IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

WONDERLAND SWITZERLAND AG, Plaintiff, v. EVENFLO COMPANY, INC., Defendant.	Civil Action No. 20-cv-727-RGA

FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Wonderland Switzerland AG ("Wonderland") files this First Amended Complaint for patent infringement against Defendant Evenflo Company, Inc. Wonderland alleges as follows:

THE PARTIES

1. Wonderland is a corporation duly organized and existing under the laws of Switzerland, having its principal place of business at Beim Bahnhof 5, 6312 Steinhausen, Switzerland.

2. On information and belief, Evenflo is a Delaware corporation having its principal place of business at 225 Byers Road, Miamisburg, Ohio 45342-3614.

JURISDICTION AND VENUE

3. This Court has subject matter jurisdiction over the patent infringement claims herein under 28 U.S.C. §§ 1331 and 1338(a) because this action arises under the patent laws of the United States, 35 U.S.C. §§ 1 et seq.

4. This Court has both general and specific personal jurisdiction over Evenflo Evenflo because Evenflo is organized and incorporated under the laws of this state. On information and belief, Evenflo has also established minimum contacts with Delaware because:

(1) Evenflo owns and/or operates an interactive Internet website, www.evenflo.com, accessible Delaware residents, which advertises and offers for sale goods, including Evenflo's EveryFit 4-in-1 Car Seat ("EveryFit Car Seat"), EveryKid 4-in-1 Car Seat ("EveryKid Car Seat"), SafeMax 3-in-1 Car Seat ("SafeMax Car Seat), and Evolve 3-in-1 Car Seat ("Evolve Car Seat"), that infringe that patents in this Complaint; (2) Evenflo offers for sale and sells its goods to residents of Delaware, including its EveryFit Car Seat, EveryKid Car Seat, SafeMax Car Seat, and Evolve Car Seat, accused of infringement herein, through online retailers such as Amazon.com and Walmart.com; and (3) Evenflo has sold and offered for sale the Everyfit Car Seat, EveryKid Car Seat, SafeMax Car Seat, and Evolve Car Seat through retailers in Delaware, such as Buy Buy Baby, Target, Kohl's, and Walmart. Evenflo has purposefully availed itself of the benefits of Delaware and the exercise of personal jurisdiction by this Court is proper.

5. Venue is proper in this federal district pursuant to 28 U.S.C. § 1400(b) because Evenflo is incorporated in Delaware, and has committed acts of infringement in this District.

STATEMENT OF FACTS

Wonderland and Its Innovative Car Seat Features and Designs

6. Wonderland and its affiliates have been innovators in child products for more than thirty years. Wonderland and its affiliates design, manufacture, and sell products for children of all ages to keep children safe, including state-of-the-art child car seats, play yards, strollers, rockers, and high chairs for leading brands such as Graco, Nuna, and Joie. Wonderland and its affiliates' innovations are protected by more than 500 patents in the U.S., and nearly 2600 patents worldwide.

7. Child car seats are necessary to protect children during a car travel, but children outgrow them, and buying new car seats can be a significant expense. To address this problem, Wonderland and its affiliates developed an improved child car seat for babies and toddlers that

owners can easily convert into high-back booster seats for young children and no-back booster seats for older children. The challenge Wonderland and its affiliates addressed was to ensure the connection between the booster and the seatback would be as safe and secure as a single component.

Graco Nautilus 65

8. Wonderland's innovations, protected by the patents-in-suit, allow removal of the seatback to convert a car seat or booster seat into a no-back booster seat and allow adjustment and configuration of the backrest of the car seat without complex and cumbersome operations. Wonderland's designs have been well-received, with users noting, for example, that "[s]witching between car seat modes is easy, and each mode is true to size than many other convertibles" and "[t]he car seat has the best in class durability a proven crash safety record, and grows well with your children." https://bestcarseathub.com/best-top-rated-car-seats/ (referencing the Graco 4Ever Car Seat). These systems have proven superior to competing car seats and have received industry praise as well as glowing reviews from customers. See, e.g., https://mommyhood101.com/best-booster-seats (naming the Graco Nautilus Snuglock LX as the No. 1 on their list of the "Best Booster Seats of 2020"); https://babysafetylab.com/best-safest- convertible-car-seats/ (listing the

Graco 4Ever as No. 1 in the list of the "Best Safest Convertible Car Seat 2020"); https://www.safety.com/car-seats/ (naming the Graco 4Ever DLX as the "Best Car Seat for Growth with Your Child."). Mommyhood101 recently included three Graco car seats in their list of the "Best Convertible Car Seats 2020." https://mommyhood101.com/best- convertible-car-seats. The online publication praises the 4Ever because it can "basically be used until your child is ready to ride without a car seat at all, with the largest weight range available (4 to 120 pounts) and true 4in1 convertible car seat capabilities (serving as a rear-facing seat, front- facing harnessed seat, front-facing belt-positioning booster, and a backless booster)," and their reviewers agreed that "the Graco Ever was one of the most versatile comfortable, and functional products available." Id. Parenting Pod named the 4EVer the "Best one seat for all ages" because "[s]ure, there are other convertible (and combination) seats, but they don't offer all four options." https://parentingpod.com/best-safest-convertible-car-seats/.

Evenflo's Car Seats

9. Evenflo is also in the business of manufacturing and selling child car seats. On information and belief, Evenflo introduced the EveryFit Car Seat in January 2020 and has sold and continues to sell the EveryFit Car Seat online and in retail stores throughout the United States, including in Delaware. On information and belief, Evenflo also introduced the EveryKid Car Seat in January 2020, and has sold and continues to sell the EveryKid Car Seat online via www.walmart.com and in Walmart retail locations throughout the United States, including in Delaware. On information and belief, Evenflo introduced the SafeMax Car Seat in 2016, and has sold and continues to sell the SafeMax Car Seat online via www.buybuybaby.com and in Buy Buy Baby locations throughout the United States, including in Delaware. On information and belief, Evenflo introduced the Evolve Car Seat at least by 2016, and has sold the Evolve Car Seat online via www.kohls.com and in Kohl's locations throughout the United States, including in

Delaware.

10. Evenflo's sales of the EveryFit Car Seat, EveryKid Car Seat, SafeMax Car Seat, and Evolve Car Seat compete with sales of car seats by Wonderland, its affiliates, and its customers, who sell under well-known brands such as Graco, Nuna, and Joie.

11. Evenflo has a history of copying the features and designs of Wonderland products, including products Graco sells, which Wonderland designs and manufactures. The EveryFit, EveryKid, SafeMax, and Evolve products are examples of this behavior. An engineer for the Evenflo admitted under oath in an unrelated proceeding that Evenflo has modified its designs to look more like those of Graco. See https://www.propublica.org/article/evenflo-maker-of-the-big-kid-booster-seat-put-profits-over-child-safety.

12. According to the Evenflo website, the EveryFit Car Seat "accommodates your child by adjusting to multiple positions . . . [t]his all-in-one car seat provides a safe and secure ride for up to a decade." See https://www.evenflo.com/car-seats/us_everyfit.html?dwvar_us everyfit_fashion=39312349&cgid=car-seat- convertible#start=3. The website says the same thing for the EveryKid Car Seat. See. https://www.evenflo.com/car-seats/us_everykid.html?dwvar_us everykid_fashion=39312340&cgid=car-seat- convertible#start=5. Similarly, Evenflo's website describes the SafeMax Car Seat as having "three forward-facing modes that will accommodate your child through their booster-seat years." See https://www.evenflo.com/car-seats/us_safemax-booster.html. The website says the Evolve Car Seat "provides extended modes to fit your growing child longer." See https://www.evenflo.com/car-seats/evolve/us_evolve.html.

13. Wonderland and its affiliates invented, patented, and commercialized the detachable seatback, adjustable backrest, and the ornamental design of the EveryFit Car Seat and EveryKid Car Seat before Evenflo copied them. Wonderland and its customers sold products using these features since at least 2008, long before Evenflo introduced its EveryFit Car Seat,

EveryKid Car Seat, SafeMax Car Seat, and Evolve Car Seat. Wonderland's customer, Graco, sold the Nautilus, Nautilus Snuglock, 4Ever, 4Ever Extend2Fit, and Grow4Me before Evenflo, and each of these products incorporates at least one of the patented inventions.

Wonderland's Patents

14. On December 1, 2009, the United States Patent and Trademark Office ("USPTO") issued U.S. Patent No. 7,625,043 entitled "Child car seat with multiple use configurations." A copy of the '043 patent is attached as Exhibit A.

15. The '043 patent describes a car seat for transporting children in an automobile that can change configurations as a child grows. The patent further describes a car seat with a seat back that someone can detach to form a no-back booster seat. See Exhibit A, 3:24-29. The car seat can also be reclined. See id., 3:39-47.

16. The inventors assigned the '043 patent to Wonderland Nurserygoods Co., Ltd., which recorded that assignment on September 12, 2006. Wonderland Nurserygoods Co., Ltd. assigned the '043 patent to Wonderland Switzerland AG, which recorded that assignment on April 16, 2020. Wonderland Switzerland AG has the full and exclusive right to bring suit and enforce the '043 patent and to collect damages and profits for infringement.

17. The '043 includes three independent claims 1, 12, and 18. Claim 1 is representative. It recites:

> 1. A car seat for use in an automobile to transport a child, comprising:
>
> a seat assembly defining a generally horizontal seat surface for supporting a child positioned thereon, said seat assembly including a pair of receptacles; and
>
> a seat back having a locking mechanism for selectively detachably connecting said seat back to said seat assembly, said seat back including a rear support portion oriented in generally upright position when attached to said seat assembly, said seat back having a pair of attachment arms projecting generally perpendicularly outwardly

relative to said rear support portion for engagement with said seat assembly so as to be received within corresponding said receptacles.

18. On March 27, 2012, the USPTO issued U.S. Patent No. 8,141,951 entitled "Child safety seat." A copy of the '951 patent is attached as Exhibit B.

19. The '951 patent describes a car seat with a mechanism for adjusting the height of the backrest. The '951 patent explains, "[T]he structural design [of conventional backrest adjustment systems] is complicated or the operation is inconvenient." Ex. B, 1:28-31. The '951 patent instead describes a simple and innovative engagement mechanism that allows the backrest to move vertically and fix at a desired height. See Ex. B, 6:27-39.

20. The '951 includes one independent claim, which recites:

1. A child safety seat

comprising: a seat body;

an engaging board connected to the seat body, a tooth-shaped structure being formed on the engaging board;

a backrest movably disposed on the engaging board; and

an engaging mechanism disposed between the engaging board and the backrest, the engaging mechanism comprising:

an engaging member pivotally connected to the backrest for engaging with the tooth-shaped structure; and

a driving device movably connected to the backrest, the driving device comprising:

a connecting member pivotally connected to a first end of the engaging member; and

a pulling member connected to the connecting member, for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a releasing position, so as to disengage a second end of the engaging member from the tooth- shaped structure, and further for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a locking position, so as to engage the second end of the engaging member with a positioning groove of the tooth-

shaped structure, such that a height of the backrest relative to the engaging board is fixed;

wherein the backrest is capable of moving relative to the engaging board when the second end of the engaging member is disengaged from the tooth-shaped structure.

21. The ’951 patent was originally assigned to Excellerate Enterprise Co., Ltd. upon filing. Excellerate Enterprise Co., Ltd. Assigned the ’951 patent to BP Children’s Products HK Co. Limited, which recorded that assignment on September 18, 2013. BP Children’s Products HK Co. Limited assigned the ’951 patent to Bambino Prezioso Switzerland AG, which recorded that assignment on August 15, 2018. Bambino Prezioso Switzerland AG assigned the ’951 patent to Wonderland Switzerland AG, which recorded that assignment on April 16, 2020. Wonderland Switzerland AG has the full and exclusive right to bring suit and enforce the ’951 patent and to collect damages and profits for infringement.

COUNT ONE
(Infringement of U.S. Patent 7,625,043)

22. Wonderland realleges and incorporates by reference paragraphs 1-21.

23. Evenflo has made, used, sold, offered for sale, and imported into the United States, and continues to do so, child car seats, including the Evenflo EveryFit Car Seat, EveryKid Car Seat, SafeMax Car Seat, and Evolve Car Seat that practice at least one claim of the ’043 patent.

Infringement of the ’043 Patent by the EveryFit Car Seat

24. The Evenflo EveryFit Car Seat includes every element of claim 1 of the ’043 patent.

25. Claim 1 recites a car seat “for use in an automobile to transport a child,” comprising “a seat assembly defining a generally horizontal seat surface for supporting a child positioned thereon, said seat assembly including a pair of receptacles.” The EveryFit Car Seat is

designed to transport a child in a car and has a seat assembly with a generally horizontal seat surface to support a child seated on it. These features are apparent in the images of the EveryFit Car Seat available on the Evenflo website at https://www.evenflo.com/car-seats/us_everyfit.html?dwvar_us everyfit_fashion=39312349&cgid=car-seat- convertible#start=3. A representative image of the EveryFit Car Seat from Evenflo's website is below.

26. The EveryFit Car Seat also includes a pair of receptacles shown below in the disassembled car seat.

27. Claim 1 further recites "a seat back having a locking mechanism for selectively detachably connecting said seat back to said seat assembly, said seat back including a rear support portion oriented in generally upright position when attached to said seat assembly." The EveryFit Car Seat has a seat back that is generally vertical when attached to the seat and has a mechanism that connects and detaches the seat back to the car seat. Evenflo's website, https://www.evenflo.com/car-seats/us_everyfit.html?dwvar_us everyfit_fashion=39312349&cgid=car-seat- convertible#start=3, shows the EveryFit Car Seat in four different configurations: "rear-facing car seat with harness, forward-facing car seat with harness, belt-positioning high-back booster, and no-back booster." In the first three of these configurations, the seat back of the EveryFit Car Seat is attached to the seat assembly and generally vertically oriented. In the "no-back booster" configuration, the seat back of the EveryFit Car Seat is detached.

28. Claim 1 further recites "said seat back having a pair of attachment arms projecting generally perpendicularly outwardly relative to said rear support portion for engagement with said seat assembly so as to be received within corresponding said receptacles." The EveryFit Car Seat also includes such attachment arms. They appear in images on Evenflo's website, https://www.evenflo.com/car-seats/us_everyfit.html?dwvar_us everyfit_fashion=39312349&cgid=car-seat- convertible#start=3, for example the following representative image.

Infringement of the ’043 Patent by the EveryKid Car Seat

29. The Evenflo EveryKid Car Seat also includes every element of claim 1 of the ’043 patent.

30. Claim 1 recites a car seat “for use in an automobile to transport a child,” comprising “a seat assembly defining a generally horizontal seat surface for supporting a child positioned thereon, said seat assembly including a pair of receptacles.” The EveryKid Car Seat is designed to transport a child in a car and has a seat assembly with a generally horizontal seat surface to support a child seated on it. These features are apparent in the images of the EveryKid Car Seat available on the Evenflo website at https://www.evenflo.com/car-seats/us_everykid.html?dwvar_us everykid_fashion=39312340&cgid=car-seat-convertible#start=5. A representative image of the EveryKid Car Seat from Evenflo’s website is below.

31. The EveryKid Car Seat also includes a pair of receptacles shown below in the disassembled car seat.

32. Claim 1 further recites "a seat back having a locking mechanism for selectively detachably connecting said seat back to said seat assembly, said seat back including a rear

support portion oriented in generally upright position when attached to said seat assembly." The EveryKid Car Seat has a seat back that is generally vertical when attached to the seat and has a mechanism that can selectively detachably connect the seat back to the car seat. Evenflo's website, https://www.evenflo.com/car-seats/us_everykid.html?dwvar_us everykid_fashion=39312340&cgid=car-seat- convertible#start=5, shows the EveryKid Car Seat in four different configurations: "rear-facing car seat with harness, forward-facing car seat with harness, belt-positioning high-back booster, and no-back booster." In the first three of these configurations, the seat back of the EveryKid Car Seat is attached to the seat assembly and generally vertically oriented. In the "no-back booster" configuration, the seat back of the EveryKid Car Seat is detached.

33. Claim 1 also recites "said seat back having a pair of attachment arms projecting generally perpendicularly outwardly relative to said rear support portion for engagement with said seat assembly so as to be received within corresponding said receptacles." The EveryKid

Car Seat also includes a pair of attachment arms that extend generally perpendicularly outward relative to the seat's rear support portion for receipt in the seat assembly's receptacles. These features appear in images on Evenflo's website, https://www.evenflo.com/car-seats/us_everykid.html?dwvar_us everykid_fashion=39312340&cgid=car-seat-convertible#start=5, for example the following representative image.

Infringement of the '043 Patent by the SafeMax Car Seat

34. The Evenflo SafeMax Car Seat also includes every element of claim 1 of the '043 patent.

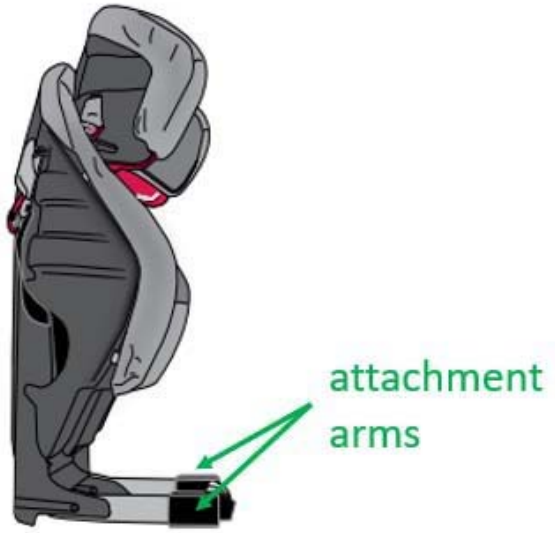
35. Claim 1 recites a car seat "for use in an automobile to transport a child," comprising "a seat assembly defining a generally horizontal seat surface for supporting a child positioned thereon, said seat assembly including a pair of receptacles." The SafeMax Car Seat is designed to transport a child in a car and has a seat assembly with a generally horizontal seat surface to support a child seated on it. These features are apparent in the images of the SafeMax Car Seat available on the Evenflo website at https://www.evenflo.com/car-seats/us_safemax-booster.html. A representative image of the SafeMax Car Seat from Evenflo's website is below.

36. The SafeMax Car Seat also includes a pair of receptacles shown below in the disassembled car seat.

37. Claim 1 further recites "a seat back having a locking mechanism for selectively detachably connecting said seat back to said seat assembly, said seat back including a rear support portion oriented in generally upright position when attached to said seat assembly." The SafeMax Car Seat has a seat back that is generally vertical when attached to the seat and has a mechanism that can selectively detachably connect the seat back to the car seat. Evenflo's

website, https://www.evenflo.com/car-seats/us_safemax-booster.html, shows the SafeMax Car Seat in three different configurations. In the first two of these configurations, the seat back of the SafeMax Car Seat is attached to the seat assembly and generally vertically oriented. In the "no- back booster" configuration, the seat back of the SafeMax Car Seat is detached.

38. Claim 1 also recites "said seat back having a pair of attachment arms projecting generally perpendicularly outwardly relative to said rear support portion for engagement with said seat assembly so as to be received within corresponding said receptacles." The SafeMax Car Seat also includes a pair of attachment arms that extend generally perpendicularly outward relative to the seat's rear support portion for receipt in the seat assembly's receptacles. These features appear in images in the manual for the SafeMax Car Seat on Evenflo's website, https://www.evenflo.com/on/demandware.static/-/Sites-evenflo-Library/default/dw4a4d70fd/instruction-manuals/car-seats/booster/25701025-Evolve-Transitions-SafeMax%203%20in%201-EN.pdf, for example the following representative image.



Infringement of the ’043 Patent by the Evolve Car Seat

39. The Evenflo Evolve Car Seat also includes every element of claim 1 of the ’043 patent.

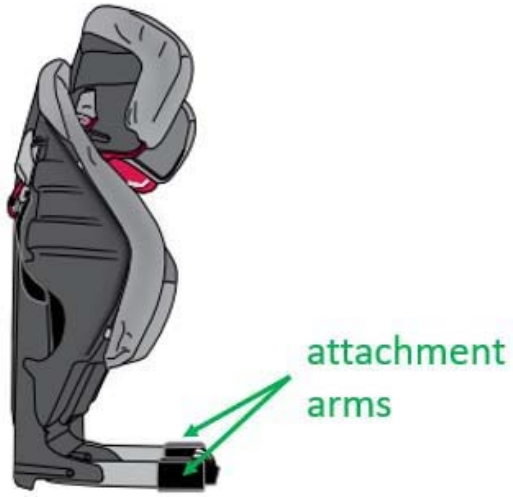
40. Claim 1 recites a car seat “for use in an automobile to transport a child,” comprising “a seat assembly defining a generally horizontal seat surface for supporting a child positioned thereon, said seat assembly including a pair of receptacles.” The Evolve Car Seat is designed to transport a child in a car and has a seat assembly with a generally horizontal seat surface to support a child seated on it. These features are apparent in the images of the Evolve Car Seat available on the Evenflo website at https://www.evenflo.com/car-seats/evolve/us_evolve.html. A representative image of the Evolve Car Seat from Evenflo’s website is below.

41. The Evolve Car Seat also includes a pair of receptacles shown below in the disassembled car seat.

42. Claim 1 further recites "a seat back having a locking mechanism for selectively detachably connecting said seat back to said seat assembly, said seat back including a rear support portion oriented in generally upright position when attached to said seat assembly." The Evolve Car Seat has a seat back that is generally vertical when attached to the seat and has a

mechanism that can selectively detachably connect the seat back to the car seat. Evenflo's website, https://www.evenflo.com/car-seats/evolve/us_evolve.html, shows the Evolve Car Seat in three different configurations. In the first two of these configurations, the seat back of the Evolve Car Seat is attached to the seat assembly and generally vertically oriented. In the "no-back booster" configuration, the seat back of the Evolve Car Seat is detached.

43. Claim 1 further recites "said seat back having a pair of attachment arms projecting generally perpendicularly outwardly relative to said rear support portion for engagement with said seat assembly so as to be received within corresponding said receptacles." The Evolve Car Seat also includes a pair of attachment arms that extend generally perpendicularly outward relative to the seat's rear support portion for receipt in the seat assembly's receptacles. These features appear in the manual for the Evolve Car Seat on Evenflo's website, https://www.evenflo.com/on/demandware.static/-/Sites-evenflo-Library/default/dw4a4d70fd/instruction-manuals/car-seats/booster/25701025-Evolve-Transitions-SafeMax%203%20in%201-EN.pdf, for example the following representative image.



44. By making, using, selling, offering for sale, and/or importing in the United States the EveryFit Car Seat, EveryKid Car Seat, SafeMax Car Seat, and Evolve Car Seat, Evenflo has infringed and is continuing to infringe at least one claim of the '043 patent. 35 U.S.C. § 271(b).

45. On information and belief, Evenflo is knowledgeable of Wonderland's patent portfolio from the parties' prior dealings and litigation history. Despite Evenflo's knowledge of the '043 patent and its infringing activities, Evenflo has infringed and continues to infringe one or more claims of the '043 patent by manufacturing, selling, and/or offering for sale additional EveryFit Car Seats, EveryKid Car Seats, SafeMax Car Seats, and Evolve Car Seats. This intentional infringement without regard for Wonderland's patent rights constitutes egregious conduct sufficient to establish willful infringement under 35 U.S.C. § 284.

46. The ongoing and continuous infringement by Evenflo of the '043 patent entitles Wonderland to an injunction permanently enjoining Evenflo from further infringing Wonderland's patent rights, pursuant to 35 U.S.C. § 283.

47. Wonderland has suffered and continues to suffer damages from Evenflo's infringement of the '043 patent and is entitled to compensation and other monetary relief to the

extent allowed by law, pursuant to 35 U.S.C §§ 284 and 285.

COUNT TWO
(Infringement of U.S. Patent No. 8,141,951)

48. Wonderland realleges, and incorporates by reference in full herein, paragraphs 1-47.

49. Evenflo has made, used, sold, offered for sale, and imported into the United States, and continues to do so, child car seats, including the Evenflo EveryFit Car Seat, EveryKid Car Seat, SafeMax Car Seat, and Evolve Car Seat, that practices at least one claim of the '951 patent.

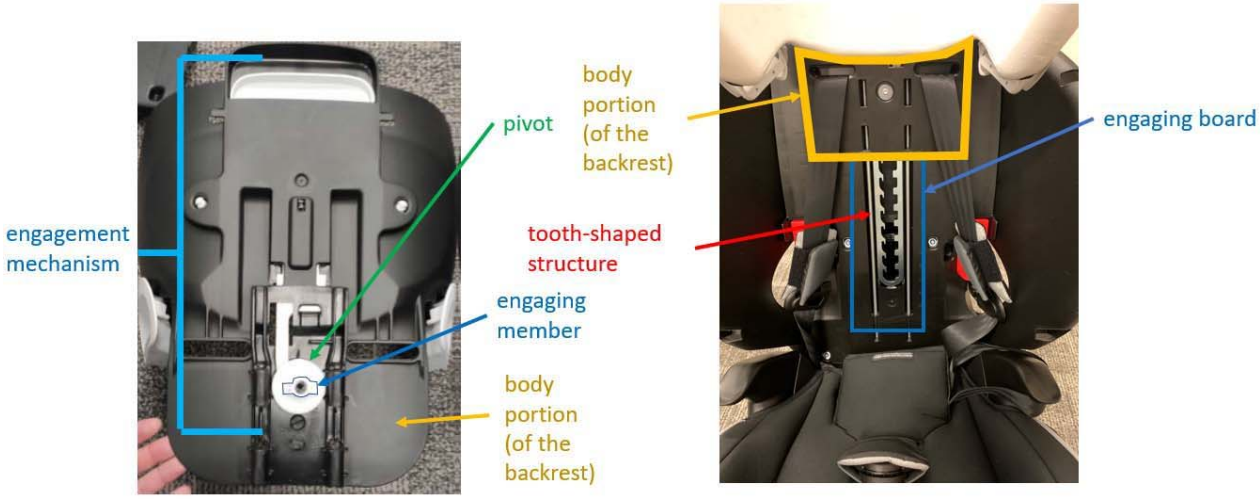
Infringement of the '951 Patent by the EveryFit Car Seat

50. The Evenflo EveryFit Car Seat includes every element of claim 1 of the '951 patent.

51. Claim 1 recites a child safety seat having "an engaging board connected to the seat body, a tooth-shaped structure being formed on the engaging board." The EveryFit Car Seat on Evenflo's website https://www.evenflo.com/car-seats/us_everyfit.html?dwvar_us everyfit_fashion=39312349&cgid=car-seat- convertible#start=3 shows an engaging board connected to the seat body. The engaging board also includes a tooth-shaped structure shown on the figure below.

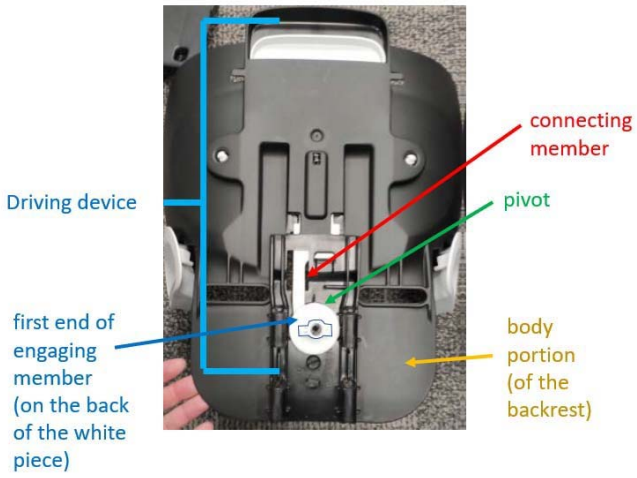
52. Claim 1 further recites "a backrest movably disposed on the engaging board." The EveryFit Car Seat has a backrest on the engaging board such that it moves relative to the engaging board. The movement is demonstrated on the figures below from Evenflo's website that shows the EveryFit Car Seat backrest in at least four different positions.

53. Claim 1 recites "an engaging mechanism disposed between the engaging board and the backrest, the engaging mechanism comprising an engaging member pivotally connected to the backrest for engaging with the tooth-shaped structure." As seen in the figure below, the EveryFit Car Seat has an engaging mechanism between the engaging board and the backrest with the engaging mechanism having an engaging member pivotally connected to the backrest for engaging with the tooth-shaped structure shown below on the disassembled EveryFit Car Seat.



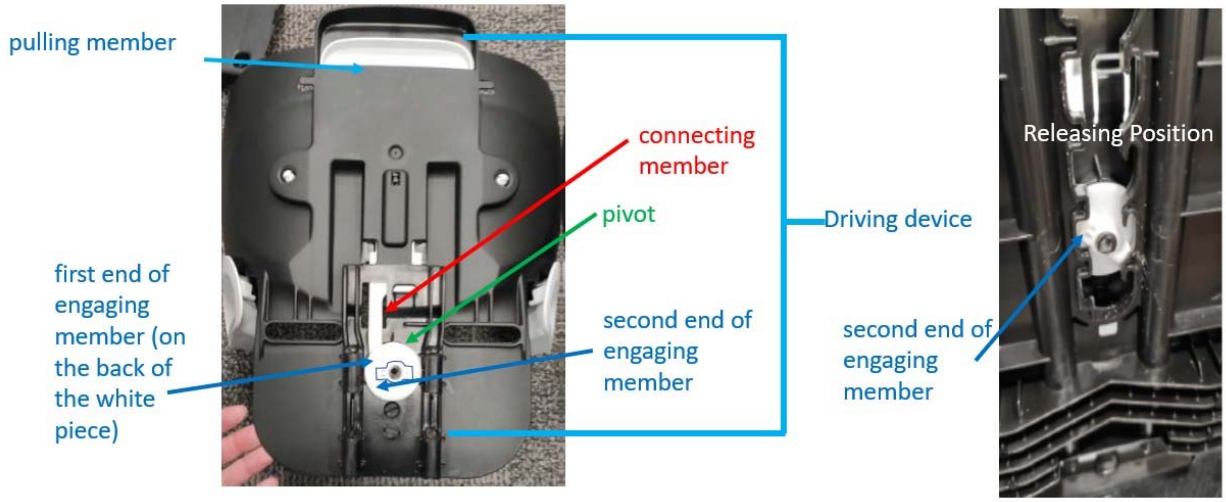
54. Claim 1 further recites "a driving device movably connected to the backrest, the driving device comprising a connecting member pivotally connected to a first end of the

engaging member." As seen in the figure below, Evenflo's EveryFit Car Seat also includes a driving device movably connected to the backrest, the driving device comprising a connecting member pivotally connected to a first end of the engaging member.

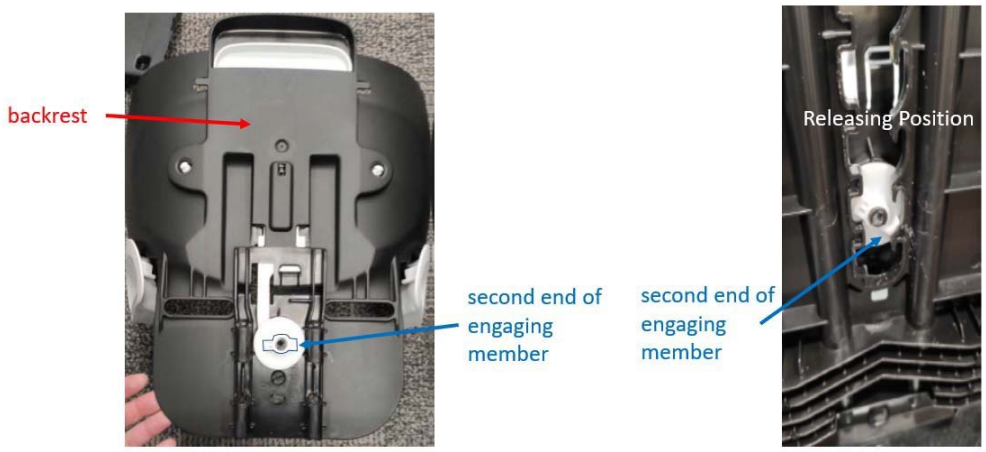


55. Claim 1 further recites "a pulling member connected to the connecting member, for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a releasing position, so as to disengage a second end of the engaging member from the tooth-shaped structure, and further for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a locking position, so as to engage the second end of the engaging member with a positioning groove of the tooth-shaped structure, such that a height of the backrest relative to the engaging board is fixed." Evenflo's website shows the EveryFit Car Seat backrest in at least four different positions that are associated with the grooves of the tooth-shaped structure. EveryFit Car Seat's backrest includes a pulling member connected to the connecting member for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a releasing position to disengage a second end of the engaging member from the tooth-shaped structure, and further for driving the first end of the engaging member to rotate relative to the backrest when

the driving device moves to a locking position to engage the second end of the engaging member with a positioning groove of the tooth-shaped structure, such that a height of the backrest relative to the engaging board is fixed to allow the backrest to lock into the different positions. These elements can be seen in the disassembled EveryFit Car Seat below.



56. Claim 1 further recites "the backrest is capable of moving relative to the engaging board when the second end of the engaging member is disengaged from the tooth-shaped structure." Evenflo's website shows the EveryFit Car Seat backrest in at least four different positions and capable of vertical movement. As seen below, the EveryFit Car Seat's backrest is capable of moving relative to the engaging board when the second end of the engaging member is disengaged from the tooth-shaped structure to permit the multiple backrest positions.



Infringement of the ’951 Patent by the EveryKid Car Seat

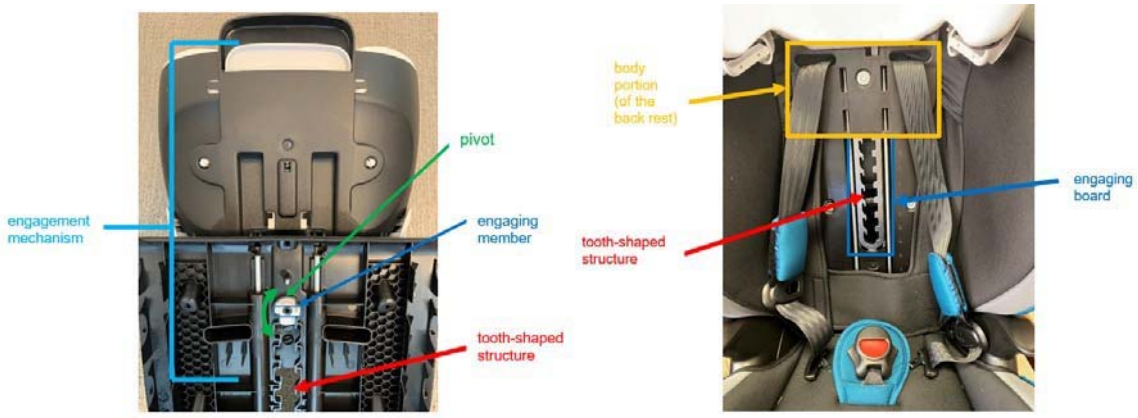
57. The Evenflo EveryKid Car Seat includes every element of claim 1 of the ’951 patent.

58. Claim 1 recites a child safety seat having “an engaging board connected to seat body, a tooth-shaped structure being formed on the engaging board.” The EveryKid Car Seat on Evenflo’s website https://www.evenflo.com/car- seats/us_everykid.html?dwvar_us everykid_fashion=39312340&cgid=car-seat-convertible#start=5 shows an engaging board connected to the seat body. The engaging board also includes a tooth-shaped structure shown on the figure below.

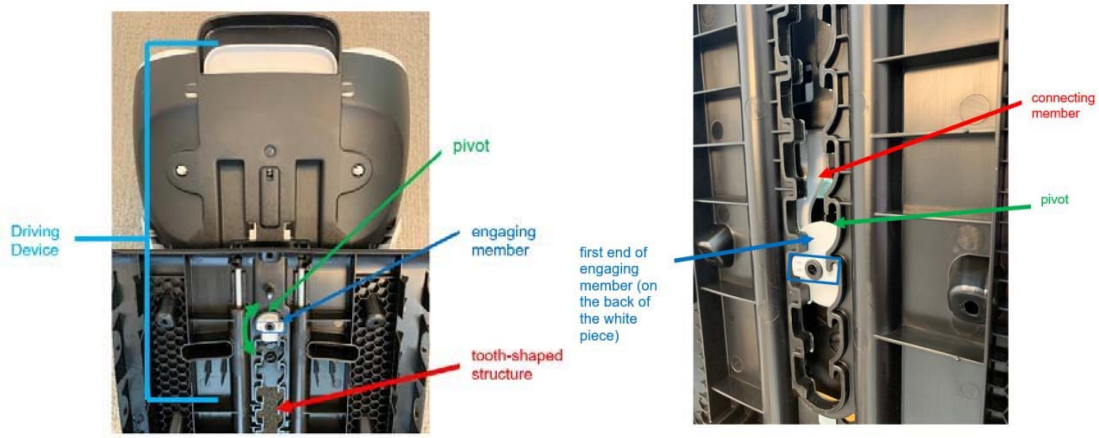
59. Claim 1 further recites "a backrest movably disposed on the engaging board." The EveryKid Car Seat has a backrest on the engaging board such that it moves relative to the engaging board. The movement is demonstrated on the figures below from Evenflo's website that shows the EveryKid Car Seat backrest in at least four different positions.

60. Claim 1 recites "an engaging mechanism between the engaging board and the backrest, the engaging mechanism comprising an engaging member pivotally connected to the backrest for engaging with the tooth-shaped structure." As seen in the figure below, the EveryKid Car Seat has an engaging mechanism between the engaging board and the backrest with the engaging mechanism having an engaging member pivotally connected to the backrest for engaging with the tooth-shaped structure shown below on the disassembled EveryKid Car

seat.

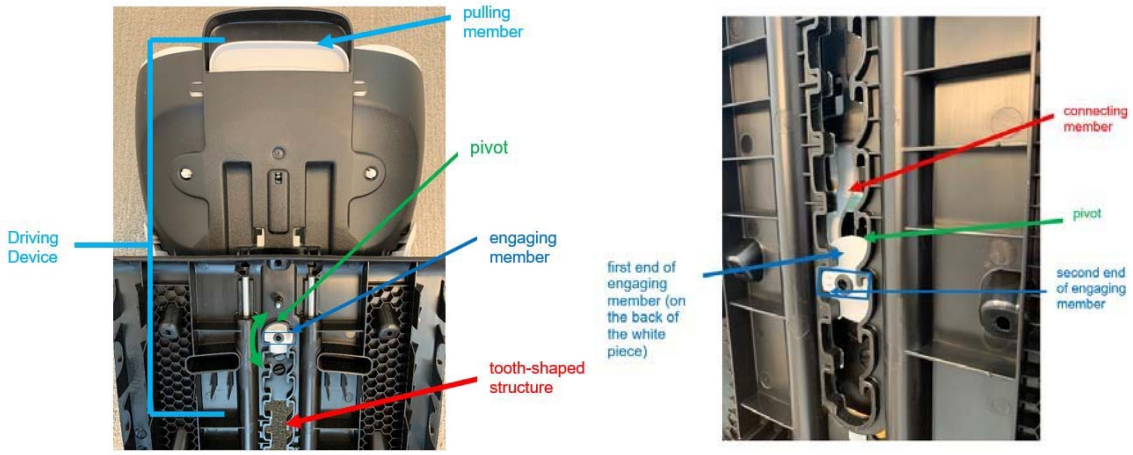


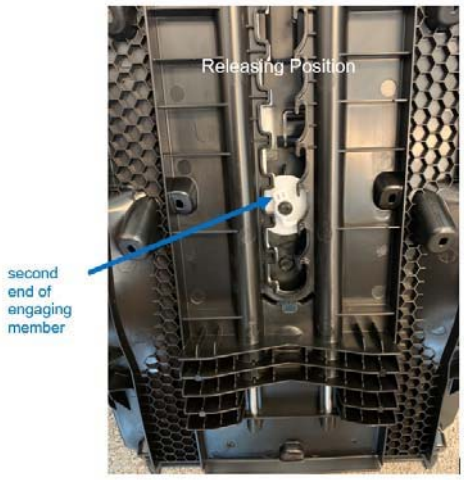
61. Claim 1 further recites "a driving device movably connected to the backrest, the driving device comprising a connecting member pivotally connected to a first end of the engaging member." As seen in the figure below, Evenflo's EveryKid Car Seat also includes a driving device movably connected to the backrest, the driving device comprising a connecting member pivotally connected to a first end of the engaging member.



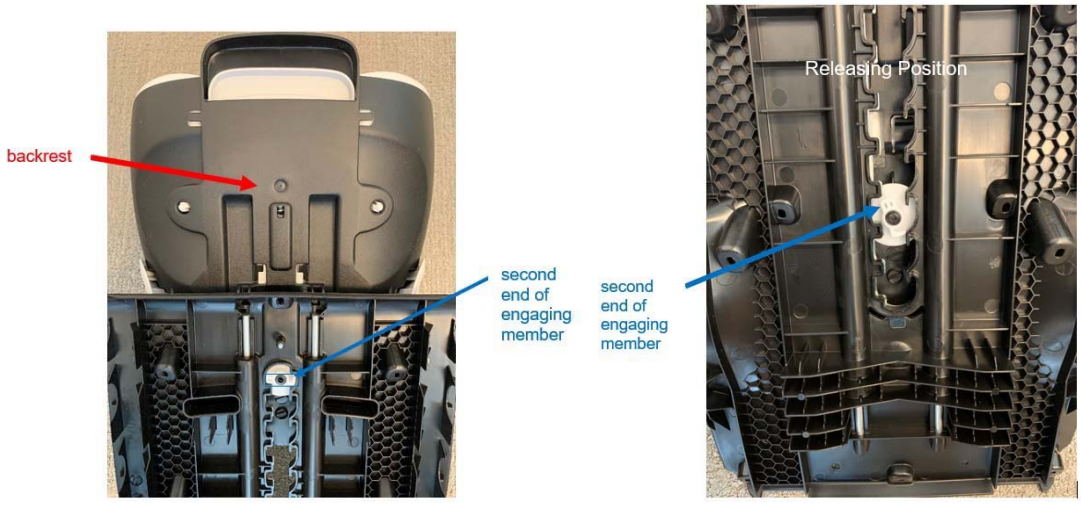
62. Claim 1 further recites "a pulling member connected to the connecting member, for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a releasing position, so as to disengage a second end of the engaging member from the tooth-shaped structure, and further for driving the first end of the engaging

member to rotate relative to the backrest when the driving device moves to a locking position, so as to engage the second end of the engaging member with a positioning groove of the tooth-shaped structure, such that a height of the backrest relative to the engaging board is fixed." Evenflo's website shows the EveryKid Car Seat backrest in at least four different positions that are associated with the grooves of the tooth-shaped structure. The figure below shows the EveryKid Car Seat's backrest includes a pulling member connected to the connecting member for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a releasing position to disengage a second end of the engaging member from the tooth-shaped structure, and further for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a locking position to engage the second end of the engaging member with a positioning groove of the tooth-shaped structure, such that a height of the backrest relative to the engaging board is fixed to allow the backrest to lock into the different positions. These elements can be seen in the disassembled EveryKid Car Seat below.





63. Claim 1 further recites "the backrest is capable of moving relative to the engaging board when the second end of the engaging member is disengaged from the tooth-shaped structure." Evenflo's website shows the EveryKid Car Seat backrest in at least four different positions and capable of vertical movement. As seen below, the EveryKid Car Seat's backrest is capable of moving relative to the engaging board when the second end of the engaging member is disengaged from the tooth-shaped structure to permit the multiple backrest positions.

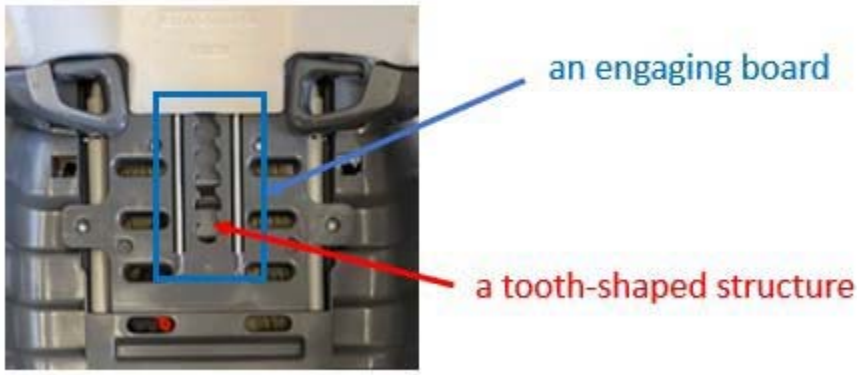


Infringement of the '951 Patent by the SafeMax Car Seat

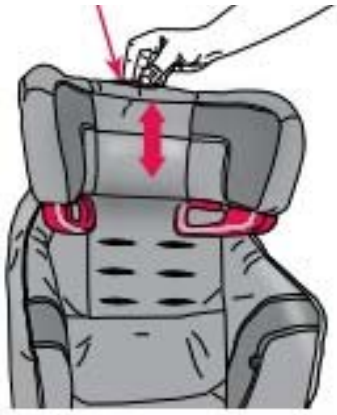
64. The Evenflo SafeMax Car Seat includes every element of claim 1 of the '951

patent.

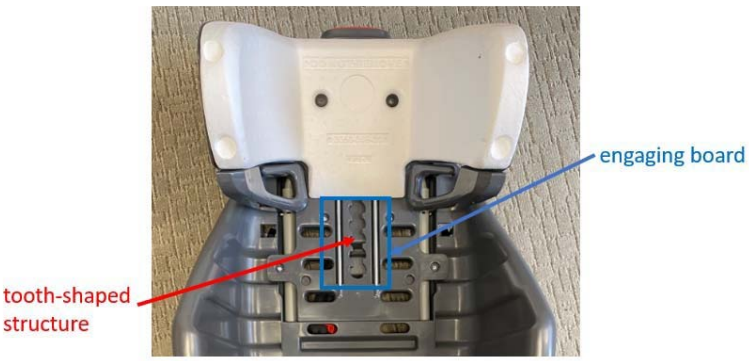
65. Claim 1 recites a child safety seat having "an engaging board connected to the seat body, a tooth-shaped structure being formed on the engaging board." The SafeMax Car Seat on Evenflo's website https://www.evenflo.com/car-seats/us_safemax-booster.html shows an engaging board connected to the seat body. The engaging board also includes a tooth-shaped structure shown on the figure below.

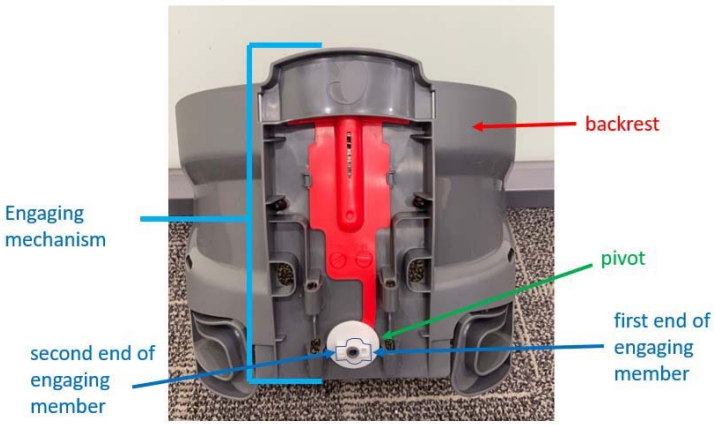


66. Claim 1 further recites "a backrest movably disposed on the engaging board." The SafeMax Car Seat has a backrest on the engaging board such that it moves relative to the engaging board. The movement is demonstrated on the figures below from the manual for the SafeMax Car Seat found on Evenflo's website that shows the SafeMax Car Seat backrest is movable to different vertical positions. *See* https://www.evenflo.com/on/demandware.static/-/Sites-evenflo-Library/default/dw4a4d70fd/instruction-manuals/car-seats/booster/25701025-Evolve-Transitions-SafeMax%203%20in%201-EN.pdf.

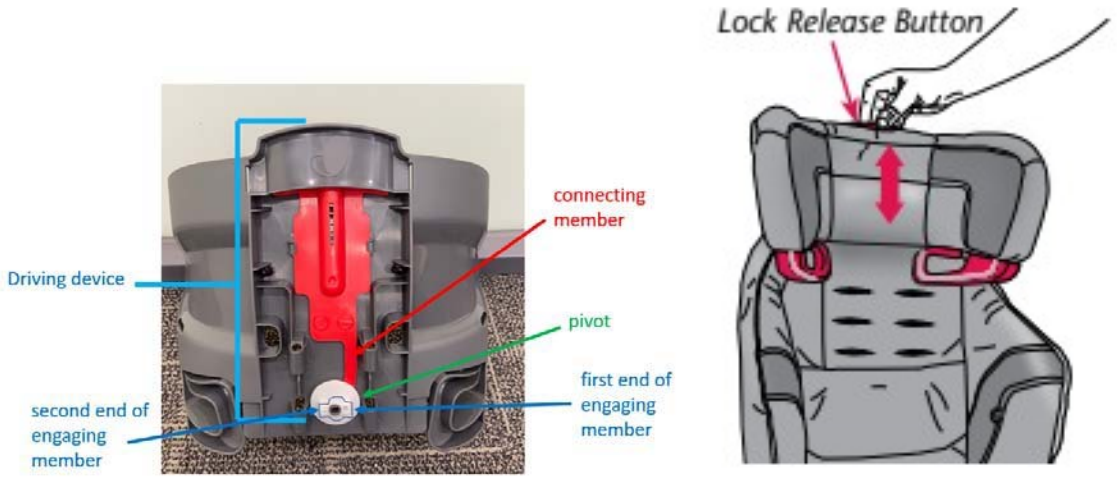


67. Claim 1 recites "an engaging mechanism disposed between the engaging board and the backrest, the engaging mechanism comprising an engaging member pivotally connected to the backrest for engaging with the tooth-shaped structure." The SafeMax Car Seat has an engaging mechanism between the engaging board and the backrest with the engaging mechanism having an engaging member pivotally connected to the backrest for engaging with the tooth-shaped structure shown below on the disassembled SafeMax Car Seat.



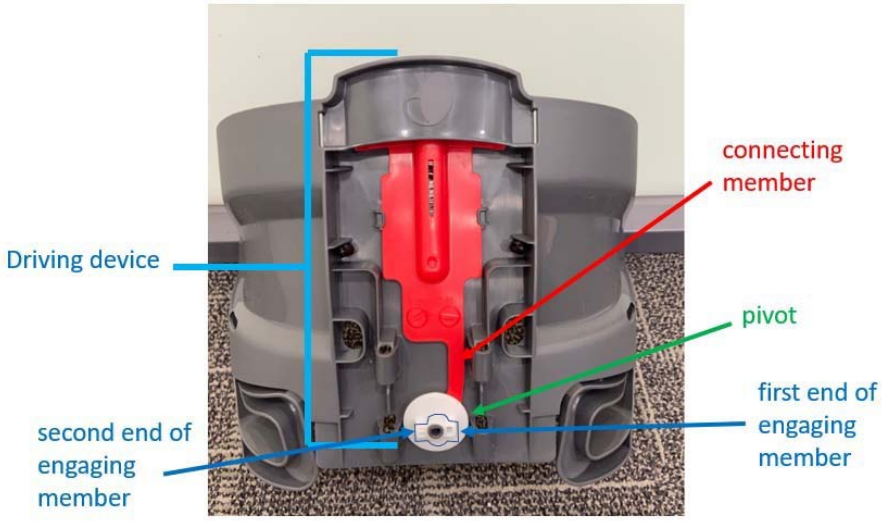


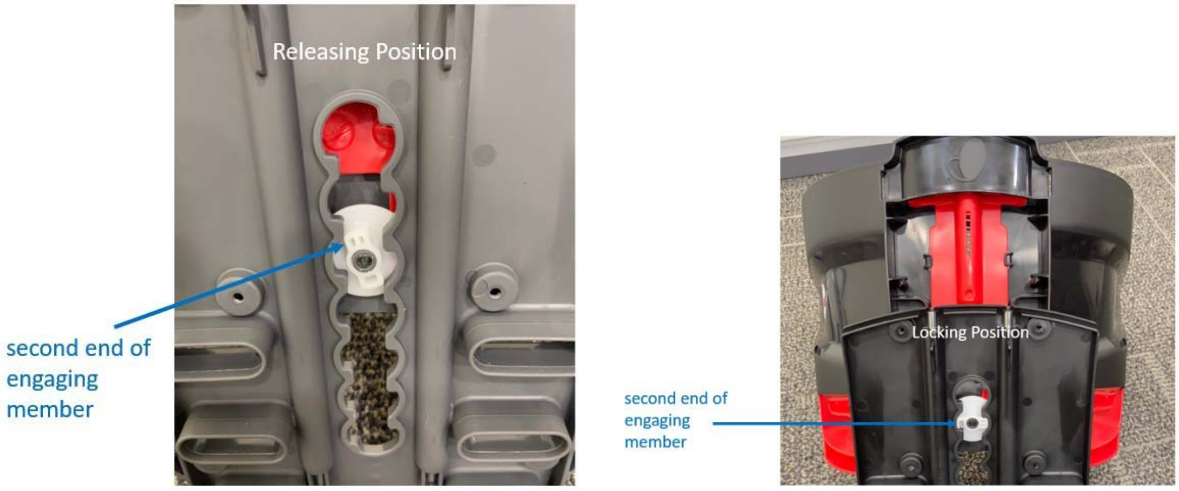
68. Claim 1 further recites "a driving device movably connected to the backrest, the driving device comprising a connecting member pivotally connected to a first end of the engaging member." Evenflo's SafeMax Car Seat also includes a driving device movably connected to the backrest, the driving device comprising a connecting member pivotally connected to a first end of the engaging member. The driving device engages the connecting member by pushing the "lock release button" seen below in a figure from the SafeMax Car Seat user's manual.



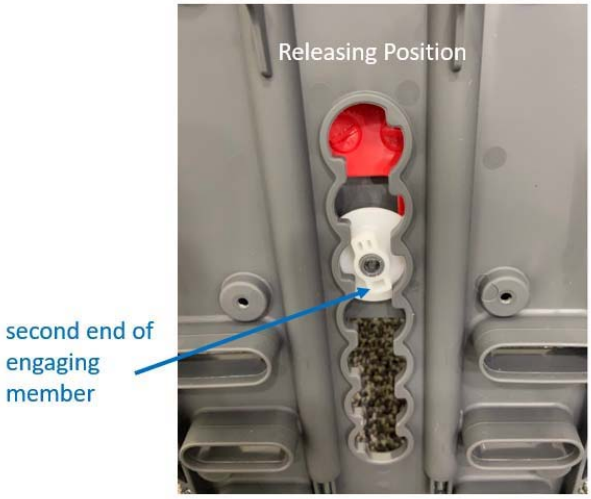
69. Claim 1 further recites "a pulling member connected to the connecting member, for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a releasing position, so as to disengage a second end of the engagingmember from the tooth-shaped structure, and further for driving the first end of the engaging member to rotate

relative to the backrest when the driving device moves to a locking position, so as to engage the second end of the engaging member with a positioning groove of the tooth- shaped structure, such that a height of the backrest relative to the engaging board is fixed." The SafeMax Car Seat user's manual shows the SafeMax Car Seat backrest is movable in different positions that are associated with the grooves of the tooth-shaped structure. This is achieved because the SafeMax Car Seat's backrest includes a button that acts as a pulling member connected to the connecting member for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a releasing position to disengage a second end of the engaging member from the tooth-shaped structure, and further for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a locking position to engage the second end of the engaging member with a positioning groove of the tooth-shaped structure, such that a height of the backrest relative to the engaging board is fixed to allow the backrest to lock into the different positions. These elements can be seen in the disassembled SafeMax Car Seat below.





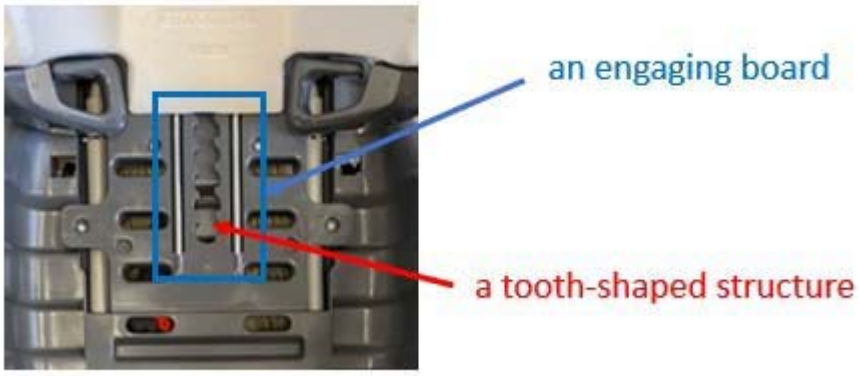
70. Claim 1 further recites "the backrest is capable of moving relative to the engaging board when the second end of the engaging member is disengaged from the tooth-shaped structure." The SafeMax Car Seat user's manual shows the SafeMax Car Seat backrest can be locked into different positions and capable of vertical movement. The SafeMax Car Seat's backrest is capable of moving relative to the engaging board when the second end of the engaging member is disengaged from the tooth-shaped structure to permit the multiple backrest positions.



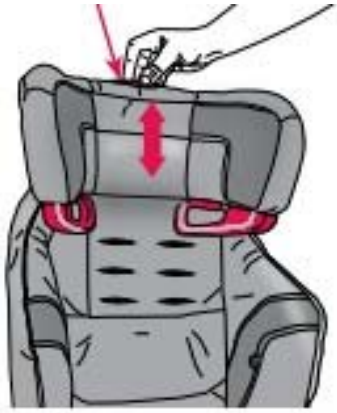
Infringement of the '951 Patent by the Evolve Car Seat

71. The Evenflo Evolve Car Seat includes every element of claim 1 of the '951 patent.

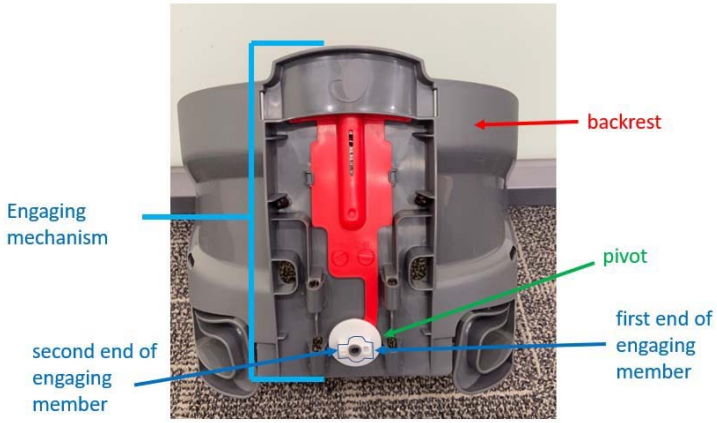
72. Claim 1 recites a child safety seat having "an engaging board connected to the seat body, a tooth-shaped structure being formed on the engaging board." The Evolve Car Seat on Evenflo's website https://www.evenflo.com/car-seats/evolve/us_evolve.html shows an engaging board connected to the seat body. The engaging board also includes a tooth-shaped structure shown on the figure below.



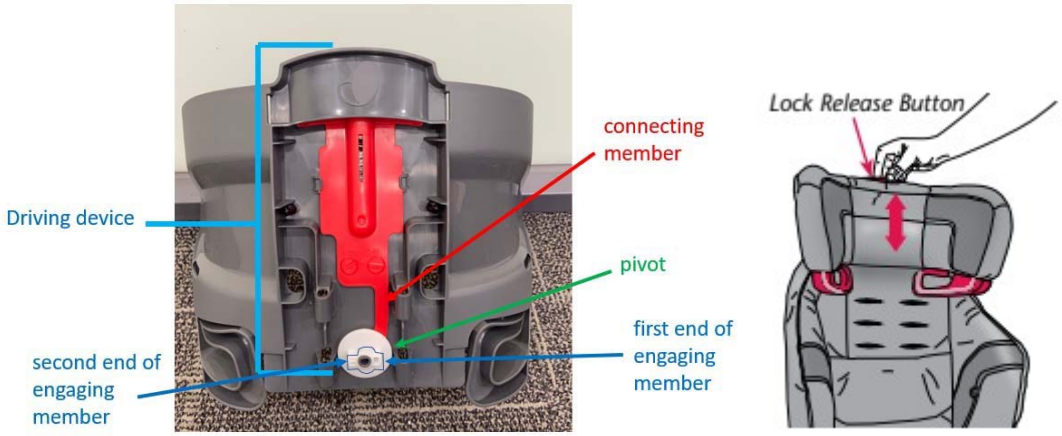
73. Claim 1 further recites "a backrest movably disposed on the engaging board." The Evolve Car Seat has a backrest on the engaging board such that it moves relative to the engaging board. The movement is demonstrated on the figures below from the manual for the Evolve Car Seat found on Evenflo's website that shows the Evolve Car Seat backrest is movable to different vertical positions. See https://www.evenflo.com/on/demandware.static/-/Sites-evenflo-Library/default/dw4a4d70fd/instruction-manuals/car-seats/booster/25701025-Evolve- Transitions-SafeMax%203%20in%201-EN.pdf.



74. Claim 1 recites "an engaging mechanism disposed between the engaging board and the backrest, the engaging mechanism comprising an engaging member pivotally connected to the backrest for engaging with the tooth-shaped structure." The Evolve Car Seat has an engaging mechanism between the engaging board and the backrest with the engaging mechanism having an engaging member pivotally connected to the backrest for engaging with the tooth-shaped structure shown below on the disassembled Evolve Car Seat.

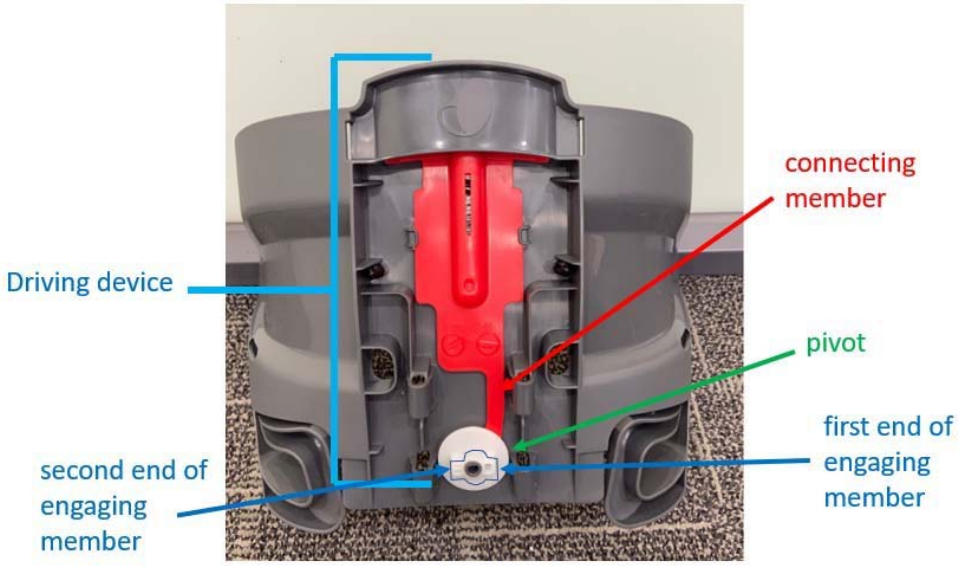


75. Claim 1 further recites "a driving device movably connected to the backrest, the driving device comprising a connecting member pivotally connected to a first end of the engaging member." Evenflo's Evolve Car Seat also includes a driving device movably connected to the backrest, the driving device comprising a connecting member pivotally connected to a first end of the engaging member. The driving device engages the connecting member by pushing the "lock release button" seen below in a figure from the Evolve Car Seat user's manual.

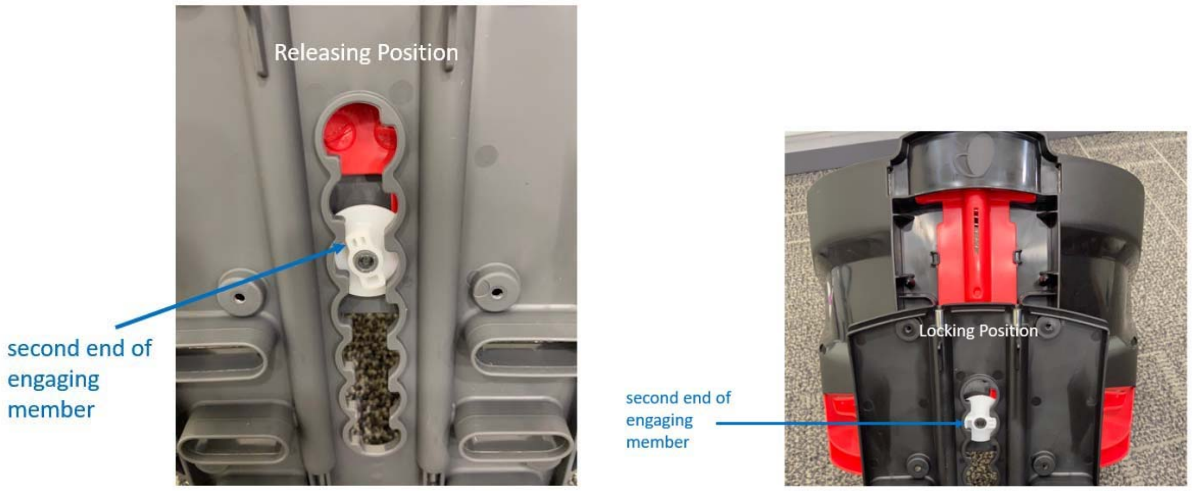


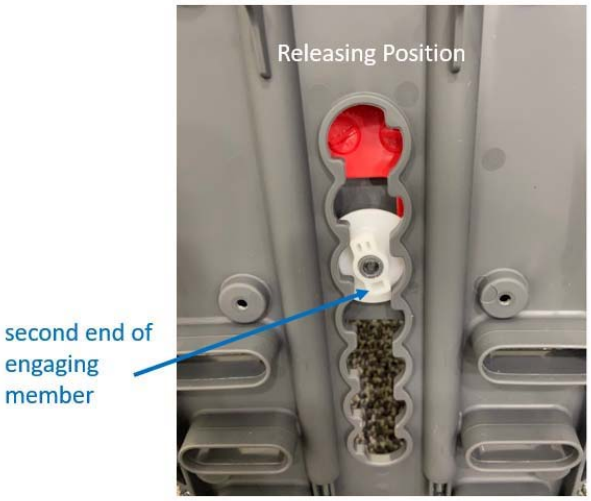
76. Claim 1 further recites "a pulling member connected to the connecting member, for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a releasing position, so as to disengage a second end of the engaging member from the tooth-shaped structure, and further for driving the first end of the engaging member to

rotate relative to the backrest when the driving device moves to a locking position, so as to engage the second end of the engaging member with a positioning groove of the tooth- shaped structure, such that a height of the backrest relative to the engaging board is fixed." The Evolve Car Seat user's manual shows the Evolve Car Seat backrest is movable in different positions that are associated with the grooves of the tooth-shaped structure. This is achieved because the Evolve Car Seat's backrest includes a button that acts as a pulling member connected to the connecting member for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a releasing position to disengage a second end of the engaging member from the tooth-shaped structure, and further for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a locking position to engage the second end of the engaging member with a positioning groove of the tooth-shaped structure, such that a height of the backrest relative to the engaging board is fixed to allow the backrest to lock into the different positions. These elements can be seen in the disassembled Evolve Car Seat below.



77. Claim 1 further recites "the backrest is capable of moving relative to the engaging board when the second end of the engaging member is disengaged from the tooth-shaped structure." The Evolve Car Seat user's manual shows the Evolve Car Seat backrest can be locked into different positions and capable of vertical movement. The Evolve Car Seat's backrest is capable of moving relative to the engaging board when the second end of the engaging member is disengaged from the tooth-shaped structure to permit the multiple backrest positions.





78. By making, using, selling, offering for sale, and/or importing in the United States the EveryFit Car Seat, EveryKid Car Seat, SafeMax Car Seat, and Evolve Car Seat, Evenflo has

infringed and is continuing to infringe at least one claim of the ’951 patent. 35 U.S.C. § 271(b).

79. On information and belief, Evenflo is knowledgeable of Wonderland’s patent portfolio based on the parties’ prior dealings and litigation history. Despite Evenflo’s knowledge of the ’951 patent and its infringing activities, Evenflo has infringed and is continuing to infringe one or more claims of the ’951 patent by manufacturing, selling, and/or offering for sale additional EveryFit Car Seats, EveryKid Car Seats, SafeMax Car Seats, and Evolve Car Seats. This intentional infringement without regard for Wonderland’s patent rights constitutes egregious conduct sufficient to establish willful infringement under 35 U.S.C. § 284.

80. The ongoing and continuous infringement by Evenflo of the ’951 patent entitles Wonderland to an injunction permanently enjoining Evenflo from further infringing Wonderland’s patent rights, pursuant to 35 U.S.C. § 283.

81. Wonderland has suffered and continues to suffer damages from Evenflo’s infringement of the ’951 patent and is entitled to compensation and other monetary relief to the extent allowed by law, pursuant to 35 U.S.C §§ 284 and 285.

REQUEST FOR RELIEF

WHEREFORE, Plaintiff Wonderland respectfully requests the Court enter judgment in its favor and against Evenflo on the patent infringement claims set forth above and respectfully requests that this Court:

(a) enter judgment that Evenflo has infringed, and continues to infringe at least one claim of the ’043 patent in violation of at least one of 35 U.S.C. § 271(a), (b), and/or (c);

(b) award Wonderland all available and legally permissible damages and relief sufficient to compensate Wonderland for Evenflo’s infringement of the ’043 patent, including to the full extent permitted by 35 U.S.C. § 284, together with interest, in an amount to be determined at trial;

(c) declare Evenflo's infringement of the '043 patent to be willful and award Wonderland treble damages in accordance with 35 U.S.C. § 284;

(d) enter judgment that Evenflo has infringed, and continues to infringe at least one claim of the '951 patent in violation of at least one of 35 U.S.C. § 271(a), (b), and/or (c);

(e) award Wonderland all available and legally permissible damages and relief sufficient to compensate Wonderland for Evenflo's infringement of the '951 patent, including to the full extent permitted by 35 U.S.C. § 284, together with interest, in an amount to be determined at trial;

(f) declare Evenflo's infringement of the '951 patent to be willful and award Wonderland treble damages in accordance with 35 U.S.C. § 284;

(g) require Evenflo to account for and pay to Wonderland total profits made by Evenflo from sales of the EveryFit Car Seat under 35 U.S.C. § 289;

(h) enter a permanent injunction against Evenflo, barring and enjoining its further making, using, selling, offering for sale, and/or importing into the United States of all infringing products;

(i) declare this to be an exceptional case under 35 U.S.C. §§ 285 and 271(e)(4) and award Wonderland costs, expenses, and disbursements in this action, including reasonable attorney fees; and

(j) award Wonderland such other and further relief as may be permitted and is appropriate at law or in equity.

JURY DEMAND

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, Wonderland hereby respectfully requests a trial by jury on all issues triable of right by a jury.

Date: May 21, 2021

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EXHIBIT A

US007625043B2

(12) **United States Patent**
Hartenstine et al.

(10) **Patent No.: US 7,625,043 B2**
(45) **Date of Patent: Dec. 1, 2009**

(54) **CHILD CAR SEAT WITH MULTIPLE USE CONFIGURATIONS**

(75) Inventors: **Curtis M. Hartenstine**, Birdsboro, PA (US); **Sharon A. Gillett**, Shillington, PA (US); **Robert E. Haut**, West Chester, PA (US)

(73) Assignee: **Wonderland Nurserygoods Co., Ltd.**, Taipei (TW)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 455 days.

(21) Appl. No.: **11/519,465**

(22) Filed: **Sep. 12, 2006**

(65) **Prior Publication Data**

US 2007/0057547 A1 Mar. 15, 2007

Related U.S. Application Data

(60) Provisional application No. 60/717,331, filed on Sep. 15, 2005, provisional application No. 60/760,235, filed on Jan. 19, 2006.

(51) **Int. Cl.**
A47C 1/08 (2006.01)

(52) **U.S. Cl.** **297/250.1**; 297/256.1; 297/258.13; 297/255

(58) **Field of Classification Search** 297/250.1, 297/256.1, 256.13, 255, 410
See application file for complete search history.

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* cited by examiner

Primary Examiner—Laurie K Cranmer
(74) *Attorney, Agent, or Firm*—Miller Law Group, PLLC

(57) **ABSTRACT**

A car seat is formed with a seat member pivotally connected to a base member for positional adjustment in desired reclined positions controlled by an intuitively operable adjustment mechanism. The seat back is pivotally connected to the seat member to be oriented in a shipping position or an operative position. A latching mechanism secures the seat back to the seat member in the operative position. The seat back is provided with a head rest that is vertically movable relative to the seat back to uncover routing openings in the seat back as the child grows and the head rest is positioned accordingly. The harness is routed through selected routing openings in the seat back before passing over a hanger at the top of the seat back so that the length of the harness remains constant irrespective of the positioning of the harness in conjunction with the size of the child.

22 Claims, 15 Drawing Sheets

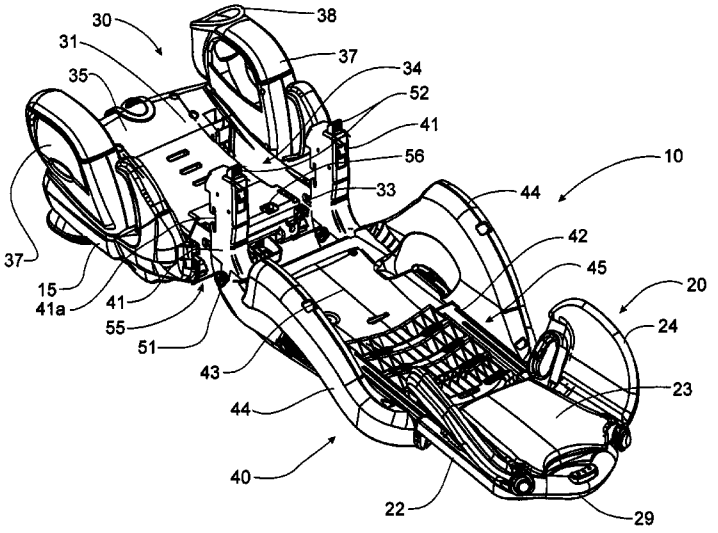

Fig. 1

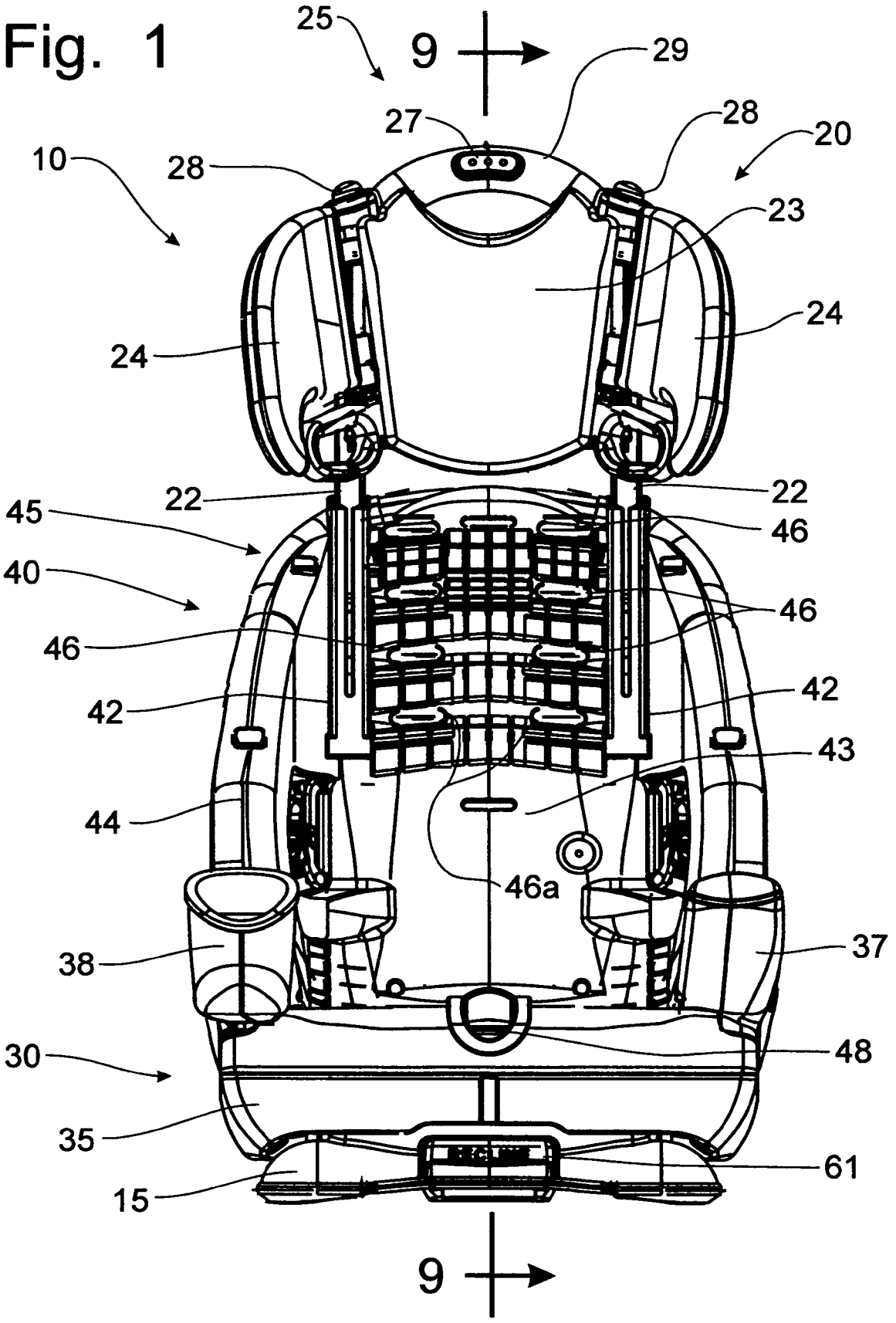
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Fig. 2

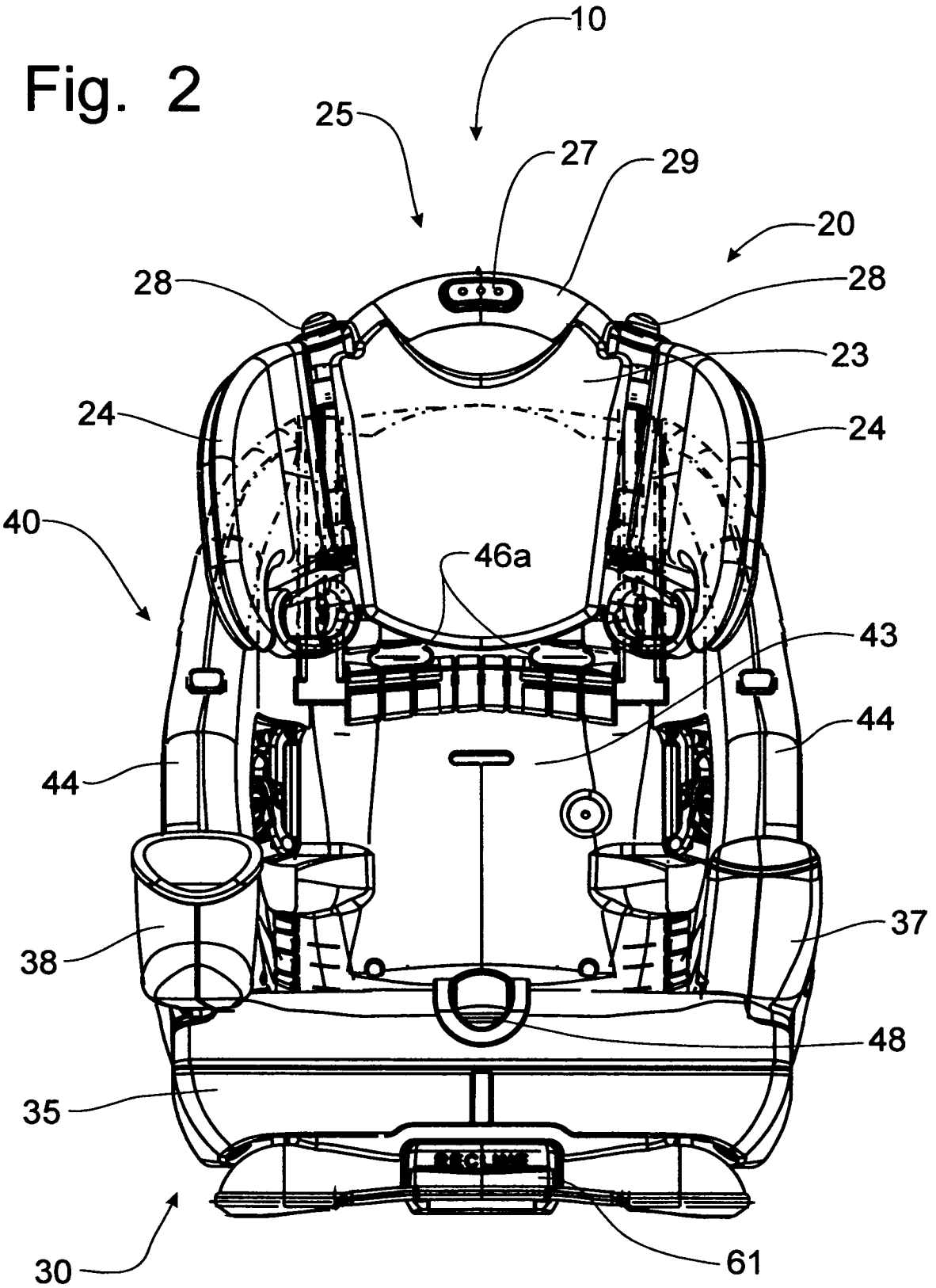

Fig. 3

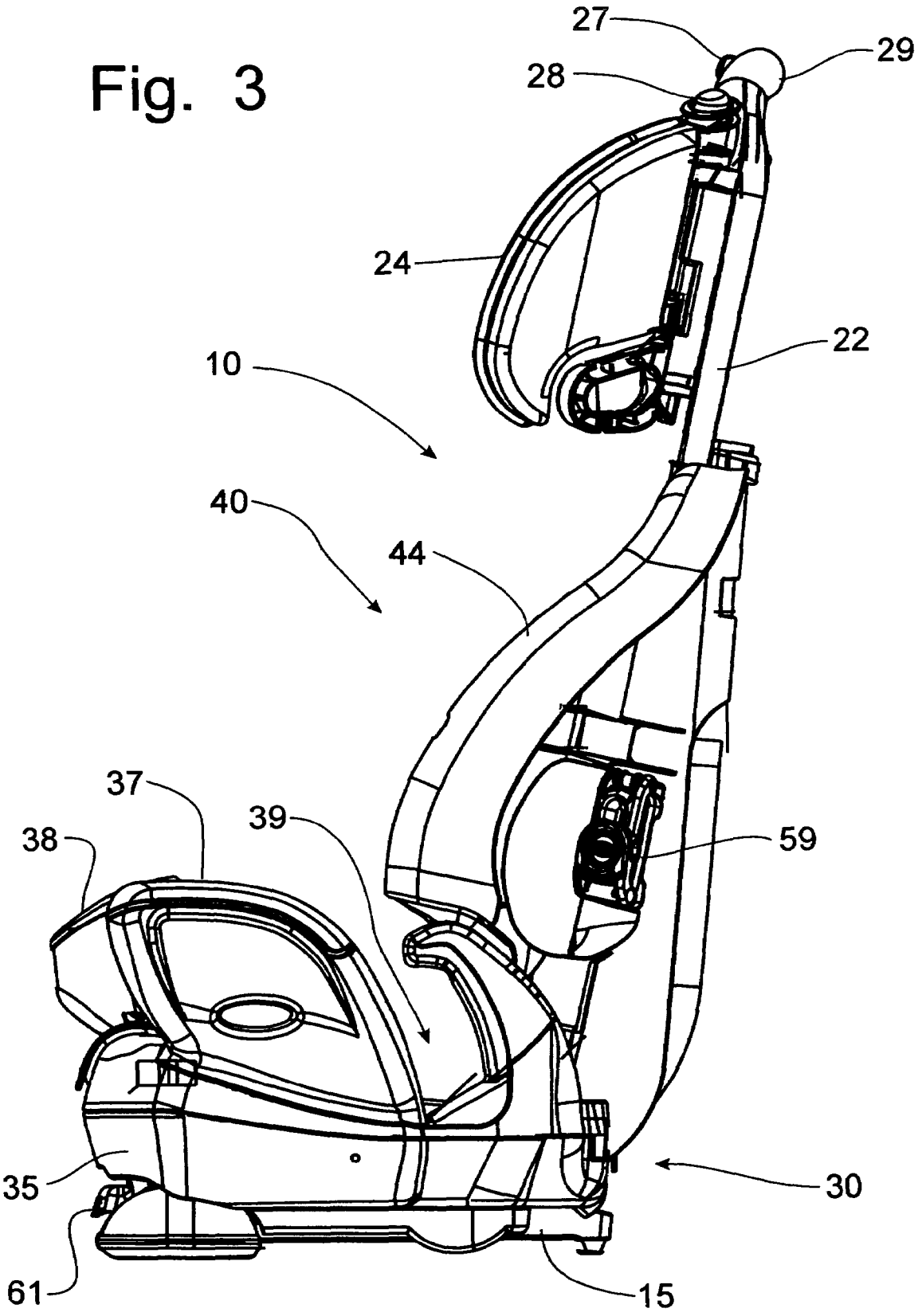

Fig. 4

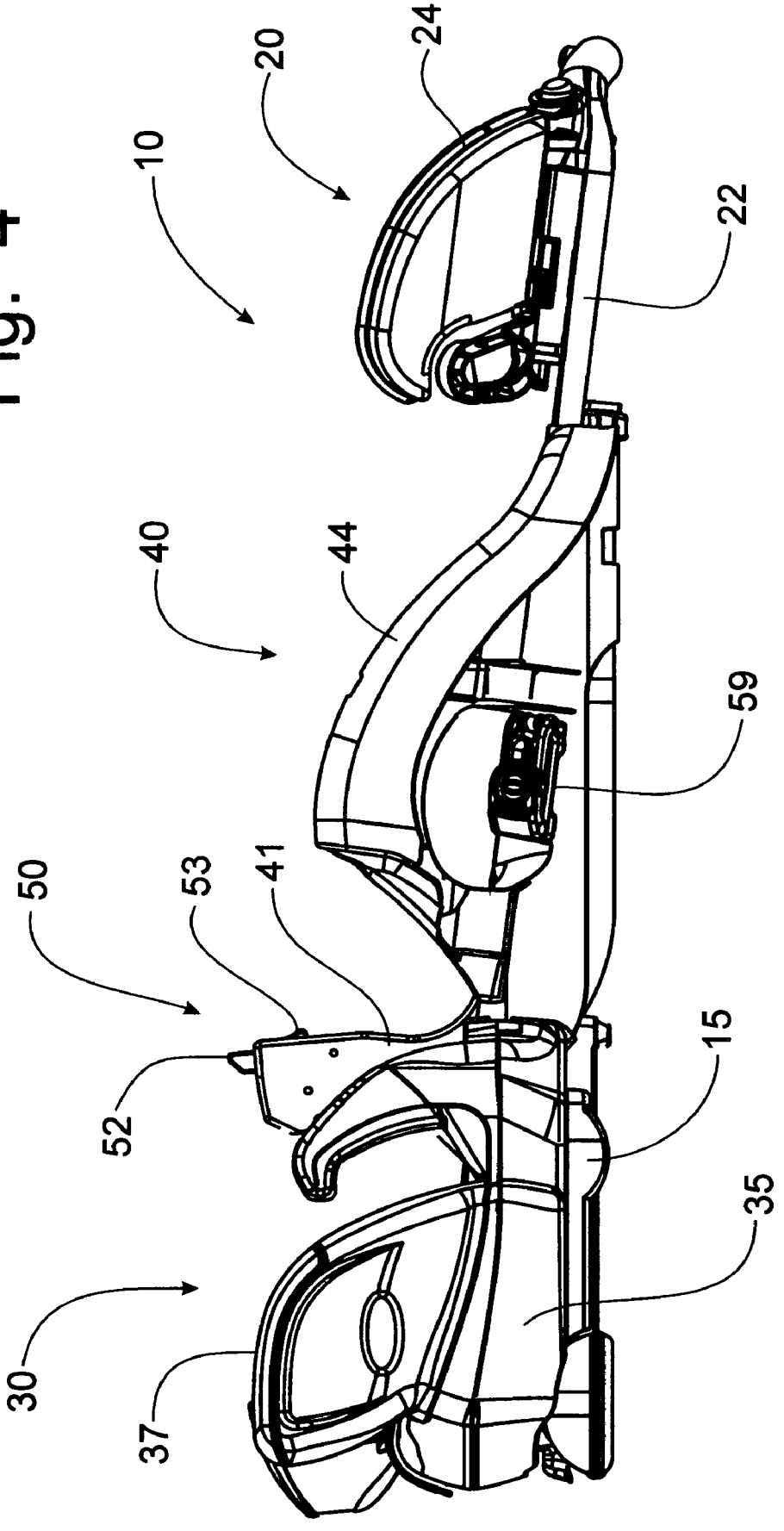

Fig. 5

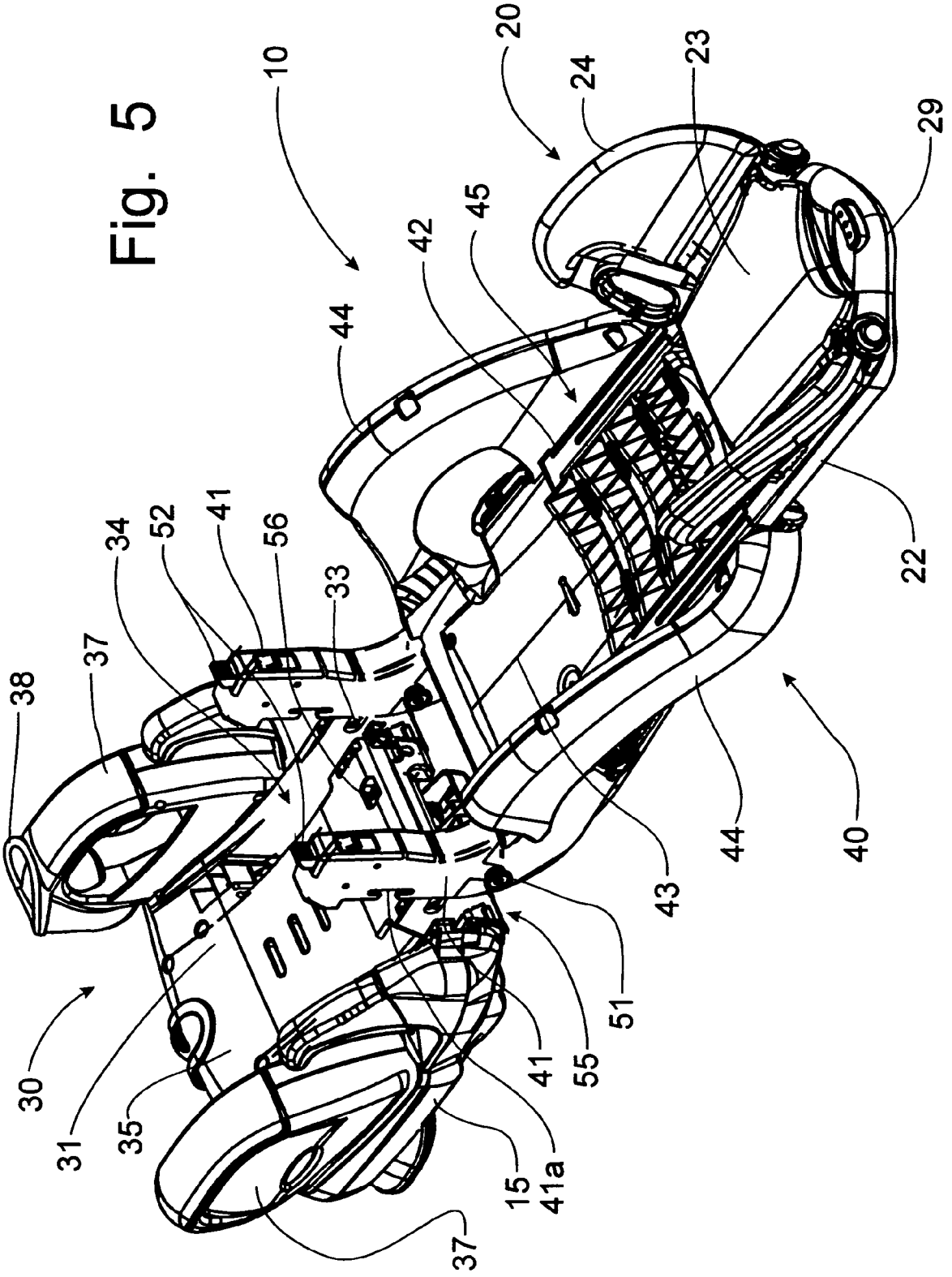
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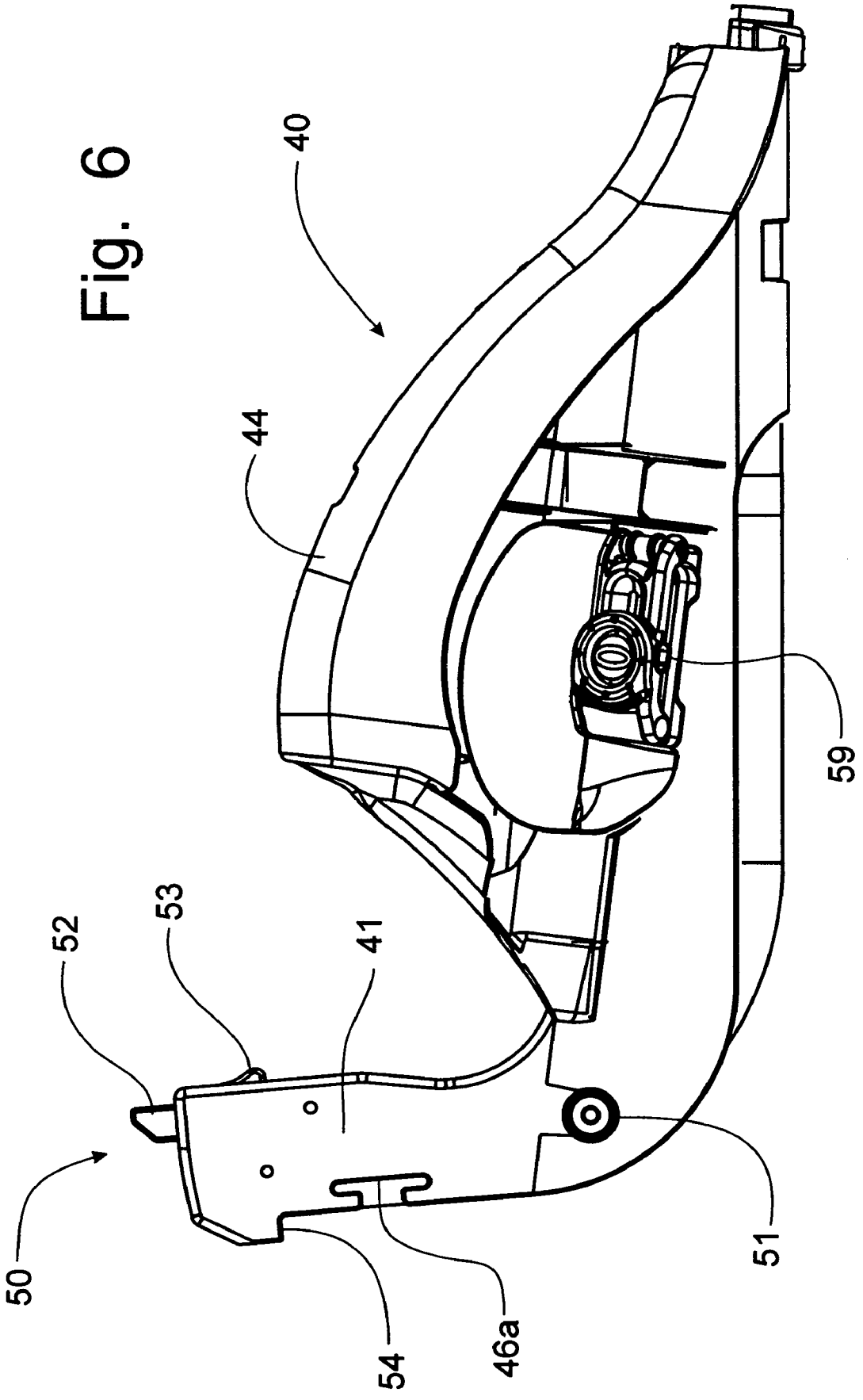
Fig. 6



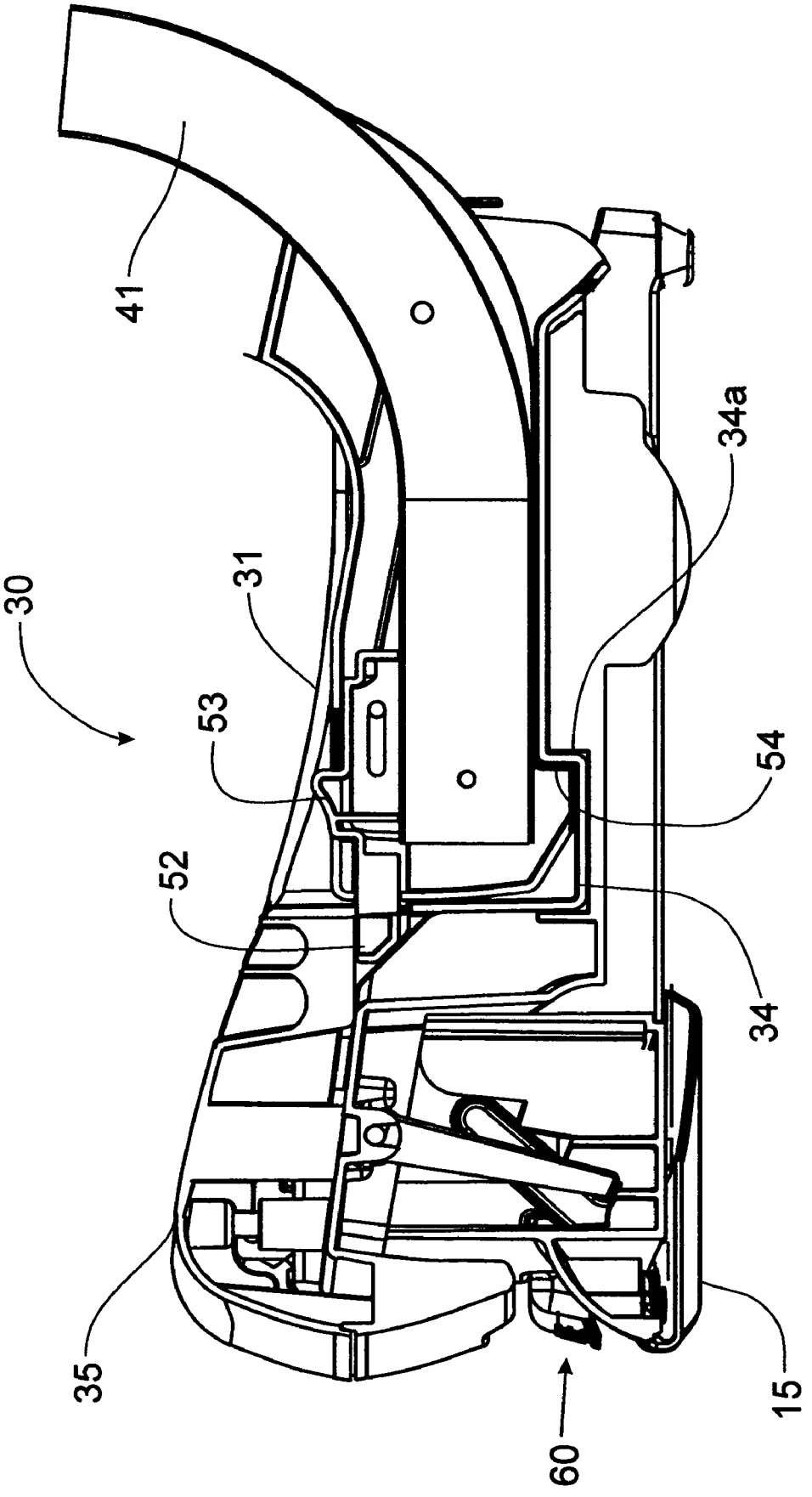


Fig. 6A

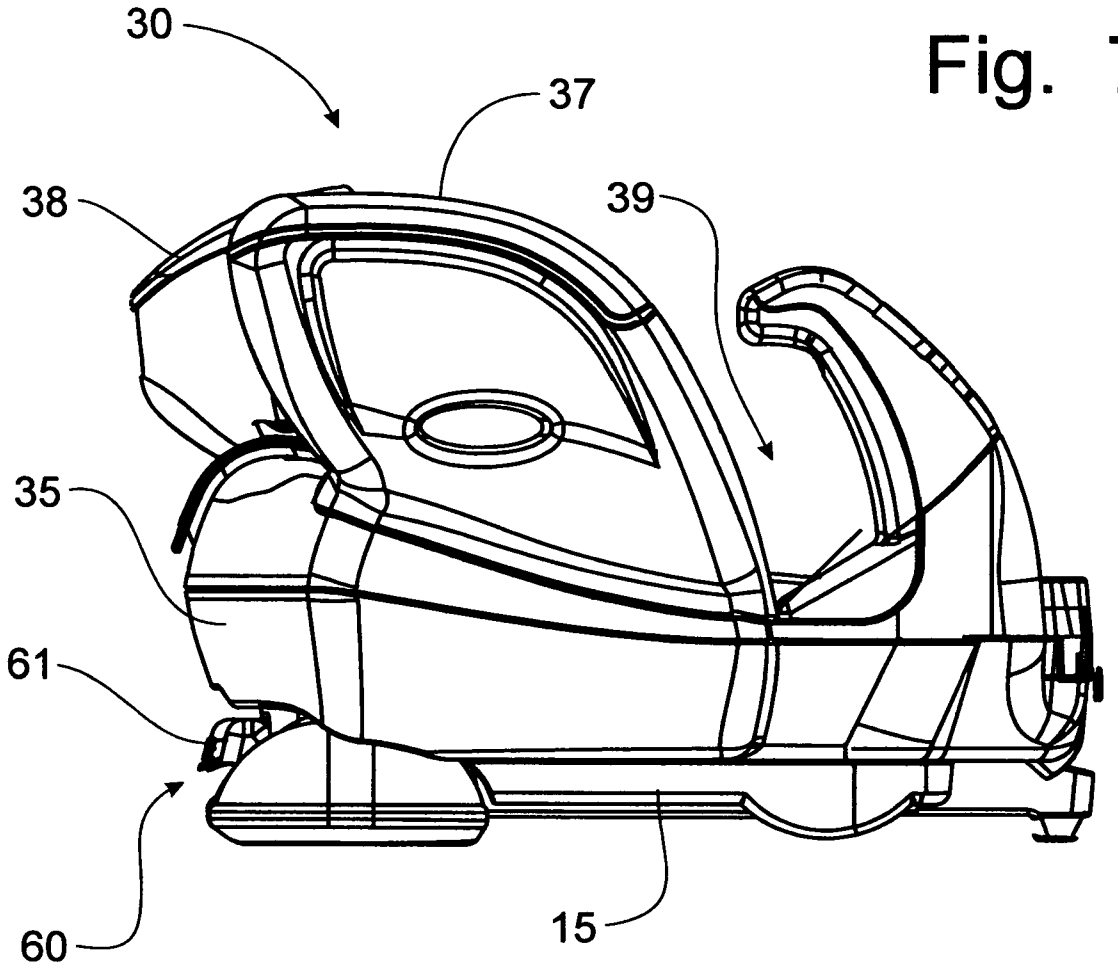


Fig. 7

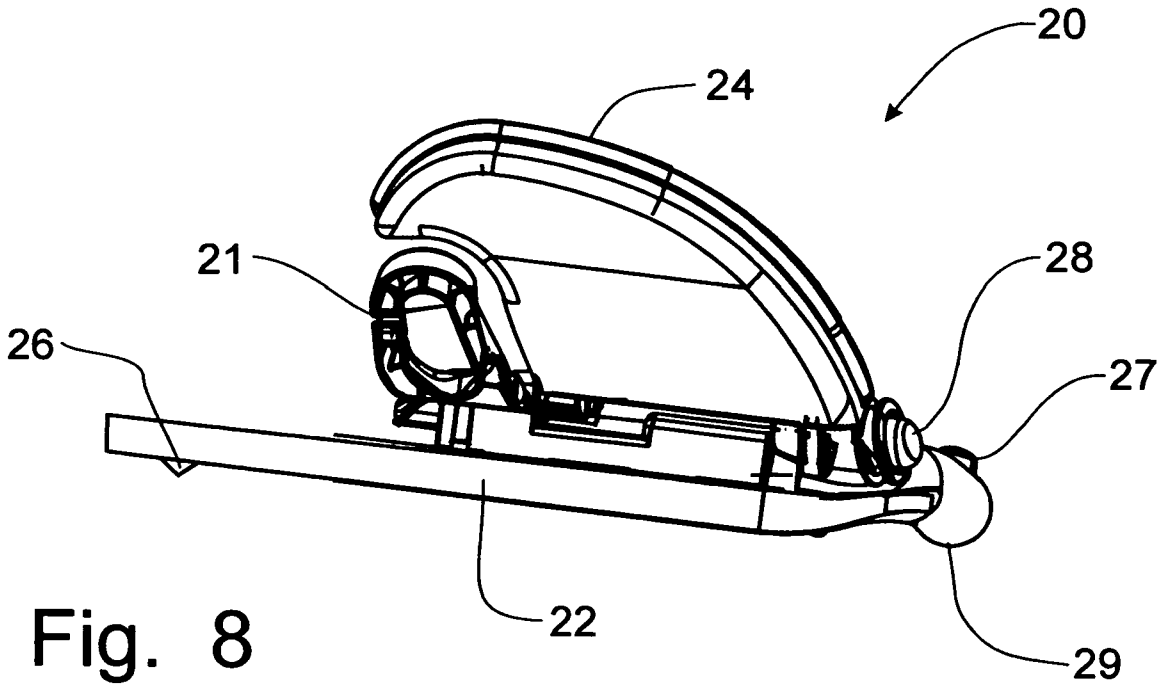
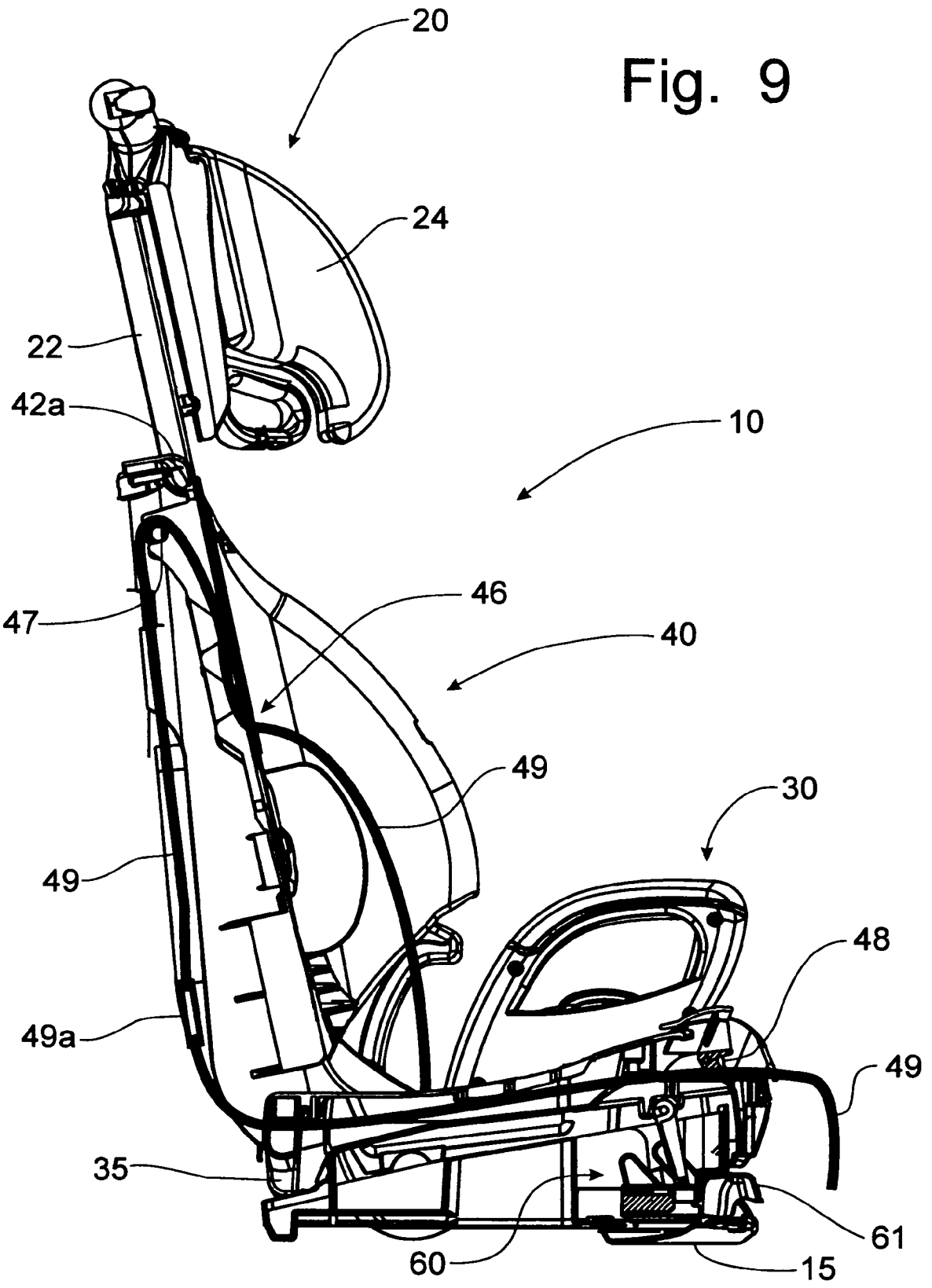


Fig. 8

Fig. 9



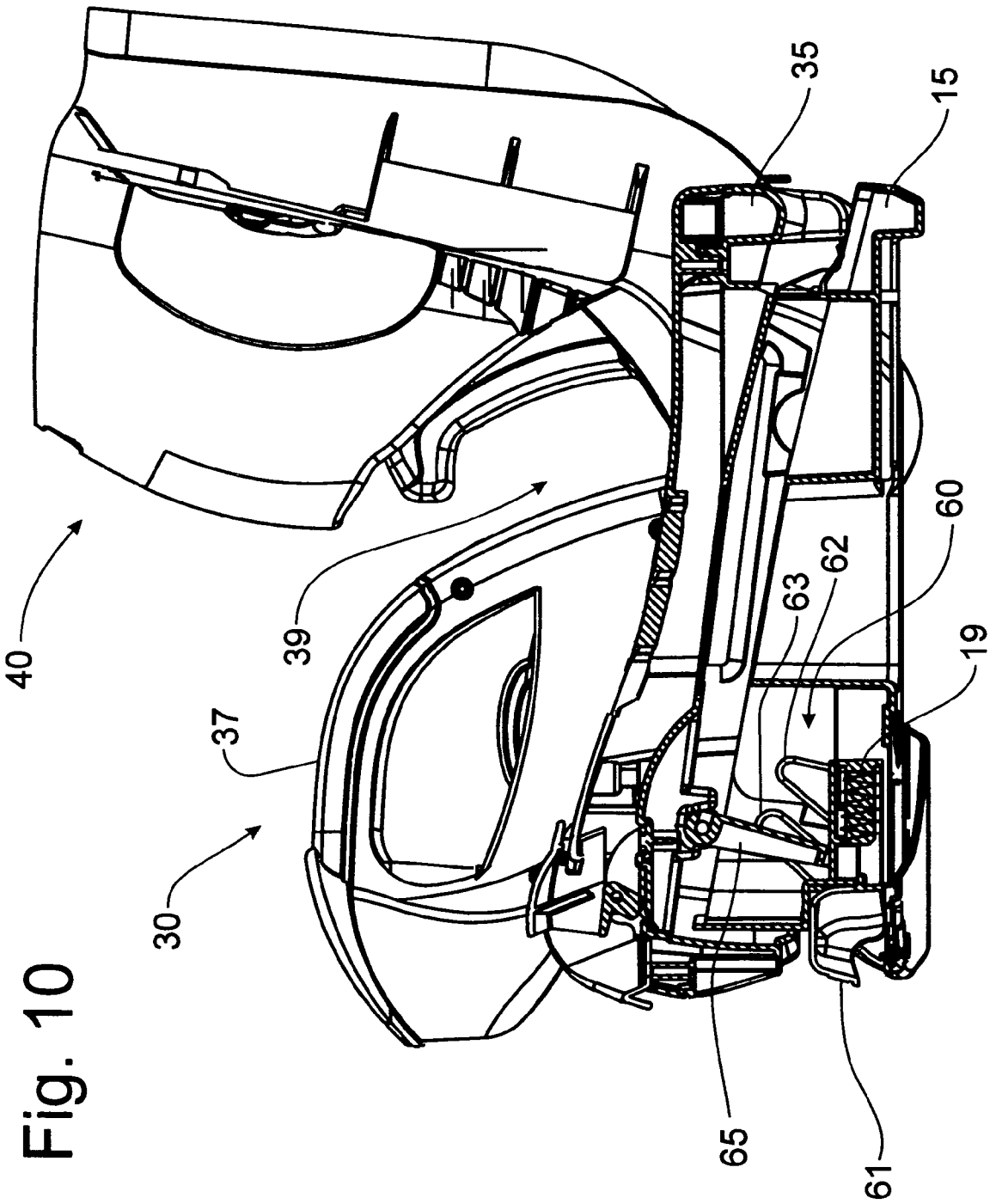


Fig. 10

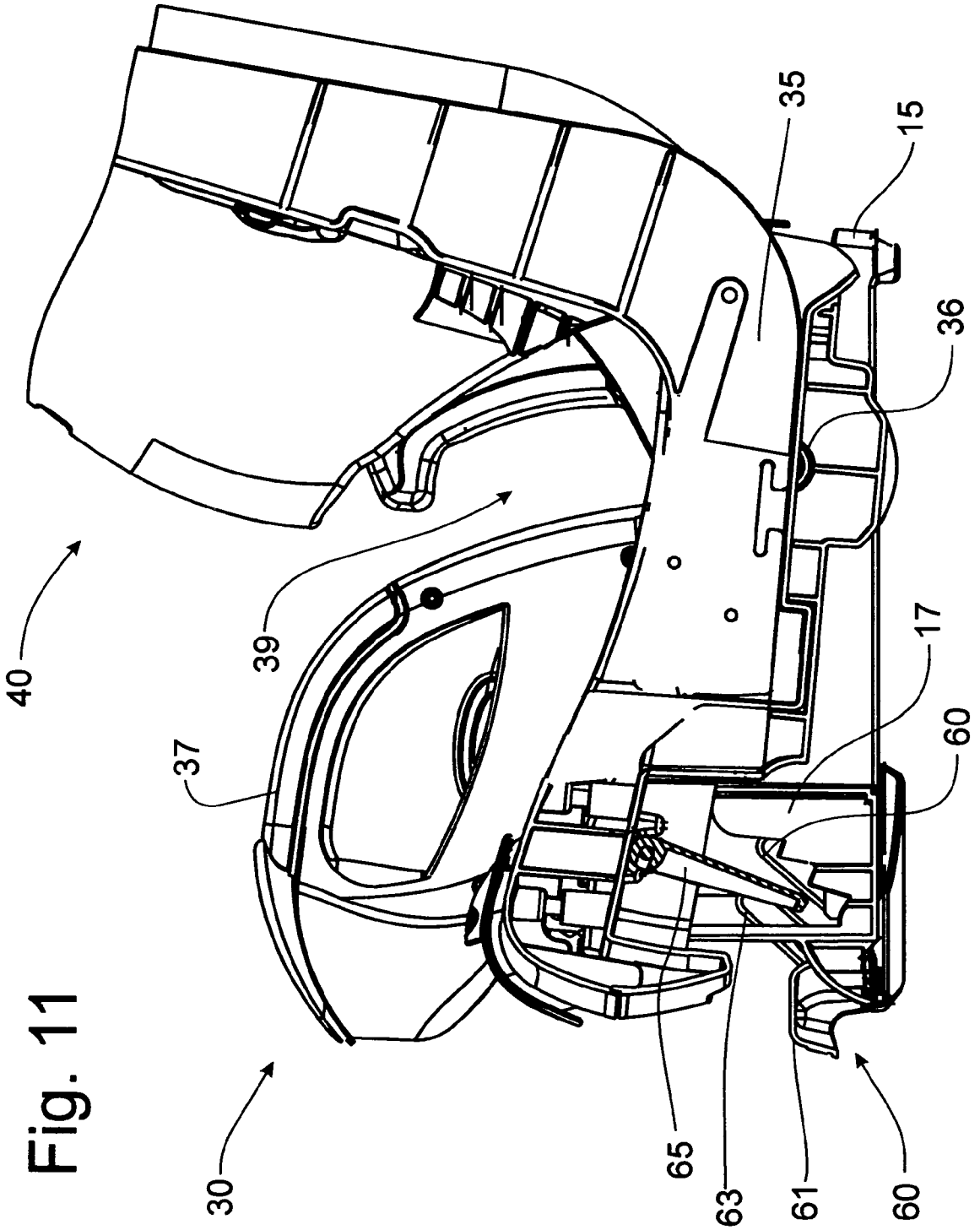


Fig. 11

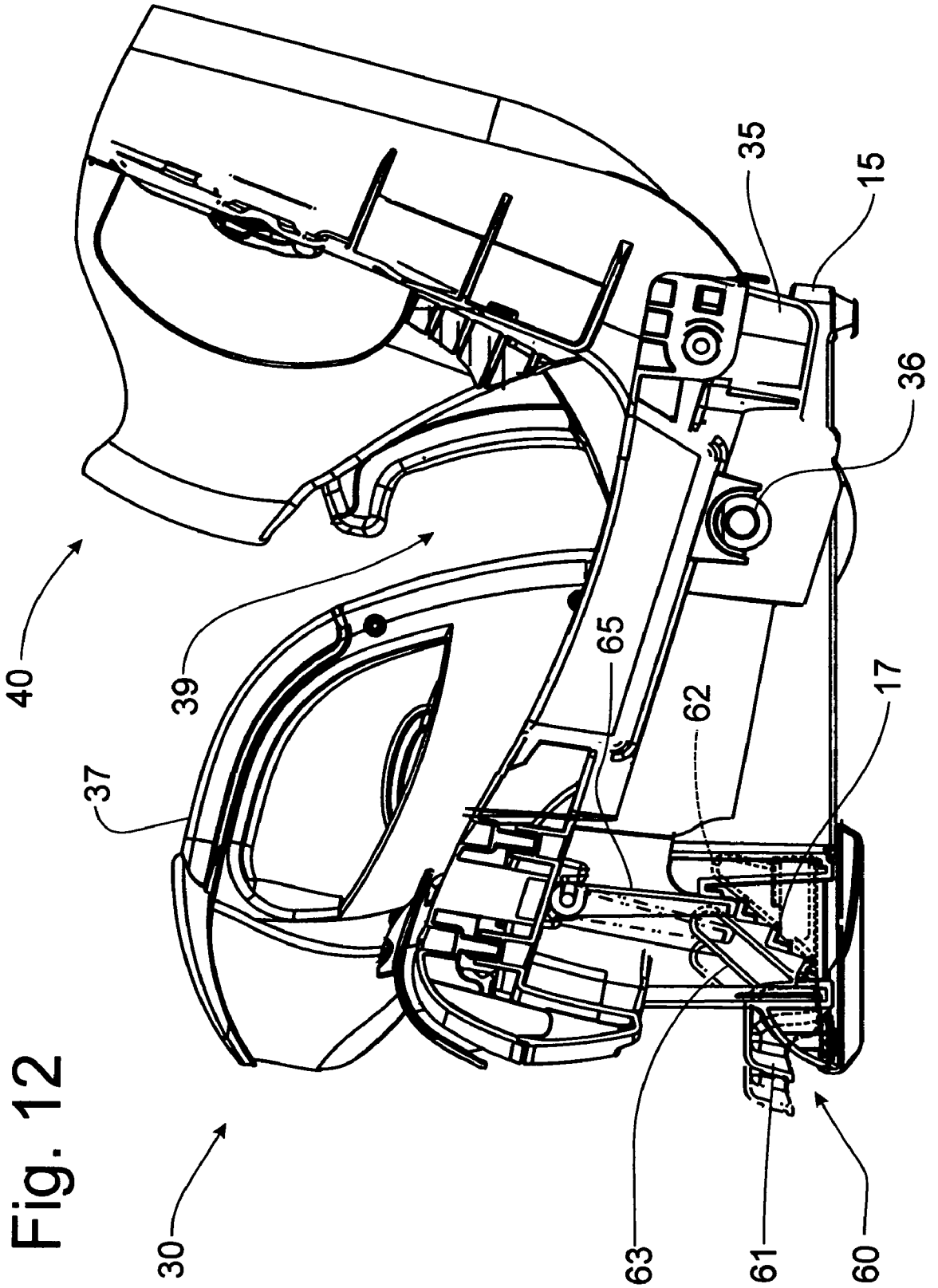
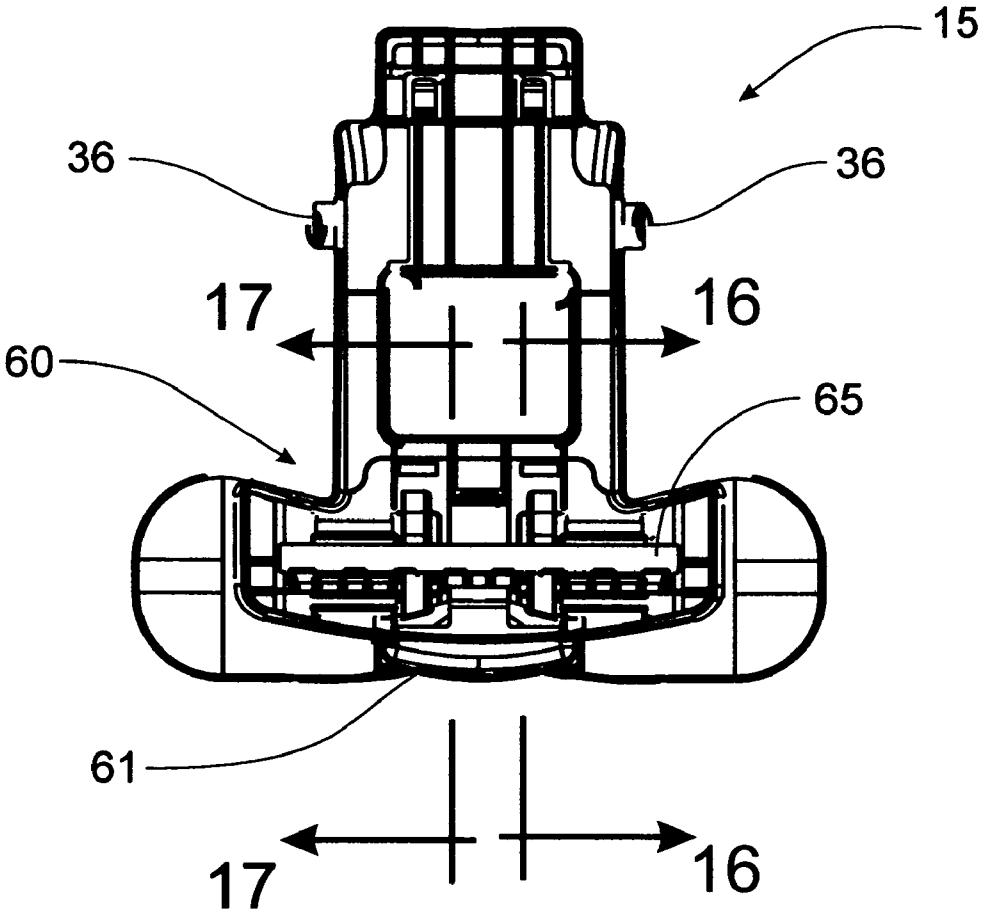


Fig. 12

Fig. 13



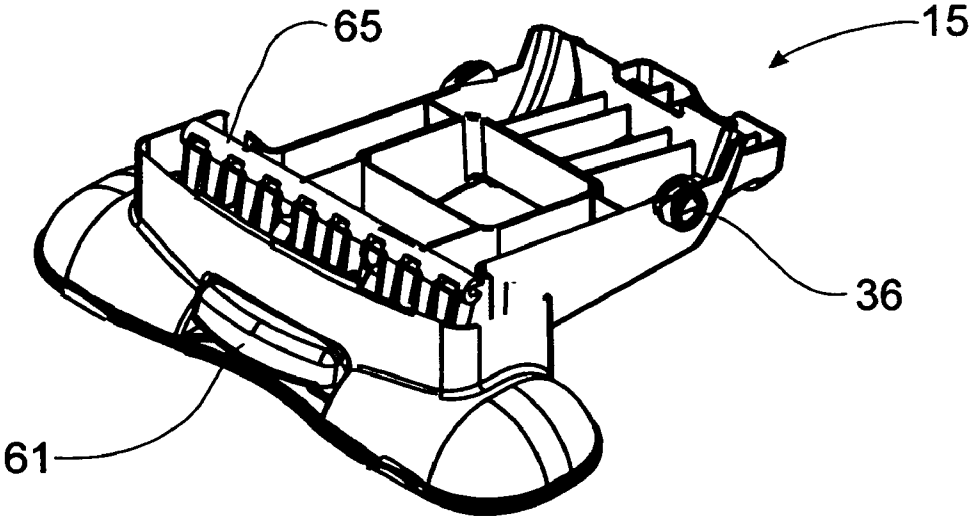


Fig. 14

Fig. 15

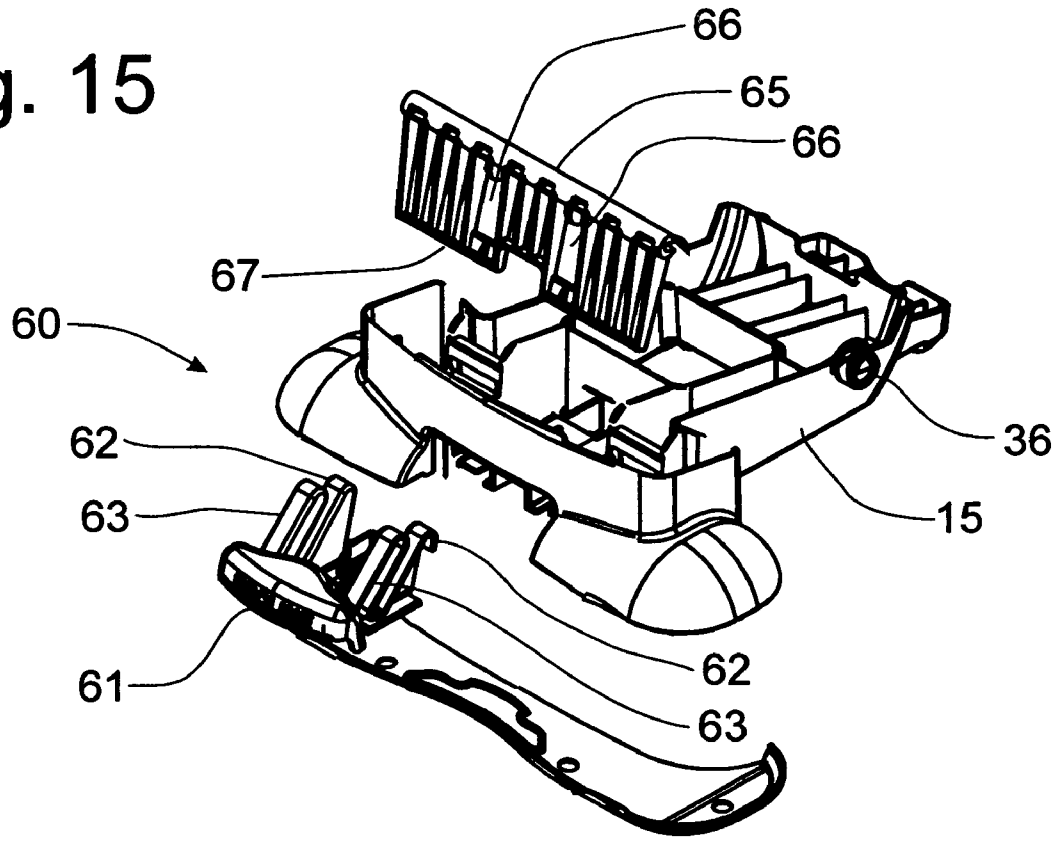


Fig. 16

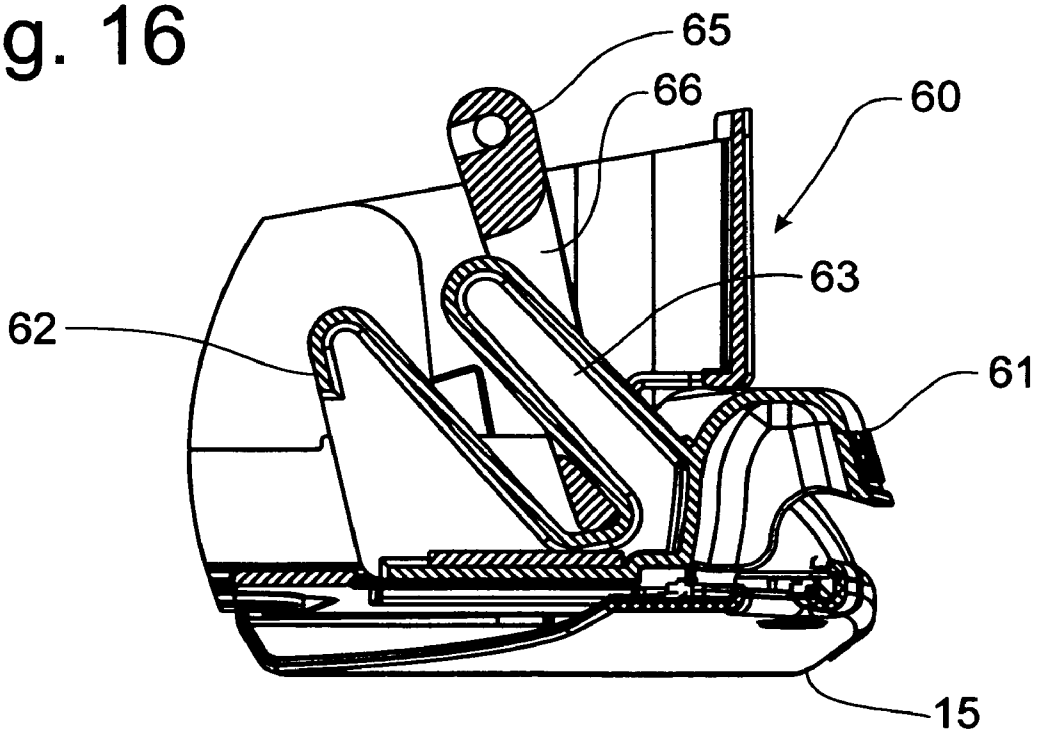


Fig. 17

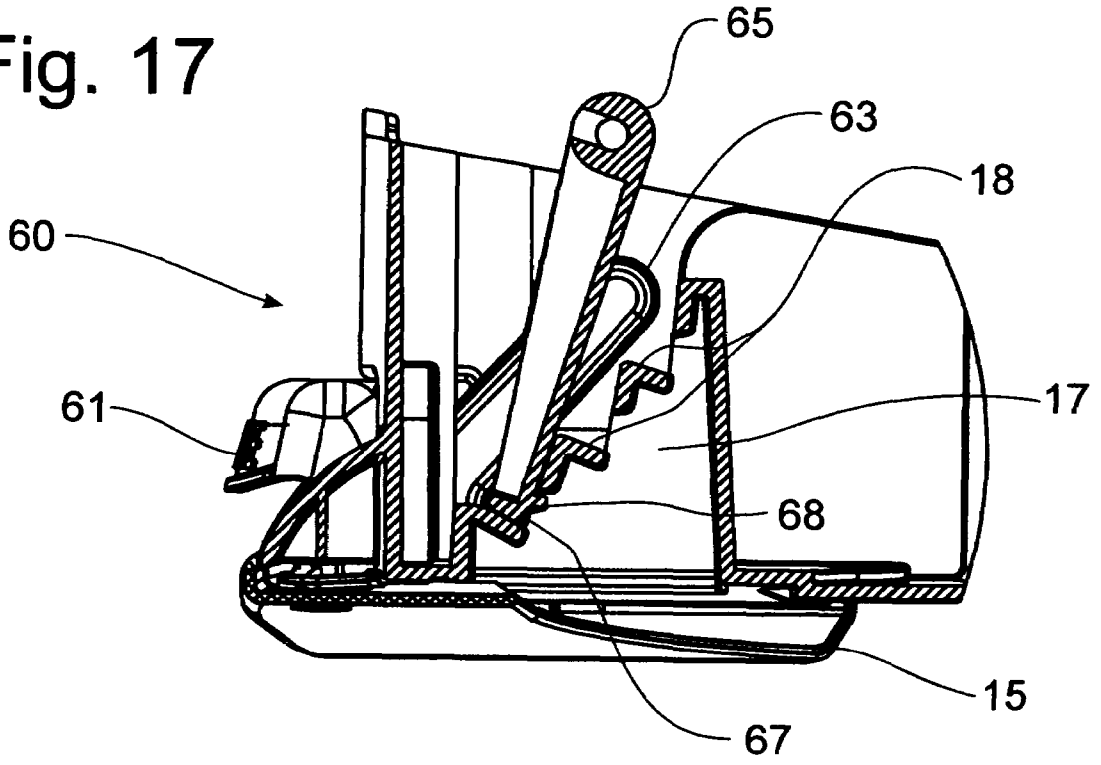
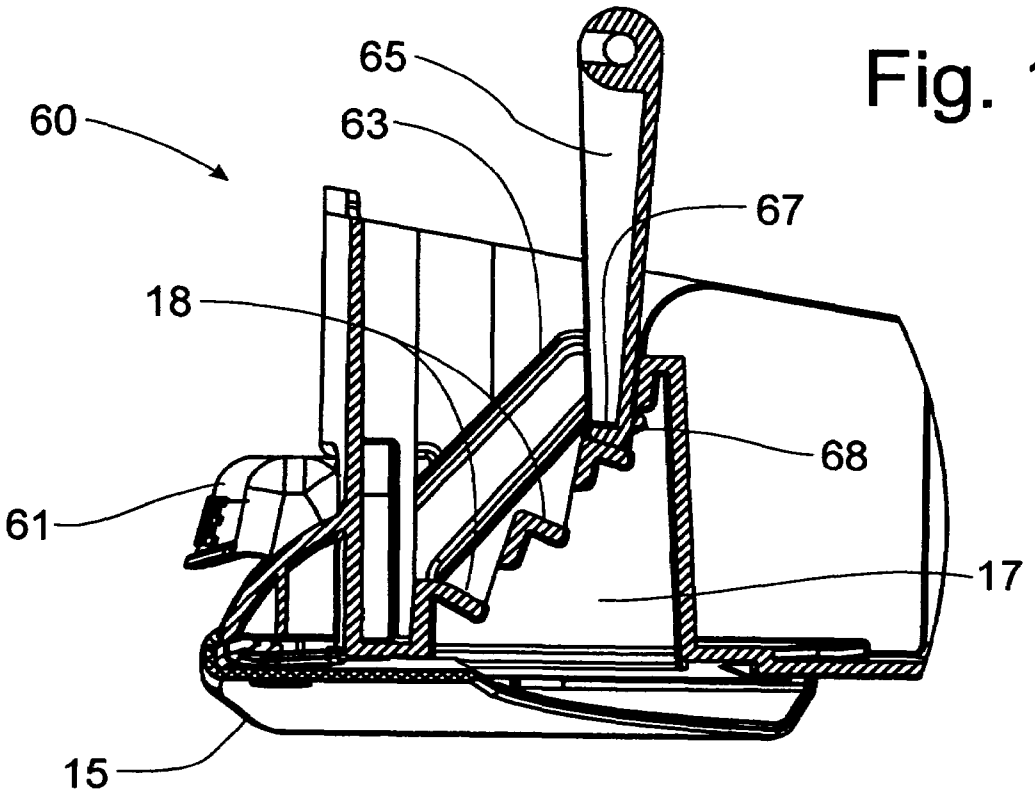


Fig. 18



CHILD CAR SEAT WITH MULTIPLE USE CONFIGURATIONS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority on U.S. Provisional Patent Application Ser. No. 60/717,331, filed on Sep. 15, 2005, and on U.S. Provisional Patent Application Ser. No. 60/760,235, filed on Jan. 19, 2006, the contents of both provisional patent applications being incorporated herein by reference.

FIELD OF THE INVENTION

The present invention relates generally to a car seat for use in transporting children in an automobile, and, more particularly, to a car seat that can be utilized in different configurations for different sized children until the children are large enough to be transported in an automobile without benefit of a car seat.

BACKGROUND OF THE INVENTION

Car safety seats for children are commercially available in a many configurations corresponding to differences in the age, weight, and size of the child being transported. Parents can choose a car seat that is not only the correct size, but also suits their tastes, budget, and life style. As children grow in size and maturity level, they need different kinds of car seats. For example, a child may initially use a rearwardly facing infant car seat, then graduate to a forward facing toddler seat with an integrated harness, and finally to a belt positioning booster seat utilizing the vehicle's lap and shoulder belt system before being able to safely use the vehicle's seat belts alone.

There are many car seats on the market that can be used in multiple configurations. For instance, a forward facing car seat with an integral harness appropriate for a 20-40 pound child might accommodate a child weighing 30-100 pounds as a belt positioning booster seat with the removal of the harness and utilizing the vehicle's lap and shoulder belts. This is convenient for the care giver because it means fewer seats to purchase. Some parents choose to buy a belt positioning booster seat for their older child. Such a booster seat may be configured with a high back, such as is disclosed in U.S. Pat. No. 6,682,143, granted to Davis Amirault on Jan. 27, 2004, or can have no back at all. Older children who don't want to be seen sitting in a "baby seat" like this option and parents don't have to manage a big bulky car seat.

Currently available car seats typically have a monolithic shell, i.e. the back and seat cannot be used separately. Some car seats are designed to have a no back base option, but are configured as a separate seat fastened under the monolithic seat and back, such as is disclosed in U.S. Pat. No. 4,754,999, issued on Jul. 5, 1998, to James Kain. The problem with this configuration is the redundancy of seats; one as part of the monolithic shell, and one as a seat only.

Several commercially available car seats offer a recline mechanism that allows the seat to recline relative to a base member on which the seat member is supported. Typically, such recline mechanisms are difficult to operate physically and are not intuitive as to how the recline mechanism is operated. The ability to recline is important for comfort for the child being transported in the car seat. Accordingly, a conveniently operable recline mechanism for a car seat would be a desirable feature to be incorporated into the structure of the car seat.

Many commercially available car seats currently route the shoulder belts directly through the shoulder slots provided in the seat back. Typically, car seats will provide shoulder slots at several different heights to accommodate the range of different size children using the product. It is also typical that the shoulder harness can be conveniently loosened and tightened by either releasing or pulling a center strap connected to the shoulder strap and protruding out the front of the seat base for easy access. A simple cam type locking device is use to hold the center strap in the desired position. In order to accommodate a large range of children, the length of adjustment of the center strap has to be long enough to drawn the harness tight when in the lowest shoulder slot positions but also allow enough slack to fit the larger children when the harness is in the highest shoulder slot position. Many times the connection plate which attaches the shoulder belts to the center strap must travel in a range from just below the lowest shoulder slots down and around the junction of the seat back and seat bottom. This repositioning of the connection plate may cause extra friction as the connection plate travels around this junction making it more difficult for the user to tighten or loosen the harness.

These monolithic toddler car seats available on the market today with built in harnesses are configured with the seat and back rigidly and permanently attached. When shipped, this car seat configuration dictates that the packing carton forms a rectangular box shape around the "L" shaped car seat. As a result, a large volume of empty space remains in the carton, taking up shipping space, which is a very inefficient use of the shipping carton.

U.S. Pat. No. 5,845,967, issued on Dec. 8, 1998, to Michael Kane, et al, discloses a car seat for restraining a child in a vehicle having a unitary shell formed in an upper back portion and a lower seat portion connected to an integral hinge. The upper and lower portions are configured to form a lockable mortise and tenon joint therebetween. The booster seat further includes indicia for indicating height limitations of a child sitting in the seat. U.S. Pat. No. 5,845,968, granted to David Lovie on Dec. 8, 1998, teaches a booster seat that includes a spring-loaded detent that can be engaged by the cam members of backrest support member to hold the backrest in an orientation. When the safety seat is not in use, or when it is desired to use the booster cushion without the backrest, the backrest and its support member can be stowed within the booster cushion.

Examples of recline mechanisms for children's car seats can be found in European Patent Application No. EP0301281, published on Feb. 1, 1989; in U.S. Pat. No. 5,746,478, granted on May 5, 1998, to Michael Lumley, et al; in U.S. Pat. No. 5,609,393, issued to Paul Meeker, et al on Mar. 11, 1997; in U.S. Pat. No. 5,181,761, issued on Jan. 26, 1993, to Paul Meeker; in U.S. Pat. No. 4,632,456, granted to Kenzou Kassai on Dec. 30, 1986; in U.S. Pat. No. 6,554,358, granted to James Kain on Apr. 29, 2003; and in U.S. Pat. No. 6,428,099, issued to James Kain on Aug. 6, 2002.

In U.S. Pat. No. 6,623,074, granted on Sep. 23, 2003, to Ronald Asbach, et al, the car seat is provided with a vertically movable head rest through which the harness straps are mounted so that the height of the harness straps will automatically be moved vertically with the corresponding positioning of the head rest.

It would be desirable to provide a child's car seat that could be configured in a variety of positions to accommodate the growth of a child without requiring the purchase of other car seats or booster seats that provide a separate size and age appropriate operation. It would also be desirable for such a car seat to provide a conveniently and intuitively operable

recline mechanism to enhance the safety and comfort of the child in at least one of the configurations of the car seat. It would also be desirable for such a car seat to provide a harness system that can be re-positioned to accommodate the growth of the child without compromising the operation of the harness tightening mechanism, specifically the connection plate interconnecting the double harness straps and the harness tightening strap.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a car seat for transporting children in an automobile that is capable of being configured in multiple orientations to accommodate the growth in the child using the car seat.

It is a feature of this invention that the seat back is pivotally connected to the seat member.

It is another feature of this invention that the seat back can be lowered to a shipping position that is generally linearly oriented with respect to the seat member.

It is an advantage of this invention that the positioning of the seat back into a shipping position reduces the size of the shipping carton for the car seat.

It is still another feature of this invention that the seat back is detachable from the seat member.

It is another advantage of this invention that the removal of the seat back from the seat member configures the car seat into a booster seat with which the child can use the seat belt of the automobile for security.

It is still another advantage of this invention that a separate booster seat is not required when the child outgrows the car seat in the conventional L-shaped configuration.

It is yet another feature of this invention that the seat back connected to the seat member through a selectively operable latching mechanism.

It is still another feature of this invention that the seat member is mounted on a base member that is positionally adjustable.

It is yet another advantage of this invention that the positioning of the seat member relative to the base member establishes a recline orientation of the car seat.

It is a further feature of this invention that a recline adjustment mechanism is provided between the seat member and the base member to control the recline orientation of the seat.

It is another object of this invention to provide a recline adjustment mechanism that is convenient and intuitive to utilize.

It is still a further feature of this invention that the recline adjustment mechanism is operated by a pull lever located conveniently at the front of the base member.

It is yet another feature of this invention that the pull lever of the recline adjustment mechanism pulls the recline stop paddle off of the recline angle ramp to allow the seat to be rotated about a pivot at the approximate center of gravity of the seat where the recline stop paddle will then move to another step in the recline angle ramp.

It is a further advantage of this invention that the pulling of the pull lever draws the stop paddle directly off the ramp while the lever is pulled outwardly, while a spring retracts the pull lever automatically when the lever is released.

It is still another object of this invention to provide a car seat that includes a harness routing system that permits positional adjustment of the harness to accommodate the growth of the child using the car seat.

It is still another feature of this invention that the harness can be routed through a selected set of a plurality of routing openings in the seat back corresponding to the size of the child while then passing over the top of a hanger member at the top of the seat back before returning to the seat member for engagement with the tightening mechanism.

It is still another advantage of this invention that the connector plate in the harness remains in substantially the same location irrespective of the routing openings selected for passage of the harness from the front of the seat back to the rear of the seat back.

It is yet another advantage of this invention that the length of the harness is not substantially varied by changing the location of the routing openings utilized.

It is yet another object of this invention to provide a seat back with a vertically movable head rest that is selectively positionable relative to the seat back.

It is yet another feature of this invention that the head rest can be selectively positioned to accommodate the growth of the child using the car seat.

It is yet another advantage of this invention that the vertical positioning of the head rest will coordinate with the utilization of the routing openings in the seat back so that the head rest will uncover the routing openings to be used thus positioning the safety harness with respect to the shoulders of the child using the car seat.

It is a further object of this invention to provide a car seat that is durable in construction, inexpensive of manufacture, carefree of maintenance, facile in assemblage, and simple and effective in use.

These and other objects, features and advantages are accomplished according to the instant invention by providing a car seat formed with a seat member pivotally connected to a base member for positional adjustment in desired reclined positions controlled by an intuitively operable adjustment mechanism. The seat back is pivotally connected to the seat member to be oriented in a shipping position or an operative position. A latching mechanism secures the seat back to the seat member in the operative position. The seat back is provided with a head rest that is vertically movable relative to the seat back to uncover routing openings in the seat back as the child grows and the head rest is positioned accordingly. The harness is routed through selected routing openings in the seat back before passing over a hanger at the top of the seat back so that the length of the harness remains constant irrespective of the positioning of the harness in conjunction with the size of the child.

BRIEF DESCRIPTION OF THE DRAWINGS

The advantages of this invention will be apparent upon consideration of the following detailed disclosure of the invention, especially when taken in conjunction with the accompanying drawings wherein:

FIG. **1** is a front elevational view of a car seat incorporating the principles of the instant invention, the harness and conventional fabric liner being deleted for purposes of clarity, the head rest being positioned in a vertically extended orientation corresponding to a large toddler positioned in the car seat;

FIG. **2** is a front elevational view of the car seat depicted in FIG. **1**, but with the head rest lowered to a position corresponding to a small toddler positioned in the car seat;

FIG. **3** is a left side elevational view of the car seat depicted in FIG. **1** in the upright, operative position;

FIG. **4** is a left side elevational view of the car seat depicted in FIG. **1** but with the seat back unlatched and pivoted into a shipping position, the head rest being depicted in a vertically extended position before being detached from the seat back;

FIG. **5** is a perspective view of the car seat with the seat back removed from the seat member so that the seat member can be configured as a booster seat;

FIG. **6** is a left side elevational view of the seat back detached from the seat member, the head rest also being detached from the seat back;

FIG. **7** is an enlarged left side elevational view of the seat member configured as a booster seat;

FIG. **8** is an enlarged left side elevational view of the head rest;

FIG. **9** is a cross-sectional view of the car seat taken along lines **9**—**9** of FIG. **1** showing the path of the harness through the seat back and around a hanger at the top of the seat back;

FIG. **10** is an enlarged partial cross-sectional view of the car seat to show the recline adjustment mechanism in a zero degree tilt orientation;

FIG. **11** is an enlarged partial cross-sectional view of the car seat similar to that of FIG. **10**, but showing the recline adjustment mechanism in a five degree tilt orientation, the actuation handle being shown in an extended actuation position and the paddle member being shown pivoted away from the stepped ramp with the actuation handle;

FIG. **12** is an enlarged partial cross-sectional view of the car seat similar to that of FIG. **10**, but showing the recline adjustment mechanism in a ten degree tilt orientation, the movement of the actuation handle and the paddle member being shown in phantom;

FIG. **13** is a top plan view of the base member incorporating the recline adjustment mechanism;

FIG. **14** is a perspective view of the base member depicted in FIG. **13**;

FIG. **15** is an exploded perspective view of the base member shown in FIG. **14**;

FIG. **16** is a partial enlarged cross-sectional view of the base member depicting an elevational view of the recline adjustment mechanism in the zero tilt orientation corresponding to lines **16**—**16** in FIG. **13** taken through the opening in the recline paddle member;

FIG. **17** is a partial enlarged cross-sectional view of the base member corresponding to lines **17**—**17** in FIG. **13** to show an elevational view of the recline adjustment mechanism in the five degree tilt orientation; and

FIG. **18** is a partial cross-sectional view of the base member similar to that of FIG. **17** except that the recline adjustment mechanism is in a ten degree tilt orientation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIGS. **1**-**9**, a car seat incorporating the principles of the instant invention can best be seen. The car seat **10** can be configured into a generally conventional L-shaped configuration providing a seat assembly **30** on which the child is supported while being transported in an automobile with an upright seat back **40** supporting the back of the child and a head rest **20** vertically movable on the seat back to support the head of the child positioned in the car seat **10**.

The car seat **10** is intended for use with a child larger than an infant, which is typically placed into a rearwardly facing infant car seat until the child is large enough and old enough to be positioned in a forwardly facing car seat **10**, which is typically about the first birthday of the child. The car seat **10**, however, can be configured in multiple orientations to correspond to the growth of the child until the child is old enough and large enough to safely sit on the car seat using the seat belts of the automobile without benefit of any booster apparatus.

Typically, toddlers and young children are placed into the conventional L-shaped configuration of the car seat **10**, such as is depicted in FIG. **2**, with the head rest **20** lowered onto the upper portion of the seat back **40** to provide proper support for the child's head. The car seat **10** can be re-configured through a movement of the head rest **20** through multiple positions to allow the car seat **10** to be adapted to the growth of the child. FIG. **1** depicts the maximum height of the head rest **20** for use with larger children as a high back booster seat.

As can be seen in FIGS. **1**, **2**, **5** and **8**, the head rest **20** includes a pair of support rails **22** that are received within channels **42** formed at the top of the seat back **40**. A latching mechanism **25** is located within the head rest **20** to secure the position of the head rest **20** on the seat back **40**. The latching mechanism includes a pair of latch members **26** located at the bottom end of the support rails **22** and an actuator button **27** mounted on the top handle **29** of the head rest **20** to pull on cables (not shown) through a cam mechanism (not shown) in a manner known to one of ordinary skill in the art. The latch members **26** are engagable with openings (not shown) in the channels **42** to secure the support rails **22** within the channels **42** throughout the full range of vertical movement of the head rest **20** relative to the seat back **40**. Preferably, the top of the channels **42** is formed with a retainer clip **42***a* that engages a protrusion (not shown) on the lower end of the support rails **22** to prevent the head rest **20** from being removed from the seat back **40** once installed.

Preferably, the head rest **20** is formed with a back support portion **23** and a pair of wings **24** projecting forwardly of the back support portion **23** and at an angle corresponding to the orientation of the side wings **44** of the seat back **40** so that the head rest **20** will nest properly along the upper portion of the seat back **40**, as is depicted in FIG. **2**, when the head rest **20** is in a lowered position. Preferably, the wings **24** are pivotally positionable to aid in the comfort of the child being transported on the car seat **10**. Accordingly, the wings **24** are connected to the back portion **23** by a pivot mechanism **28** that permits the selective positioning of the wings **24**. The head rest **20** is also formed with a shoulder belt guide **21** that is mounted to the frame of the head rest **20** to be movable vertically therewith, and positioned beneath the side wings **24**, to be used to restrain the automotive shoulder belt when the car seat **10** is used in a high back booster mode, as described below. The shoulder belt guide **21** has a slot formed therein for the passage of the automotive shoulder belt into the interior of the guide **21**.

The seat back **40** has a rear support portion **43** from which the side wings **44** extend in a fixed monolithic structure. The upper part of the rear support portion **43** includes a harness routing apparatus **45** including a plurality of pairs of routing openings **46** spaced vertically between the channels **42**. The harness routing apparatus **45** allows the passage of the harness **49**, best seen in FIG. **9**, through the seat back to establish a proper fit on the child's shoulders positioned in the car seat **10**. The harness **49** will pass through a selected pair of routing openings **46** to traverse from the front of the seat back **40** to the rear of the seat back **40**, establishing a support point on the seat back **40** for the harness **49** being routed through the seat back **40**. The harness straps **49** then extend upwardly from the selected routing openings **46** on the rearward side of the seat back **40** to a hanger **47** positioned at the top of the rear support portion **43**. The harness straps **49** then turn over top of the hanger **47** and extend downwardly to the bottom of the rear support portion **43** where the harness straps **49** extend for-

wardly to the conventional harness tightening apparatus **48** at the front part of the seat assembly **30**.

As is best seen in FIG. **2**, the lowermost position of the head rest **20** leaves the lowermost routing openings **46***a* exposed for access in the routing of the harness straps **49** through the rear support portion **43** of the seat back **40**. The harness **49** is formed as a pair of straps to pass over the shoulders of the child in the car seat **10**, then through the routing openings **46** in the seat back **40**, around the hanger **47** and to a conventional connection plate **49***a* located behind the lower part of the rear support portion **43**. The connection plate **49***a* is connected to the two harness straps extending downwardly from the hanger **47** and to a single strap extending through the seat assembly **30** to the tightening mechanism **48**.

By passing the harness straps **49** through selective routing openings **46** in the seat back **40**, the overall length of the harness **49** does not change substantially. As a result, the connection plate **49***a* will remain in substantially the same location irrespective of the set of routing openings **46** selected for the passage of the harness straps **49**. In conventional car seats, the relocation of the harness to a different height to accommodate growth in the child changes the vertical position of the connection plate, sometimes interfering with the passage of the single harness strap through the seat member.

Referring now to FIGS. **4-6**, the seat back **40** is detachable from the seat assembly **30** through a seat back locking mechanism **50** to permit the seat assembly **30** to be used as a booster seat, a configuration of the car seat **10** applicable to larger children that still need to have some height in the automotive seat in order to make the automobile's seat belts to fit properly. The seat back **40** is formed with a pair of laterally spaced attachment arms **41** that project forwardly from the rear support portion **43** at the lowermost part thereof. The seat back **40** is also formed with a pair of laterally opposed mounting pins **51** that project outwardly laterally from the lowermost portion of the seat back **40**. The T-shaped mounting pins **51** are positioned to be received in a pivot socket **33** formed in the seat assembly **30**.

The seat assembly **30** has a pivot locking mechanism **55** at the rearward portion thereof that can be actuated by a spring-loaded switch **56**. The pivot locking mechanism **55** captures the mounting pins **51** in the pivot sockets **33** to secure the seat back **40** onto the rear of the seat assembly **30**. The seat back **40** can then pivot about the mounting pins **51** relative to the seat assembly **30**. The forward pivotal movement of the seat back **40** from the shipping position shown in FIGS. **4** and **5** to the operative position depicted in FIGS. **1-3** and **9**, lowers the attachment arms **41** into the receptacles **34** formed in the seat assembly **30**. As can be seen best in FIGS. **6** and **6**A, the ends of the attachment arms **41** are formed with an offset step **54** that engages a corresponding depression **34***a* in the receptacle **34** to prevent the attachment arms **41** from pulling straight rearwardly once latched into position.

Each of the attachment arms **41** includes a spring-loaded latch **52** that is released by a switch **53** mounted on top of the attachment arm **41**. When the attachment arms **41** are lowered into the receptacles **34**, the spring-loaded latches **52** retract to allow the attachment arms **41** to properly seat within the receptacles **34**. The release of the attachment arms **41** from the receptacles **34** requires the manipulation of the latches **52** to overcome the spring force exerted on the latches **52**, thus allowing the seat back **40** to pivot rearwardly about the mounting pins **51**. As can be seen in FIGS. **4-6**, each of the attachment arms **41** are formed with a slot **41***a* for receiving the free end of the harness to trap the harness in the assembled car seat **10** package.

To minimize the size of the shipping package, the car seat **10** can be shipped in the unassembled configuration depicted in FIG. **5** with the seat back **40** removed from the seat assembly **30**, or in the shipping position depicted in FIG. **4** with the seat back **40** and head rest **20** attached to the seat assembly **30**. The head rest **20** can be positioned at the lowermost position on the seat back, as depicted on FIG. **2**, or preferably removed from the seat back and placed on top of the seat back **40** between the side wings **44**. Instead of the conventional L-shaped monolithic shell requiring a substantial amount of wasted space within the shipping package, the unassembled car seat **10** can be shipped an a rectangular package that is reduced substantially as compared to the shipping package required for the conventional L-shaped monolithic shell car seat.

The seat assembly **30** has an upper, generally horizontally extending support surface **31** on which the child sits while using the car seat **10**. The seat assembly **30** is formed as a seat member **35** pivotally connected at a pivot axis **36** to a base member **15**. The pivotal connection between the seat member **35** and the base member **15** allows the seat member **35** to recline or tilt relative to the base member **15**, which is always supported on the automotive seat (or other appropriate support structure). With the seat back **40** attached to the seat member **35**, this tilting of the seat member **35** relative to the base member **15** results in a reclining of the entire portion of the car seat **10** in contact with the child seated therein. Accordingly, the child can be selectively reclined to the desired position at the comfort of the child. The seat member **35** is also formed with laterally opposing arm rests **37** defining the physical sides of the seating support surface **31**. At least one of the arm rests **37** can include a cup holder **38**.

Interposed between the seat member **35** and the base member **15** is a recline adjustment mechanism **60** to secure the seat member **35** and attached components **20**, **40**, in the selected recline position. The recline adjustment mechanism **60** is best seen in FIGS. **10-18**. An actuator handle **61** is slidably supported on the base member **15** at the forwardmost portion thereof for movement between a home position, such as is depicted in FIG. **16**, and an actuation position, such as is depicted in FIGS. **11** and **12**. Attached to the actuator handle **61** are first and second paddle trap members **62**, **63**. A recline paddle **65** is pivotally mounted on the seat member **35** and hangs down therefrom for engagement with the paddle trap members **62**, **63**, as will be described in greater detail below. The recline adjustment mechanism **60** also includes a stepped ramp **17** fixed to the base member **15**. A compression spring **19** is mounted on a mounting member and fixed between the actuation handle **61** and the base member **15** so that the movement of the actuation handle **61** to the actuation position creates a biasing force in the spring **19** to urge the actuation handle **61** into the home position.

As can best be seen in FIGS. **13-16**, the recline paddle **65** is formed as an elongated member positioned laterally across a cavity in the base member **15**. The central part of the recline paddle **65** is formed with a pair of openings **66** through which the second paddle trap members **63** can pass to extend through the recline paddle **65**. Both the first and second paddle trap members **62**, **63** are angled rearwardly at substantially the same angle as the stepped ramp **17**, but spaced apart to trap the tip **67** of the recline paddle **65** between the two paddle trap members **62**, **63**. When the actuator handle **61** is moved outwardly against the biasing force exerted by the compression spring **19**, the first paddle trap member **62** pushes the recline paddle **65** forwardly away from the step **18** on the ramp **17** so that the seat member **35** can be moved to the desired recline or tilt angle relative to the base member **15**.

Releasing the actuation handle **61**, allows the spring **19** to return the actuation handle **61** to the home position whereupon the second paddle trap member **63** pushes the paddle **65** back into engagement with the selected step **18** on the stepped ramp **17**, thus locking the recline adjustment mechanism **60** in place. To further secure the recline paddle **65** to the stepped ramp **17**, the tip **67** of the recline paddle **65** is formed with a rearwardly extending protrusion **68** that is engaged beneath the step **18** on the stepped ramp **17** above which the recline paddle **65** is seated.

To operate the recline adjustment mechanism **60**, the actuator handle **61** is pulled outwardly to release the recline paddle **65** from the stepped ramp **17**. The seat member **35** is then manually positioned at the desired tilt or recline angle, which corresponds to one of the steps **18** on the stepped ramp **17**. Preferably, the seat member **35** is pivotally movable about the axis **36** between three set recline angles, zero degrees, five degrees and ten degrees. The stepped ramp **17** has a step corresponding to each of these predetermined recline angle designations. When the operator has selected the desired recline angle, the tip **67** of the recline paddle **65** will be seated on the corresponding step once the actuation handle **61** has been released to return to the home position. For example, FIG. **17** depicts the zero degree angle orientation, while FIG. **18** depicts the ten degree angle orientation.

The actuator handle **61** is then released to allow the compression spring **19** to retract the actuator handle **61** and paddle trap members **62**, **63** in the home position. Since the second paddle trap member **63** is oriented parallel to the angle of the stepped ramp **17**, the second paddle trap member **63** will trap the tip **67** of the recline paddle **65** against whichever step **18** has been selected, as is depicted in FIGS. **17** and **18**. The rearward protrusion **68** helps secure the seat member **35** in the selected recline angle by being engaged into the stepped ramp **17**. The paddle trap member **63** prevents the recline paddle **65** from moving away from the stepped ramp **17** and disengaging the protrusion **68** therefrom.

In operation, the car seat **10** is preferably shipped to the consumer in an flat orientation, such as is depicted in FIG. **4**, with the seat back **40** and the head rest **20** mounted on the seat assembly **30**. If shipped in the unassembled condition, as seen in FIG. **5**, the consumer, after removing the car seat **10** from the shipping container, needs only to push the seat back **40** into engagement with the seat assembly **30** by snapping the mounting pins **51** into the pivot sockets **33**. The pivot locking mechanism **55** is spring-loaded and will automatically lock the mounting pins **51** into the pivot sockets **33**. The seat back **40** can then be pivoted on the mounting pins **51** and raised into the conventional L-shaped configuration at which point the attachment arms **41** will be received within the receptacles **34** with the spring-loaded locking mechanism **50** automatically locking the attachment arms **41** into the proper position. If received in the flat shipping orientation shown in FIG. **4**, the seat back **40** need only be pivoted into the upright position to ready the car seat **10** for use.

The head rest **20** can then be mounted onto the seat back **40** by sliding the support rails **22** into the receiver channels **42** at the top portion of the seat back **40**. After the head rest **20** is assembled, the latching mechanism **25** will have to be retracted by depressing the actuator button **26** until the head rest **20** is positioned on the seat back **40** at the desired height relative to the seat assembly **30**. The latching mechanism **25** can then be released to secure the head rest in the desired vertical position. Assuming that the child to be transported in the car seat **10** is sufficiently small to require the use of the harness **49**, the harness **49** should be routed through the proper set of routing openings **46** which will most likely be the pair of routing openings located immediately below the bottom of the head rest **20**.

The car seat **10** is secured to the automobile seat by the automobile seat belts (not shown). The lap belt (not shown) is passed through the passageway **39** in the seat assembly to be locked into place. The shoulder belt (not shown) is secured to the seat back **40** in a tensioned state by pulling on the shoulder belt and clamping it in the belt clamps **59** located on opposing sides of the rear face of the seat back **40**. Option conventional tethers (not shown) can also be utilized to secure the car seat on the automobile seat.

Once properly secured to the automobile seat, the car seat **10** is ready for use. As the child grows in size, the car seat **10** can be reconfigured to accommodate the growth. The recline angle can be adjusted through the operation of the recline adjustment mechanism **60**, as described above, to fit the size and comfort of the child. The head rest **20** can be repositioned vertically, along with the harness **49** routing, to match the size of the child.

Eventually, the child will grow to the stage where the harness is not necessary, as the automotive seat belts can provide a secure environment for the transportation of the child, though the child is not yet large enough for the automotive seat belts to fit the child properly. In this situation, the seat back **40** can be removed from the seat assembly **30** by first releasing the switch **53** to allow the attachment arms **41** to move out of the receptacles **34** as the seat back **40** is pivoted rearwardly on the mounting pins **51**. The switch **56** can then be release to allow the mounting pins **51** to be removed from the pivot sockets **33**, thereby allowing the seat back **40** to be removed from the seat assembly **30**. The seat assembly **30**, in the form depicted in FIG. **7**, can then be utilized as a booster seat which elevates the child sufficiently above the automobile seat to allow the automobile seat belts to have a proper fit on the child being transported.

It will be understood that changes in the details, materials, steps and arrangements of parts which have been described and illustrated to explain the nature of the invention will occur to and may be made by those skilled in the art upon a reading of this disclosure within the principles and scope of the invention. The foregoing description illustrates the preferred embodiment of the invention; however, concepts, as based upon the description, may be employed in other embodiments without departing from the scope of the invention.

Having thus described the invention, what is claimed is:

1. A car seat for use in an automobile to transport a child, comprising:

a seat assembly defining a generally horizontal seat surface for supporting a child positioned thereon, said seat assembly including a pair of receptacles; and

a seat back having a locking mechanism for selectively detachably connecting said seat back to said seat assembly, said seat back including a rear support portion oriented in generally upright position when attached to said seat assembly, said seat back having a pair of attachment arms projecting generally perpendicularly outwardly relative to said rear support portion for engagement with said seat assembly so as to be received within corresponding said receptacles.

2. The car seat of claim **1** further comprising a head rest mountable on said seat back and being vertically positionable relative thereto, said head rest including a latching mechanism to secure the head rest is a desired position relative to said seat back.

3. The car seat of claim **2** wherein said seat back is formed with a plurality of sets of routing openings in said rear support

portion for the passage of harness straps from a front side of said seat back to a rear side of said seat back, at least one set of routing openings being located below said head rest irrespective of the desired position of said head rest on said seat back.

4. The car seat of claim **3** wherein said harness straps are routed upwardly from the selected set of routing openings to a hanger mounted at a top portion of said rear support portion of said seat back, said harness straps being looped around said hanger before extending downwardly into said seat assembly.

5. The car seat of claim **1** wherein said locking mechanism includes a latching apparatus on each said attachment arm for securing said attachment arm to said seat assembly.

6. The car seat of claim **5** wherein each said attachment arm is formed with an offset step to engage a correspondingly shaped depression in said receptacle to restrain linear movement of said attachment arm along said seat assembly.

7. The car seat of claim **6** wherein said seat back further includes a pair of opposing laterally extending mounting pins engagable with corresponding pivot sockets formed in said seat assembly so that said seat back is pivotable relative to said seat assembly.

8. The car seat of claim **7** wherein said locking mechanism further includes a pivot lock mechanism for securing said mounting pins in said pivot sockets, said pivot lock mechanism being operable to affect disengagement of said mounting pins from said pivot sockets to permit said seat back to be separated from said seat assembly.

9. The car seat of claim **1** wherein said seat assembly comprises:

a base member;

a seat member pivotally connected to said base member; and

a recline adjustment mechanism operably interconnecting said base member and said seat member to control the pivotal movement of said seat member on said base member.

10. The car seat of claim **9** wherein said recline adjustment mechanism comprises:

an actuation handle movably supported on said base member for movement between a home position and a release position;

a stepped ramp fixed to said base member and including a plurality of steps corresponding respectively to predefined recline angles of said seat member relative to said base member; and

a recline paddle pivotally connected to said seat member and engagable with a selected one of said steps to secure said seat member at the selected predefined recline angle.

11. The car seat of claim **10** wherein said actuation handle includes a paddle trap member operable to lock said recline paddle against said stepped ramp when said actuation handle is in said home position.

12. A recline adjustment mechanism for a car seat having a seat member pivotally supported on a base member for pivotal movement through a plurality of recline angles, said recline adjustment mechanism operably interconnecting said seat member and said base member to control the pivoted recline angle of said seat member, comprising:

an actuation handle supported for movement between a home position and a release position;

a stepped ramp fixed to said base member and including a plurality of step positions corresponding respectively to predefined recline angles of said seat member relative to said base member;

a recline paddle pivotally associated with said actuation handle and being engagable with a selected one of said step positions to secure said seat member at the selected predefined recline angle; and

a paddle trap apparatus being operable to secure said recline paddle into engagement with the selected step position when said actuation handle is in said home position.

13. The recline adjustment mechanism of claim **12** wherein said recline paddle is formed with an opening therein, said paddle trap apparatus including a first paddle trap member oriented to pass through said opening to trap said recline paddle against said stepped ramp.

14. The recline adjustment mechanism of claim **13** wherein said recline paddle is formed with a distal tip that engages said steps on said stepped ramp, said tip being formed with a protrusion that extends into a hole formed in said stepped ramp to secure said recline paddle against said stepped ramp.

15. The recline adjustment mechanism of claim **14** further comprising a spring anchored on said base member and engaged with said actuation handle to bias said actuation handle toward said home position.

16. The recline adjustment mechanism of claim **15** wherein said actuation handle and said paddle trap apparatus is an integral device slidably mounted on said base member for movement between said home and release positions.

17. The recline adjustment mechanism of claim **14** wherein said paddle trap apparatus further includes a second paddle trap member spaced from said first paddle trap member to position said distal tip of said recline paddle therebetween.

18. A car seat for use in an automobile to transport a child, comprising:

a seat assembly defining a generally horizontal seat surface for supporting a child positioned thereon, said seat assembly being formed with a pair of laterally spaced receptacles in said seat surface and a pair of laterally spaced pivot sockets;

a seat back selectively detachably connected to said seat assembly, said seat back including a rear support portion oriented in generally upright position when attached to said seat assembly and a pair of attachment arms projecting outwardly relative to said rear support portion for engagement with said seat assembly, said seat back being formed with a pair of opposing laterally extending mounting pins engagable with said pivot sockets so that said seat back is pivotable relative to said seat assembly; and

a locking mechanism mounted on said attachment arms for securing said attachment arms within said receptacles in said seat assembly and being operable between a locking position in which said locking mechanism is operable to engage said seat assembly to structurally integrate said attachment arms into said seat assembly and lock the seat back into a generally upright orientation with respect to the seat assembly and a release position in which said attachment arms are free to disengage said seat assembly.

19. The car seat of claim **18** further comprising:

a pivot lock mechanism for securing said mounting pins in said pivot sockets, said pivot lock mechanism allowing said mounting pins to be disengaged from said pivot sockets such that said seat back can be removed from said seat assembly.

20. The car seat of claim **18** wherein said seat back is formed with a plurality of sets of routing openings in said rear support portion for the passage of harness straps from a front side of said seat back to a rear side of said seat back, said

harness straps being routed upwardly from the selected set of routing openings to a hanger mounted at a top portion of said rear support portion of said seat back, said harness straps being looped around said hanger before extending downwardly into said seat assembly.

21. The car seat of claim **18** further comprising:

a head rest mountable on said seat back and vertically positionable relative thereto, said head rest including a latching mechanism to secure the head rest is a desired position relative to said seat back, at least one set of routing openings being located below said head rest irrespective of the desired position of said head rest on said seat back.

22. The car seat of claim **18** wherein attachment arms project generally perpendicularly outwardly relative to said rear support portion for engagement with said seat assembly to be positioned within said receptacles substantially forwardly of said seat back.

* * * * *

EXHIBIT B

US008141951B2

(12) **United States Patent**
Chen

(10) **Patent No.: US 8,141,951 B2**
(45) **Date of Patent: Mar. 27, 2012**

(54) **CHILD SAFETY SEAT**

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(73) Assignee: **Excellerate Enterprise Co., Ltd.**, Songshan District, Taipei (TW)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 366 days.

(21) Appl. No.: **12/555,814**

(22) Filed: **Sep. 9, 2009**

(65) **Prior Publication Data**

US 2010/0060055 A1 Mar. 11, 2010

Related U.S. Application Data

(60) Provisional application No. 61/095,630, filed on Sep. 10, 2008.

(51) **Int. Cl.**
A47D 1/10 (2006.01)

(52) **U.S. Cl.** **297/256.11**; 297/353; 297/256.13

(58) **Field of Classification Search** 297/256.11, 297/256.13, 353
See application file for complete search history.

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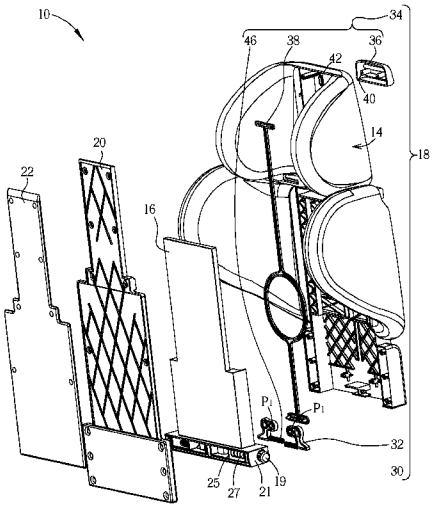
(74) *Attorney, Agent, or Firm* — Winston Hsu; Scott Margo

(57) **ABSTRACT**

A child safety seat includes a seat body, an engaging board, a backrest, and an engaging mechanism. The engaging board is connected to the seat body. A tooth-shaped structure is formed on the engaging board. The backrest is movably disposed on the engaging board. The engaging mechanism is disposed between the engaging board and the backrest. The engaging mechanism includes an engaging member and a driving device. The engaging member is pivotally connected to the backrest for engaging with the tooth-shaped structure. The driving device is pivotally connected to the engaging member and movably connected to the backrest. When the driving device moves between a locking position and a releasing position relative to the backrest, the driving device drives the engaging member to rotate relative to the backrest.

13 Claims, 8 Drawing Sheets



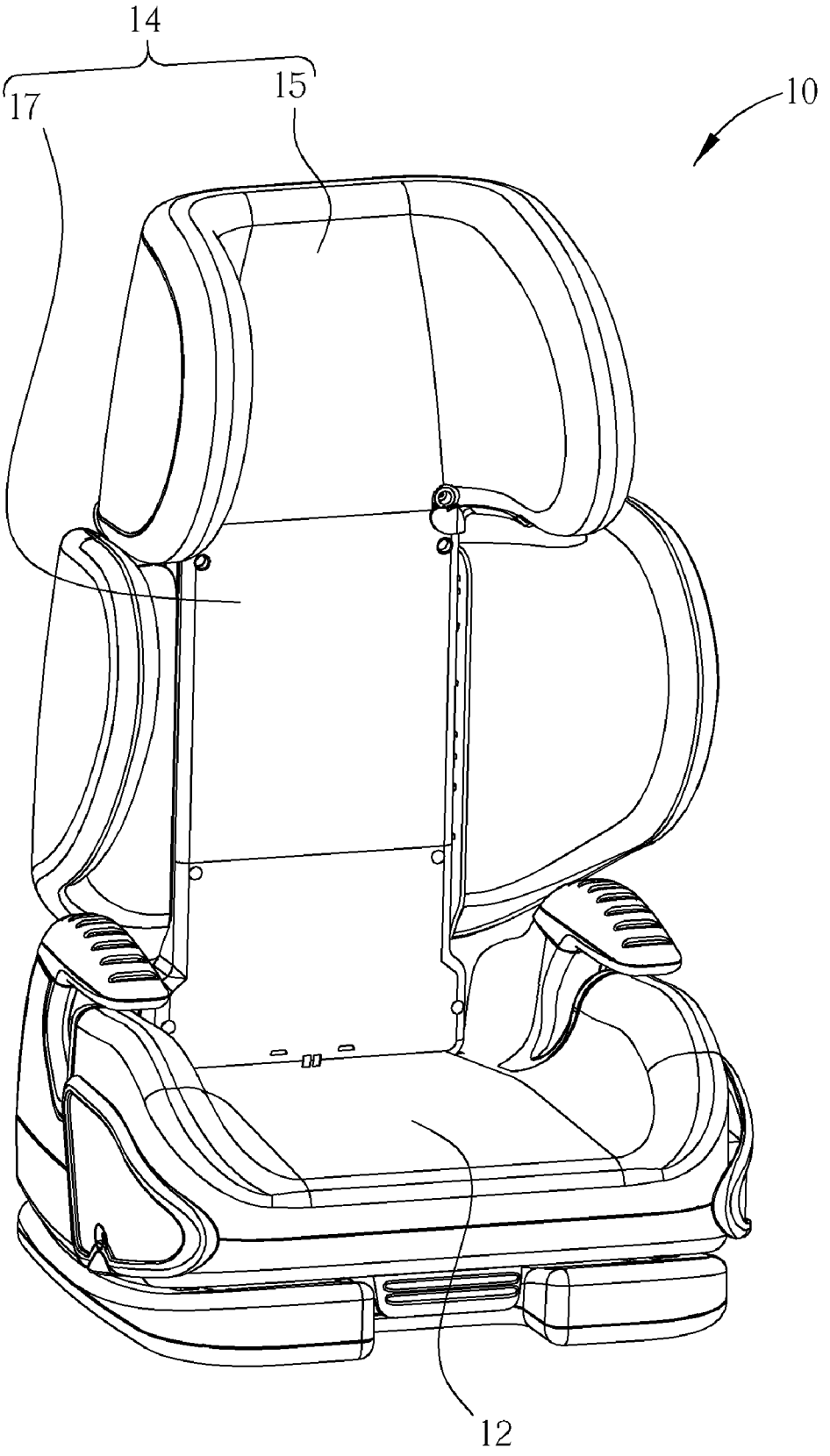


FIG. 1

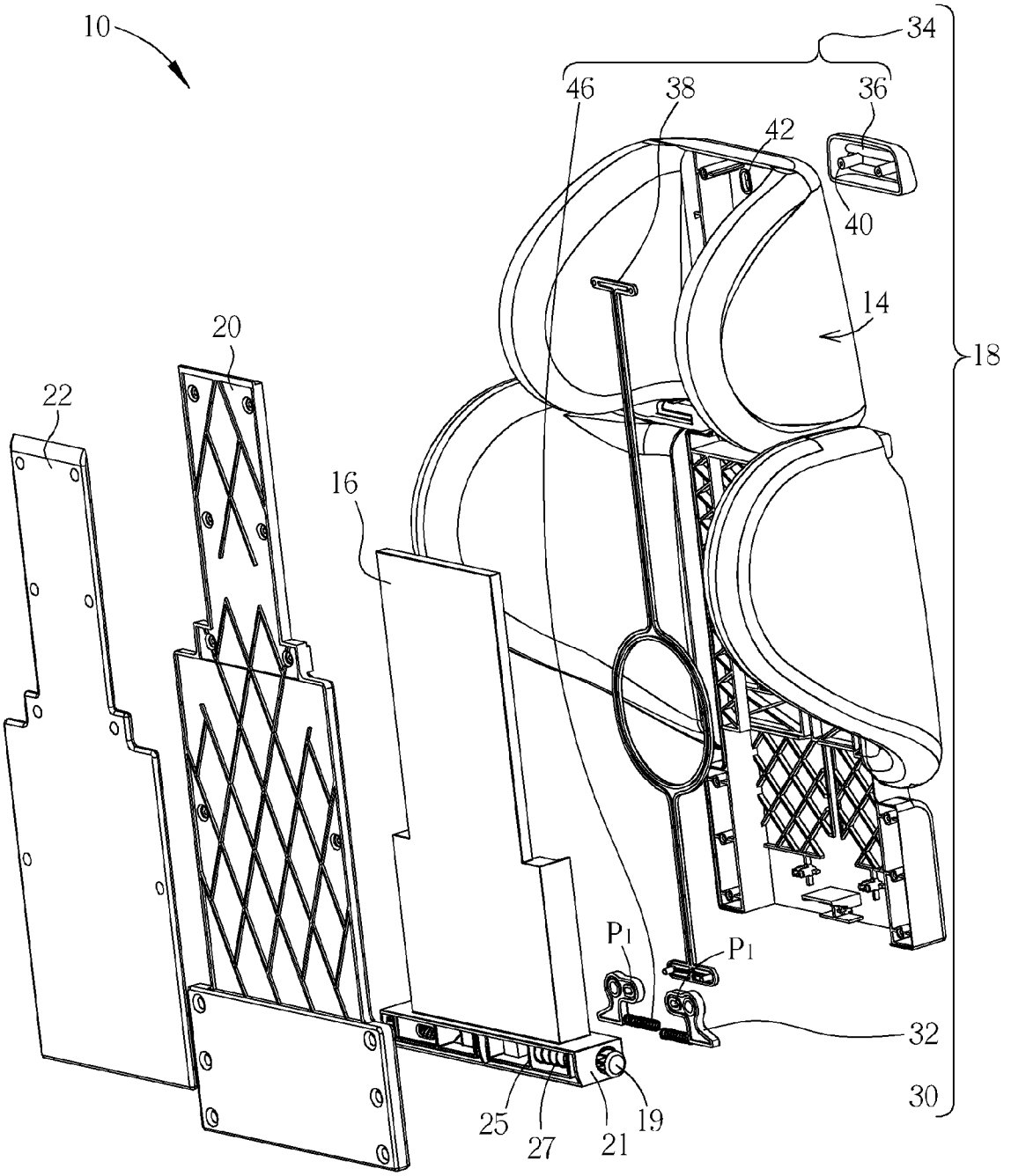


FIG. 2

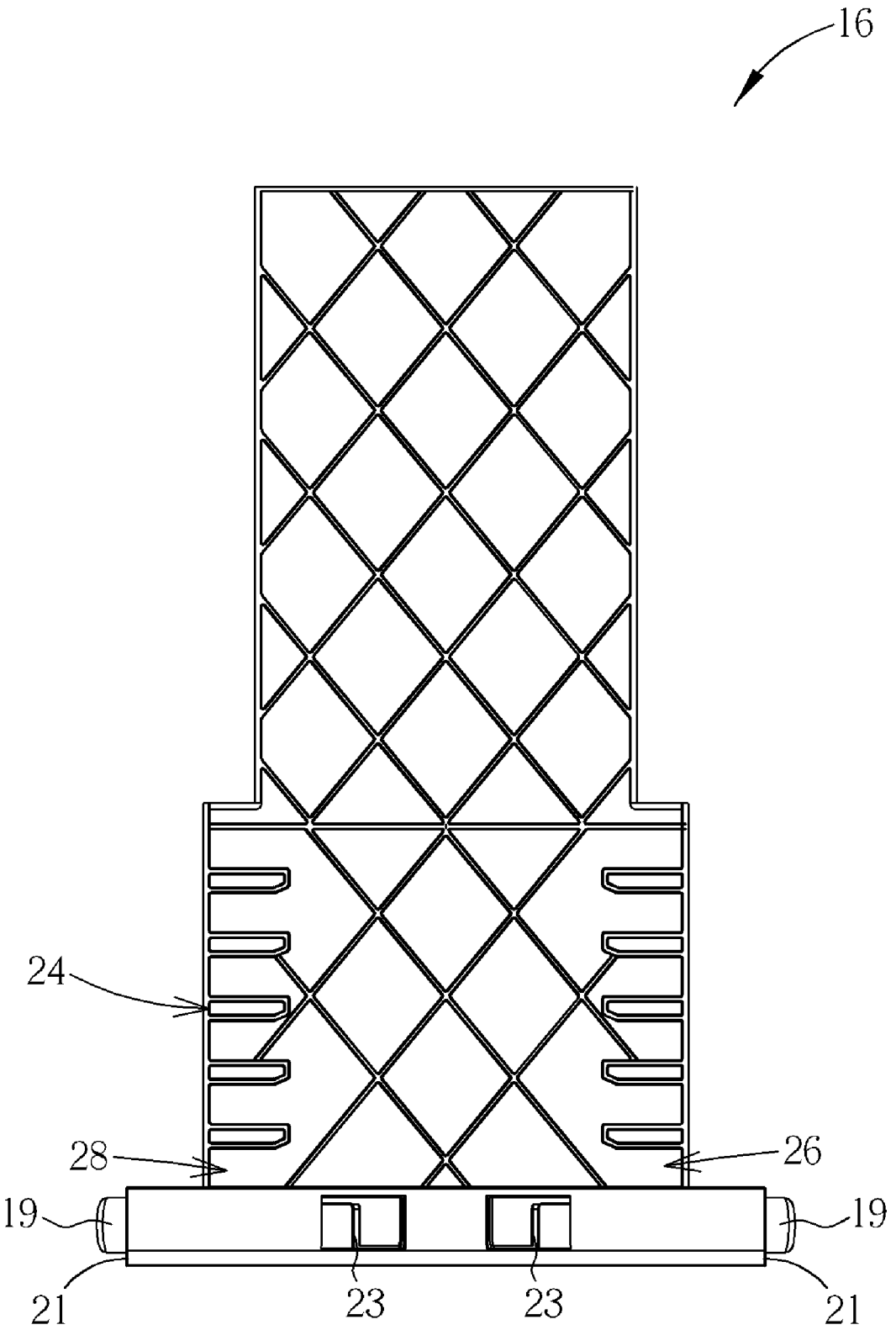


FIG. 3

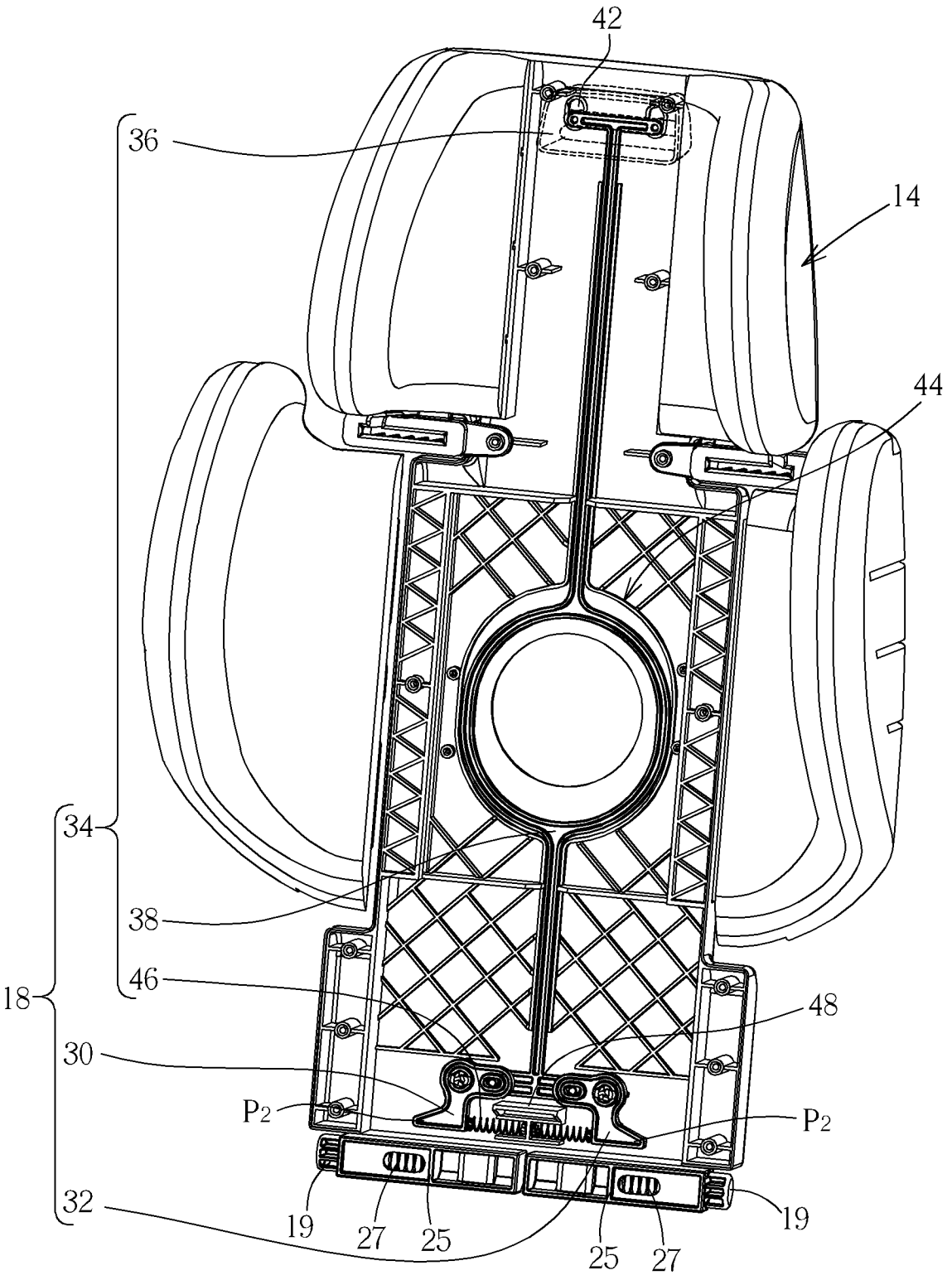


FIG. 4

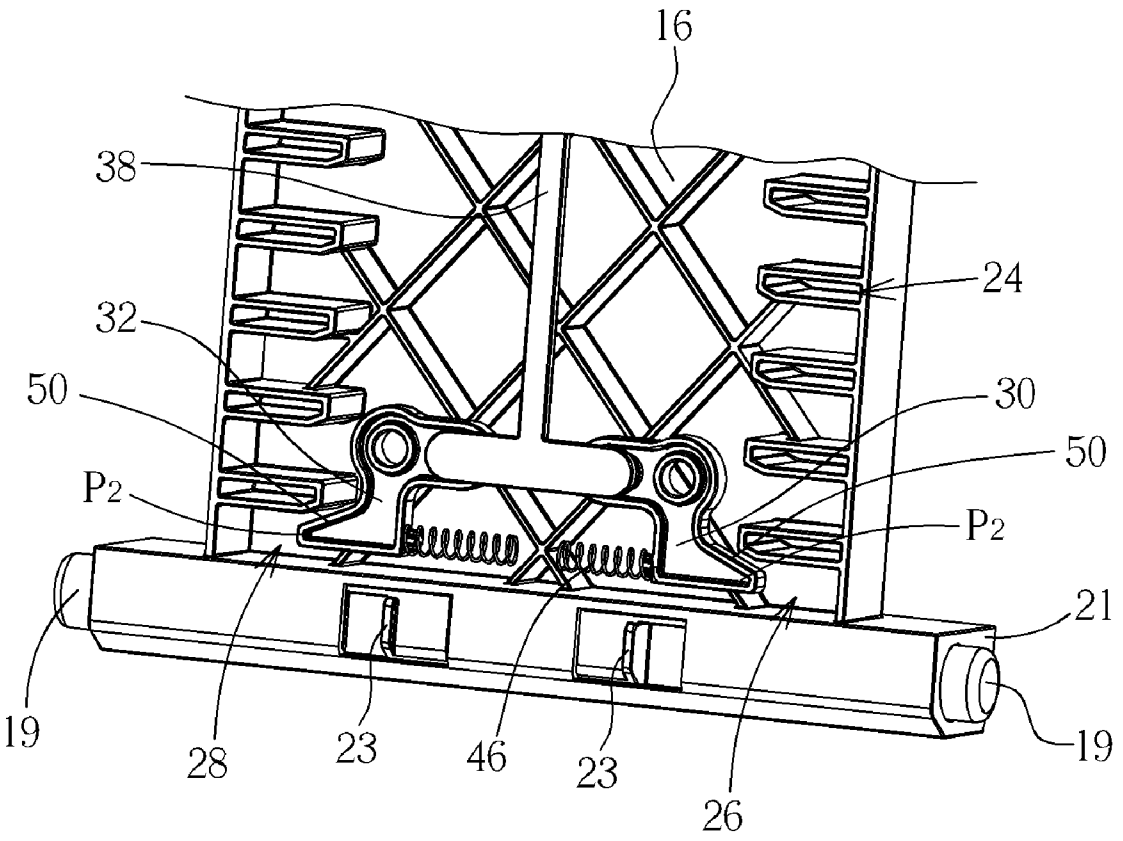


FIG. 5

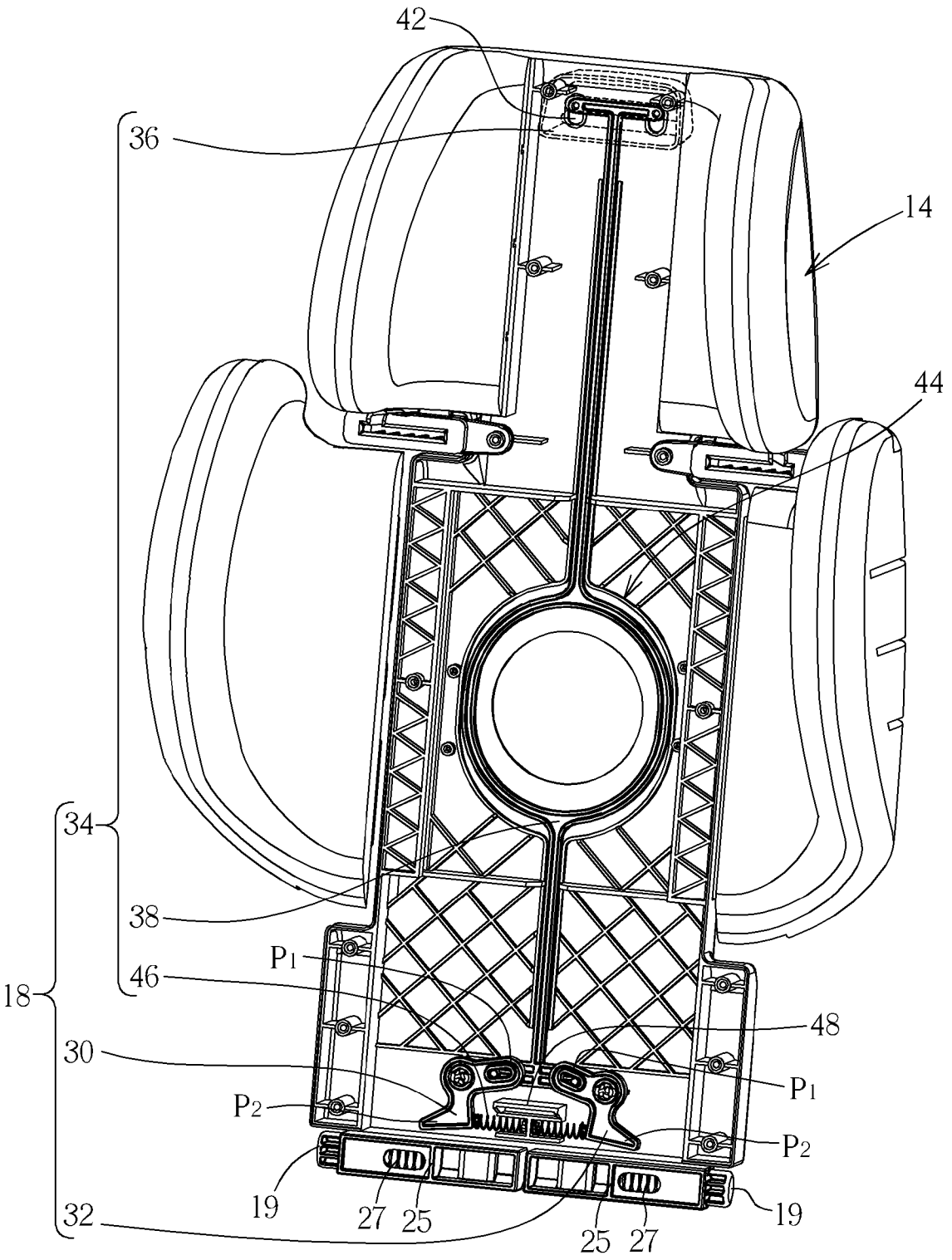


FIG. 6

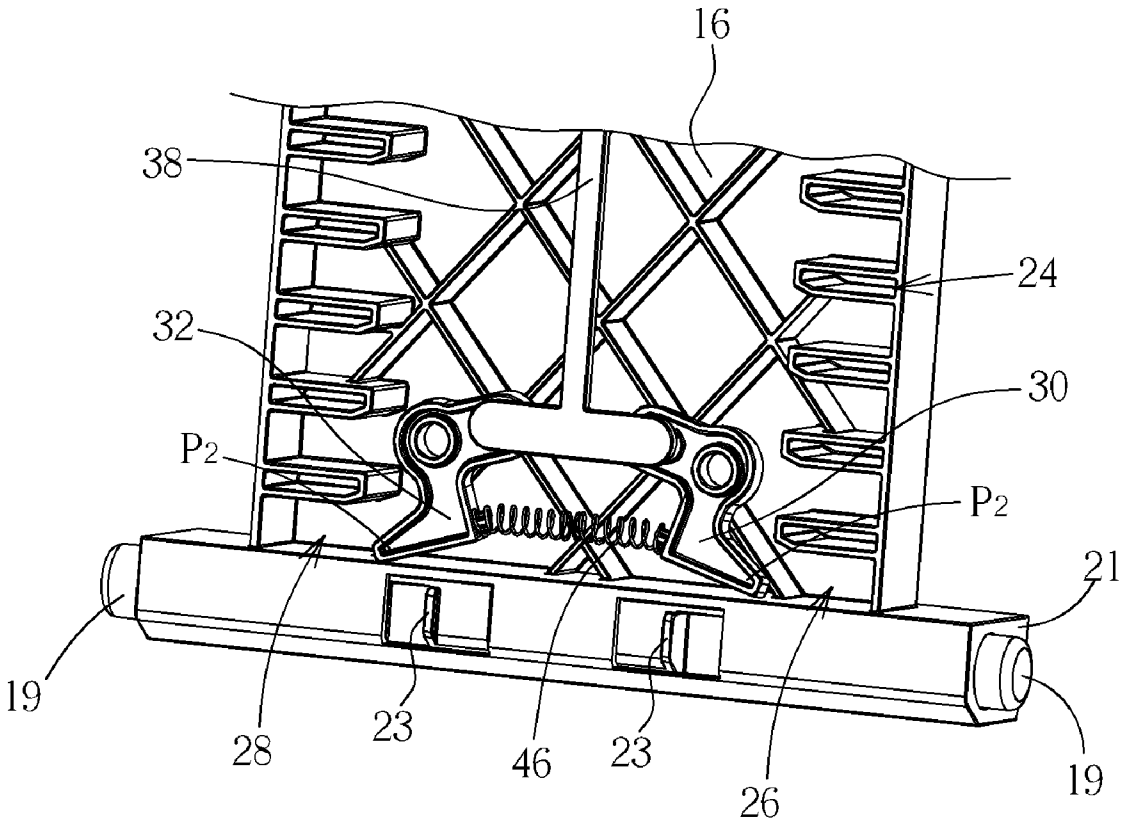


FIG. 7

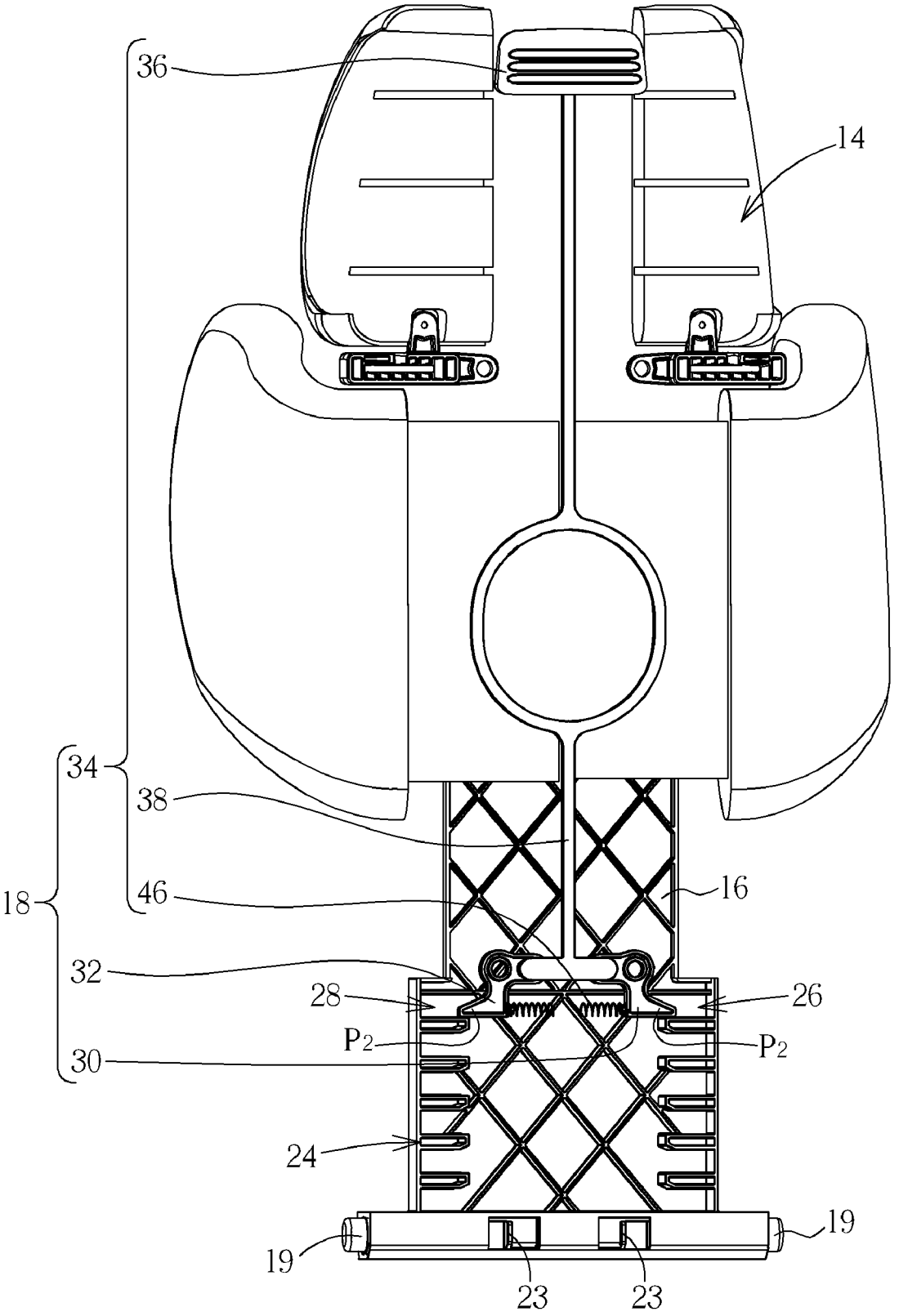


FIG. 8

CHILD SAFETY SEAT

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 61/095,630, which was filed on Sep. 10, 2008, and is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a child safety seat, and more particularly, to a child safety seat equipped with a mechanism for adjusting height of backrest.

2. Description of the Prior Art

In general, to ensure safety of a child while traveling in car, many countries have legislated there has to be a child safety seat installed in the car for securing the child. To absorb impact force during an automobile accident, the safety design of the child safety seat is always complicated. However, besides the structural design for safety issue, people do not pay much attention to auxiliary design for purpose of adjusting requirement based on different children. For example, a height adjusting mechanism can be used to adjust height of backrest based on different children with different heights. Although a conventional height adjusting mechanism can be used to adjust height of backrest within a specific range, there are still some problems, such as the structural design is complicated or the operation is inconvenient.

SUMMARY OF THE INVENTION

Therefore, an objective of the invention is to provide a child safety seat equipped with a mechanism for adjusting height of backrest, so as to solve the aforesaid problems.

According to one embodiment, a child safety seat of the invention comprises a seat body, an engaging board, a backrest and an engaging mechanism. The engaging board is connected to the seat body and a tooth-shaped structure is formed on the engaging board. The backrest is movably disposed on the engaging board. The engaging mechanism is disposed between the engaging board and the backrest. The engaging mechanism comprises an engaging member and a driving device. The engaging member is pivotally connected to the backrest for engaging with the tooth-shaped structure. The driving device is pivotally connected to the engaging member and movably connected to the backrest. The driving device drives the engaging member to rotate relative to the backrest when moving between a locking position and a releasing position relative to the backrest.

According to the aforesaid embodiment of the invention, the child safety seat utilizes the aforesaid driving device to engage/disengage the engaging member with/from the tooth-shaped structure of the engaging board, so as to enable the backrest to move relative to the engaging board upwardly and downwardly or fix at specific height relative to the engaging board. Accordingly, through simple design of engaging mechanism, the invention not only simplifies the structure of height adjusting mechanism but also reduces the manufacture cost. Furthermore, a user can easily adjust height of the backrest relative to the engaging board through simple operation, so as to greatly enhance the convenience while using the child safety seat.

These and other objectives of the present invention will no doubt become obvious to those of ordinary skill in the art after

reading the following detailed description of the preferred embodiment that is illustrated in the various figures and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram illustrating a child safety seat according to one embodiment of the invention.

FIG. **2** is an exploded view illustrating parts of the child safety seat shown in FIG. **1**.

FIG. **3** is a rear view illustrating the engaging board shown in FIG. **2**.

FIG. **4** is a schematic diagram illustrating the engaging mechanism, which is shown in FIG. **2**, disposed on the backrest.

FIG. **5** is an enlarged view illustrating the first and second engaging members, which are shown in FIG. **2**, engaged with the tooth-shaped structure.

FIG. **6** is a schematic diagram illustrating the driving device, which is shown in FIG. **4**, moving to a releasing position relative to the backrest

FIG. **7** is an enlarged view illustrating the first and second engaging members, which are shown in FIG. **5**, disengaged from the tooth-shaped structure.

FIG. **8** is a schematic diagram illustrating the first and second engaging members, which are shown in FIG. **7**, moving to other first and second positioning grooves relative to the engaging board.

DETAILED DESCRIPTION

Referring to FIGS. **1** and **2**, FIG. **1** is a schematic diagram illustrating a child safety seat **10** according to one embodiment of the invention, and FIG. **2** is an exploded view illustrating parts of the child safety seat **10** shown in FIG. **1**. As show in FIG. **1**, the child safety seat **10** comprises a seat body **12** and a backrest **14**. The seat body **12** may comprise some components, such as seat pad, handrail, and so on, disposed on a common child safety seat. As shown in FIG. **2**, the child safety seat can further comprise an engaging board **16**, an engaging mechanism **18**, a backrest cover **20** and a protecting pad **22**. The backrest **14** is movably disposed on the engaging board **16** and used for supporting the back of a child secured on the child safety seat **10**. That is to say, the child can lie on or lean against the backrest **14**. The backrest **14** comprises a headrest portion **15** and a body portion **17**. The headrest portion **15** is connected to the body portion **17** closely and formed integrally and movable synchronously with the body portion **17**, wherein the headrest portion **15** is used for supporting the head of a child and the body portion **17** is used for supporting the body of a child individually. The engaging board **16** is connected to the seat body **12**. The engaging board **16** is shown in FIG. **3**. FIG. **3** is a rear view illustrating the engaging board **16** shown in FIG. **2**.

As show in FIG. **2**, a protruding shaft **19** extends outwardly from one side **21** of the engaging board **16**. The protruding shaft **19** of the engaging board **16** can be connected to a concave hole (not shown) of the seat body **12**. Accordingly, the engaging board **16** is pivotable by the protruding shaft **19** relative to the seat body **12**, so as to adjust the tilt angle of the engaging board **16**. Furthermore, as shown in FIGS. **3** and **4**, FIG. **4** is a schematic diagram illustrating the engaging mechanism **18**, which is shown in FIG. **2**, disposed on the backrest **14**. There is a press portion formed on one end of the protruding shaft **19**, wherein the press portion is away from the side **21** of the engaging board **16**. The engaging board **16** has a partition **25** to make a room at the bottom for receiving

one part of the protruding shaft **19** and a resilient member **27** which is disposed between the other end of the protruding shaft **19** and the partition **25**. As shown in FIG. **3**, a tooth-shaped structure **24** is formed on the engaging board **16** and comprises a plurality of first positioning grooves **26** and a plurality of second positioning grooves **28**. FIG. **3** shows six first positioning grooves **26** and six second positioning grooves **28**.

The engaging mechanism **18** is disposed between the engaging board **16** and the backrest **14**. As shown in FIG. **2**, the engaging mechanism **18** comprises a first engaging member **30**, a second engaging member **32** and a driving device **34**. The first engaging member **30** is pivotally connected to the backrest **14** and used for engaging with one of the first positioning grooves **26** of the tooth-shaped structure **24**. The second engaging member **32** is also pivotally connected to the backrest **14** and used for engaging with one of the second positioning grooves **28** of the tooth-shaped structure **24**. The driving device **34** is movably connected to the backrest **14** and comprises a pulling member **36** and a connecting member **38**. In this embodiment, the pulling member **36** can be a handle. The connecting member **38** is connected to the pulling member **36** and pivotally connected to a first end P**1** of the first engaging member **30** and a first end P**1** of the second engaging member **32**. The pulling **36** can drive the first end P**1** of the first engaging member **30** and the first end P**1** of the second engaging member **32** to rotate relative to the backrest **14** when the driving device **34** moves relative to the backrest **14**. The backrest cover **20** is disposed on one side of the engaging board **16** and used for covering the engaging board **16** and the engaging mechanism **18**, so as to achieve additional protection effect. The protecting pad **22** is disposed on the backrest cover **20**. In this embodiment, the protecting pad **22** can be made of expandable polystyrene (EPS). It should be noted that the protecting pad **22** also can be made of other soft material for absorbing impact force. In other words, since the protecting pad **22** can absorb impact force during an automobile accident, the child secured on the child safety seat **10** can be protected well.

Moreover, as shown in FIG. **2**, the pulling member **36** comprises at least one pillar **40** (two pillars are shown in FIG. **2**) The pillar **40** can be received in a restraining hole **42** of the backrest **14** and used to restrain the moving range of the pulling member **36** relative to the backrest **14**. For example, the pulling member **36** can only move in one limited direction relative to the backrest **14** due to the restraining hole **42**. In this embodiment, the headrest portion **15** and the body portion **17** are formed integrally, so that the headrest portion **15** and the body portion **17** can move relative to the engaging board **16** simultaneously.

Referring to FIGS. **3** and **4**, an accommodating space **44** is formed on the backrest **14**. As shown in FIG. **4**, the accommodating space **44** is used to accommodate the connecting member **38**, such that the connecting member **38** can move upwardly and downwardly within the accommodating space **44**. Furthermore, the driving device **34** further comprises a spring **46** connected to between the first engaging member **30** and a protruding portion **48** of the backrest **14**. The spring **46** is used to provide an elastic force for the first engaging member **30**, so as to position a second end P**2** of the first engaging member **30** in one of the first positioning grooves **26** of the tooth-shaped structure **24**. As to the second engaging member **32**, as shown in FIG. **4**, the aforesaid manner also can be adapted to the second engaging member **32**. That is to say, the spring **46** also can be connected between the second engaging member **32** and the protruding portion **48** of the backrest **14** and used to provide an elastic force for the second engaging member **32**, so as to position a second end P**2** of the second engaging member **32** in one of the second positioning grooves **28** of the tooth-shaped structure **24**.

In the following, the structure and principle of the backrest **14**, the engaging board **16** and the engaging mechanism **18** will be depicted in detail. Referring to FIGS. **4** and **5**, FIG. **5** is an enlarged view illustrating the first and second engaging members **30** and **32**, which are shown in FIG. **2**, engaged with the tooth-shaped structure **24**. When the driving device **34** is located at a locking position (shown in FIG. **4**) relative to the backrest **14** and the backrest **14** is located at a height (shown in FIG. **1**) relative to the engaging board **16**, the second end P**2** of the first engaging member **30** and the second end P**2** of the second engaging member **32** are respectively engaged with the first positioning groove **26** and the second positioning groove **28** of the tooth-shaped structure **24**. Furthermore, the springs **46**, which are respectively disposed between the first engaging member **30** and the protruding portion **48** and between the second engaging member **32** and the protruding portion **48**, can provide elastic force for the first and second engaging members **30** and **32**, so as to respectively position the second end P**2** of the first engaging member **30** and the second end P**2** of the second engaging member **32** in the first and second positioning grooves **26** and **28**. Consequently, the backrest **14** of the child safety seat **10** can be fixed at a desired height (shown in FIG. **1**) relative to the engaging board **16** due to the engagement between the second end P**2** of the first engaging member **30** and the first positioning groove **26** and the engagement between the second end P**2** of the second engaging member **32** and the second positioning groove **28**. Accordingly, the child can lie on or lean against the backrest **14** comfortably.

Referring to FIGS. **6** and **7**, FIG. **6** is a schematic diagram illustrating the driving device **34**, which is shown in FIG. **4**, moving to a releasing position relative to the backrest **14**, and FIG. **7** is an enlarged view illustrating the first and second engaging members **30** and **32**, which are shown in FIG. **5**, disengaged from the tooth-shaped structure **24**. When a user wants to adjust the height of the backrest **14** relative to the engaging board **16** in compliance with the height of the child secured on the child safety seat **10**, he or she only has to pull the pulling member **36** of the driving device **34** upwardly from a bottom position of the restraining hole **42** (shown in FIG. **4**) to a top position of the restraining hole **42** (shown in FIG. **6**), so as to drive the driving device **34** to move relative to the backrest **14** from the locking position (shown in FIG. **4**) to the releasing position (shown in FIG. **6**). At this time, the connecting member **38**, which is connected to the pulling member **36**, will move upwardly and then drive the first end P**1** of the first engaging member **30** and the first end P**1** of the second engaging member **32** to rotate relative to the backrest **14**. Therefore, as shown in FIG. **7**, due to the rotation of the first and second engaging members **30** and **32**, the second end P**2** of the first engaging member **30** and the second end P**2** of the second engaging member **32** are respectively disengaged from the first and second positioning grooves **26** and **28** of the tooth-shaped structure **24**. At this time, the spring **46** is compressed. Accordingly, since the second end P**2** of the first engaging member **30** and the second end P**2** of the second engaging member **32** have been respectively disengaged from the first and second positioning grooves **26** and **28** of the tooth-shaped structure **24**, the backrest **14** can move relative to the engaging board **16** upwardly and downwardly. After the user pulls the pulling member **36** of the driving device **34** upwardly to the top position of the restraining hole **42**, the pillar **40** of the pulling member **36** abuts against the restraining hole **42** of the backrest **14**. Thus, the user can operate the

pulling member **36** to drive the backrest **14** to move relative to the engaging board **16** to a desired height in compliance with the height of the child secured on the child safety seat **10**.

For example, when the backrest **14** moves to the position (shown in FIG. **8**) relative to the engaging board **16** from a former position (such as shown in FIG. **7**), the first and second engaging members **30** and **32** also move to align with another first and second positioning grooves **26** and **28** of the tooth-shaped structure **24**. After releasing the pulling member **36**, the compressed springs **46** provide elastic force for the first and second engaging members **30** and **32**, so as to drive the first and second engaging members **30** and **32** to rotate relative to the backrest **14**. Consequently, the driving device **34** will get back to the locking position automatically. During the aforesaid operation, due to the elastic force generated by the springs **46**, the second end P**2** of the first engaging member **30** and the second end P**2** of the second engaging member **32** will rotate relative to the backrest **14** until the second end P**2** of the first engaging member **30** and the second end P**2** of the second engaging member **32** are respectively engaged with the first and second positioning grooves **26** and **28** of the tooth-shaped structure **24**. Accordingly, through the engagement between the engaging mechanism **18** and the engaging board **16**, the user can fix the backrest **14** at the height shown in FIG. **8** and then the operation of adjusting the height of the backrest **14** of the child safety seat **10** has been completed. Consequently, the child can lie on or lean against the backrest **14** with appropriate height comfortably.

Moreover, as shown in FIG. **5**, the second ends P**2** of the first and second engaging members **30** and **32** have inclined surfaces **50** formed thereon. When moving the backrest **14** upwardly and directly without operating the pulling member **36**, the inclined surfaces **50** of the first and second engaging members **30** and **32** abut against side walls of the first and second positioning grooves **26** and **28** respectively and then rotate correspondingly, so as to disengage the first and second engaging members **30** and **32** from the first and second positioning grooves **26** and **28** respectively. Accordingly, the backrest **14** can move upwardly for purpose of height adjustment. Since the springs **46** are compressed by the rotation of the engaging members **30** and **32**, then provide elastic force after being released to enforce the first and second engaging members **30** and **32** be engaged with other positioning grooves after the engaging members **30** and **32** are disengaged from the side walls of the first and second positioning grooves **26** and **28**. Consequently, the backrest **14** can be fixed at a desired position. In addition, as shown in FIG. **8**, since there are six positioning grooves formed on each of both sides of the tooth-shaped structure **24**, the backrest **14** of the child safety seat **10** can be adjusted in six different positions. It should be noted that the number of the positioning grooves formed on the tooth-shaped structure **24** can be determined based on practical applications and manufacturing requirements of the child safety seat **10**.

If the user wants to adjust the height of the backrest **14** relative to the engaging board **16** again, he or she only has to pull the pulling member **36** of the driving device **34** again and repeats the aforesaid operation, so as to drive the first and second engaging members **30** and **32** of the engaging mechanism **18** to rotate relative to the backrest **14** and then disengage from the tooth-shaped structure **24**. Then, the user can pull the backrest **14** to move relative to the engaging board **16** upwardly and downwardly. Accordingly, the user can move the backrest **14** to a desired height relative to the engaging board **16** in compliance with the height of the child secured on the child safety seat **10**. Since the back of the child can be supported well, the child can lie on or lean against the backrest **14** comfortably.

Still further, the user can operate the protruding shaft **19** of the engaging board **16** to disengage the seat body **12** from the engaging board **16** or the backrest **14**. When the engaging board **16** is pivotally connected to the seat body **12** and the user wants to disengage the backrest **14** from the seat body **12**, he or she only has to press the press portions **23** of the protruding shafts **19** simultaneously to retract the protruding shafts **19** toward the center of the engaging board **16**. At this time, the engaging board **16** can be disconnected from the seat body **12**, such that the seat body **12** can be disengaged from the engaging board **16** or the backrest **14**. On the other hand, when the user wants to attach the engaging board **16** or the backrest **14** to the seat body **12**, he or she has to press the press portions **23** to retract the protruding shafts **19** into the engaging board **16**. At this time, the resilient members **27** are compressed between protruding shafts **19** and partitions **25**. Afterward, the user has to align the protruding shafts **19** and the corresponding concave holes of the seat body **12** and then release the press portions **23**, such that the protruding shafts **19** will protrude from the engaging board **16** due to the elastic force generated by the resilient members **27** and then engage with the seat body **12**. Consequently, the engaging board **16** or the backrest **14** is connected to the seat body **12** again.

Compared to the prior art, the child safety seat of the invention utilizes the aforesaid driving device to engage/disengage the engaging member with/from the tooth-shaped structure of the engaging board, so as to enable the backrest to move relative to the engaging board upwardly and downwardly or fix at specific height relative to the engaging board. Accordingly, through simple design of engaging mechanism, the invention not only simplifies the structure of height adjusting mechanism but also reduces the manufacture cost. Furthermore, a user can easily adjust height of the backrest relative to the engaging board through simple operation, so as to greatly enhance the convenience while using the child safety seat.

Those skilled in the art will readily observe that numerous modifications and alterations of the device and method may be made while retaining the teachings of the invention. Accordingly, the above disclosure should be construed as limited only by the metes and bounds of the appended claims.

What is claimed is:

1. A child safety seat comprising:

a seat body;

an engaging board connected to the seat body, a tooth-shaped structure being formed on the engaging board;

a backrest movably disposed on the engaging board; and

an engaging mechanism disposed between the engaging board and the backrest, the engaging mechanism comprising:

an engaging member pivotally connected to the backrest for engaging with the tooth-shaped structure; and

a driving device movably connected to the backrest, the driving device comprising:

a connecting member pivotally connected to a first end of the engaging member; and

a pulling member connected to the connecting member, for driving the first end of the engaging member to rotate relative to the backrest when the driving device moves to a releasing position, so as to disengage a second end of the engaging member from the tooth-shaped structure, and further for driving the first end of the engaging member to rotate relative to the backrest when the driving

device moves to a locking position, so as to engage the second end of the engaging member with a positioning groove of the tooth-shaped structure, such that a height of the backrest relative to the engaging board is fixed;

wherein the backrest is capable of moving relative to the engaging board when the second end of the engaging member is disengaged from the tooth-shaped structure.

2. The child safety seat of claim **1**, wherein the second end of the engaging member has an inclined surface.

3. The child safety seat of claim **1**, wherein the pulling member comprises a pillar disposed in a restraining hole of the backrest.

4. The child safety seat of claim **1**, wherein the driving device further comprises a spring connected between the engaging member and a protruding portion of the backrest.

5. The child safety seat of claim **1**, wherein the pulling member is a handle.

6. The child safety seat of claim **1**, wherein the backrest comprises a headrest portion and a body portion, the headrest portion and the body portion are formed integrally and movable synchronously disposed on the engaging board.

7. The child safety seat of claim **1**, wherein an accommodating space is formed on the backrest and used for accommodating the connecting member.

8. The child safety seat of claim **1**, further comprising a backrest cover, disposed on one side of the engaging board, for covering the engaging board and the engaging mechanism.

9. The child safety seat of claim **8**, further comprising a protecting pad disposed on the backrest cover.

10. The child safety seat of claim **9**, wherein the protecting pad is made of expandable polystyrene (EPS).

11. The child safety seat of claim **1**, further comprising a protruding shaft extending outwardly from one side of the engaging board, wherein the engaging board is pivotally connected to the seat body by the protruding shaft.

12. The child safety seat of claim **11**, further comprising a resilient member disposed between the protruding shaft and the engaging board.

13. The child safety seat of claim **11**, wherein the protruding shaft is capable of moving relative to the engaging board.

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