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(54) **SUPPORT BASE FOR A CHILD SAFETY SEAT**

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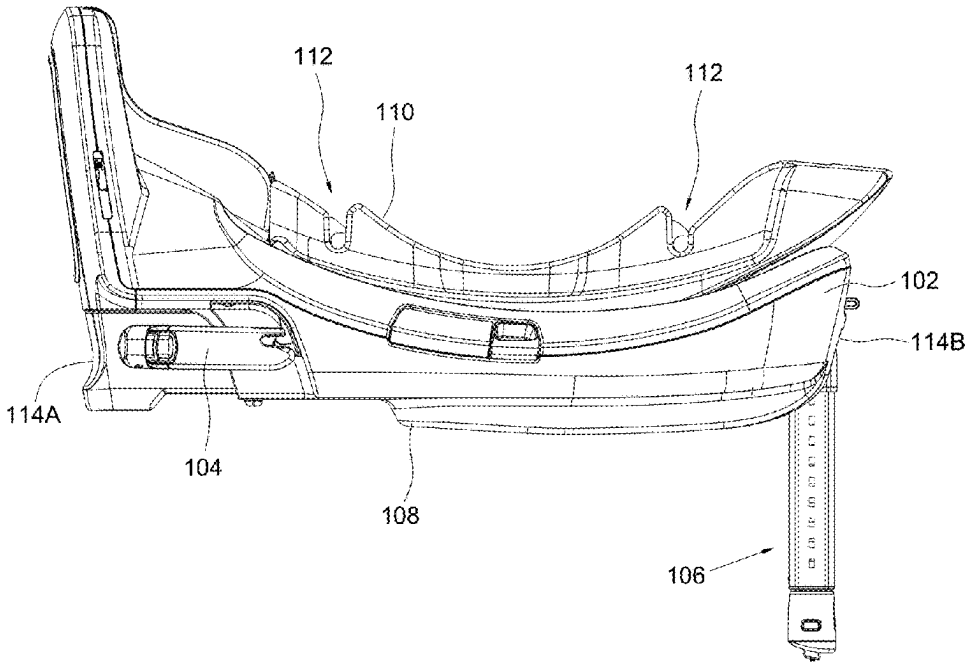
(57) **ABSTRACT**

A support base for a child safety seat includes a pivotable support leg that is operable to retract and expand from the support base, the support leg including multiple segments connected with one another via a plurality of sliding connections, the sliding connections including a first and a second sliding connection. Moreover, the support base includes an actuating button operably coupled to a first and a second latch. The first latch is operable to lock and unlock the first sliding connection for preventing or allowing relative sliding between segments of the first sliding connection. The second latch is operable to lock and unlock the second sliding connection for preventing or allowing relative sliding between segments of the second sliding connection. When the actuating button is actuated, the first latch is urged to unlock the first sliding connection and the second latch is urged to unlock the second sliding connection.



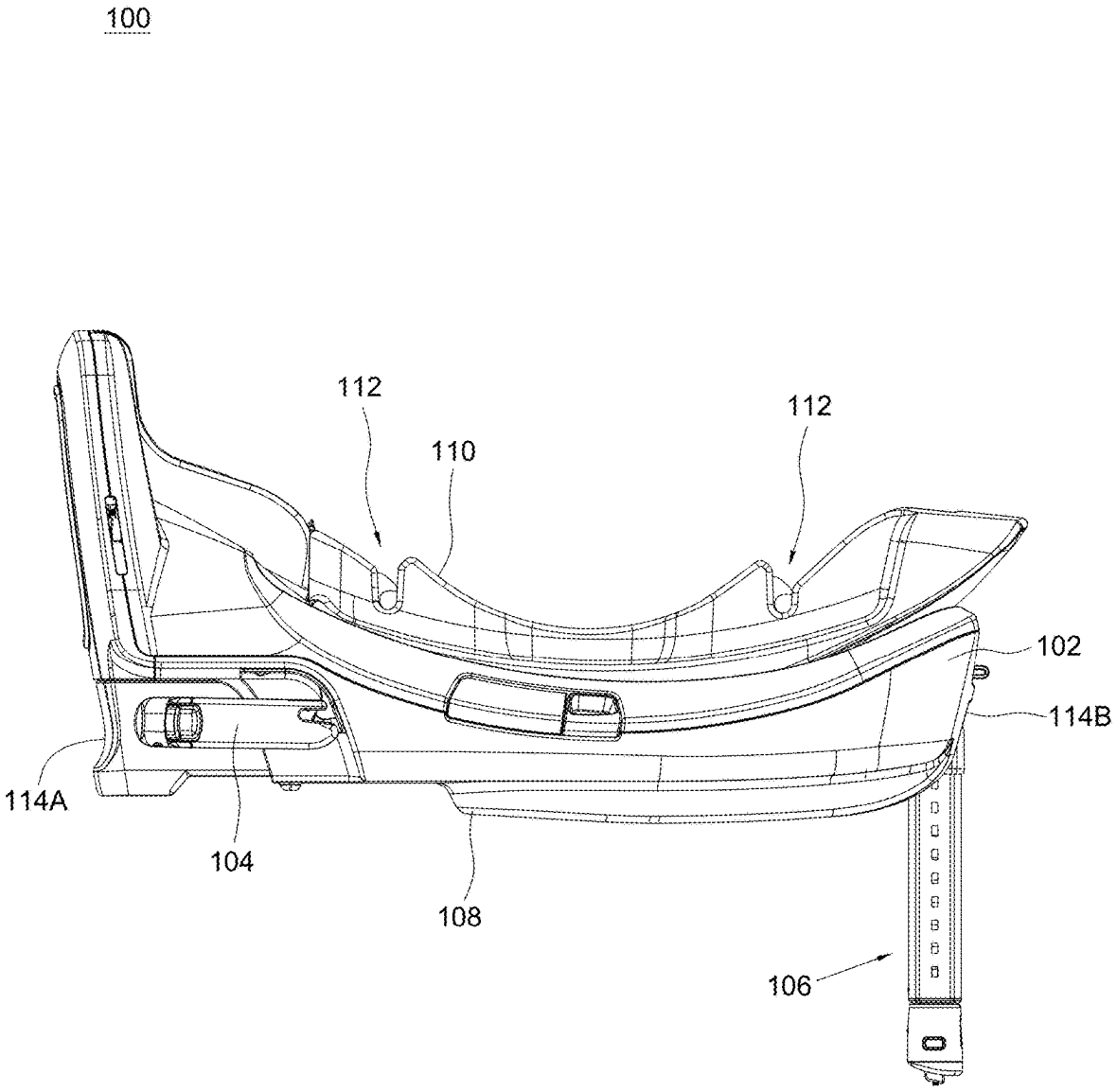


FIG. 1

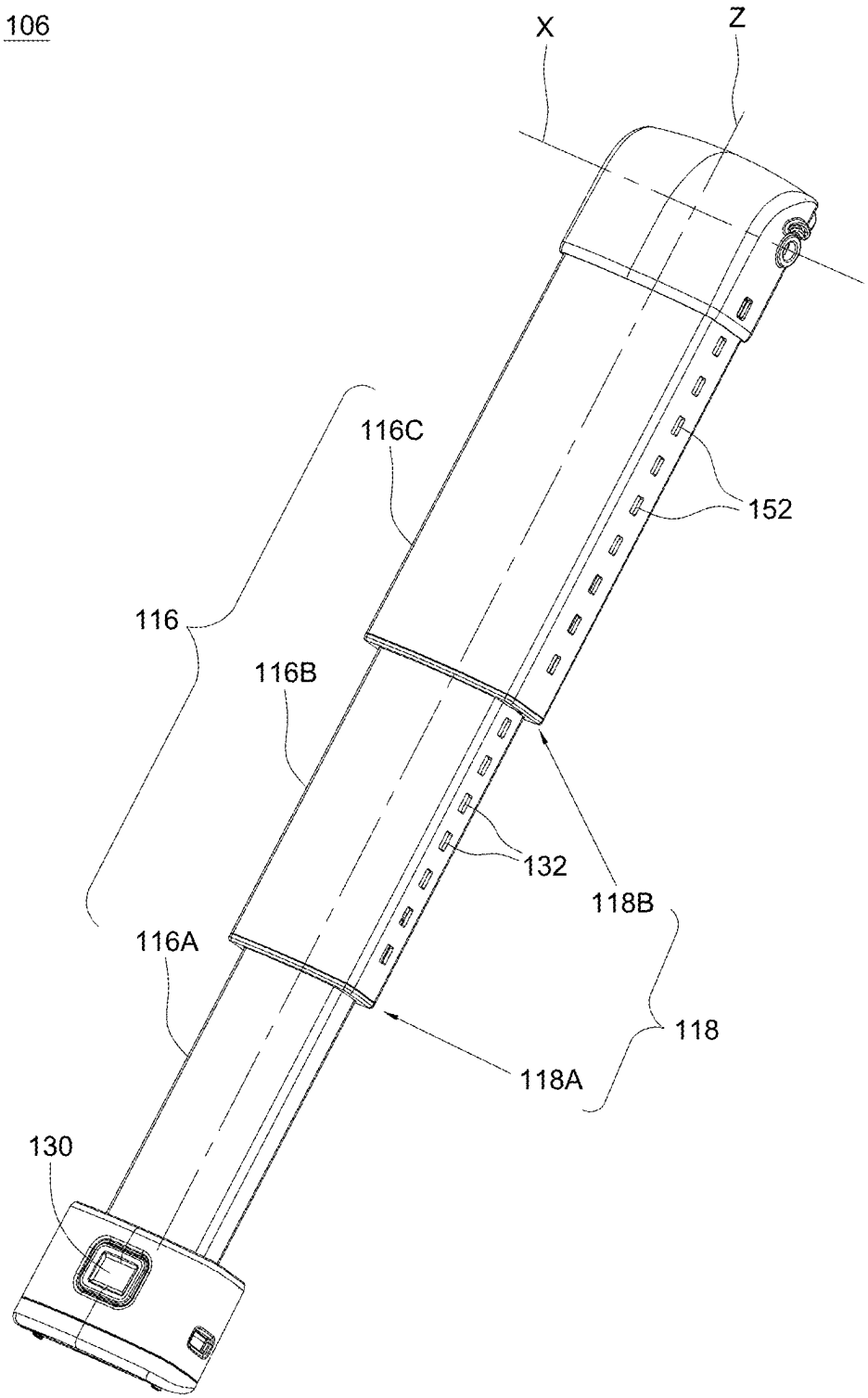


FIG. 2

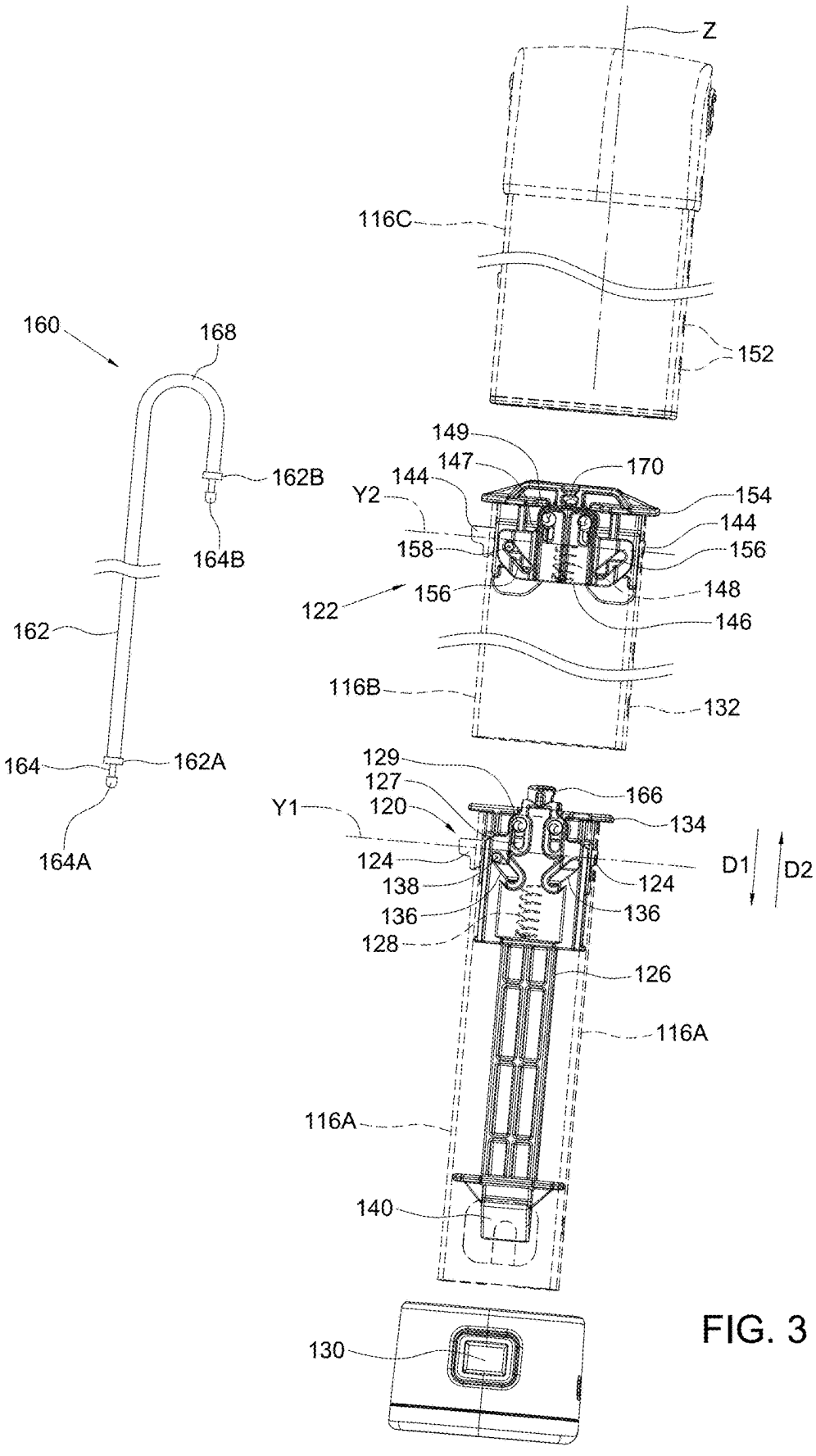

Z
116C
152
160
168
162B
164B
162
164
162A
164A
149
147
144
170
Y2
154
144
158
156
156
148
122
146
116B
132
129
127
166
120
134
Y1
124
D1
D2
124
138
136
136
128
126
116A
116A
140
130

FIG. 3

SUPPORT BASE FOR A CHILD SAFETY SEAT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. patent application Ser. No. 18/434,258, filed Feb. 6, 2024, which is a continuation of U.S. patent application Ser. No. 18/297,050 filed on Apr. 7, 2023, now issued U.S. Pat. No. 11,912,174 issue date Feb. 27, 2024, which is a continuation application of U.S. patent application Ser. No. 17/392,909 filed on Aug. 3, 2021, now issued U.S. Pat. No. 11,623,548 issue date Apr. 11, 2023, which is a continuation application of U.S. patent application Ser. No. 16/418,359 filed on May 21, 2019, now issued U.S. Pat. No. 11,097,639, issue date Aug. 24, 2021, which claims priority to U.S. provisional application No. 62/675,970 filed on May 24, 2018, the disclosures of both of which are hereby incorporated by reference as if set forth in their entireties herein.

BACKGROUND

1. Field of the Invention

[0002] The present invention relates to child safety seats.

2. Description of the Related Art

[0003] Child safety seats currently available on the market may include a child seat that can be attached to a support base for easy installation on a vehicle seat. In some existing products, the support base may be assembled with latch devices that can attach to the anchor structure of the vehicle for restrictedly positioning the support base on a vehicle seat. In addition, the support base may have a support leg that can be deployed to contact a vehicle floor. When a vehicle accident occurs, the support leg can thereby transfer energy to the vehicle floor. Because the vehicle floor may not have a uniform height, the support leg usually has multiple sections that are adjustable to shorten or extend the length of the support leg as needed. However, the multiple sections of the support leg generally require actuation of multiple release buttons for adjusting the support leg. This may cause confusion, which may result in improper installation of the support base in a vehicle.

[0004] Therefore, there is a need for an improved design that is more convenient to operate, and address at least the foregoing issues.

SUMMARY

[0005] The present application describes a support base for a child safety seat that has a support leg more convenient to operate for adjustment.

[0006] According to one aspect, the support base includes a support leg pivotally connected to the support base and operable to retract and expand from the support base, the support leg including a plurality of segments connected with one another via a plurality of sliding connections, the sliding connections including a first and a second sliding connection. Moreover, the support base includes a first and a second latch, and an actuating button operably coupled to the first and second latches. The first latch is operable to lock the first sliding connection for preventing relative sliding between segments of the first sliding connection and to unlock the first sliding connection for relative sliding adjustment between the segments of the first sliding connection. The second latch is operable to lock the second sliding connection for preventing relative sliding between segments of the second sliding connection and to unlock the second sliding connection for relative sliding adjustment between the segments of the second sliding connection. When the actuating button is actuated, the first latch is urged to unlock the first sliding connection and the second latch is urged to unlock the second sliding connection.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. **1** is a side view illustrating an embodiment of a support base for a child safety seat;

[0008] FIG. **2** is a perspective view illustrating a support leg used in the support base shown in FIG. **1**; and

[0009] FIG. **3** is an exploded view illustrating further construction details of two locking mechanisms provided in the support leg.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0010] FIG. **1** is a side view illustrating an embodiment of a support base **100** for a child safety seat. Referring to FIG. **1**, the support base **100** can include a shell **102**, latch devices **104** and a support leg **106**. The shell **102** can include one or more rigid casing portions attached to each other. Exemplary materials suitable for making the shell **102** may include rigid plastic materials. The shell **102** can have a bottom **108** suitable for placement on a vehicle seat, and an upper surface **110** suitable for receiving the installation of a child seat (not shown). For example, the upper surface **110** of the shell **102** can include a plurality of cavities **112** in which corresponding portions of a child seat may be received and locked in position. In some embodiments, the upper surface **110** of the shell **102** may be carried by a sliding platform movable back and forth relative to a lower portion of the shell **102** for adjustment of a child seat installed on the support base **100**.

[0011] The latch devices **104** may be assembled with the shell **102** adjacent to a left and a right side of the shell **102** at an end **114**A of the shell **102**. The latch devices **104** are operable to releasably engage with an anchor structure (e.g., ISOFIX anchor) provided in a vehicle to lock the support base **100** in place on a vehicle seat.

[0012] Referring to FIG. **1**, the support leg **106** is connected with the shell **102** at an end **114**B thereof opposite to the end edge **114**A, and is operable to expand and retract at the bottom **108** of the support base **100**. In use, the support leg **106** can be expanded to protrude downward from the bottom **108** for contacting against a floor of a vehicle. When the support leg **106** is not used, the support leg **106** can be retracted toward the bottom **108** of the shell **108**.

[0013] In conjunction with FIG. **1**, FIG. **2** is a perspective view illustrating a construction of the support leg **106**. Referring to FIGS. **1** and **2**, the support leg **106** can have a lengthwise axis Z, and include a plurality of segments **116** telescopically connected with one another via a plurality of sliding connections **118**. The segments **116** can be made of rigid materials, which can exemplary include metallic materials. According to an example of construction, the support leg **106** can include three segments **116**A, **116**B and **116**C, a sliding connection **118**A can couple the two adjacent segments **116**A and **116**B, another sliding connection **118**B

can couple the two adjacent segments **116**B and **116**C, and the segment **116**C can be pivotally connected with the shell **102** about a pivot axis X. The support leg **106** can thereby rotate relative to the shell **102** for folding toward the bottom **108** of the shell **102** or deploying downward for use, and the segments **116**A, **116**B and **116**C can slide relative to one another along the lengthwise axis Z for expanding or shortening the support leg **106**. When the support leg **106** is expanded for use, the segment **116**B can form an intermediate segment extending between the segments **116**A and **116**C, and the segments **116**A and **116**C respectively form a bottom and a top segment of the support leg **106**. When the support leg **106** is retracted, the segment **116**A can be retracted toward the interior of the segment **116**B, and the segment **116**B can be retracted toward the interior of the segment **116**C so as to shorten the support leg **106**.

[0014] In conjunction with FIGS. **1** and **2**, FIG. **3** is an exploded view illustrating two locking mechanisms **120** and **122** provided in the support leg **106**. Referring to FIGS. **1-3**, the locking mechanism **120** is operable to lock and unlock the sliding connection **118**A (i.e., lock and unlock the segment **116**A with respect to the segment **116**B), and the locking mechanism **122** is operable to lock and unlock the sliding connection **118**B (i.e., lock and unlock the segment **116**B with respect to the segment **116**C).

[0015] Referring to FIGS. **1-3**, the locking mechanism **120** can be assembled with the segment **116**A, and can include two latches **124**, an actuating part **126**, a spring **128** and an actuating button **130**.

[0016] The latches **124** can lock the sliding connection **118**A for preventing relative sliding between the two segments **116**A and **116**B of the sliding connection **118**A, and unlock the sliding connection **118**A for relative sliding adjustment between the two segments **116**A and **116**B of the sliding connection **118**A. According to an example of construction, the latches **124** may be assembled with the segment **116**A so that each latch **124** can move relative to the segment **116**A to engage with and disengage from any one of multiple openings **132** provided on the segment **116**B for respectively locking and unlocking the sliding connection **118**A. For example, the segment **116**A may be fixedly connected with a support mount **134**, and the latches **124** may be assembled with the support mount **134** of the segment **116**A for sliding transversally along an axis Y**1** substantially orthogonal to the lengthwise axis Z of the support leg **106**. The latches **124** can slide away from each other to engage with two openings **132** for locking the sliding connection **118**A, and can slide toward each other to disengage from the openings **132** for unlocking sliding connection **118**A.

[0017] Referring to FIG. **3**, the actuating part **126** is assembled with the segment **116**A for sliding along the lengthwise axis Z of the support leg **106** relative to the segment **116**A. According to an example of construction, the actuating part **126** may be formed as a single part having an elongate shape. The actuating part **126** may have one or more guide slot **127**, and the support mount **134** may have one or more pin **129** slidably disposed through the guide slot **127** so that the actuating part **126** can be guided for sliding along the lengthwise axis Z. Moreover, the actuating part **126** is connected with the latches **124**, and is operable to urge the latches **124** to move for unlocking the sliding connection **118**A. For example, the actuating part **126** may have two symmetric guide slots **136** that are tilted an angle relative to the lengthwise axis Z, and the latches **124** can be respectively connected fixedly with protruding pins **138** that are respectively guided for sliding along the guide slots **136**. The actuating part **126** can thereby slide relative to the segment **116**A in a first direction D**1** for urging the latches **124** to lock the sliding connection **118**A, and in a second direction D**2** opposite to the first direction D**1** for urging the latches **124** to unlock the sliding connection **118**A.

[0018] Referring to FIG. **3**, the spring **128** can be respectively connected with the segment **116**A and the actuating part **126**. The spring **128** can bias the actuating part **126** to slide in the direction D**1** for urging the latches **124** to lock the sliding connection **118**A.

[0019] Referring to FIGS. **2** and **3**, the actuating button **130** can be exposed on the segment **116**A for operation, and is operable to push the actuating part **126** to slide in the second direction D**2** for urging the latches **124** to unlock the sliding connection **118**A. For example, the actuating button **130** may be slidably assembled with the segment **116**A adjacent to a distal end of the segment **116**A, and can contact with a ramped surface **140** of the actuating part **126** for pushing the actuating part **126** to slide in the second direction D**2**.

[0020] Referring to FIG. **3**, the locking mechanism **122** can be assembled with the segment **116**B, and can include two latches **144**, an actuating part **146** and a spring **148**. The latches **144** and the actuating part **146** can be assembled with the segment **116**B in a manner similar to the latches **124** and the actuating part **126** described previously.

[0021] Referring to FIG. **3**, the latches **144** can lock the sliding connection **118**B for preventing relative sliding between the two segments **116**B and **116**C of the sliding connection **118**B, and unlock the sliding connection **118**B for relative sliding adjustment between the two segments **116**B and **116**C of the sliding connection **118**B. The latches **144** may be assembled with the segment **116**B so that each latch **144** can move relative to the segment **116**B to engage with and disengage from any one of multiple openings **152** provided on the segment **116**C for respectively locking and unlocking the sliding connection **118**B. For example, the segment **116**B may be fixedly connected with a support mount **154**, and the latches **144** may be assembled with the support mount **154** of the segment **116**B for sliding transversally along an axis Y**2** substantially orthogonal to the lengthwise axis Z of the support leg **106**. The axis Y**2** of movement of the latches **144** can be parallel to the axis Y**1** of movement of the latches **124**. Likewise, the latches **144** can slide away from each other to engage with any two openings **152** for locking the sliding connection **118**B, and can slide toward each other to disengage from the openings **152** for unlocking the sliding connection **118**B.

[0022] The actuating part **146** is assembled with the segment **116**B for sliding along the lengthwise axis Z of the support leg **106** relative to the segment **116**B. According to an example of construction, the actuating part **146** may be formed as a single part having an elongate shape. The actuating part **146** may have one or more guide slot **147**, and the support mount **154** may have one or more pin **149** slidably disposed through the guide slot **147** so that the actuating part **146** can be guided for sliding along the lengthwise axis Z. Moreover, the actuating part **146** is connected with the latches **144**, and is operable to urge the latches **144** to move for unlocking the sliding connection **118**B. For example, the actuating part **146** may have two

symmetric guide slots **156** that are tilted an angle relative to the lengthwise axis Z, and the latches **144** can be respectively connected fixedly with protruding pins **158** that are respectively guided for sliding along the guide slots **156**. The actuating part **146** can thereby slide relative to the segment **116**B in the first direction D**1** for urging the latches **144** to lock the sliding connection **118**B, and in the second direction D**2** opposite to the first direction D**1** for urging the latches **144** to unlock the sliding connection **118**B.

[0023] Referring to FIG. **3**, the spring **148** can be respectively connected with the segment **116**B and the actuating part **146**. The spring **148** can bias the actuating part **146** to slide in the direction D**1** for urging the latches **144** to lock the sliding connection **118**B.

[0024] With the aforementioned construction, the latches **124** of the locking mechanism **120** and the latches **144** of the locking mechanism **122** can slide parallel to one another for respectively locking and unlocking the two sliding connections **118**A and **118**B, and the actuating parts **126** and **146** can move in the same direction D**2** for urging the latches **124** and **144** to respectively unlock the two sliding connections **118**A and **118**B.

[0025] Referring to FIG. **3**, the two locking mechanisms **120** and **122** are coupled to each other via a linking assembly **160** so that a movement of the actuating part **126** for urging the latches **124** to unlock the sliding connection **118**A can cause the actuating part **146** to move concurrently for urging the latches **144** to unlock the sliding connection **118**B. In this manner, the two locking mechanisms **120** and **122** can be unlocked at the same time with one single operating step. According to an example of construction, the linking assembly **160** can include a sheath **162** having two opposite ends **162**A and **162**B, and a cable **164** having two opposite ends **164**A and **164**B. The cable **164** is received through the sheath **162** with the two ends **164**A and **164**B of the cable **164** respectively protruding outside the sheath **162** at the two ends **162**A and **162**B thereof. In the linking assembly **160**, the cable **164** and the sheath **162** can slide relative to each other.

[0026] The linking assembly **160** can be connected with the locking mechanism **120**, extend along the lengthwise axis Z of the support leg **106** past the locking mechanism **122**, and loop back and connect with the locking mechanism **122**. More specifically, the end **162**A of the sheath **162** can be anchored to a coupling structure **166** on the actuating part **126**, and the end **162**B of the sheath **162** can be anchored to the segment **116**B (e.g., by fixedly connecting the end **162**B with the support mount **154**). The end **164**A of the cable **164** can be anchored to the segment **116**A (e.g., by fixedly connecting the end **164**A with the support mount **134** of the segment **116**A), and the end **164**B of the cable **164** can be anchored to the actuating part **146**. Accordingly, the end **162**A of the sheath **162** and the actuating part **126** are movable in unison relative to the segment **116**A, the end **164**B of the cable **164** and the actuating part **146** are movable in unison relative to the segment **116**B, and the end **162**B of the sheath **162** and the end **164**A of the cable **164** are respectively coupled movably with the segments **116**B and **116**A. Once the linking assembly **160** is connected with the locking mechanisms **120** and **122**, the linking assembly **160** can form a loop **168** between the two ends **162**A and **162**B of the sheath **162** and between the two ends **164**A and **164**B of the cable **164**. According to an example of construction, the linking assembly **160** may be routed through a channel provided in the support mount **154**, the end **162**B of the sheath **162** can be anchored to a coupling structure **170** on the support mount **154**, and the loop **168** may be formed by a portion of the linking assembly **160** that extends outside the support mount **154** between the channel and the coupling structure **170** of the support mount **154**. The loop **168** formed by the linking assembly **160** inside the support leg **106** can protrude away from the two locking mechanisms **120** and **122**.

[0027] With the aforementioned construction, the actuating button **130** can be depressed to cause the two locking mechanisms **120** and **122** to unlock for adjusting the length of the support leg **106**. When the actuating button **130** is depressed, the actuating button **130** can push against the actuating part **126** so that the actuating part **126** slides in the direction D**2** for urging the latches **124** to move and unlock the sliding connection **118**A. The sliding displacement of the actuating part **126** in the direction D**2** can be transmitted via the linking assembly **160** to cause the actuating part **146** to slide in the same direction D**2** for urging the latches **144** to move and unlock the sliding connection **118**B. In particular, the actuating part **126** and the end **162**A of the sheath **162** can slide relative to the segment **116**A in the direction D**2** to change and increase the length of the loop **168**, which can cause the cable **164** to move correspondingly relative to the sheath **162** and pull the actuating part **146** to slide in the same direction D**2**, which in turn urge the latches **144** to move and unlock the sliding connection **118**B. Accordingly, the two sliding connections **118**A and **118**B can be unlocked with one single operating step for adjustment of the support leg **106**. Once the support leg **106** is adjusted to a desired length, the biasing forces applied by the springs **128** and **148** can respectively cause the latches **124** and **144** to lock the sliding connections **118**A and **118**B.

[0028] Advantages of the support base for a child safety seat described herein include a support leg having a plurality of segments that can be locked with two locking mechanisms and can be unlocked for adjustment with one single operating step. Accordingly, the support leg is more convenient to operate for adjustment.

[0029] Realization of the support base for a child safety seat has been described in the context of particular embodiments. These embodiments are meant to be illustrative and not limiting. Many variations, modifications, additions, and improvements are possible. These and other variations, modifications, additions, and improvements may fall within the scope of the inventions as defined in the claims that follow.

What is claimed is:

1. A support base for a child safety seat, comprising:

a support leg pivotally connected to the support base and operable to retract and expand from a bottom of the support base, the support leg including a plurality of segments connected with one another via a plurality of sliding connections, the sliding connections including a first and a second sliding connection, each of the first and the second sliding connection respectively coupling two adjacent ones of the segments;

a first locking mechanism operable to lock the first sliding connection for preventing relative sliding between the two segments thereof and to unlock the first sliding connection for relative sliding between the two seg-

ments thereof, wherein the first locking mechanism includes a first latch and a first actuating part connected to each other;

a second locking mechanism operable to lock the second sliding connection for preventing relative sliding between the two segments thereof and to unlock the second sliding connection for relative sliding between the two segments thereof, wherein the second locking mechanism includes a second latch and a second actuating part connected to each other; and

a flexible linking assembly coupling the first actuating part to the second actuating part so that the first and the second actuating part are movable concurrently toward the bottom of the support base, wherein the first and the second actuating part are movable relative to the support leg toward or away from the bottom of the support base for switching the first and the second locking mechanism between a locking state and an unlocking state.

2. The support base according to claim **1**, wherein the first actuating part is movable toward the bottom of the support base for unlocking the first sliding connection, and the second actuating part is movable toward the bottom of the support base for unlocking the second sliding connection.

3. The support base according to claim **1**, wherein the second actuating part is located between the first actuating part and the bottom of the support base when the support leg is expanded from the bottom of the support base.

4. The support base according to claim **3**, wherein the first actuating part and the second actuating part are movable concurrently toward the bottom of the support base in response to an actuating force applied upon the first actuating part.

5. The support base according to claim **1**, further comprising an actuating button connected to the first actuating part, the first actuating part and the second actuating part moving concurrently toward the bottom of the support base in response to an operation of the actuating button.

6. The support base according to claim **5**, wherein the actuating button is disposed adjacent to a distal end of the support leg.

7. The support base according to claim **5**, wherein the actuating button is exposed at a side of the support leg.

8. The support base according to claim **5**, wherein the first latch is disposed adjacent to a first end of one of the two segments of the first sliding connection, the actuating button is disposed adjacent a second end of the one of the two segments of the first sliding connection, and the first actuating part extends lengthwise between the first end and the second end of the one of the two segments of the first sliding connection.

9. The support base according to claim **8**, wherein the first actuating part is a single part of an elongate shape having two opposite ends, one of the two opposite ends of the first actuating part is slidably connected to the one of the two segments of the first sliding connection, and the other one of the two opposite ends of the first actuating part is connected to the actuating button.

10. The support base according to claim **9**, wherein the actuating button contacts with the first actuating part for urging the first actuating part to move toward the bottom of the support base.

11. The support base according to claim **1**, wherein the first and the second latch slide parallel to each other for respectively locking and unlocking the first and the second sliding connection.

12. The support base according to claim **1**, wherein the first latch and the first actuating part are assembled with one of the segments of the first sliding connection for respectively sliding along a first and a second axis that are substantially orthogonal to each other.

13. The support base according to claim **12**, wherein the first actuating part includes a guide slot tilted an angle relative to the second axis, and the first latch has a protruding pin guided for sliding along the guide slot.

14. The support base according to claim **13**, wherein the first actuating part slides away from the bottom of the support base for urging the first latch to lock the first sliding connection, and slides toward the bottom of the support base for urging the first latch to unlock the first sliding connection.

15. The support base according to claim **14**, wherein the first locking mechanism further includes a spring, the spring being connected with the first actuating part for biasing the first actuating part to slide away from the bottom of the support base.

16. The support base according to claim **12**, wherein the second latch and the second actuating part are assembled with one of the segments of the second sliding connection similarly to the first latch and the first actuating part.

17. The support base according to claim **1**, wherein the segments include a first segment, a second segment and a third segment, the first and the second segment being coupled to each other via the first sliding connection, the second and the third segment being coupled to each other via the second sliding connection, and the third segment being pivotally connected with a shell of the support base.

18. The support base according to claim **17**, wherein the first latch and the first actuating part are assembled with the first segment, and the second latch and the second actuating part are assembled with the second segment.

19. The support base according to claim **1**, wherein the linking assembly includes a sheath, and a cable slidably disposed through an interior of the sheath.

20. The support base according to claim **19**, wherein the first latch and the first actuating part are assembled with a first segment of the support leg, the second latch and the second actuating part are assembled with a second segment of the support leg, the sheath has a first and a second end respectively anchored to the first actuating part and the second segment, and the cable has a third and a fourth end respectively anchored to the first segment and the second actuating part.

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