail portion, the second handrail portion being detachably connected with two ends of the first handrail portion via two coupling assemblies, wherein at least one of the two coupling assemblies includes a first engaging structure provided on the first handrail portion, and a second engaging structure provided on the second handrail portion and adapted to engage with the first engaging structure. The two folding joints are respectively affixed with two opposite sides of the first handrail portion. The two legs are respectively connected pivotally with the two folding joints, each of the two legs having an upper segment and a lower segment that are connected with each other via a height adjustment mechanism. The bar linkage extends transversally between the two legs, and has two opposite ends respectively connected with the two legs.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Figure 1 is a perspective view illustrating a first embodiment of a baby crib;

[0011] Figure 2 is a perspective view illustrating the baby crib of Figure 1 provided with wheel assemblies;

[0012] Figure 3 is a partial cross-sectional view illustrating one wheel assembly;

[0013] Figure 4 is an exploded view illustrating an embodiment of a height adjustment mechanism disposed between upper and lower segments of a leg in the baby crib shown in Figure 1;

[0014] Figure 5 is a partial cross-sectional view of the height adjustment mechanism shown in Figure 4;

[0015] Figure 6 is a schematic view illustrating a locking mechanism used for attaching a bar linkage in the baby crib shown in Figure 1;

[0016] Figure 7 is a partial cross-sectional view illustrating the locking mechanism of Figure 6;

[0017] Figure 8 is a perspective view illustrating a handrail portion attached with support bars in the baby crib shown in Figure 1;

[0018] Figure 9 is a schematic view illustrating a structure of the handrail portion shown attached with the support bars in Figure 8;

[0019] Figure 10 is a schematic view illustrating the structure of another handrail portion of the baby crib to which the handrail portion shown in Figure 9 can be detachably assembled;

[0020] Figure 11 is a partial cross-sectional view illustrating a coupling assembly that locks the two handrail portions with each other;

[0021] Figure 12 is a partial cross-sectional view illustrating the coupling assembly in an unlocking state for

separating the two handrail portions from each other;

[0022] Figure 13 is a schematic view illustrating an embodiment of a tab used in the coupling assembly shown in Figure 11;

[0023] Figure 14 is a schematic view illustrating an embodiment of an actuator part used in the coupling assembly shown in Figure 11;

[0024] Figure 15 is a schematic view illustrating the baby crib of Figure 1 in a fully collapsed state;

[0025] Figure 16 is a schematic view illustrating an enclosure implemented in the baby crib shown in Figure 1;

[0026] Figure 17 is a schematic view illustrating the baby crib of Figure 1 configured as a bedside baby crib;

[0027] Figure 18 is a perspective view illustrating a second embodiment of a baby crib;

[0028] Figure 19 is an enlarged view illustrating portion A of Figure 18;

[0029] Figure 20 is a partial cross-sectional view illustrating another structure of a coupling assembly for attaching the two handrail portions in the baby crib shown in Figure 18;

[0030] Figure 21 is a partial cross-sectional view illustrating the coupling assembly of Figure 20 in a locking state for attaching the two handrail portions with each other;

[0031] Figure 22 is a partial cross-sectional view illustrating the coupling assembly of Figure 20 in an unlocking state for separating the two handrail portions from each other;

[0032] Figure 23 is a schematic view illustrating a sleeve used in the coupling assembly shown in Figure 20;

[0033] Figure 24 is a schematic side view of the baby crib shown in Figure 18;

[0034] Figure 25 is a schematic view illustrating a portion of the baby crib shown in Figure 18;

[0035] Figure 26 is a partial cross-sectional view taken along a vertical section of the portion shown in Figure 25;

[0036] Figure 27 is an enlarged view illustrating portion B of Figure 26;

[0037] Figure 28 is an enlarged view illustrating portion C of Figure 26;

[0038] Figure 29 is a schematic view illustrating a driving part used in a height adjustment mechanism between upper and lower segments of a leg in the baby crib shown in Figure 18;

[0039] Figure 30 is a schematic view illustrating a folding joint assembled between one leg and an upper frame in the baby crib shown in Figure 18;

[0040] Figure 31 is a schematic view illustrating a handle actuator used in the height adjustment mechanism assembled in a leg of the baby crib shown in Figure 18;

[0041] Figure 32 is a partially exploded view of the baby crib shown in Figure 18;

[0042] Figure 33 is a perspective view illustrating a third embodiment of a baby crib;

[0043] Figure 34 is a schematic view illustrating the construction of a lower frame in the baby crib shown in Figure 33;

[0044] Figure 35 is a partial cross-sectional view illustrating the construction of another coupling assembly attaching two handrail portions in the baby crib shown in Figure 33;

[0045] Figure 36 is a schematic view illustrating the coupling assembly of Figure 35 in an unlocking state for separating the two handrail portions from each other; and

[0046] Figure 37 is a schematic view illustrating the baby crib of Figure 33 provided with an enclosure.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0047] Referring to Figures 1-17, an embodiment of a baby crib can include an upper frame 1, two folding joints 2 respectively affixed with two opposite side segments of the upper frame 1, and two upright legs 3. The legs 3 can have upper ends respectively connected pivotally with the folding joints 2, and lower ends affixed with two foot portions 4 that can rest on a ground surface. It is worth noting that the upper ends of the legs 3 may also be affixed with the folding joints 2 by locking engagement. In other embodiments, the upper ends of the legs 3 and the folding joints 2 may be formed integrally in a same piece. By realizing a pivotal connection between the legs 3 and the folding joints 2 (as described in the illustrated embodiment), the legs 3 can be conveniently folded for facilitating storage of the baby crib, as shown in Figure 15.

[0048] As shown in Figure 1, the foot portions 4 can have a tubular structure of a curved shape to allow rocking movements of the baby crib. In other embodiments, the foot portions 4 can also have linear shapes disposed in a same plane substantially parallel to the ground.

[0049] Referring to Figure 2, one embodiment of the baby crib can also provide wheel assemblies 5a provided on the foot portions 4. The wheel assemblies 5a can respectively include wheels 5 for facilitating displacement of the baby crib. As shown in Figure 3, each of the wheel assemblies 5a can include a quick actuator 51, a fastener 52 and a spring 53. The fastener 52 can be movably assembled with the foot portion 4. The spring 53 can have two ends respectively connected with the fastener 52 and an inner sidewall of the foot portion 4. The fastener 52 can have an end opposite to the spring 53 that is connected with the quick actuator 51, and an elliptical hole 521 disposed in an intermediate region between the two opposite ends of the fastener 52. A vertical pivot axle of the wheels 5 can be assembled through the foot portion 4 and the hole 521. The fastener 52 can be biased by the spring 53 to engage with the pivot axle of the wheel 5 for securing the wheel 5 with the foot portion 4.

[0050] For disassembling the wheel 5, the quick actuator 51 can be operated to push the fastener 52 in movement. As a result, the fastener 52 can compress the spring 53, and displace the hole 521 to a position that allows vertical sliding of the pivot axle of the wheel 5. The wheel 5 thereby can be easily disassembled from the foot portion 4.

[0051] Referring to Figures 1, 2 and 4, each of the legs

3 can be formed by the telescopic assembly of an upper and a lower segment 31 and 32 of an elongated shape. The upper and lower segments 31 and 32 of each leg 3 can be hollow tubes, and can be respectively connected with a height adjustment mechanism 33 operable to adjust the height of the baby crib.

[0052] Referring to Figures 4 and 5, two height adjustment mechanisms 33 can respectively be provided on the two legs 3. Each of the height adjustment mechanisms 33 can include an actuator 330 and a latch 332. The actuator 330 can include a driving part 331 movably assembled through the lower segment 32, and a release button 333 connected with the driving part 331. The driving part 331 and the release button 333 can be disposed so as to be exposed on an outside of the lower segment 32. In the illustrated embodiment, the driving part 331 and the release button 333 are shown as separate parts. In other embodiments, the driving part 331 and the release button 333 can also be formed as an integral part. The upper segment 31 can include a plurality of openings 310 distributed along a vertical direction (as shown in Figure 5) along the upper segment 31 through any one of which an engaging portion 332a of the latch 332 can engage to lock the upper segment 31 with the lower segment 32. The driving part 331 can have an angled surface 331a, and the latch 332 can have an angled surface 332b in sliding contact with the angled surface 331a.

[0053] When the height of the baby crib is to be adjusted, the release button 333 can be pushed downward, which drives downward displacement of the driving part 331. Owing to the sliding contact between the angled surface 332b and the angled surface 331a, the driving part 331 can drive the latch 332 to move toward the interior of the lower segment 32 to disengage from any one of the openings 310. The upper and lower segments 31 and 32 then can be moved relative to each other to modify the height of the baby crib. Once the baby crib is adjusted to a desired height, the latch 332 can engage with one corresponding opening 310 to lock the upper segment 31 with the lower segment 32. As shown, the height adjustment mechanism 33 can further include a spring 334 having two ends respectively connected with an inner sidewall of the lower segment 32 and the latch 332. The spring 334 can be operable to bias the latch 332 to engage with any of the openings 310.

[0054] As shown in Figure 4, a top portion of the lower segment 32 can be affixed with a cap 61, and a lowermost portion of the upper segment 31 can be affixed with a sleeve 62. The lower segment 32 can be disposed so as to be movable through the sleeve 62, which can reduce friction when the upper and lower segments 31 and 32 are moved relative to each other. The cap 61 and the sleeve 62 may also abut against each other to prevent separation of the upper segment 31 from the lower segment 32.

[0055] Referring to Figure 1 again, the baby crib can include a bar linkage 7 having two opposite ends respectively connected with the two legs 3. The bar linkage 7

can have a linear shape, and extend transversally and substantially perpendicular to the vertical axes of the legs 3. When the baby crib is deployed, the bar linkage 7 can be positioned adjacent to lower regions of the upper segments 31 such that the bar linkage 7 and the two legs 3 can form a generally H-shape, the two ends of the bar linkage 7 being locked with the upper segments 31. The baby crib can thereby have a more rigid and stable support structure.

[0056] Referring to Figures 6 and 7, the two ends of the bar linkage 7 can be respectively assembled with the two upper segments 31 via two locking mechanisms 7a. Each of the locking mechanisms 7a can include an actuator 71, a spring 72 and a pin 73. Each of the upper segments 31 can include an elongated channel 311 that extends vertically along the upper segment 31 and has a lower portion provided with an opening 312. The pin 73 can be movably assembled in an interior of the bar linkage 7, and can be affixed with the actuator 71. The spring 72 can be disposed in the bar linkage 7, and can bias the pin 73 to engage with the opening 312 to hold the bar linkage 7 adjacent to the lower ends of the upper segments 31. In particular, the spring 72 can have two opposite ends respectively affixed with a rivet (not shown) of the bar linkage 7 and an end of the pin 73. As shown in Figure 6, the channel 311 can extend vertically from a lower end of the upper segment 31 to one folding joint 2 disposed adjacent to an upper region of the upper segment 31. An inner sidewall of the folding joint 2 that communicates with the channel 311 can include an opening 21 that is substantially aligned vertically with the opening 312 and is adapted to receive the engagement of the pin 73.

[0057] When the baby crib is to be collapsed, the two ends of the bar linkage 7 can slide vertically upward along the channels 311 until they reach and engage with the two openings 21. As shown in Figure 6, the two ends of the bar linkage 7 can be respectively assembled with sliding parts 74 that are guided in movement along the channels 311 for vertical displacement of the bar linkage 7 along the two legs 3. In one embodiment, each sliding part 74 can be partially held in and restricted to move along one corresponding channel 311. Accordingly, the bar linkage 7 can be kept substantially horizontal while it is adjusted vertically along the legs 3.

[0058] Referring to Figures 1, 7 and 15, when the baby crib is in the deployed state, the pins 73 can respectively engage with the openings 312 of the legs 3 so that the bar linkage 7 can be held stationary at a middle height of the legs 3, e.g., adjacent to lower regions of the upper segments 31. The legs 3 can be positioned parallel to each other at two sides of the upper frame 1 to provide stable support for the baby crib in the deployed state.

[0059] When the baby crib is to be collapsed, the actuators 71 can be operated to unlock the bar linkage 7 from the legs 3. Subsequently, the bar linkage 7 can be moved upward along the channels 311 of the legs 3, pass through the pivotal connection between the legs 3 and

the folding joints 2, and then engage and lock with the folding joints 2 at a position adjacent to the upper frame 1 by engagement of the pins 73 with the openings 21. The legs 3 then can pivot toward a center of the upper frame 1, and the upper and lower segments 31 and 32 can retract into each other to shorten the length of the legs 3. Figure 15 illustrates the baby crib in a fully collapsed state. Once the baby crib is fully collapsed, the legs 3 can lie substantially parallel to the plane of the upper frame 1. If required, the wheels 5 may also be dismounted from the foot portions 4 to reduce the overall size of the collapsed baby crib.

[0060] In one embodiment, a tip of each pin 73 can have an angled surface (as shown in Figure 7) that can be in sliding contact with a rim of the opening 21 when it is in the locked state. While the baby crib is locked in the deployed state, the bar linkage 7 can be directly pushed downward to cause horizontal displacement of the pin 73 that disengages from the associated opening 21 owing to the sliding contact of the angled surface of the pin 73. The bar linkage 7 can be thereby unlocked, and slide downward until the pins 73 reach the lower portions of the upper segments 31 and respectively engage with the openings 312, without the need of operating the actuators 71.

[0061] Referring to Figures 8-14, the upper frame 1 can be formed from the assembly of two handrail portions 11 and 12 that surrounds a central gap. In one embodiment, the handrail portion 11 can have a U-shape, and the two folding joints 2 can be respectively assembled at two opposite side segments of the handrail portion 11. The handrail portion 12 can be a tubular segment of an elongated shape that is detachably assembled with two ends of the handrail portion 11. For example, two coupling assemblies 8 can be respectively used to detachably fasten the two ends of the handrail portion 12 with the two ends of the handrail portion 11. Each of the two coupling assemblies 8 can include engaging structures 81 and 82 (as shown in Figures 8-10) that are respectively provided on the ends of the handrail portions 12 and 11 and can engage with each other.

[0062] In one embodiment, the engaging structure 81 can have a rib 811 and an opening 812. The engaging structure 82 can include an actuator part 821, a spring 822, a slot 823 that can receive the engagement of the rib 811, and a tab 824 that can engage with the opening 812. The rib 811 has a shape that can mate with the slot 823. The actuator part 821 can have an angled surface 821a (as better shown in Figure 14), and the tab 824 can have an angled surface 824a (as better shown in Figure 13) that can be in sliding contact with the angled surface 821a of the actuator part 821. The spring 822 can have two ends respectively connected with the tab 824 and an inner sidewall of the handrail portion 11, and can be operable to bias the tab 824 into engagement with the opening 812.

[0063] In the cross-sectional view of Figure 11, the handrail portion 12 is shown as being locked with the

handrail portion 11. When the handrail portions 12 and 11 are to be separated from each other, the actuator part 821 can be displaced upward. Owing to the sliding contact between the angled surfaces 821a and 824a, the tab 824 can move inward toward the interior of the handrail portion 11 and disengage from the opening 812 (as shown in Figure 12). The rib 811 then can be disengaged from the slot 823 to detach the handrail portions 12 and 11 from each other.

[0064] When the baby crib is to be assembled, the rib 811 can slide downward into the slot 823. Because the engaging tip of the tab 824 has an angled surface, the tab 824 can be pushed by the engaging structure 81 toward the release position. Once the tab 824 becomes aligned with the opening 812, the tab 824 can engage with the opening 812 to lock the handrail portions 12 and 11 with each other.

[0065] The handrail portion 12 has been described as having an elongated shape with two opposite ends respectively connected with the handrail portion 11 so as to form a substantially rectangular shape of the upper frame 1. In alternate embodiments, the handrail portion 12 can also be formed as a U-shape with two opposite curved end portions that are connected with the handrail portion 11 so as to define the rectangular shape of the upper frame 1. Moreover, it can be appreciated that the placement of the coupling structures 81 and 82 can also be interchanged on the handrail portions 11 and 12.

[0066] Referring to Figures 1, 16 and 17, each of the legs 3 can be connected with two support bars 9 that respectively extend at two opposite sides of the bar linkage 7. The support bars 9 can exemplarily lie perpendicular to the legs 3 in a horizontal plane that is substantially parallel to the plane of the upper frame 1.

[0067] The baby crib can further include an enclosure 10 that is arranged between the upper frame 1 at an upper side, and the lower frame defined by the support bars 9 and the bar linkage 7 at a lower side. The enclosure 10 can have side panels that surround an inner space of the baby crib adapted to receive the placement of a child. The enclosure 10 can be exemplarily made from a fabric material or like soft goods. A cushion pad 10a can be disposed at a bottom of the enclosure 10 to provide comfortable resting support. The support bars 9 and the bar linkage 7 can form a lower frame that provides support for the cushion pad 10a.

[0068] An upper end of the enclosure 10 can be connected with the handrail portions 11 and 12. The enclosure 10 can include at least a first enclosure portion 101 connected with the handrail portion 11, and a second enclosure portion 102 connected with the handrail portion 12. Two opposite side edges of the second enclosure portion 102 can be attached with two side edges of the first enclosure portion 101 via fastener devices (not shown). Examples of the fastener devices for attaching the first enclosure portion 101 with the second enclosure portion 102 can include zippers, hook and loop fasteners, and the like. As shown in Figure 2, an end of each support

bar 9 that is located below the handrail portion 12 can have an annular slot 91 adapted to engage with the rib 811 of the handrail portion 12. Once it is detached from the handrail portion 11, the two opposite ends of the handrail portion 12 can be engaged and attached with the support bars 9 for facilitating its storage and preventing its loss. In addition, the second enclosure portion 102 can be affixed with the legs 3, which can prevent its hanging vertically above the ground.

[0069] Once the handrail portion 12 is removed from the baby crib, the second enclosure portion 102 can have a reduced height, and the bottom of the inner space of the enclosure 10 can be approximately at the same height as that of an adult's bed. Accordingly, the baby crib can be used as bedside crib (as shown in Figure 17).

[0070] The baby crib as described herein can be simple in construction, and easy to collapse for storage and unfold for use. In particular, the pivotal connection between the legs 3 and the folding joints 2 can allow to collapse the baby crib into a compact and thin form having a reduced size, which can facilitate its storage and portability. The handrail portion 12 can also be desirably disassembled from the handrail portion 11, and can be installed with the support bars 9 to configure the baby crib as bedside crib. In addition, the connection of the bar linkage 7 between the two legs 3 can provide more stable support.

[0071] Figures 18-32 are schematic views illustrating a second embodiment of a baby crib. Unlike the embodiment previously described, the upper ends of the upper segments 31 in the second embodiment can be respectively affixed with the folding joints 2. Each of the upper segments 31 can include four locking holes 313. Each of the folding joints 2 can include a resilient latch 22 that can engage with any of the locking holes 313 of the upper segment 31 associated therewith. Each of the resilient latches 22 can be operable to respectively engage with any of the locking holes 313 on the associated leg 3 when the baby crib is unfolded for use, and disengage from the locking holes 313 to disassemble the upper segment 31 from the folding joint 2 for storage of the baby crib.

[0072] The handrail portion 12 can be detachably assembled with two ends of the handrail portion 11 via two coupling assemblies 8 (as shown in Figure 25). As shown in Figures 19-23, each of the coupling assemblies 8 can include a sleeve 83, an engaging structure 81 affixed with the handrail portion 12, an engaging structure 82 affixed with the handrail portion 11, and a spring 825.

[0073] The sleeve 83 can be movably assembled around the handrail portion 12, and the handrail portion 11 can have an end disposed through the sleeve 83. The engaging structure 81 can have a protruding rib 811, and the engaging structure 82 can have a slot 823 into which the rib 811 can engage. The sleeve 83 can enclose the rib 811 and the slot 823, and provide obstruction to prevent separation of the rib 811 from the slot 823. The handrail portion 12 can include an elongated slot 121 at a region corresponding to the sleeve 83. The sleeve 83 can include a post 831 that is guided through the elongated slot 121 to affix with the sleeve 83.

gated slot 121 to affix with the sleeve 83.

[0074] The spring 825 can have two ends respectively connected with the post 831 and an inner sidewall of the handrail portion 12. The spring 825 can be operable to bias the sleeve 83 toward the handrail portion 11 to enclose the engaging structures 81 and 82 and secure the connection between the handrail portions 11 and 12 (as shown in Figure 21).

[0075] When the handrail portion 12 is to be dismounted from the handrail portion 11, the sleeve 83 can be displaced along the elongated slot 121 toward the handrail portion 12, such that the spring 825 is compressed and the engaging structures 81 and 82 are exposed outward and accessible for operation (as shown in Figure 22). The rib 811 then can be disengaged from the slot 823 to separate the handrail portion 12 from the handrail portion 11.

[0076] It is worth noting that the sleeve 83 may also be movably assembled with the handrail portion 11, and the placement of the engaging structures 81 and 82 may be interchanged on the handrail portions 11 and 12. In addition, while the two side ends of the handrail portion 12 that are connected with the two ends of the handrail portion 11 have a bent shape in the embodiment shown in Figures 18-32, they may also be configured as in the embodiment illustrated in Figures 1-17 to form a substantially rectangular frame.

[0077] Referring to Figures 26, 28 and 32, each of the upper segments 31 can include a tubular extension 314 adapted to assemble with an end of the bar linkage 7. When the bar linkage 7 is connected with the upper segments 31, the two end portions of the bar linkage 7 and the two tubular extensions 314 can insert into one another, such that through holes 314a formed through the tubular extensions 314 can be respectively aligned with through holes 70 formed through the two end portions of the bar linkage 7. Moreover, two spring tabs (not shown) disposed inside the tubular extensions 314 and the bar linkage 7 can respectively engage with the through holes 314a and 70 to releasibly lock the bar linkage 7 with the upper segments 31 of the legs 3. When the baby crib is to be collapsed, the folding joints 2 can be separated from the upper segments 31. Then the spring tabs (not shown) can be operable to unlock the bar linkage 7, which can be subsequently detached from the upper segments 31.

[0078] In the second embodiment, two height adjustment mechanisms 34 can be respectively assembled with the legs 3. Each of the height adjustment mechanisms 34 can include an actuator 343, a driving part 341 and a latch 342. The actuator 343 can be formed as a handle that is assembled adjacent to the folding joint 2 for displacement along an outer surface of the upper segment 31 associated therewith. The driving part 341 can be movably assembled in the upper segment 31. The lower segment 32 can include a plurality of openings 320 distributed vertically along the lower segment 32 (as better shown in Figures 27 and 28). The latch 342 can move

transversally in the upper segment 31 to engage with any of the openings 320. An upper portion of the driving part 341 can be connected with the actuator 343, and a lower portion of the driving part 341 can be located adjacent to the latch 342, and can include an angled surface 341a adapted to push against the latch 342.

[0079] When the height of the baby crib is to be adjusted, the actuator 343 can be displaced upward, which causes the driving part 341 to move upward. As a result, the angled surface 341a can move upward and push the latch 342 to move transversally toward an outside of the upper segment 31 for disengaging from the openings 320. The upper segment 31 then can be vertically displaced relative to the lower segment 32 to adjust the height of the baby crib. Once the baby crib is set to the desired height, the latch 342 can engage with one corresponding opening 320 to lock the upper segment 31 with the lower segment 32.

[0080] As shown, the height adjustment mechanism 34 can further include a spring 344 having two ends respectively connected with an inner sidewall of the upper segment 31 and the latch 342. The spring 344 can be operable to bias the latch 342 to engage with any of the openings 320. In addition, an upper portion of the driving part 341 can have a barb 341b that can engage with an anchor slot 343a formed in an inner sidewall of the actuator 343. An upper region of the upper segment 31 can also include an elongated slot 315 extending vertically through which a knob 343b protruding from an inner sidewall of the actuator 343 can be guided for sliding movement. The actuator 343 can be thereby guided in movement on an outer surface of the upper segment 31. The barb 341b of the driving part 341 can engage with the anchor slot 343a, so that the driving part 341 can move vertically along with the actuator 343 for driving engagement and disengagement of the latch 342 with respect to the openings 320.

[0081] Figures 33-36 are schematic views illustrating a third embodiment of a baby crib. In the third embodiment, the handrail portion 12 can be detachably assembled with two ends of the handrail portion 11 via two coupling assemblies 8 (as better shown in Figures 33, 35 and 36). Each of the coupling assemblies 8 can include a release button 84, an engaging structure 81 affixed with the handrail portion 12, and an engaging structure 82 affixed with the handrail portion 11. The engaging structure 81 may include an opening formed through an end portion of the handrail portion 12, and the engaging structure 82 can include a resilient protrusion 826. The engaging structure 82 can insert into the end portion of the handrail portion 12, and the protrusion 826 can engage with the opening of the engaging structure 81. The release button 84 can be assembled on an outer surface of the handrail portion 12, and can have an actuating portion 841 in alignment with the opening of the engaging structure 81 (as shown in Figure 35).

[0082] When the handrail portion 12 is to be detached from the handrail portion 11, the actuating portion 841 of

the release button 84 can be depressed so as to push the protrusion 826 to disengage from the opening of the engaging structure 81. The engaging structure 82 then can be removed out of the end portion of the handrail portion 12 for detaching the handrail portion 12 from the handrail portion 11 (as better shown in Figure 36).

[0083] In some implementation, the protrusion 826 can also include an angled surface for facilitating the installation of the handrail portion 12. When it is assembled with the handrail portion 11 for forming the upper frame 1, the handrail portion 12 can push against the angled surface of the protrusion 826 to cause its deflection until it becomes aligned and elastically engage with the opening of the engaging structure 81.

[0084] In the third embodiment, the bar linkage 7 can have two end portions bent downward and detachably connected with the tubular extensions 314. In addition, the bar linkage 7 can be affixed with a support frame 75 to form a lower frame structure of a rectangular shape below the upper frame 1, the bar linkage 7 crossing the rectangle of the support frame 75.

[0085] Unlike the embodiments previously described, an additional spring (not shown) can be disposed between the actuator 343 and an inner sidewall of the upper segment 31 in each of the height adjustment mechanisms 34, and can be operable to bias the actuator 343 to recover an initial position.

[0086] As shown in Figure 33, two opposite ends of one foot portion 4 can be respectively provided with a wheel assembly 5 including a brake 50, whereas two opposite ends of the other foot portion 4 can include anti-slip pads 40. When the baby crib is to be displaced, the baby crib can be pulled upward to raise the anti-slip pads 40 above the ground, and then displaced via the rolling contact of the wheel assemblies 5 with the ground. Once the baby crib is placed at the desired position, the anti-slip pads 40 can rest in contact against the ground.

[0087] Referring to Figure 37, the upper frame 1 can have a rectangular shape. The first and second enclosure portions 101 and 102 can be connected with each other via two fasteners 103 that are disposed at two short sides of the enclosure 10 (i.e., corresponding to the two short sides of the upper frame 1). Moreover, the fasteners 103 can extend in an oblique direction. For example, the fasteners 103 can extend from one coupling assembly 8 toward a lower corner of the enclosure 10.

[0088] A person of ordinary skill in the art of baby crib designs would understand that the various constructions of the coupling assemblies 8 disposed on the upper frame 1, the height adjustment mechanisms 34 disposed on the legs 3, the connection between the bar linkage 7 and the legs 3, and the connection between the folding joints 2 and the legs 3 as described herein can be independently implemented, interchangeably implemented, or partly combined with one another to provide the desired functions and advantages.

[0089] Realizations of the baby crib have been described only in the context of particular embodiments.

These embodiments are meant to be illustrative and not limiting. Many variations, modifications, additions, and improvements are possible. Optional features of the baby crib are mentioned above and in the dependent claims. Embodiments of the baby crib according to the present invention may comprise any of these features or combinations thereof. Accordingly, plural instances may be provided for components described herein as a single instance. Structures and functionality presented as discrete components in the exemplary configurations may be implemented as a combined structure or component. These and other variations, modifications, additions, and improvements may fall within the scope of the inventions as defined in the claims that follow.

Claims

1. A baby crib comprising:

an upper frame (1) including a first and a second handrail portion (11, 12), the second handrail portion (12) being detachably connected with two ends of the first handrail portion (11) via two coupling assemblies (8), wherein at least one of the two coupling assemblies (8) includes a first engaging structure (81) provided on the first handrail portion (11), and a second engaging structure (82) provided on the second handrail portion (12) and adapted to engage with the first engaging structure (81);
two folding joints (2) respectively affixed with two opposite sides of the first handrail portion (81);
two legs (3) respectively connected pivotally with the two folding joints (2), each of the two legs (3) having an upper segment (31) and a lower segment (32) that are connected with each other via a height adjustment mechanism (33); and
a bar linkage (7) extending transversally between the two legs (7), and having two opposite ends respectively connected with the two legs (3).

2. The baby crib according to claim 1, wherein the first engaging structure (81) has a protruding rib (811), and the second engaging structure (82) has a slot (823) into which the rib (811) engages when the first handrail portion (11) is locked with the second handrail portion (12).

3. The baby crib according to claim 2, wherein the first engaging structure (81) further has an opening (812), and the second engaging structure (82) further includes a tab (824) that engages through the opening (812) when the rib (811) engages with the slot (823).

4. The baby crib according to claim 2, wherein the at

least one coupling assembly (8) further includes a sleeve (83) movably assembled around the second handrail portion (12), the first handrail portion (11) having an end disposed through the sleeve (83), and the sleeve enclosing at least partially the rib (811) and the slot (823) to block disengagement of the rib (811) from the slot (823).

5. The baby crib according to claim 2, wherein the two legs (3) are respectively connected with a first and a second support bar (9) that extend below the first handrail portion (11), and the second handrail portion (12) is operable to detachably connect with distal ends of the first and second support bars (9).

6. The baby crib according to claim 1, wherein the at least one coupling assembly (8) further includes a release button (84) assembled on an outer surface of the second handrail portion (12) and having an actuating portion (841), the first engaging structure (81) includes an opening that is formed through an end portion of the first handrail portion (12) and is in alignment with the actuating portion (841), and the second engaging structure (82) includes a resilient protrusion (826), the second engaging structure (82) being operable to insert into the end portion of the first handrail portion (12) to cause the protrusion (826) to engage with the opening.

7. The baby crib according to claim 1, wherein the two ends of the bar linkage (7) are movably assembled with the legs (3), the bar linkage (7) being vertically movable relative to the legs (3) between a first position adjacent to the lower segments (32) where the bar linkage (7) and the legs (3) form a H-shape, and a second position where the bar linkage (7) are located adjacent to the folding joints (2).

8. The baby crib according to claim 7, wherein each of the legs (3) has an elongated channel (311) that extends vertically to one folding joint (2) and has a lower portion provided with a first opening (312), the folding joint (2) has a sidewall provided with a second opening (21) substantially aligned vertically with the first opening (312), and the bar linkage (7) is held at a first position via a locking engagement with the first opening (312), and at a second position above the first position via a locking engagement with the second opening (21).

9. The baby crib according to claim 7, wherein the legs (3) include tubular extensions (314) with which the two ends of the bar linkage (7) are adapted to detachably fasten.

10. The baby crib according to claim 1, wherein the bar linkage (7) is affixed with a support frame (75) below the upper frame (1).

11. The baby crib according to claim 1, wherein the height adjustment mechanism (33) includes an actuator (330) and a latch (332), one of the upper and lower segments (31, 32) including a plurality of openings (310) distributed along a vertical direction through any one of which the latch (332) engages to lock the upper segment (31) with the lower segment (32), and the actuator (330) being assembled with the other one of the upper and lower segments (31, 32) and operable to cause the latch (332) to disengage from any of the openings (310). 5
12. The baby crib according to claim 11, wherein the height adjustment mechanism (33) further includes a spring (334), and the actuator (330) includes a driving part (331) operatively connected with the latch (332), the spring (334) having two ends respectively connected with an inner sidewall of one leg (3) and the latch (332). 10 15
13. The baby crib according to claim 12, wherein the driving part (331) has a first angled surface (331a), and the latch (332) has a second angled surface (332b) in sliding contact with the first angled surface (331a). 20 25
14. The baby crib according to claim 12, wherein the actuator (330), the spring (334) and the latch (332) are assembled with the lower segment (32), and the openings (310) are formed along the upper segment (31). 30
15. The baby crib according to claim 12, wherein the actuator (330), the spring (334) and the latch (332) are assembled with the upper segment (31), and the openings (310) are formed along the lower segment (32). 35
16. The baby crib according to claim 1, further two foot portions (4) respectively affixed with lower ends of the legs (3). 40
17. The baby crib according to claim 1, wherein the upper segments (31) of the legs (3) are respectively affixed with the folding joints (2). 45
18. The baby crib according to claim 1, wherein the upper segments (31) of the legs (3) are respectively connected pivotally with the folding joints (2). 50
19. The baby crib according to claim 1, further including an enclosure (10) disposed between the upper frame (1) and the bar linkage (7). 55
20. The baby crib according to claim 19, wherein the enclosure (10) includes at least a first enclosure portion (101) connected with the first handrail portion (11), and a second enclosure portion (102) connect- ed with the second handrail portion (12), two opposite side edges of the second enclosure portion (102) being attached with two side edges of the first enclosure portion (101) respectively via fasteners (103).
21. The baby crib according to claim 20, wherein the upper frame (1) has a rectangular shape, and the fasteners (103) are disposed at two short sides of the enclosure (10), the fasteners (103) respectively extending in oblique directions from an upper side of the enclosure (10) toward a lower side of the enclosure (10).

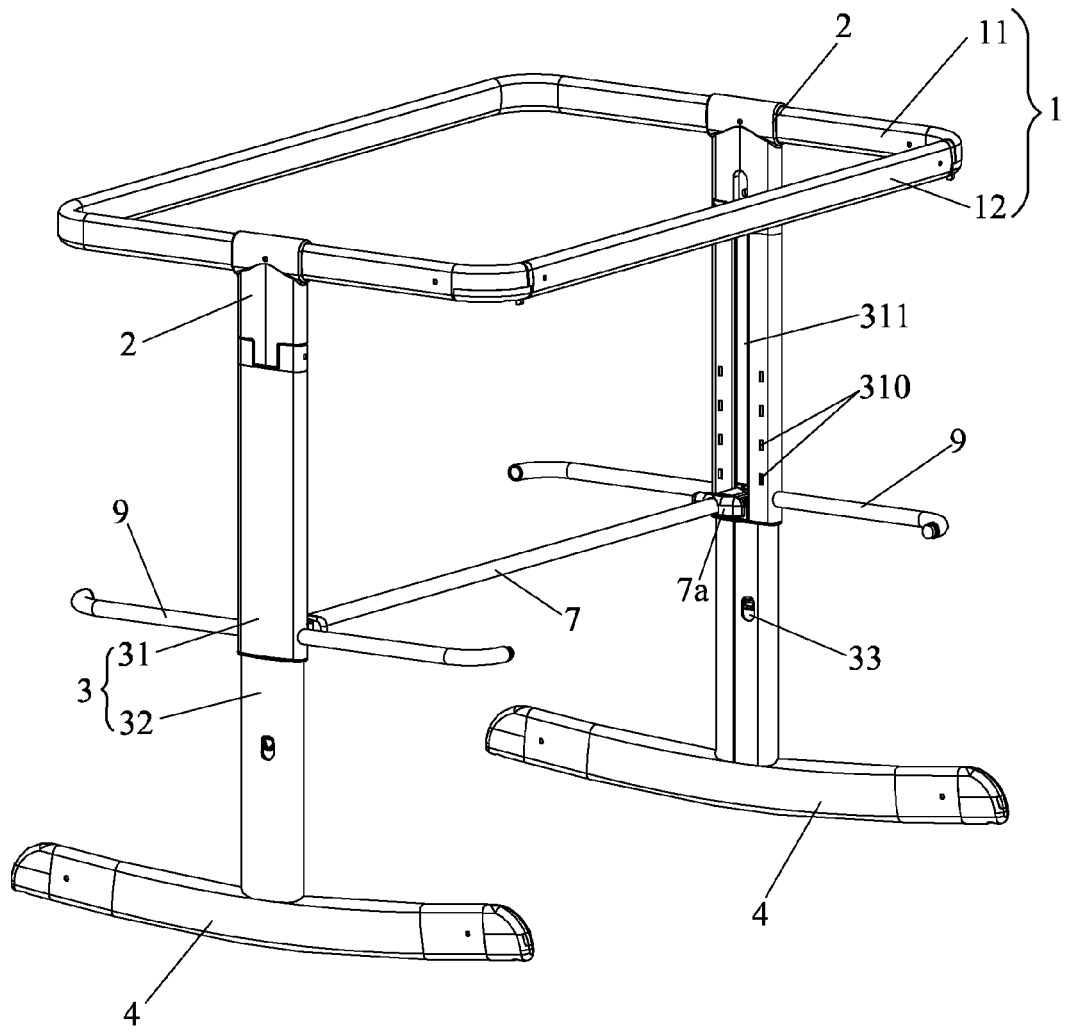


FIG. 1

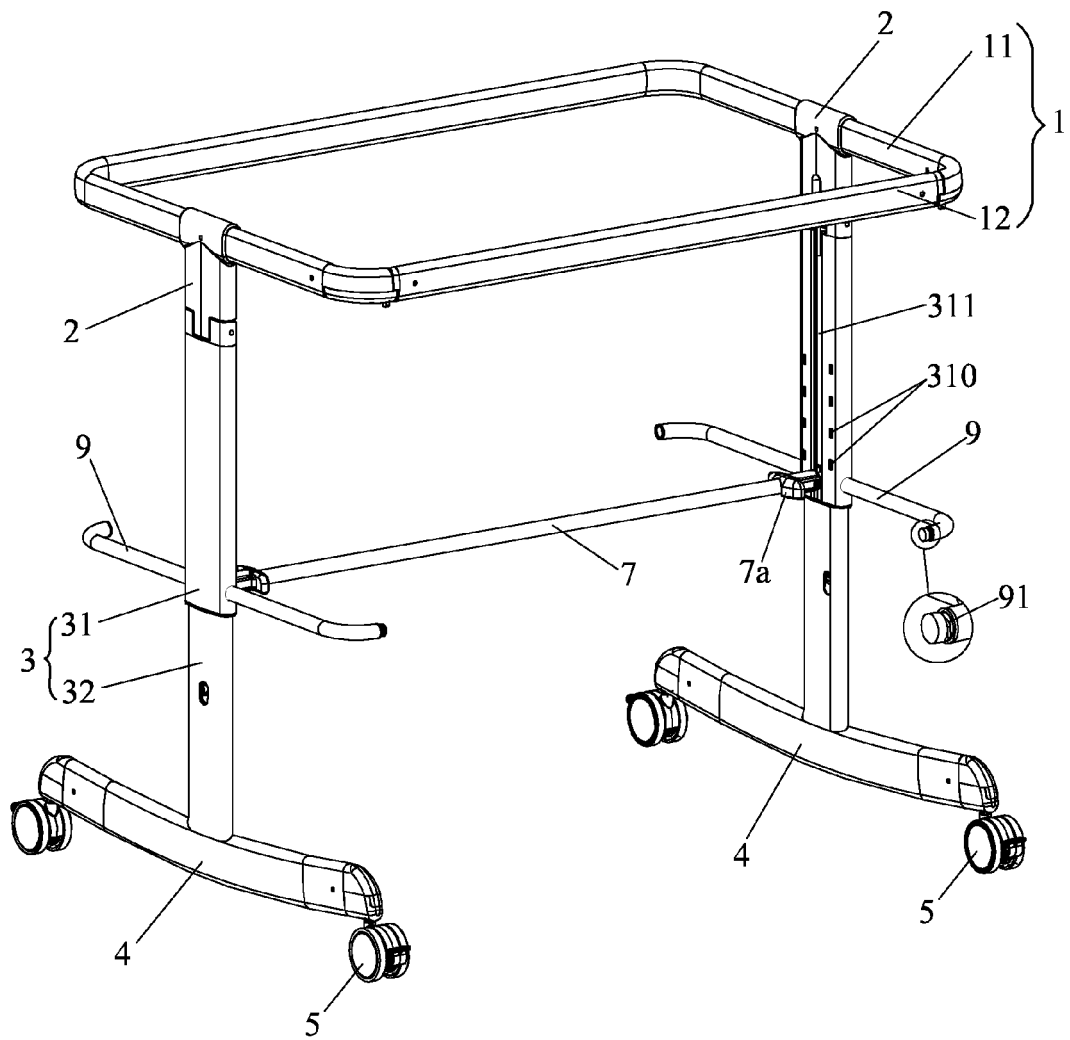


FIG. 2

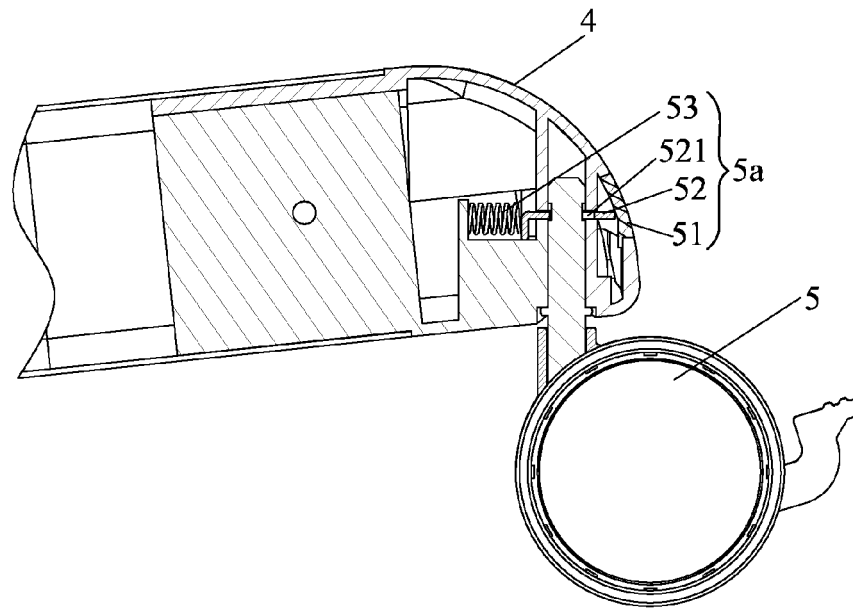


FIG. 3

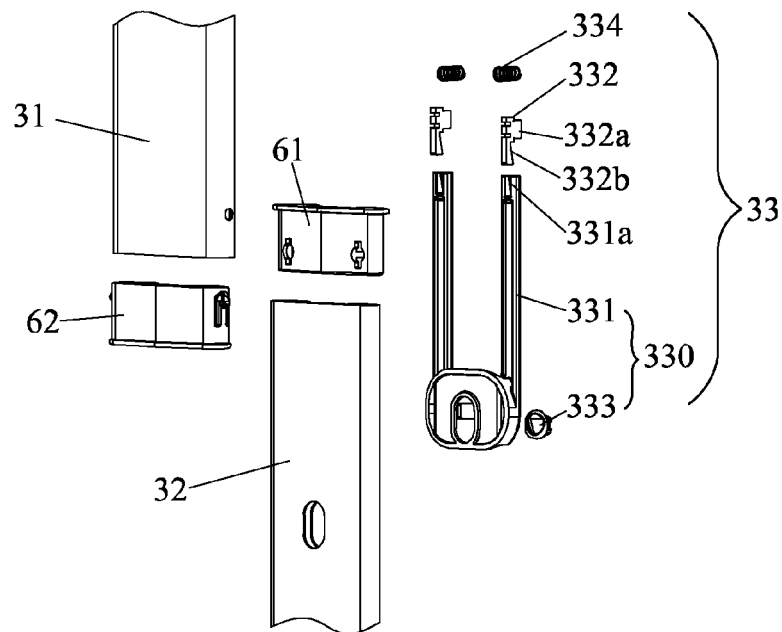


FIG. 4

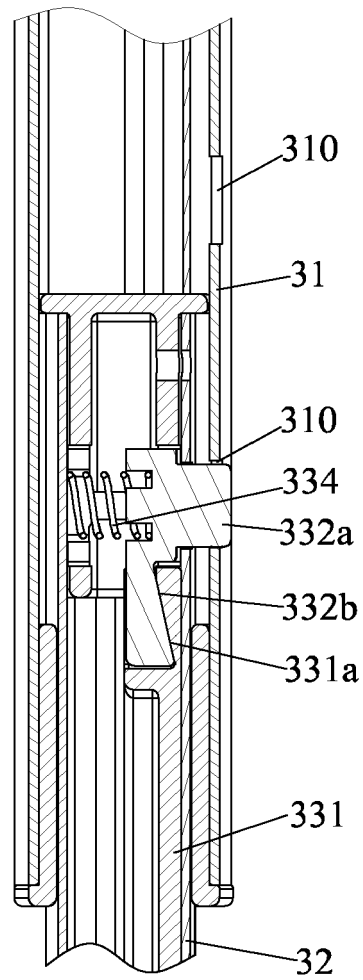


FIG. 5

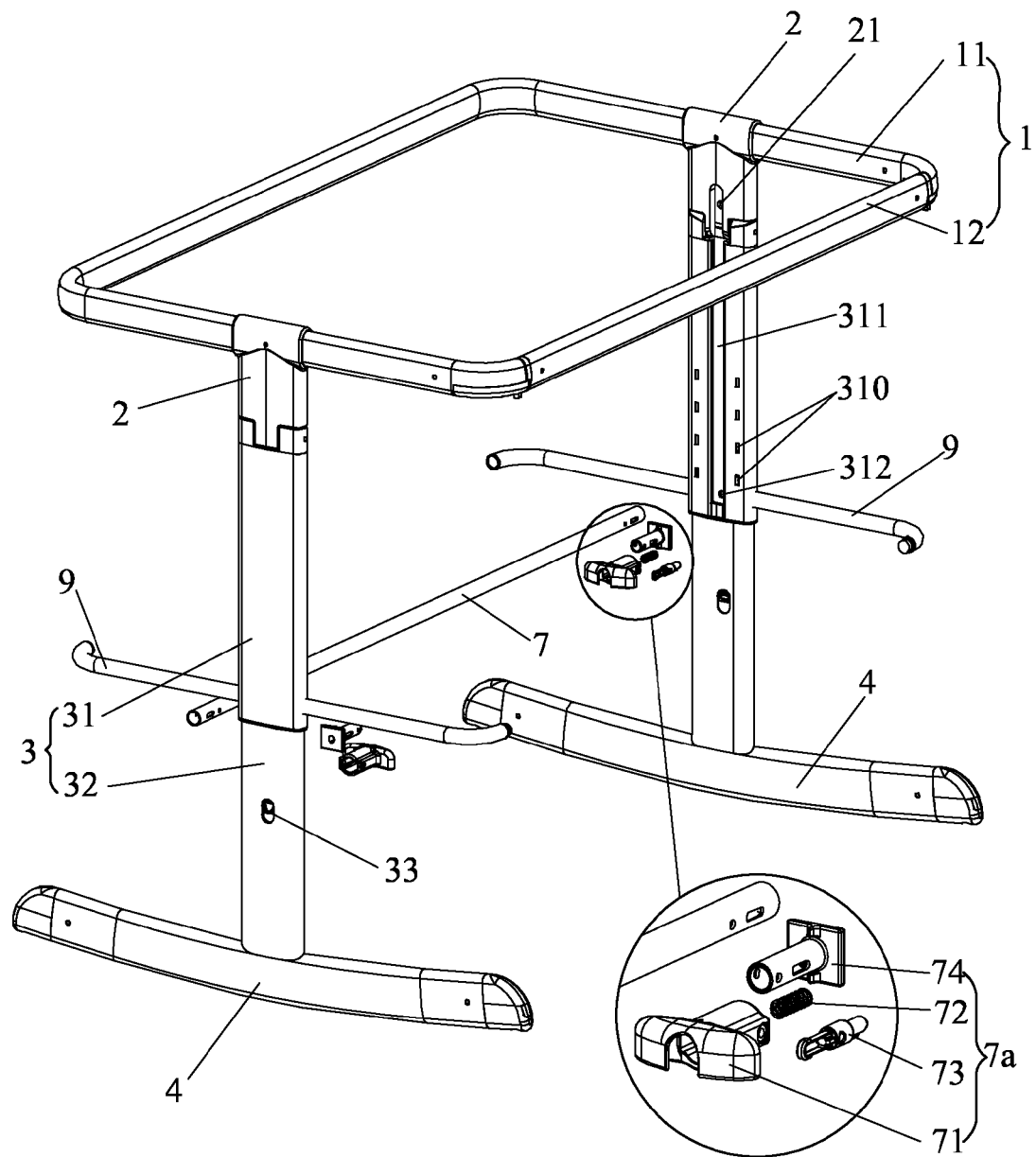


FIG. 6

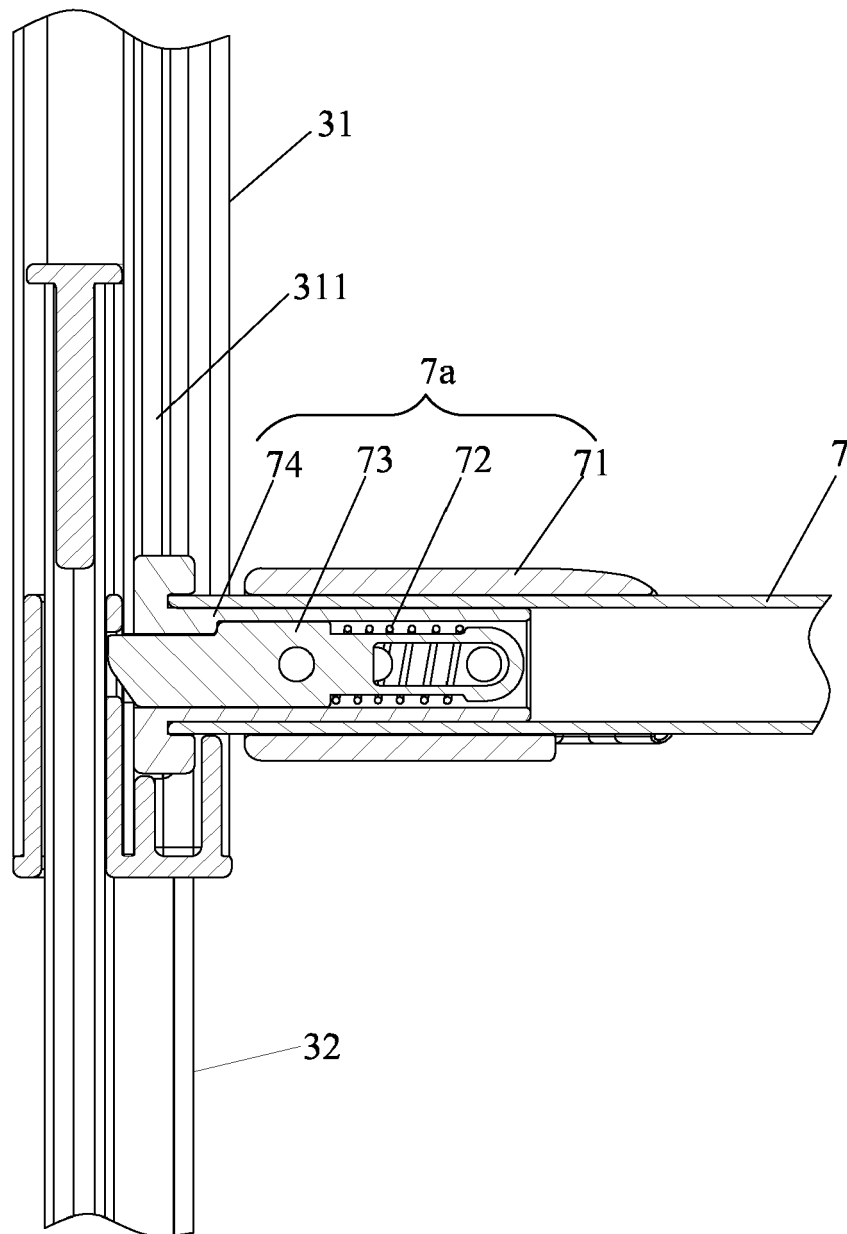


FIG. 7

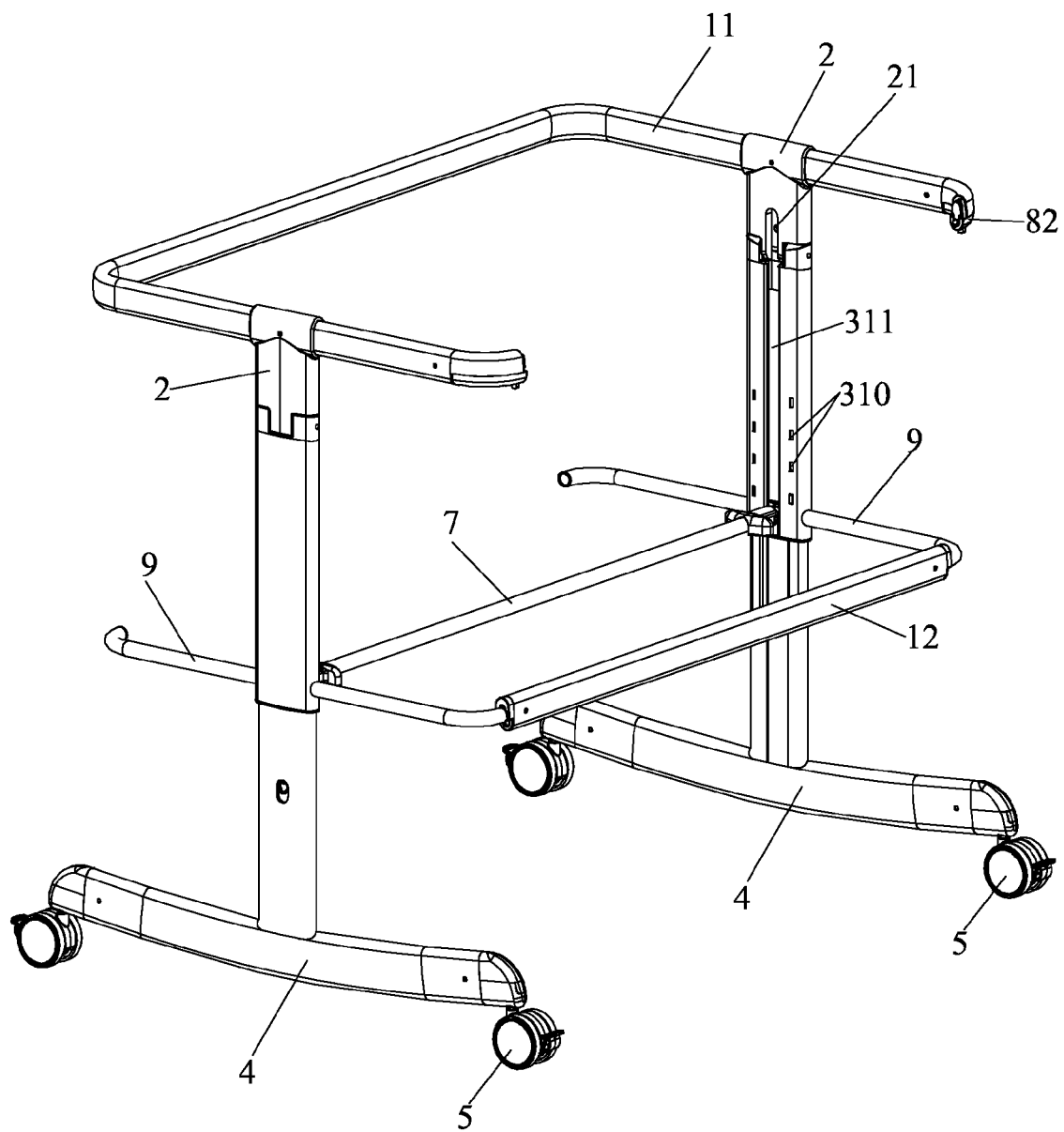


FIG. 8

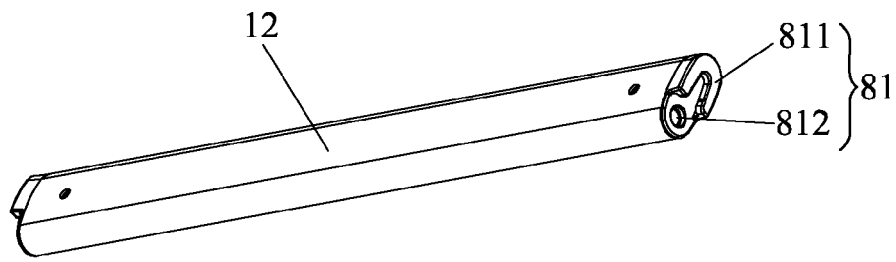


FIG. 9

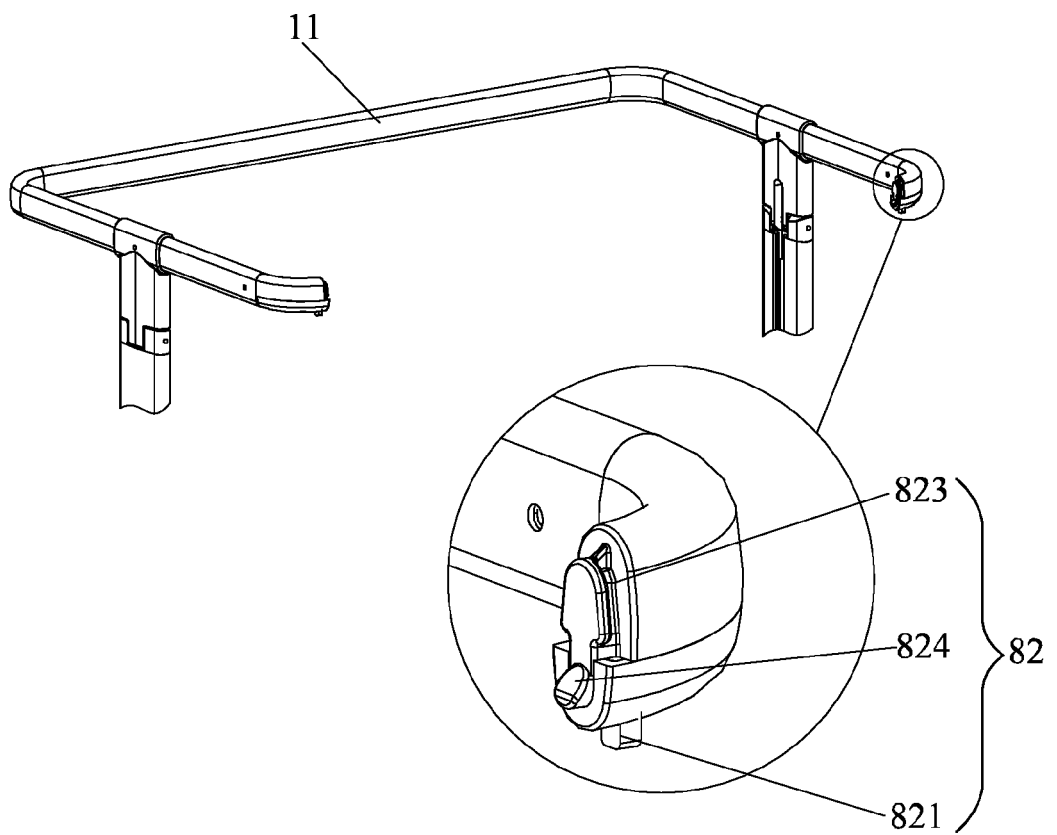


FIG. 10

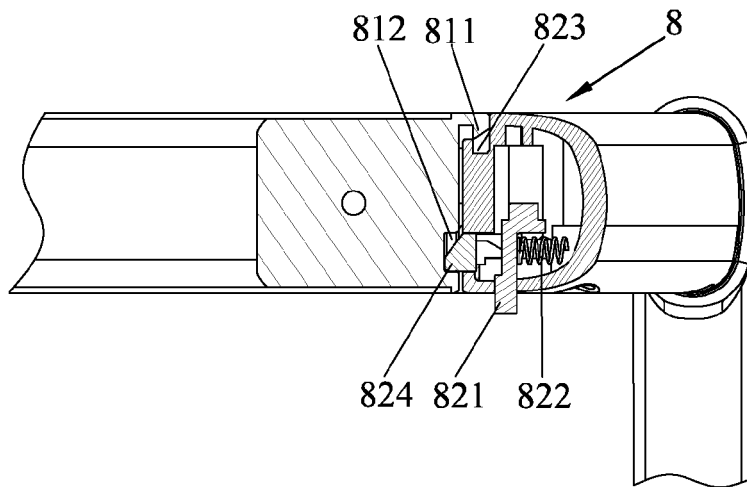


FIG. 11

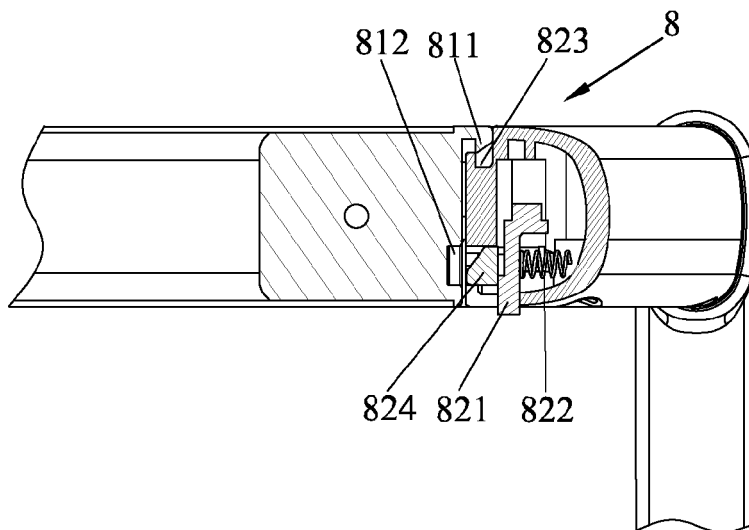


FIG. 12

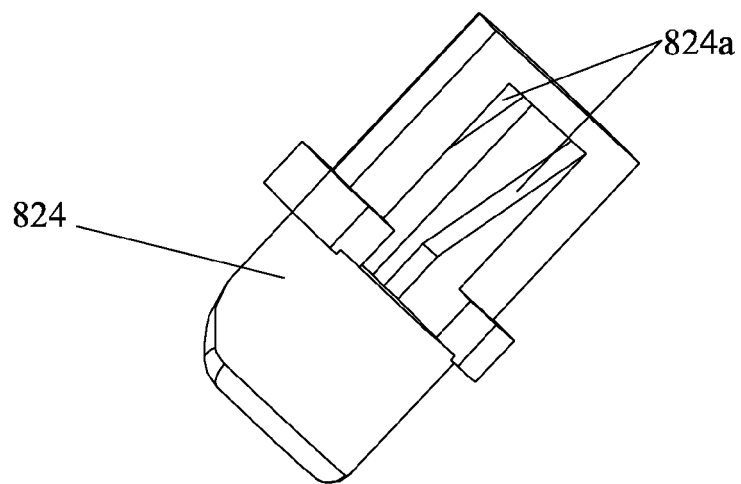


FIG. 13

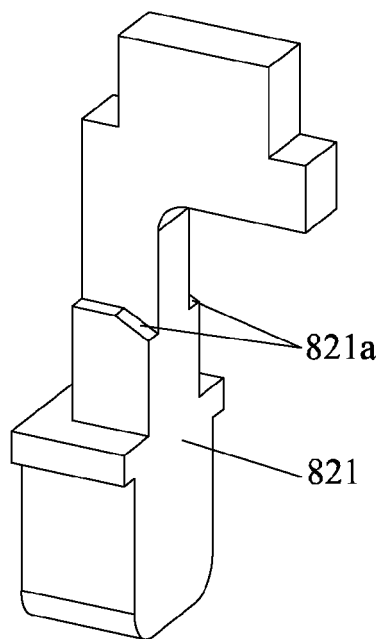


FIG. 14

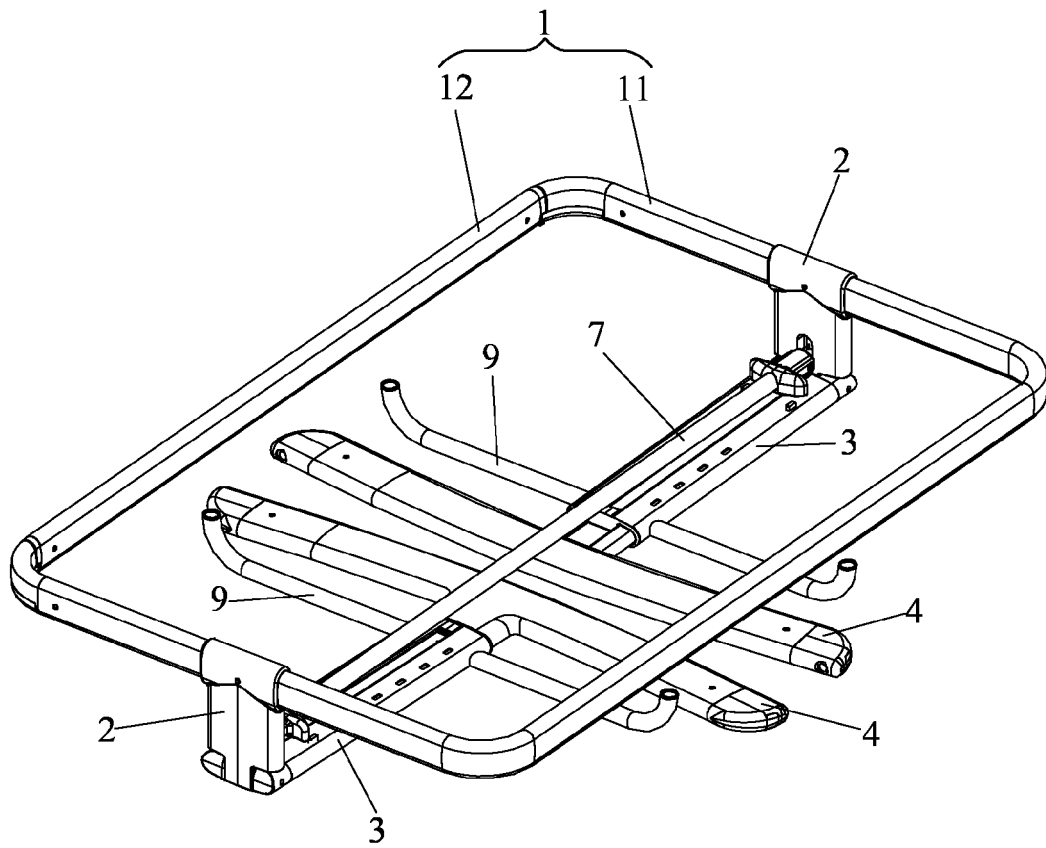


FIG. 15

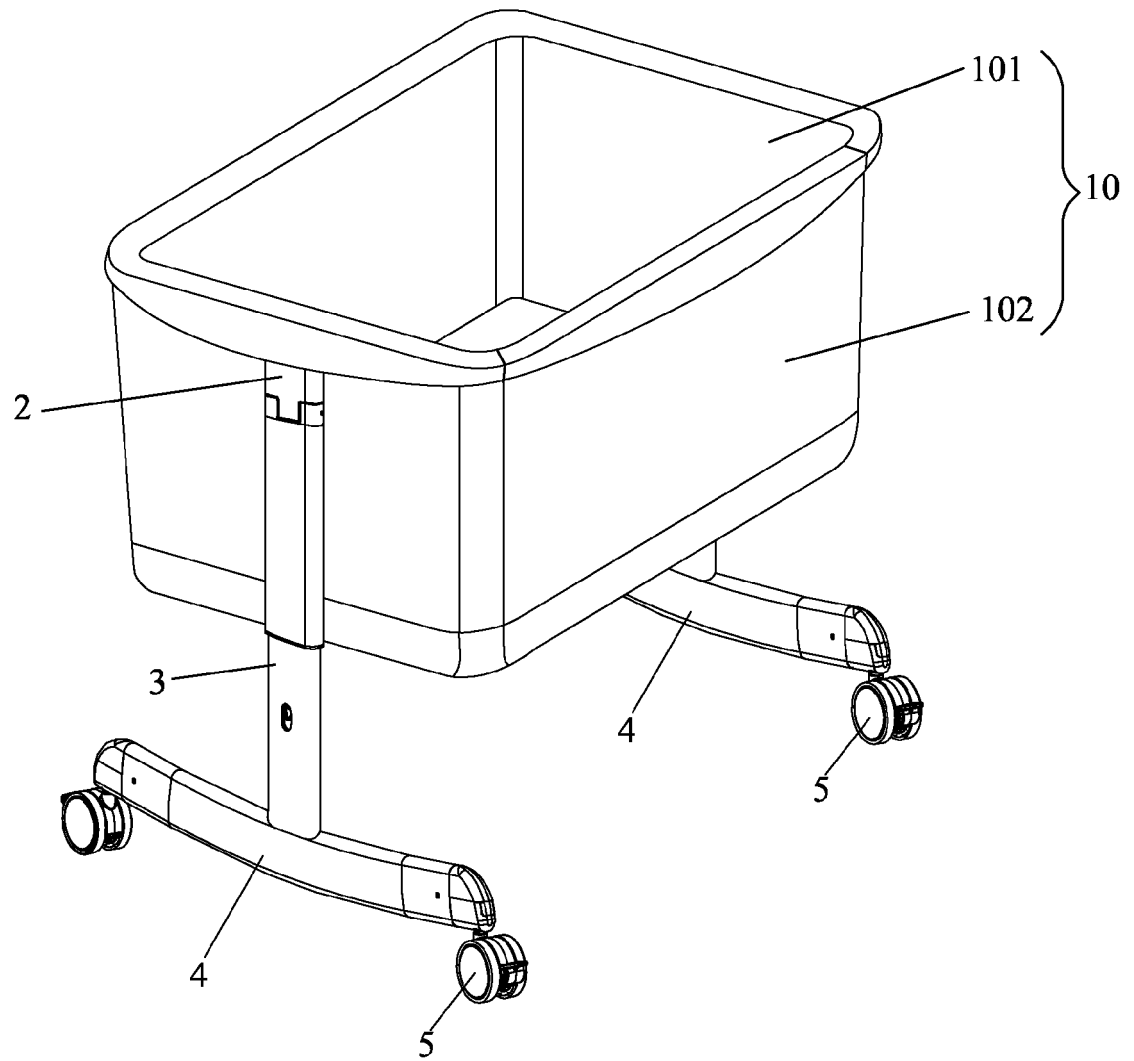


FIG. 16

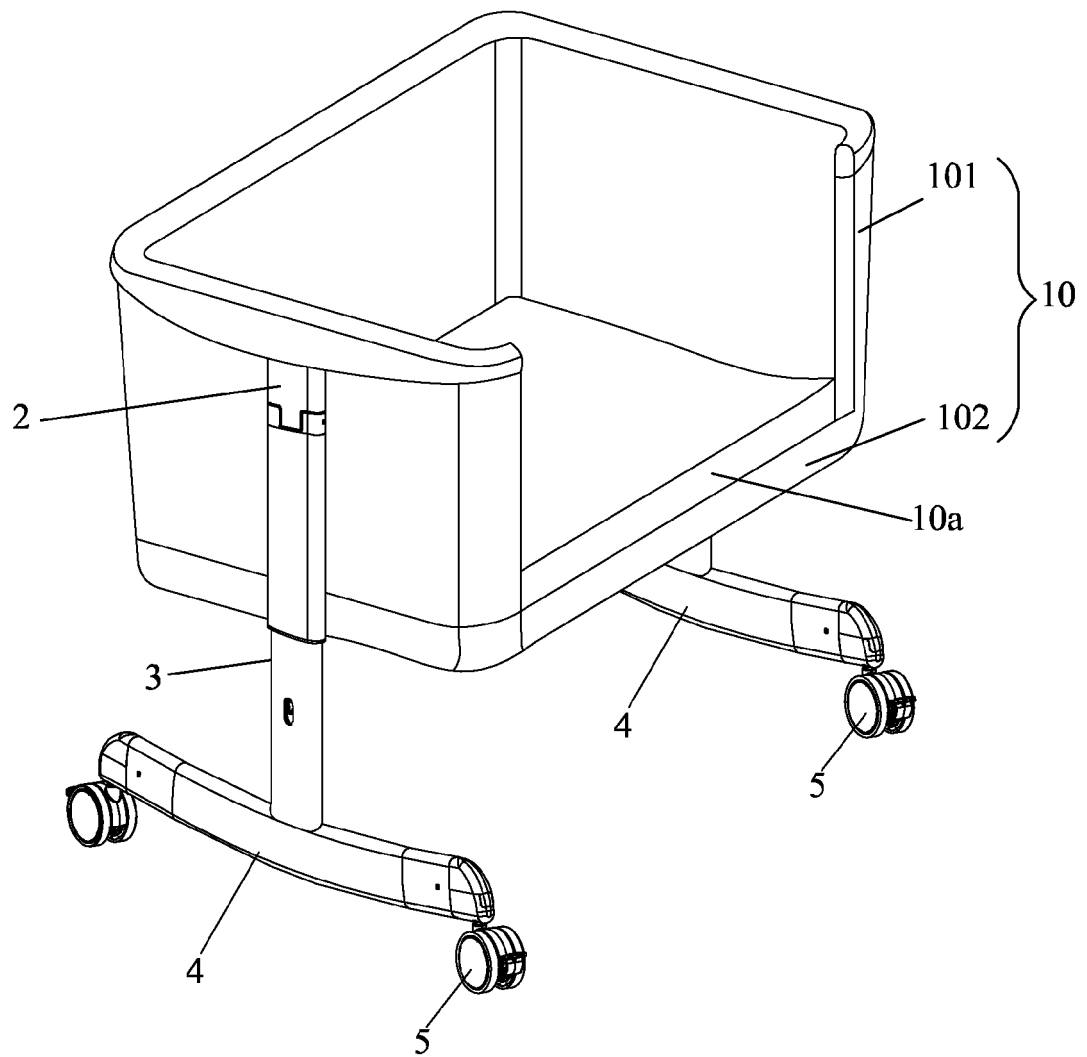


FIG. 17

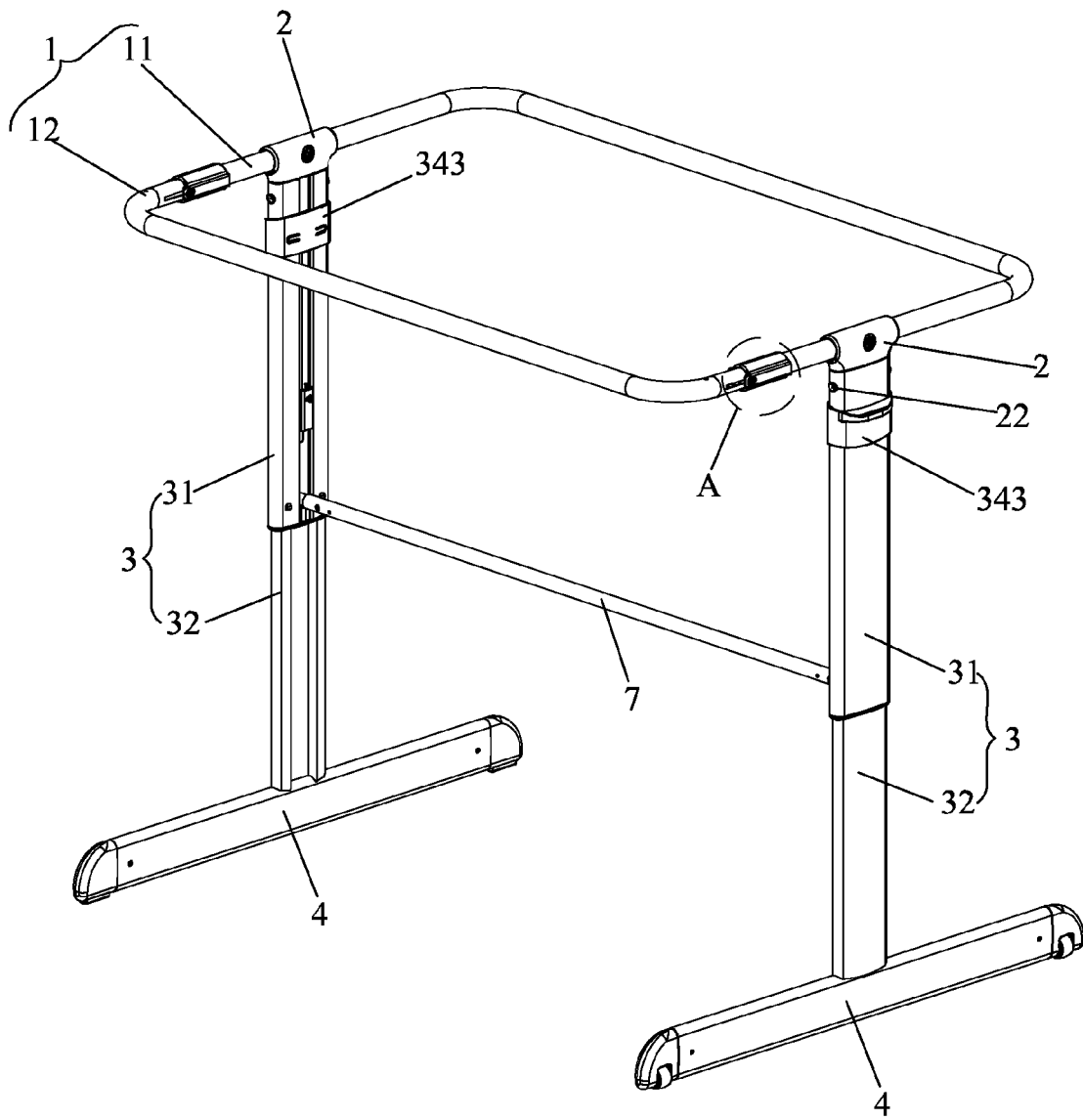


FIG. 18

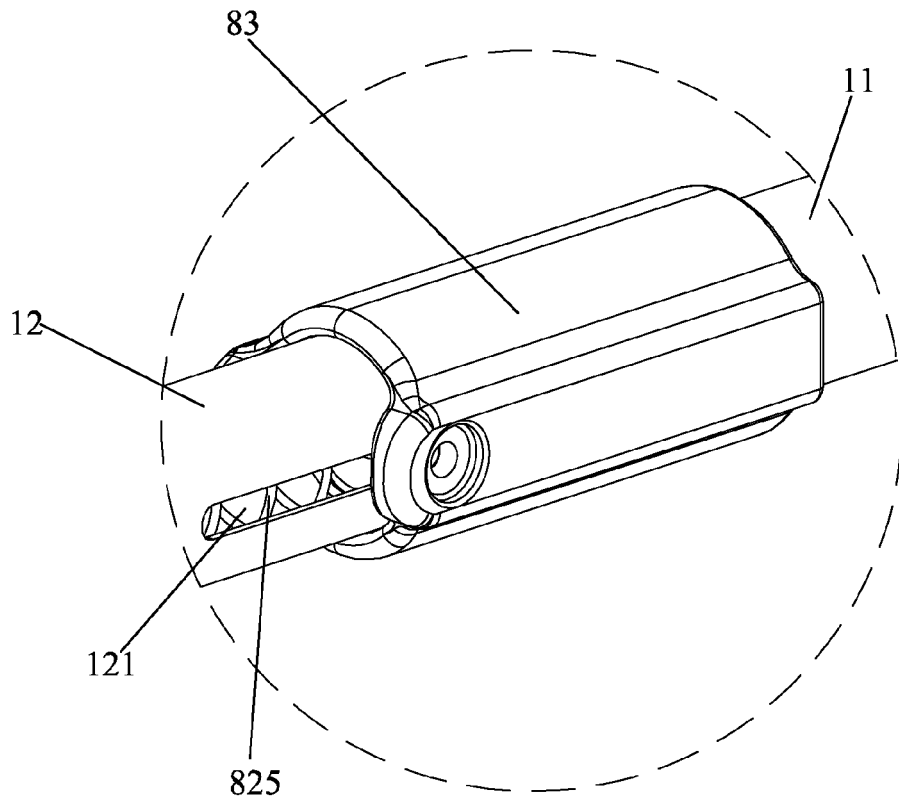


FIG. 19

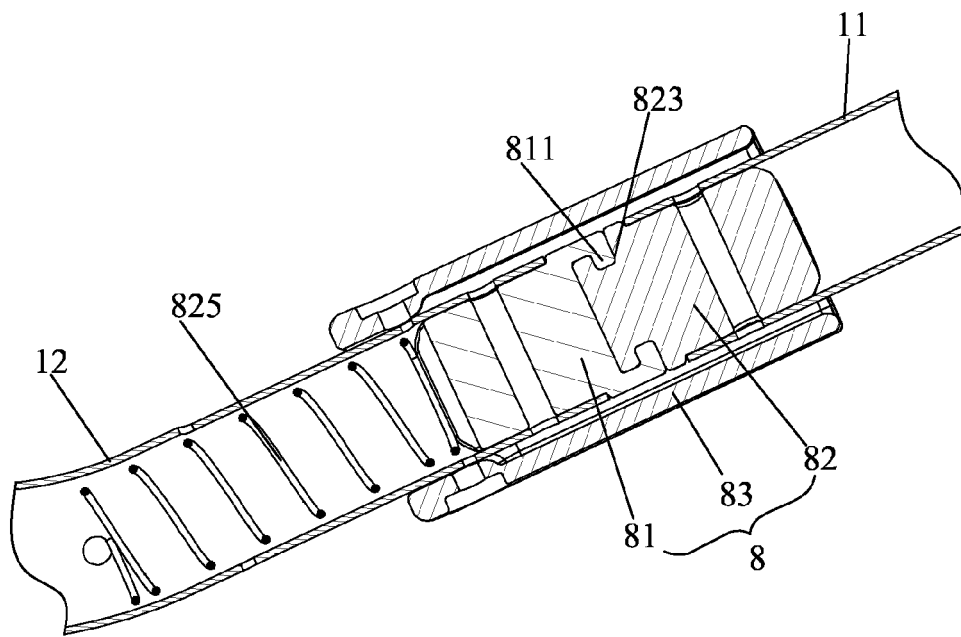


FIG. 20

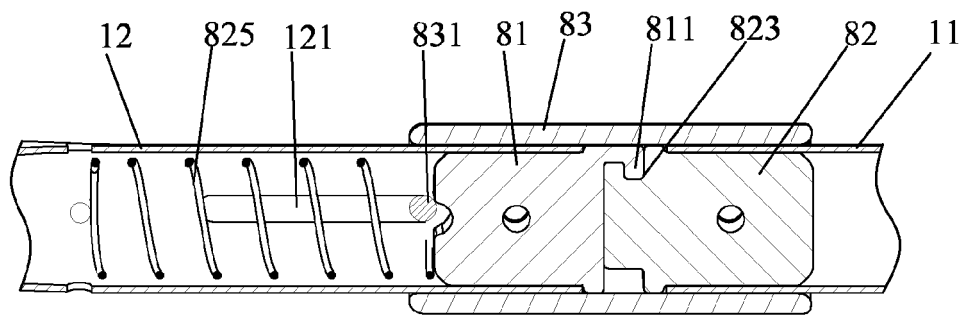


FIG. 21

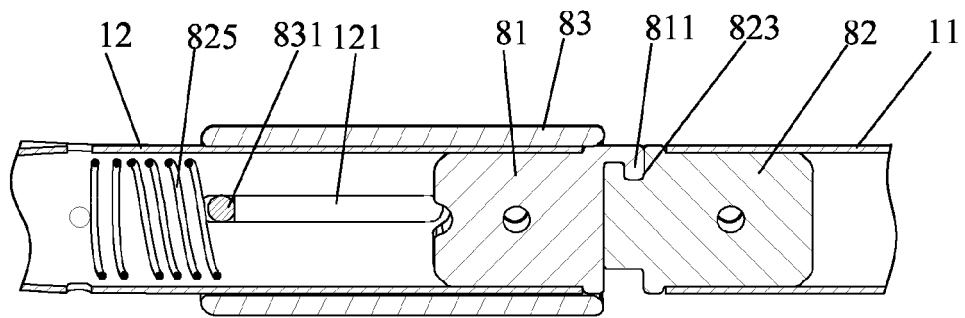


FIG. 22

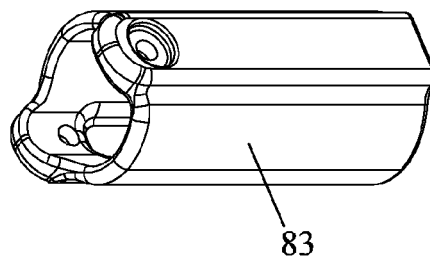
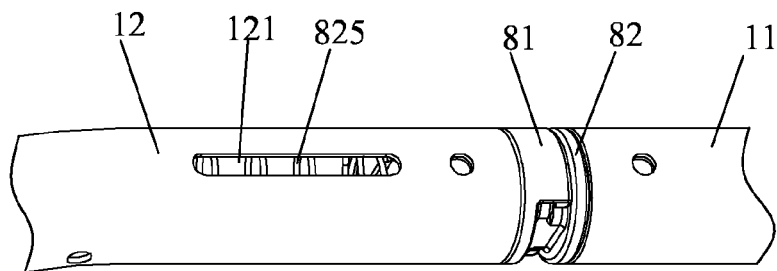


FIG. 23

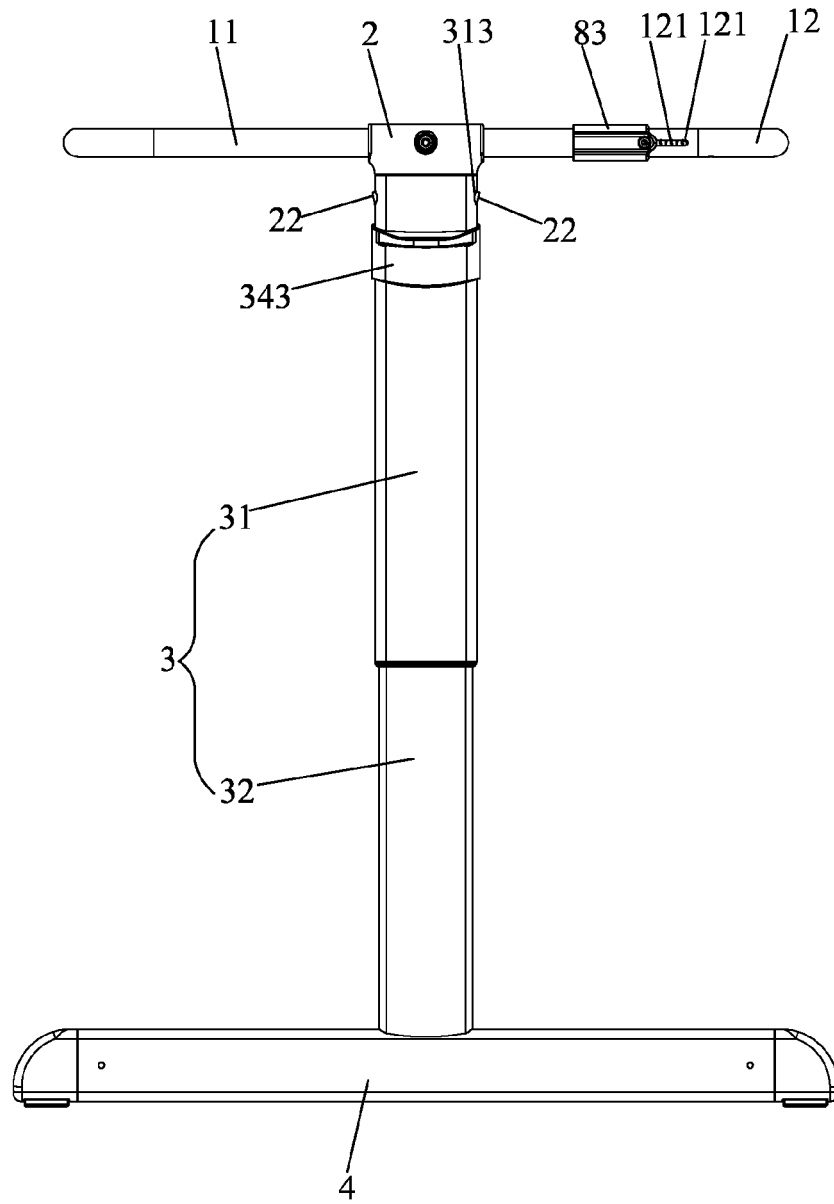


FIG. 24

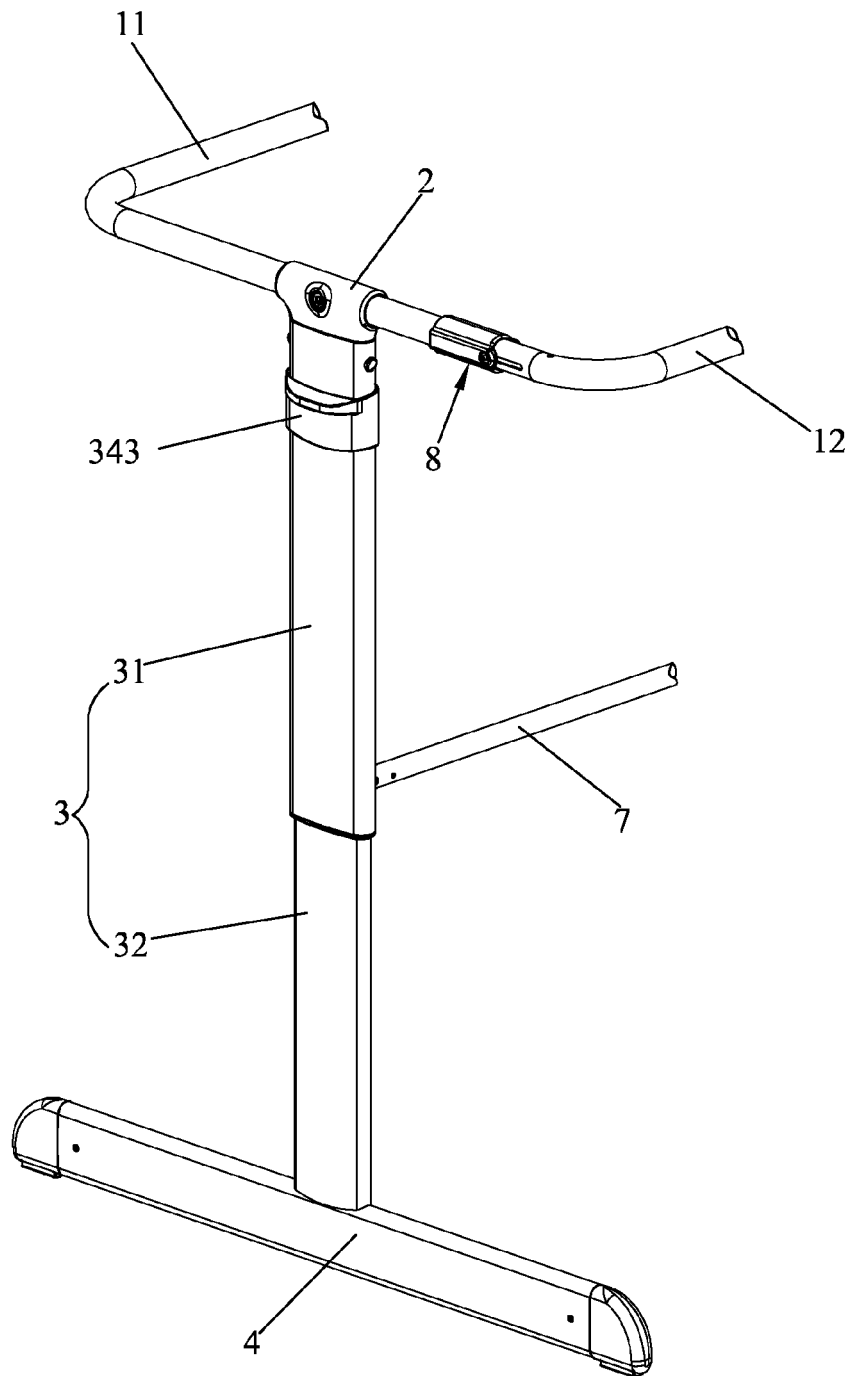


FIG. 25

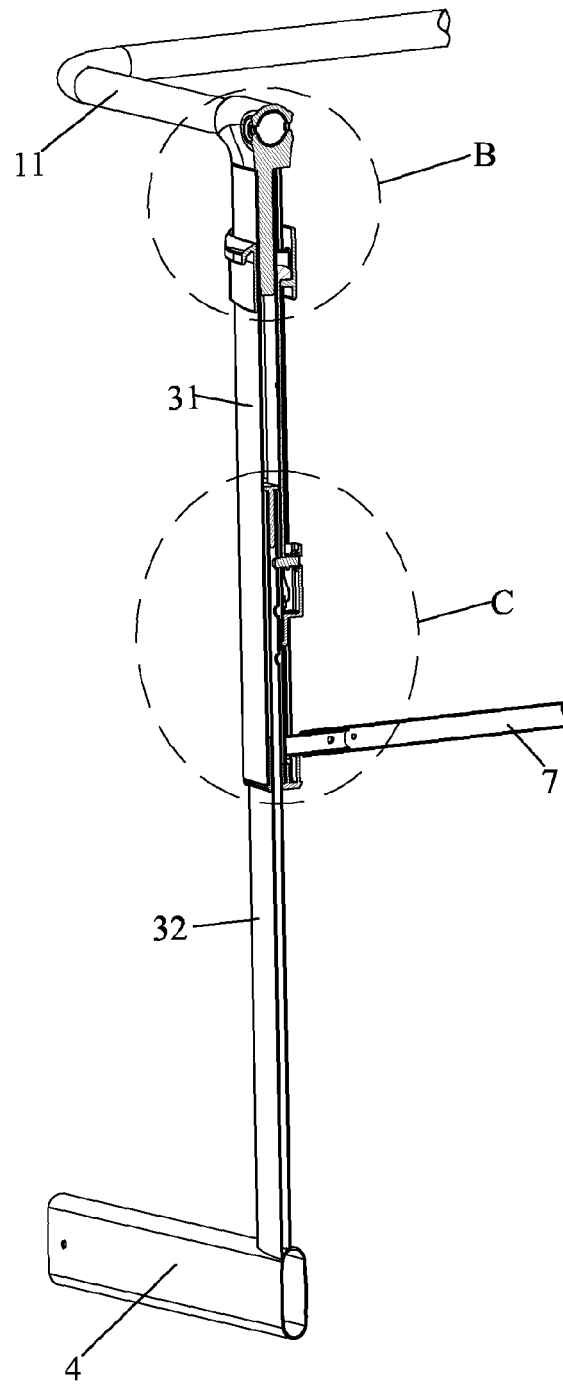


FIG. 26

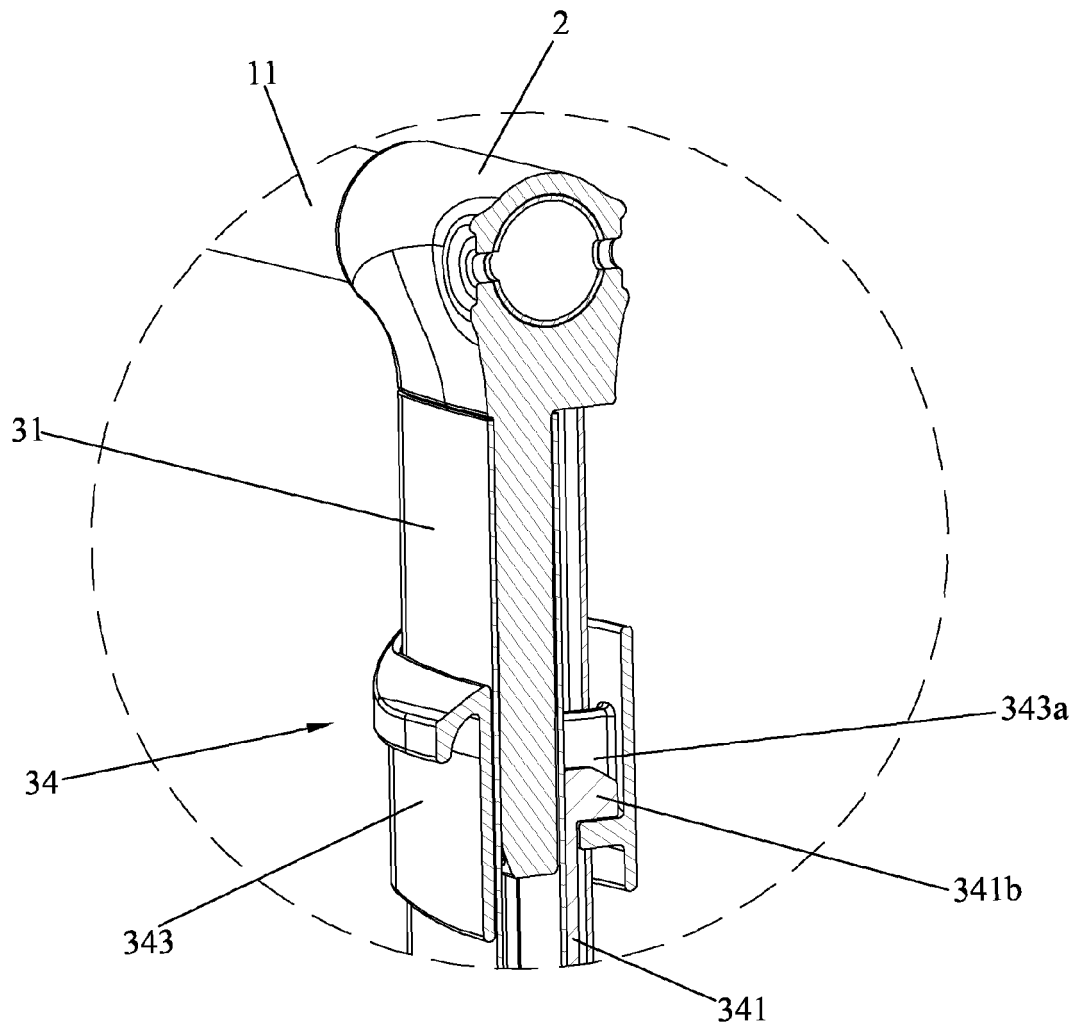


FIG. 27

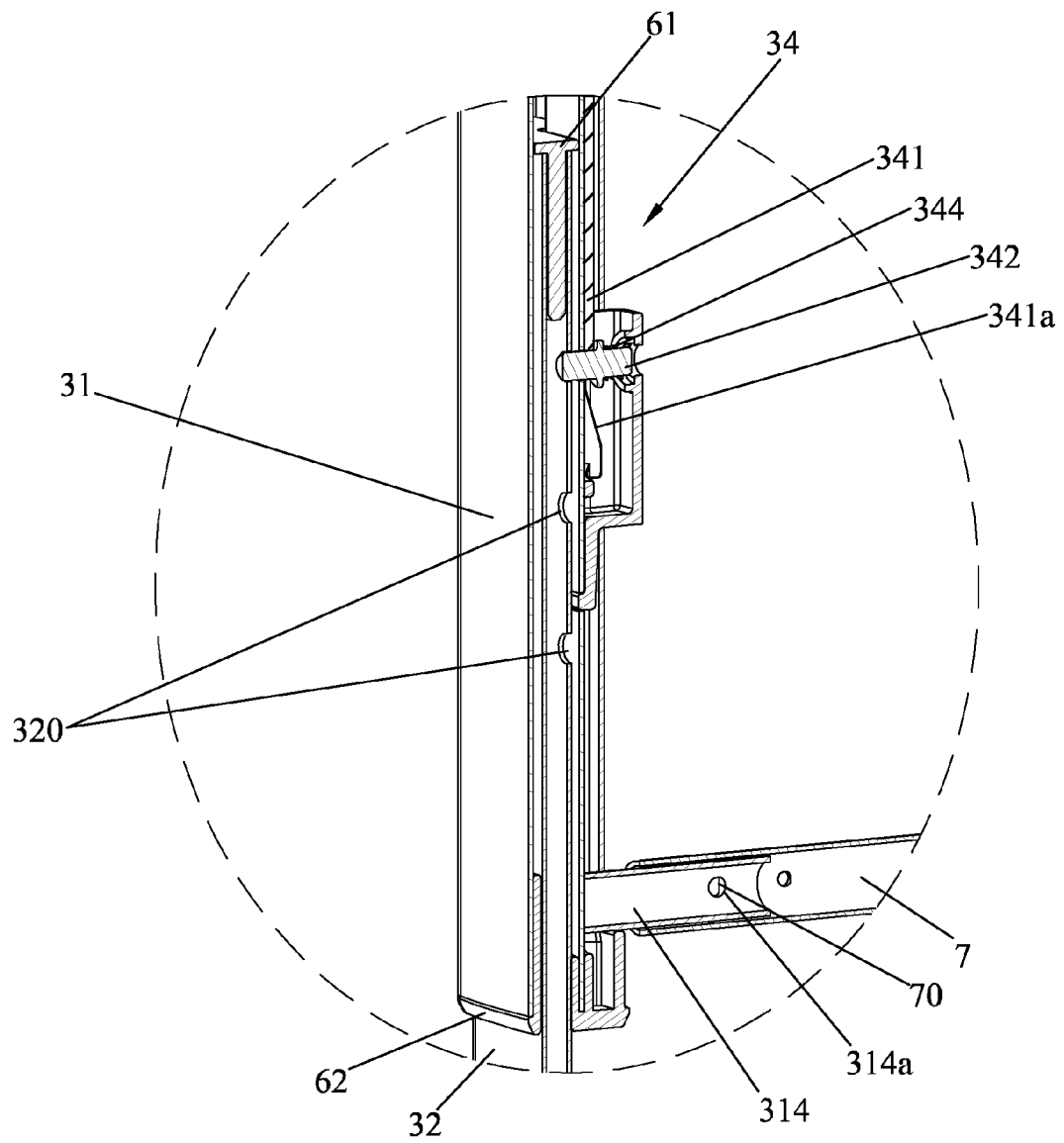


FIG. 28

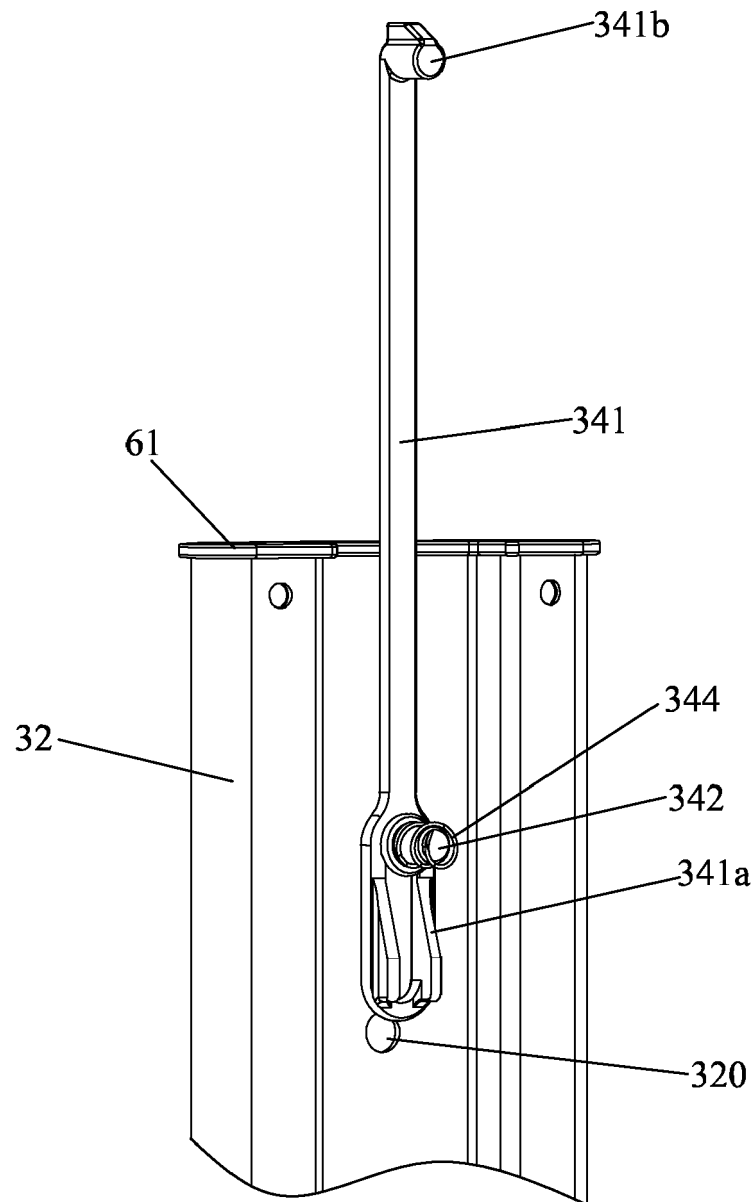


FIG. 29

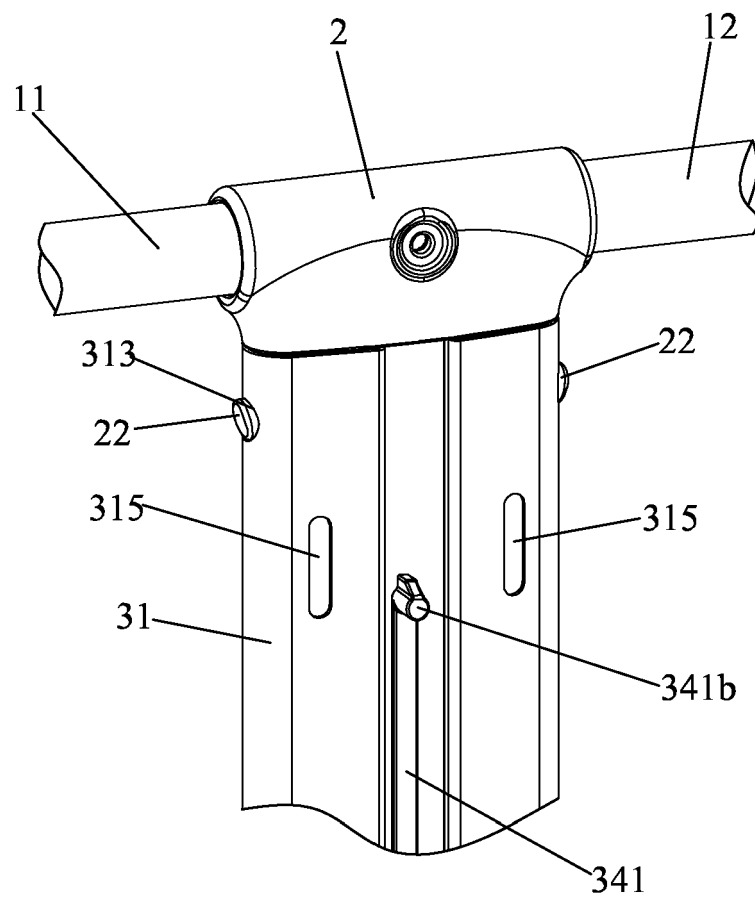


FIG. 30

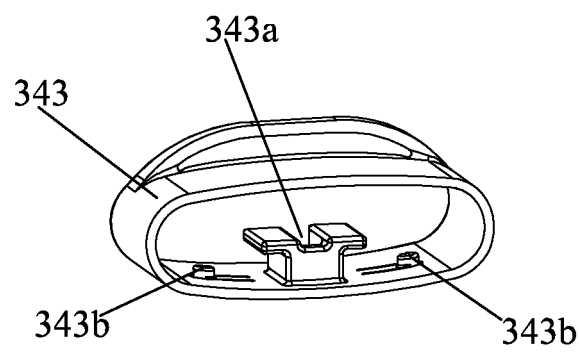


FIG. 31

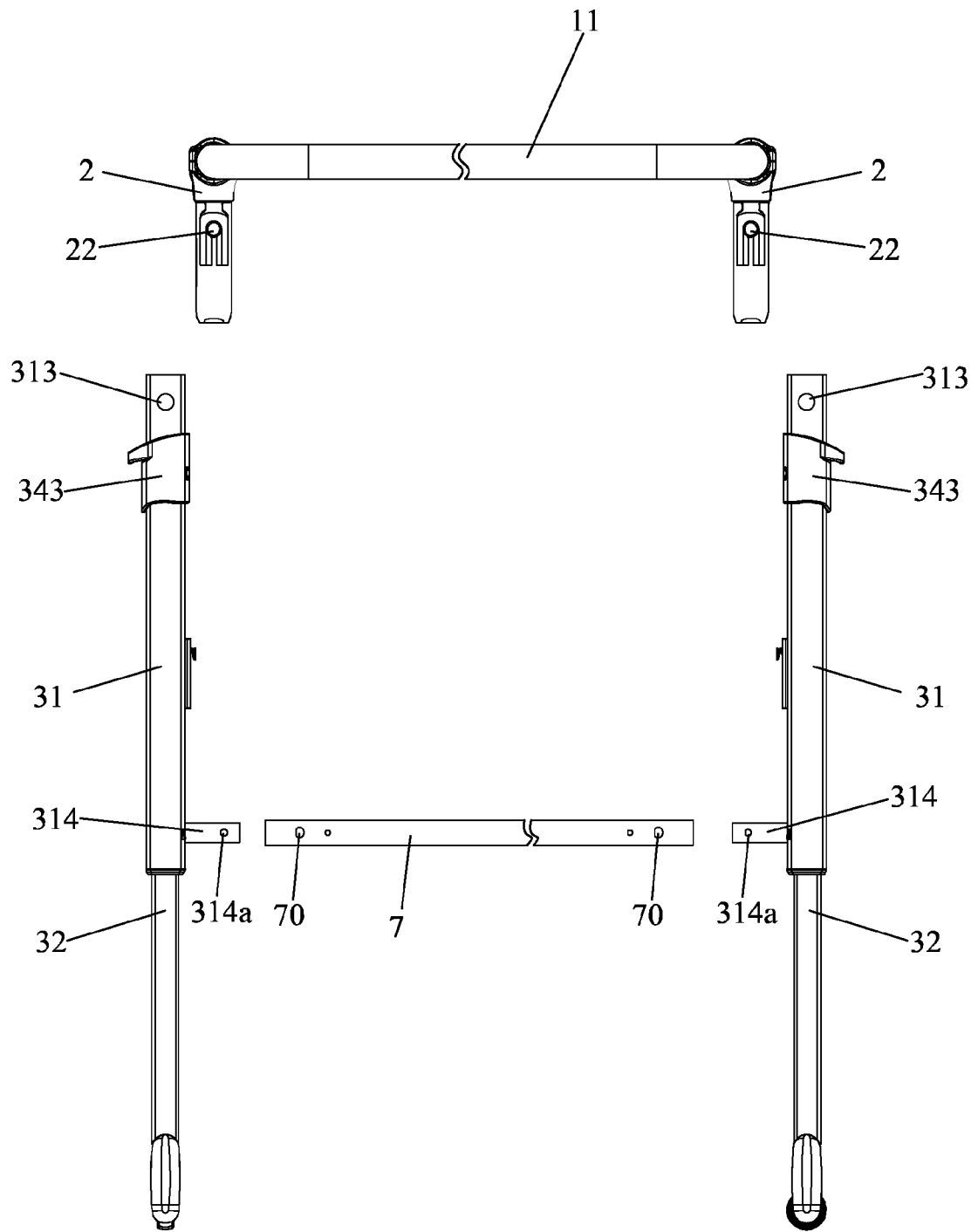


FIG. 32

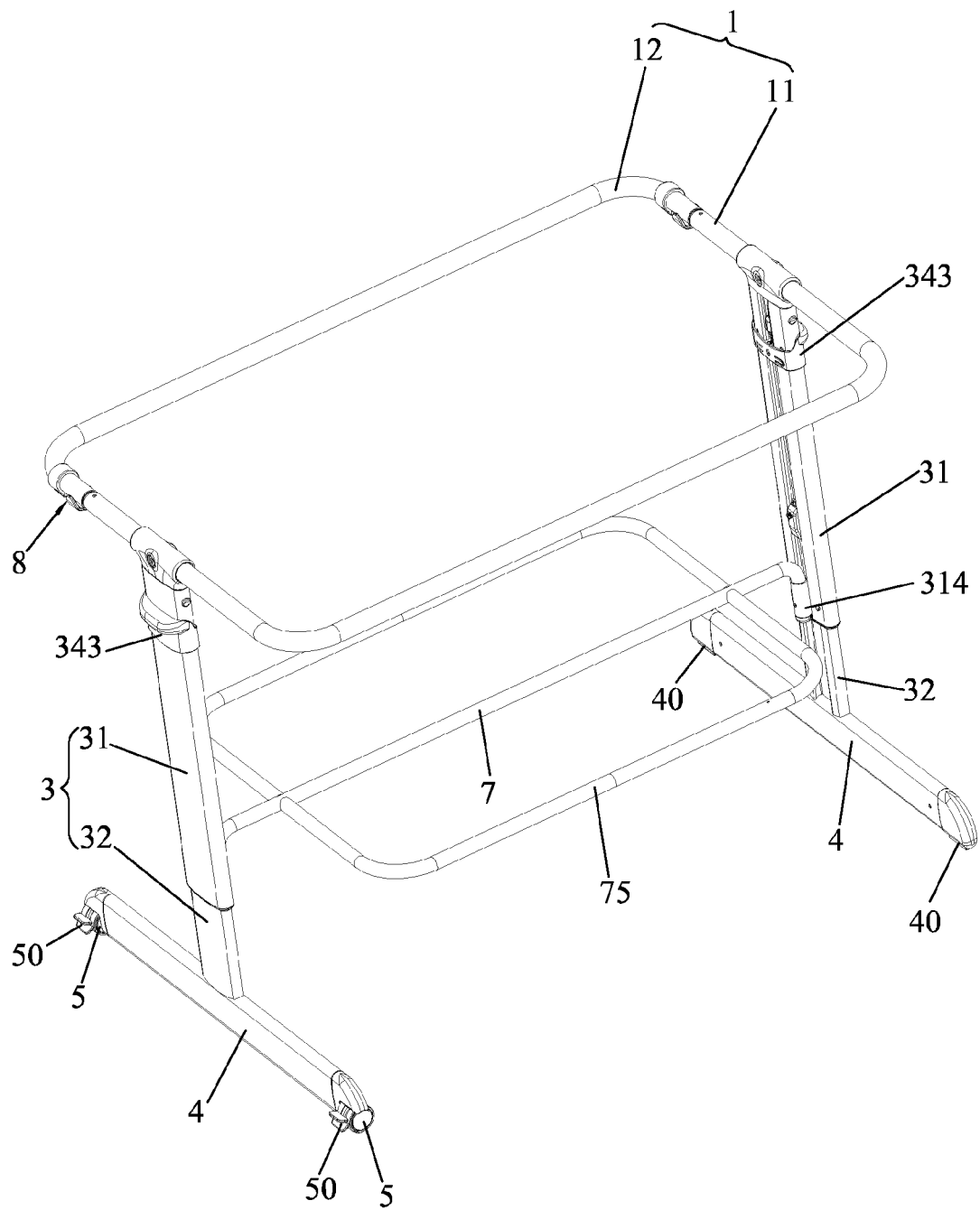


FIG. 33

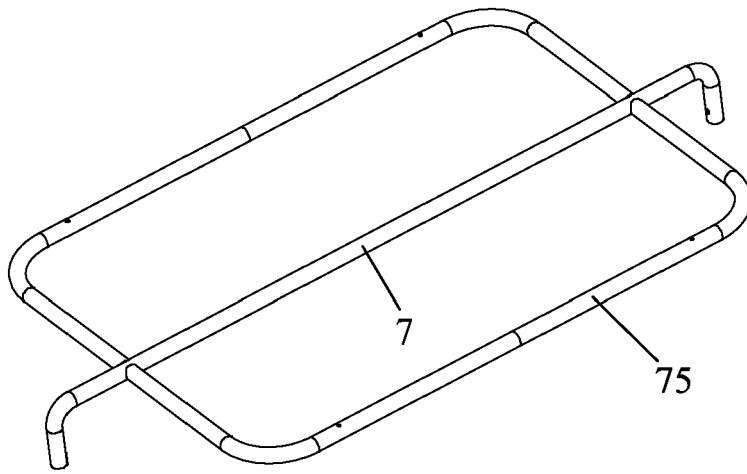


FIG. 34

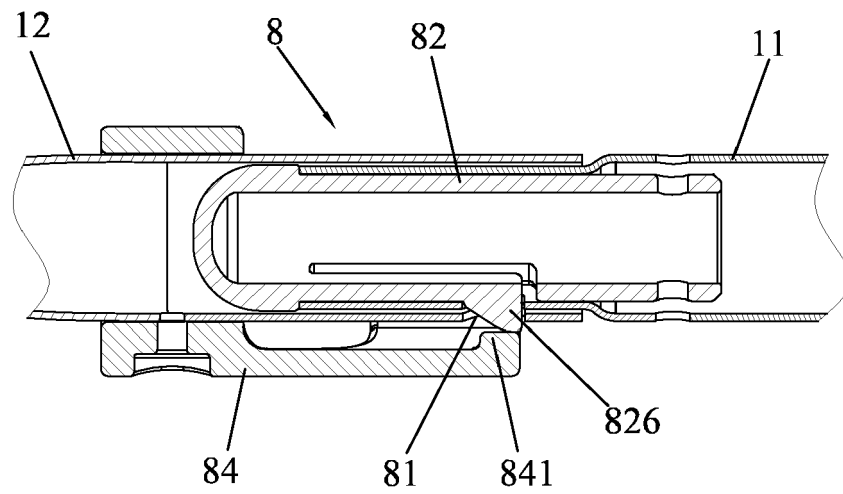


FIG. 35

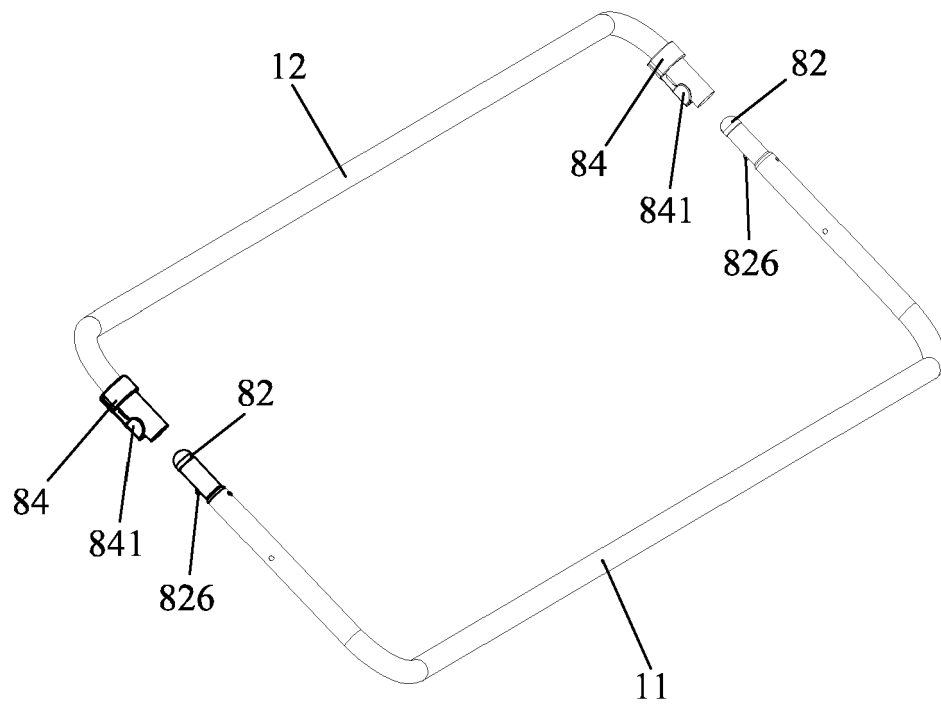


FIG. 36

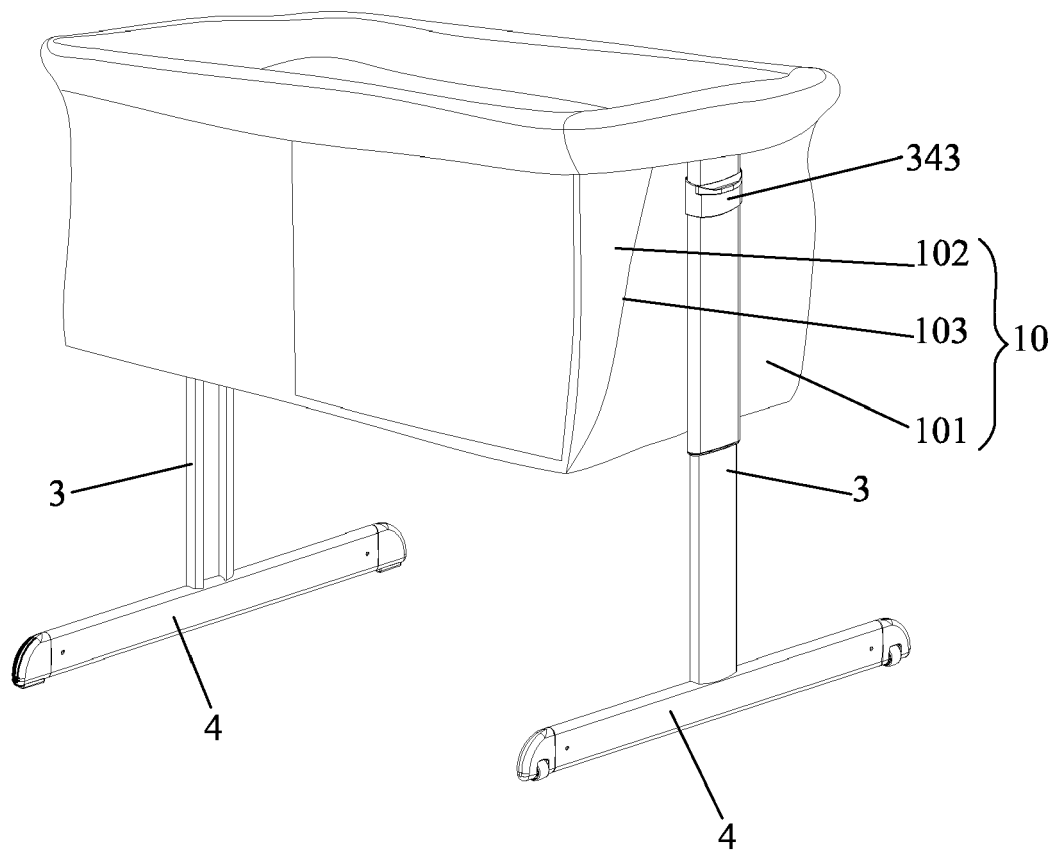


FIG. 37



EUROPEAN SEARCH REPORT

Application Number
EP 13 15 0856

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 3 789 439 A (BERG D P ET AL) 5 February 1974 (1974-02-05) * figures 2,14,17 *	1	INV. A47D7/00 A47D13/06
A	EP 0 501 086 A1 (PLAY SA) 2 September 1992 (1992-09-02) * figure 1 *	1	
A	US 2003/177574 A1 (WALDMAN KENNETH) 25 September 2003 (2003-09-25) * figure 1b *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 April 2013	Examiner Reichhardt, Otto
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			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 13 15 0856

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