(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 November 2013 (21.11.2013)

WIPO | PCT

(10) International Publication Number
WO 2013/172890 A1

(51) International Patent Classification:
B60R 22/10 (2006.01) *B60N 2/26* (2006.01)

(21) International Application Number:
PCT/US2013/026432

(22) International Filing Date:
15 February 2013 (15.02.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/649,006 18 May 2012 (18.05.2012) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(54) Title: SAFETY BELT ADJUSTER

(57) Abstract: A safety belt path adjuster assembly affixable to a car seat is disclosed. The safety belt path adjuster assembly including a first pair of fianges for receiving a safety belt and positioned to orient the safety belt across the front of a car seat. The safety belt path adjuster assembly also includes a second pair fianges for receiving the safety belt and positioned to orient the safety belt across the rear of the car seat.

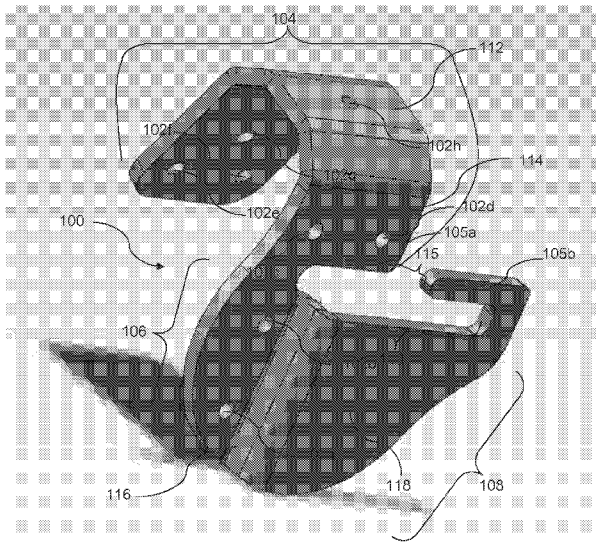

FIG. 1

WO 2013/172890 A1

SAFETY BELT ADJUSTER

RELATED APPLICATION

The present application claims the benefit of United States Provisional Application No. 61/649,006 entitled SAFETY BELT PATH ADJUSTER and filed May 18, 2012, which is incorporated herein in its entirety.

FIELD OF THE INVENTION

The present application is generally directed to child car safety seats and strollers. Specifically, the present invention is directed to child car safety seats and strollers having safety belt path adjusters for securing safety belts to secure child car safety seats and strollers to car seats.

BACKGROUND OF THE INVENTION

Car seats can be both front-facing, where the child faces the front of the car, and rear-facing, where the child faces the back of the car. In general, car seats can be secured to the car using a safety belt included in the vehicle, such as a lap belt, shoulder belt, or other safety belt. In order for a car seat to be sold in a particular country, it must pass strict regulatory tests. One particular requirement has to do with the position of the safety belt (e.g., safety belt) used to secure the car seat to the car in relation to the child. There are two primary standards that are recognized: the Federal Motor Vehicle Safety Standard 213 (FMV 213) and the Economic Commission for Europe of the United Nations Regulation No. 44 (ECE R44). Countries that follow the FMV 213 include approximately 67% of the world's countries, including the United States. Countries that follow ECE R44 include approximately 33% of the world's countries, including countries in Europe. However, the standards have different requirements and in some instances are inconsistent. As a result, car seats that satisfy the FMV 213 necessarily cannot satisfy the ECE R44 standard.

For example, in front-facing car seats, the FMV 213 standard permits the placement of the safety belt across the front of the child. As such, in order to confirm with FMV 213, the safety belt generally secures the car seat by being placed over the top of the car seat (e.g., over the side arms of the car seat) with a corresponding structure for properly positioning the car seat. Conversely, ECE R44 requires that the safety belt not cross in front of the child. As such, in order to conform to the ECE R44 standard, the car seat is typically secured by looping the safety belt through loops or other structures on the back of the car seat. The

significantly different standards regarding the positioning of the safety belt often results in manufacturers designing entirely different car seats with different engagement structures depending on the market in which the car seats are to be sold. The different car seat designs can result in a car seat that is legal in one region being illegal to use in another zone. As result, the different standards can present substantial challenges to families through different regions often requiring families with small children to bring multiple car seats.

Accordingly, there is a need for a car seat that can be legally used in regions having different safety standards.

SUMMARY OF THE INVENTION

The present invention is generally directed to a safety belt adjuster assembly securable to a car seat or wheeled conveyance and capable of receiving a safety belt to secure the car seat or wheeled conveyance to the car. The safety belt adjuster assembly further comprises a first guide portion having a first pair of flanges defining a first channel for releasably receiving the safety belt and generally transverse to the sidewall, wherein the first pair of flanges are positioned above the sidewalls of the car seat such that the safety belt can be threaded through first channel and pulled across the open front of the car seat through a first channel of a corresponding safety belt adjuster assembly opposite the first safety belt adjust assembly in accordance to FMV 213 standards.

The safety belt adjuster assembly can further comprise a second pair of flanges in which one flange if the second pair of flanges is positioned proximate to the sidewall and the opposing flange is positioned on a brace portion offset from the sidewall to define a second channel between the second pair of flanges. In certain aspects, the safety belt can be threaded between the second pair of flanges and pulled rearward to be threaded through the second channel and onto the first channel such that the second channel positions the safety belt along the sidewall. The opposing flange positioned on the brace portion can be itself offset from the brace portion to define a third channel allowing the safety belt to be threaded through the second and third channels before folded over the brace portion such that safety belt engages the safety belt adjuster assembly without positioning the strap across the front of the car seat. The multiple channels defined by the safety belt adjuster assembly allows the safety belt to be secured to the car seat according to either the FMV 213 or ECE R44 standards permitting a single car seat to be used in different regions under different standards without modification.

In certain embodiments, at least one secondary safety belt adjuster can be affixed to the back rest portion of the car seat, wherein the secondary safety belt adjuster also defines a

third pair of flanges between which the safety belt can be threaded to releasably retain a portion of the safety belt. The secondary safety belt adjusters can be positioned to adjust the path of the safety belt along the rear side of the car seat to avoid snagging of the belt.

A safety belt path adjuster assembly, according to an embodiment of the present invention, can be affixed to one of a pair of rigid sidewalls of a car seat having a front side and a back rest portion in which the sidewalls extend generally perpendicularly forward from the front side to define a recessed seating portion. In certain aspects, the safety belt path adjuster assembly can be affixed to a wheeled conveyance having a wheel assembly and a rigid seat portion comprising a pair of rigid sidewalls, a front side and a back rest portion in which the sidewalls extend generally perpendicularly forward from the front side to define a recessed seating portion. In other aspects, the safety belt adjuster assembly can be affixed to a convertible car seat and stroller as depicted in US Patent 4,620,771 and US Patent 5,104,134, both of which are incorporated by reference in their entirety.

A safety belt path adjuster assembly, according to an embodiment of the present invention, comprises a first safety belt path adjuster comprising a first pair of flanges spaced apart to define a first channel positioned above and generally perpendicular to the sidewalls of the car seat or seat portion and a second safety belt path adjuster affixed to the first safety belt path adjuster and comprising a brace portion and a second pair of flanges in which a first flange of the second pair of flanges is positioned proximate to the sidewall proximate the first safety belt path adjuster and a second flange of the second pair of flanges is affixed to the brace portion, wherein the brace portion comprises an offset portion positioning the brace portion and the opposite flange at a predetermined offset distance from the sidewall to define a second channel between the first and second flanges of the second pair of flanges, wherein the second flange is extends from the offset portion to define a third channel between the second channel and the second flange.

In certain embodiments of the present invention, the is safety belt affixed to a vehicle seat at both ends can be threaded through the first channel such that the safety belt can be secured along the sidewall and across the front side of the car seat to retain the car seat against the vehicle seat.

In certain embodiments of the present invention, the brace portion is positioned to receive the safety belt threaded through the first channel into the second channel, wherein the second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall. In this configuration, a safety belt affixed to a vehicle seat at both ends can be threaded through the second channel and the

third channel such that the safety belt is folded over the brace portion to retain the car seat against the vehicle seat, wherein the second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall.

In certain embodiments of the present invention, the second safety belt path adjuster further comprises a hanging portion having an arched shape for nestably receiving an edge of the sidewall, wherein the first safety belt path adjuster is affixed to the hanging portion. The hanging portion can further comprise at least one hole for receiving a fastener to secure the safety belt path adjuster assembly to the sidewall. In certain aspects, the first safety belt path adjuster is affixed to the hanging portion at the apex of the arched shape.

In certain embodiments of the present invention, the second safety belt path adjuster further comprises a plate extending from the hanging portion to the offset portion of the brace portion, wherein the plant engages the corresponding sidewall to align the first and second channels.

A method of securing car seat having a rigid car seat body comprising a pair of sidewalls, a front side and a back rest portion in which the sidewalls extend generally perpendicularly forward from the front side to define a recessed seating portion to a vehicle seat, according to an embodiment of the present invention, can comprise the method step of affixing a first safety belt path adjuster assembly to one of the sidewalls and a second safety belt path adjuster assembly to the opposing sidewall. Each safety belt path adjuster assembly further comprising a first safety belt path adjuster comprising a first pair of flanges spaced apart to define a first channel positioned above and generally perpendicular to the sidewalls, and a second safety belt path adjuster affixed to the first safety belt path adjuster and comprising a brace portion and a second pair of flanges in which a first flange of the second pair of flanges is positioned proximate to the sidewall proximate the first safety belt path adjuster and a second flange of the second pair of flanges is affixed to the brace portion, wherein the brace portion comprises an offset portion positioning the brace portion and the opposite flange at a predetermined offset distance from the sidewall to define a second channel between the first and second flanges of the second pair of flanges, wherein the second flange is extends from the offset portion to define a third channel between the second channel and the second flange. The method can also comprise affixing one end of a safety belt to the vehicle seat. The method can also comprise threading the opposing end of the safety belt through the first channel such that the safety belt can be secured along the sidewall and across the front side of the car seat to retain the car seat against the vehicle seat. The

method can also comprise removing the opposing end of the safety belt from the first channel. The method can also comprise threading the safety belt through the second channel and the third channel such that the safety belt is folded over the brace portion to retain the car seat against the vehicle seat, wherein the second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall. Finally, the method can also comprise affixing the opposing end of the safety belt to the vehicle seat.

The above summary of the various representative embodiments of the invention is not intended to describe each illustrated embodiment or every implementation of the invention. Rather, the embodiments are chosen and described so that others skilled in the art can appreciate and understand the principles and practices of the invention. The figures in the detailed description that follow more particularly exemplify these embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention can be completely understood in consideration of the following detailed description of various embodiments of the invention in connection with the accompanying drawings, in which:

Figure 1 is a perspective view of a safety belt path adjuster according to an embodiment of the present invention.

Figure 2 is a perspective view of a safety belt path adjuster according to an embodiment of the present invention.

Figure 3 is a perspective view of a safety belt path adjuster according to an embodiment of the present invention.

Figure 4 is a rear view of a safety belt path adjuster attached to a car seat according to an embodiment of the present invention.

Figure 5 is a perspective view of a safety belt path adjuster attached to a car seat according to an embodiment of the present invention.

Figure 6 is an exploded perspective view of a safety belt path adjusters and a car seat to which the adjusters can be attached according to an embodiment of the present invention.

Figure 7 is a side view of a safety belt path adjuster attached to a car seat according to an embodiment of the present invention.

Figure 8 is a side view of a safety belt path adjuster attached to a car seat according to an embodiment of the present invention.

Figure 9 is a perspective view of a safety belt path adjuster attached to a car seat according to an embodiment of the present invention.

Figure 10a is a perspective view of a safety belt path adjuster attached to a car seat according to an embodiment of the present invention.

Figure 10b is a partial perspective view of the safety belt path adjuster depicted in Figure 10a.

Figure 11 is a rear perspective view of a safety belt path adjuster attached to a car seat and depicting securing of the car seat to a car according to an embodiment of the present invention.

Figure 12a is a partial perspective view of a safety belt adjuster attached to a car seat according to an embodiment of the present invention.

Figure 12b is a partial perspective view of the safety belt adjuster depicted in Figure 12a with a safety belt inserted into the safety belt adjuster.

Figure 13a is a partial perspective view of a safety belt adjuster attached to a car seat according to an embodiment of the present invention.

Figure 13b is a partial perspective view of the safety belt adjuster depicted in Figure 13a with a safety belt inserted through the safety belt adjuster, wherein the safety belt is positioned in a FMV 213 compliant configuration.

Figure 13c is a partial perspective view of the safety belt adjuster depicted in Figure 13a with a safety belt inserted through the safety belt adjuster, wherein the safety belt is positioned in an ECE R44 compliant configuration.

Figure 14 is a perspective view of a convertible car seat and stroller according to an embodiment of the present invention, in which the convertible car seat and stroller configured in the stroller mode,

Figure 15 is a side view of the convertible car seat and stroller depicted in Figure 14 configured into the car seat mode and strapped onto a conventional vehicle seat.

Figure 16 is a partial cross-sectional side view of the convertible car seat and stroller with solid lines illustrating the configuration depicted in Figure 14 and dotted lines illustrating the configuration depicted in Figure 15.

Figure 17 is a rear view of the convertible car seat and stroller depicted in Figure 14.

Figure 18 is an elevation rear view in elevation of the convertible car seat and stroller depicted in Figure 15.

Figure 19 is a cross-sectional view of taken about lines 7--7 of the convertible car seat and stroller depicted in Figure 18.

Figure 20 is a front perspective view of a convertible car seat and stroller according to an embodiment of the present invention.

Figure 21 is an enlarged perspective views of one of the rear wheels of the convertible car seat and stroller according to an embodiment of the present invention.

While the invention is amenable to various modifications and alternative forms, specifics thereof have been depicted by way of example in the drawings and will be described in detail. It should be understood, however, that the intention is not to limit the invention to the particular embodiments described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

DETAILED DESCRIPTION

As depicted in FIG. 1, a primary safety belt path adjuster 100, according to an embodiment of the present invention, can be configured for placement on a top portion of a sidewall of a car seat and comprises a hanging portion 104, a plate portion 106, and a belt holding portion 108. The hanging portion 104 can be shaped to arching over and nestably engaging a sidewall portion of a car seat. In certain aspects, the hanging portion 104 can comprise a hook shape allowing the adjuster 100 to be hung off of the side of a car seat. The hanging portion 104 further comprises an inner securing portion 110, a top portion 112, and an outer securing portion 114. The inner securing portion 110 can be adapted for lapping along the inside surface of a sidewall of a car seat and further adapted to be secured to such inside surface. Similarly, the top portion 112 can be adapted to rest across the top of the sidewall of the car seat and can be further adapted to be secured to the top of the sidewall. The outer securing portion 114 can be adapted to hang adjacent to the outer surface of a sidewall of a car seat and can be further adapted to be secured to the outer surface of the sidewall of the car seat. The bottom edge of the outer securing portion 114 can further comprise a flange 105a. In certain aspects, the hanging portion 104 can comprise a generally planar structure with a hook-like contour adapted to nestably engage the top portion of a sidewall of a car seat. While a plate-like hanging portion has been described other shapes and configurations can be used to secure the adjuster to the sidewall of the car seat including a single hook like finger or multiple hook-like fingers. Still other types of hanging portions 104 can be provided. In one embodiment, for example, a flexible strap can be used to form the hanging portion 104 of the adjuster 100.

The plate portion 106 of the adjuster can be adapted to extend from the hanging portion 104, allow for better securement of the car seat and provide a base for extension of the belt holding portion 108. The plate portion 106 can extend from a portion of the outer securing portion 114 of the hanging portion 104 and continue alongside the outer surface of a sidewall of the car seat. The plate portion 106 can be generally flat and can have a slight crescent shape with a curved front edge extending downward to a point and a substantially flat rear edge.

The belt holding portion 108 can be configured to extend from the plate portion 106 and allow for routing of a lap belt, for example, upward from a portion on the seat of a vehicle, across the belt holding portion 108, and back down around the rear of the car seat. The belt holding portion 108 comprises an offsetting portion 116, a brace portion 118, and a flange portion 105b. In certain aspects, the offsetting portion 116 extends generally outward from the rear edge of the plate portion 106 and can extend substantially perpendicularly therefrom. The offsetting portion 116 extends away from the plate portion 106 to allow a safety belt to be threaded between a sidewall of a car seat and the brace portion 118. The brace portion 118 can extend from an outer edge of the offsetting portion in a direction generally parallel to the plate portion 106 such that it is in general alignment with the sidewall of the car seat when in place. In certain aspects, the brace portion can comprise a generally triangularly shaped similar to a shelf bracket and can include a substantially flat upper edge. In this configuration, the upper edge allows a safety belt to be extended upward and across the upper edge and returned to extend around the rear side of the car seat. The flange portion 105b extends upward from a rear tip of the brace portion 118 and returns generally parallel to the upper edge of the brace portion such that a safety belt extending upward and across the upper edge can pass below the flange portion 105b.

In certain embodiments, the primary safety belt path adjuster 100 further comprises holes 102a-102h, one or more of which can be used to secure the primary safety belt path adjuster 100 to a car seat, according to particular embodiments. According to various aspects, the adjuster assembly 300 can comprise more or less holes 102. Correspondingly, a plurality of holes can be drilled into each of the sides of the car seat (e.g., the plastic seat body 12 of the car seat) and screws, rivets, or other fasteners inserted through one or more of holes 102a-102h into the car seat to secure the primary safety belt path adjuster 100 to the rear of the car seat. According to an embodiment, two such safety belt adjusters 100 can be affixed to the car seat. In certain aspects, a first primary safety belt path adjuster 100 is positioned on the

left side of the car seat and a second primary safety belt path adjuster 100 is positioned on the right side of the car seat.

In certain embodiments, the primary safety belt path adjuster 100 further comprises flanges 105a and 105b. The flanges 105a, 105b can be used to secure the safety belt. In operation, the safety belt can be inserted through the space 115 between the flanges 105a and 105b by partially folding the safety belt and inserting the belt into the space 115 or inserting the safety belt edge-wise into the space 115, thereby effectively threading the safety belt through a channel 110 and held in place vis-à-vis flanges 105a and 105b, when the safety belt substantially fills the channel 110. In embodiments comprising a plurality of safety belt adjusters 100, the safety belt can be threaded through each safety belt adjustors accordingly.

Because the safety belt path adjustor 100 is affixed to the car seat, the safety belt path adjustor can make use of the strong structure of the existing plastic seat body 12 of the car seat. In addition, the design of the safety belt path adjustor 100 allows the safety belt to slide through easily as the car seat is being installed. Moreover, the safety belt path adjustor 100 has a low profile so that it does not substantially protrude beyond the side of the seat, allowing a car seat with one or more of the safety belt adjustors 100 installed to fit in narrow seats, such as an airplane.

In certain embodiments, the primary safety belt path adjuster 100 can be constructed from a plurality of materials including, but not limited to stainless steel, aluminum, plastic, titanium, composite materials or any other materials capable of withstanding at least approximately 3,900 pounds/square inch of force. In other embodiments, the primary safety belt path adjuster 100 comprises 7 gauge 304 stainless steel that can be cut, punched and/or bent into a shape approximating the shape depicted in FIG. 1.

As depicted in FIG. 2, a secondary safety belt path adjuster 200, according to an embodiment of the present invention, for placement against the back surface of a car seat for guiding a safety belt across the back of the car seat or used in combination with the primary safety belt path adjuster 100. The adjuster 200 comprises a securing portion 222 and a pair of guide portions 224. As depicted in FIGS. 11, 12a and 12b, in certain embodiments, the securing portion 222 comprises a planar shape and to shaped to sit flatly against a relatively flat portion of the back of a car seat. In certain aspects, the securing portion 222 can be contoured to engage raised or recessed portions on the back side of the car seat. In other aspects, other conventional shapes capable of releasably retaining a safety belt can be provided for the securing portion 222. The guide portions 224 can extend rearwardly from the securing portion by an offset distance and can include a return portion or flanges 205a,

205b extending generally toward the other guide portion of the pair. The flanges 205a, 205b of each of the guide portion 224 are oriented in opposing configurations, wherein each of guide portion 224 can comprise an inner edge spaced from one another by a space 215.

In certain embodiments, the secondary safety belt path adjuster 200 further comprises holes 202a and 202b for receiving fasteners to secure the secondary safety belt path adjuster 200 to a car seat. Correspondingly, holes can be drilled into the rear of the car seat such that screws, rivets, or other fasteners are insertable through holes 202a and 202b into the car seat to secure the secondary safety belt path adjuster 200 to the rear of the car seat.

In certain embodiments, the secondary safety belt path adjuster 200 further comprises flanges 205a and 205b. The flanges 205a, 205b can be used to secure the safety belt. In operation, the safety belt can be inserted through the space 215 between the flanges 205a and 205b by partially folding the safety belt and inserting the belt into the space 215 or inserting the safety belt edge-wise into the space 215, thereby effectively threading the safety belt through a channel 210 and held in place vis-à-vis flanges 205a and 205b, when the safety belt substantially fills the channel 210.

Once the safety belt is threaded through the channel 210, the safety belt adjuster 200 can hold the safety belt if the car seat pitches forward or generally moves due to an impact (e.g., if the car were involved in an accident). In particular, the safety belt rests along a sturdy portion of the back of car seat and can secure the car seat in place. In certain aspects, the safety belt adjuster 200 substantially prevents the safety belt from slipping over the top of the car seat. The general "C" shape of the safety belt adjuster 200 formed by the flanges 205a and 205b) also functions to hold the safety belt if the car seat rebounds after a crash.

In certain embodiments, the secondary safety belt path adjuster 200 can comprise a plurality of materials including stainless steel, aluminum, plastic, titanium, composite materials or any other materials capable of withstanding at least approximately 2,000 pounds/square inch of force. In certain aspects, the secondary safety belt path adjuster 200 can comprise 13 gauge 304 stainless steel that can be cut, punched and/or bent into a shape approximating the shape depicted in FIG. 2.

As depicted in FIG. 3, a safety belt path adjuster assembly 300, according to an embodiment of the present invention, can comprise a secondary safety belt path adjuster 200 affixed to a primary safety belt path adjuster 100 such that the adjuster assembly 300 can be affixed to a car seat such that a safety belt can be attached to the car seat in a manner conforming to either the FMV 213 or the ECE R44 standards when the car seat is being used as a front-facing car seat.

In certain embodiments, the adjuster assembly 300 comprises a combination of the adjuster 100 and the adjuster 200, wherein the adjuster assembly 300 comprises guide portions 324 similar to the guide portions 224 of the adjuster 200. As depicted in FIG. 3, the guide portions 324 extend upwardly from lateral edges of the top portion 312 of the hanging portion 304. The guide portions 324 can further comprise return portions or flanges 305a, 305b in opposing position to one another. The return portions can each include an inner edge separated from the other by a space 315a.

In certain embodiments, the safety belt path adjuster assembly 300 can further comprise holes 302a-302f, one or more of which can be used to secure the safety belt path adjuster assembly 300 to a car seat. In certain aspects, the safety belt path adjuster assembly 300 can comprise more or less holes 302. In operation, a plurality of holes can be drilled into each of the sides of the car seat (e.g., the plastic seat body 12 of the car seat) and screws, rivets, or other fasteners inserted through one or more of holes 302a-302x into the car seat to secure the safety belt path adjuster assembly 300 to the rear of the car seat. In certain aspects, two such safety belt adjusters 300 can be affixed to the car seat in this manner. A first safety belt path adjuster assembly 300 on the left side of the car seat and a second safety belt path adjuster assembly 300 on the right side of the car seat as depicted in FIGS. 10a, 10b and 13a.

As depicted in FIG. 13b, the safety belt path adjuster assembly 300 also includes flanges 305a, 305b, 325a, and 325b. The flange pairs 305a-305b and 325a-325b can be used to secure the safety belt, according to particular embodiments. For example, the safety belt can be inserted through the space 315a between the flanges 305a and 305b by partially folding the safety belt and inserting the belt into the space 315a or inserting the safety belt edge-wise into the space 315a, thereby effectively threading the safety belt through a channel 310a and held in place vis-à-vis flanges 305a and 305b, when the safety belt substantially fills the channel 310a. When a plurality of safety belt adjuster assemblies 300 are secured to the car seat, the safety belt can be threaded through both safety belt adjustors accordingly. Once threaded placed within channel 310a, the safety belt path adjuster would substantially conform with car seat regulations FMV 213, allowing a car seat installed with a safety belt path adjuster assembly 300 to be sold in FMV 213 countries, including the United States.

Alternatively, as depicted in FIG. 13a, the safety belt can be inserted through the space 315b between the flanges 325a and 325b by partially folding the safety belt and inserting the belt into the space 315b or inserting the safety belt edge-wise into the space 315a thereby effectively threading the safety belt through a channel 310b and held in place vis-à-vis flanges 325a and 325b, when the safety belt substantially fills the channel 310b.

When a plurality of safety belt adjuster assemblies 300 are secured to the car seat, the safety belt can be threaded through both safety belt adjustors accordingly. Once threaded placed within channel 310b, the safety belt path adjuster would substantially conform with car seat regulations ECE R44, allowing a car seat installed with a safety belt path adjuster assembly 300 to be sold in ECE R44 countries, including countries in Europe.

Because the safety belt path adjuster assembly 300 can selectively adjust the path of a safety belt either in front of or behind a car seat, car seats installed with a plurality of safety belt path adjusters 300 can be sold in nearly every country in the world because car seats would conform with both FMV 213 and ECE R44 regulations, depending on path the safety belt travels. Because the safety belt path adjustor 300 is affixed to the car seat, the safety belt path adjustor can make use of the strong structure of the existing plastic seat body 12 of the car seat. In addition, the design of the safety belt path adjustor 300 allows the safety belt to slide through easily as the car seat is being installed. Moreover, the safety belt path adjustor 100 has a low profile so that it does not substantially protrude beyond the side of the seat, allowing a car seat with one or more of the safety belt adjustors 300 installed to fit in narrow seats, such as an airplane. In addition, according to particular embodiments, the general "C" shape of a portion of safety belt adjuster assembly 300 (e.g., a "C" shape formed by the flanges 305a and 305b) also functions to hold the safety belt if the car seat rebounds after a crash.

The safety belt path adjuster assembly 300 can be constructed from a plurality of materials including stainless steel, aluminum, plastic, titanium, composite materials or any other materials capable of withstanding at least approximately 3,900 pounds/square inch of force. For example, the primary safety belt path adjuster 100 can be constructed using 7 gauge 304 stainless steel that can be cut, punched and/or bent into a shape approximating the shape depicted in FIG. 3.

FIGS. 4-9 show various views of safety belt path adjusters 100, 200, and 300 attached to a car seat 400, according to particular embodiments. In general, the safety belt path adjusters 100, 200, and 300 can be attached to the car seat 400 using screws, rivets, or other fasteners. In certain embodiments, car seat 400 can comprise any conventional car seat having a rigid car seat frame to which the safety belt path adjusters 100, 200, 300 can be affixed. In other embodiments, the car seat 400 can comprise any conventional wheeled conveyance having a rigid frame to which the safety belt path adjusters 100, 200, 300 can be affixed.

As depicted in FIGS. 14 to 21, convertible car seat and stroller 10 for use with a safety belt path adjuster 100, 200 or safety belt path adjuster assembly 300 comprises a rigid seat body 12, upper handle assembly 13 and front and rear wheel assemblies 14 and 15, respectively. The seat body 12 is formed to provide a seat portion 16, back rest portion 17, side walls 18 and 19 and a lower unitary extension 20. The lower unitary extension 20 is generally bowl-shaped and provided with a front door panel or hatch 21 and a pair of rear door panels 22 which are in the open position as depicted in FIG. 14 when the front and rear leg assemblies 14 and 15 are extended downwardly. In the car seat mode as depicted in FIG. 15, the front and rear leg assemblies are retracted into the interior, downwardly directed cavity formed within the seat body 12 so as to be fully housed and the door panels 21 and 22 are returned to a closed position. In this way, any direct contact between the wheels and vehicle seat is avoided and, as depicted in FIG. 15, the lower extension 20 of the seat body 12 can then rest directly on the vehicle seat. In a conventional manner, a safety belt as designated at S can be extended through slots 24 in the armrest portions 18 and 19 to retain the apparatus in a position in facing relation to the upright portion of the vehicle seat V. Of course, this particular arrangement is given more for the purpose of illustration and not limitation and, for instance, the seat body 12 can be configured such that it can be fastened in a reverse direction to that depicted in FIG. 15.

In certain embodiments, in the wheel support means 25 and wheel release means 26 wherein the wheel support means 25 comprises an elongated fixed support unit made up of a pair of tubular support or track members 28 disposed in closely spaced, parallel relation to one another for downward extension along the cavity side of the back rest portion 17. Each of the tubular supports 28 extends downwardly through collar-like retainers 29 which are either molded as a unitary part of an outer peripheral, thickened flange 30 at the upper edge of the back rest portion 17 or rigidly affixed thereto. The lower ends of the tubular supports 28 are anchored in collar-like retainers 32 which are molded as a unitary part of the lower back portion of the seat body 12. The wheel release means 26 is in the form of a yoke 33 which traverses the greater width of the seat body 12 and has a pair of openings 34 for insertion of the tubular supports 28 such that the yoke member 33 is free to move between the upper and lower retainers 29 and 32. Opposite lateral ends 35 of the yoke are aligned with upper ends of the front and rear wheel assemblies 14 and 15 which are pivotally connected to the ends 35 in a manner to be hereinafter described.

The yoke 33 also includes an intermediate pocket or recessed area 38 to receive a manually releasable clamping member 39 which is of generally channel-shaped

configuration. Opposite ends or legs 40 of the member 39 are urged forwardly away from the intermediate portion 38 by coiled spring members 42, as best seen from FIG. 6, to bear against the back rest portion 17. A pair of ribs 44 can extend along the back portion of the seat body 12 and terminate in opposite ends, for example, as indicated at upper ends 45 in FIG. 4, which are disposed in the path of movement of the clamping legs 40. Thus, the ribs 44 will prevent accidental sliding movement of the yoke between the raised and lowered positions. It is therefore necessary to manually squeeze or retract the clamping member 39 and its legs 40 outwardly a sufficient distance to clear the ribs 44 in order to slide the wheel release assembly 26 between the raised and lowered positions.

The front wheel assembly 14 includes a pair of tubular struts 48 pivotally connected at 49 to opposite ends of the yoke member 33. A fender-like cross brace 50 is fixed to the lower end of each strut 48 and carries a spring-loaded shaft 51 which extends upwardly from a bifurcated arm 52 for each front wheel 54. As such, the wheels 54 are self-centering for ease of retraction into the lower extension. The front wheel struts 48 are interconnected by the cross brace 50 which extend between the lower ends of the struts 48 and across the front end of the apparatus. The wheel assembly 14 is guided in its movement between the raised and lowered positions by a pair of pivot links 58, each link 58 having a fixed end 49 pivotally connected within the seat body 12 to the inside of an armrest portion and a movable end 53 pivotally connected to a lower portion of each respective strut 48 above the fender portion 50. When the wheel release assembly 26 is raised by the manual release member 39 as described, the pivot link 58 will undergo swinging movement in an arc from the downwardly extending vertical position, depicted in full in FIG. 16, to an upwardly inclined position, depicted dotted in FIG. 16, and with the lower wheel 54 moving upwardly into the cavity formed within each armrest portion 18.

The rear wheel assembly 15 is comprised of a pair of tubular struts 60, each being pivotally connected as at 61 to one end of the yoke 33 rearwardly of the pivotal connection 49 of the front struts 48. A rear wheel 62 is journaled directly to the lower end of each strut 60, and a cross brace designated at 64 interconnects the rear wheel struts for increased lateral stability. In order to guide the movement of the rear wheel assembly, a pivot link 66 includes a fixed pivotal end 67 which is pivotally connected to the underside of the seat body 12 adjacent to the lower end of the back rest portion 17 and a movable end 68 which is pivotally attached to an intermediate point on each strut 60. Accordingly, as the release assembly 26 is advanced upwardly to raise the wheel assemblies 14 and 15, the struts 60 will be guided from the extended position as depicted in full in FIG. 16 to an upper retracted position, as depicted

dotted in FIG. 16, by the swinging movement of the pivot link 66 about the fixed pivotal end. In this way, the wheel assembly 62 will move into a position within the lower extension portion 20 of the seat body 12 so that the rear door panels 22 can be raised along with the front door panel 21 into a closed position fully enclosing the wheel assembly within the cavity.

As previously described, the rigid seat body 12 is essentially in the form of a chair having the seat portion 16, backrest portion 17, side walls 18 and 19 and a lower unitary extension 20 which encloses the lower end of the seat body 12. As such, the interior cavity formed within the seat body 12 includes a relatively shallow portion as designated at 70 beneath the seat and relatively deep wells 71 and 72 beneath the armrest portions 18 and 19, respectively. The wells 71 and 72 continue upwardly along the rear area of the seat body 12, and the back rest portion 17 is left open for convenient access to the wheel release means 26 and specifically the clamping member 39. The lower unitary extension 20 includes a flat base panel section 74, an upwardly inclined front panel section 75 for the door panel 21 and an upwardly and rearwardly inclined rear panel 76 in which the rear door panels 22 are mounted. The front panel 21 includes a hinge section as indicated at 77, and a flange 78 extends rearwardly from the hinge or pivot into the path of movement of the front crossbrace 50, as depicted in FIG. 16. The front wheels 54 when extended downwardly and outwardly through the front door panel will bear directly against the panel 21 to force it into the extended position, as depicted in FIG. 16, so as to act as a leg rest or support in that position; however, when the front wheels are raised, crossbrace 50 will move into engagement with the flange 78 to cause the door panel 21 to follow upward movement of the wheels into the closed position. The rear door panel 22 is hinged as at 80 for downward and forward movement in response to extension of the rear wheels 62. Similarly, when the wheels 62 are raised, they will move into engagement with a flange 82 so as to cause the door panel 22 to follow the upward movement of the rear wheels and move into a closed position covering the wheel, as depicted in dotted form in FIG. 16.

The seat body 12 can comprise of various materials and, as illustrated in FIG. 19, is made up of a rigid inner plastic layer 84, an intermediate foam layer 85 and an outer fabric or padded layer 86. In addition to the slots 24 provided for the vehicle safety belt S, a shoulder harness 88 is incorporated into the seat body 12 in a conventional manner with the shoulder straps 88' depicted in FIG. 14 extending forwardly through slots in the back rest portion 17 of the seat body 12.

The handle section 13 includes an upper crossbar or handle grip 90 having a curved configuration corresponding to the curvature of the upper peripheral edge 30 of the back rest portion 17. Stem members 91 extend downwardly from the handle bar 90 through the tubular support portions 28, and spring-loaded buttons 92 are provided to control telescoping movement of the stems 91 through the supports 28 in a well-known manner. In this connection, a series of openings, not depicted, can be provided along the length of the supports 28 for adjustable engagement with the spring-loaded buttons 92 to regulate the height of the handle section 13 above the seat body 12 or chair when in the stroller position. In the car seat mode, the buttons 92 are released to slide the handle stems 91 downwardly until the handlebar 90 moves into engagement with the upper edge 30 of the seat body 12.

As depicted in FIG. 21, a typical form of rear wheel unit 62 and which is comprised of a pair of wheels 62 journaled on a common shaft 95, the shaft extending through the lower end of each strut 60. A spoke 96 is carried on the shaft to cooperate with a braking member 97 which is pivotally mounted as at 98 and a cog 99 on the member 97 is caused to move into inter-engagement with the spokes 96 as illustrated to brake the stroller against movement. In use, and assuming that the unit is in the stroller mode as described, the braking unit can be selectively engaged by pressing down with the foot in order to brake the stroller against movement. Conversely, the braking unit can be disengaged by lifting up on the lower end of the member 97 with the foot until it is released from engagement.

When desired to convert into a car seat, the handle unit 13 is released by depressing the buttons 92 and sliding the legs or stem members 91 downwardly until the handlebar 90 engages the upper end of the seat body 12, as illustrated in FIG. 20. The clamping member 39 is then manually engaged to release the yoke member 33 and permit it to advance from the lowered position depicted in FIG. 17 to that illustrated in FIG. 18. In the course of advancement, the front and rear wheel assemblies 14 and 15 will advance upwardly through the bottom panel into the retracted position illustrated in FIG. 16, and the door panels 21 and 22 will follow the upward movement of the wheels 54 and 62 and move into closed positions forming a smooth uninterrupted continuation of the bottom panel 74. The child can be left in the stroller as it is converted into the car seat mode and then placed on the seat of the vehicle, as illustrated in FIG. 15. The child is then strapped in the car seat in a conventional manner using the safety harness 88 and by passing the safety belt S through the slots 24 in the armrests 18 of the seat body 12. As indicated earlier, the illustrated seat body 12 configuration disclosed is intended for use as a car seat in which the child is buckled in a direction facing the rear of the vehicle to conform to Federal and State safety regulations.

Nevertheless, it will be apparent that by appropriate modification of the seat body 12 it can be so constructed and arranged as to face in a forward direction on the automobile seat. In order to convert the car seat into a stroller, it is necessary merely to follow the reverse procedure to that described for conversion into a car seat.

While the invention is amenable to various modifications and alternative forms, specifics thereof have been depicted by way of example in the drawings and described in detail. It is understood, however, that the intention is not to limit the invention to the particular embodiments described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

CLAIMS

1. A safety belt path adjuster assembly affixable to one of a pair of rigid sidewalls of a car seat having a front side and a back rest portion in which the sidewalls extend generally perpendicularly forward from the front side to define a recessed seating portion, comprising:

a first safety belt path adjuster comprising a first pair of flanges spaced apart to define a first channel positioned above and generally perpendicular to the sidewalls;

a second safety belt path adjuster affixed to the first safety belt path adjuster and comprising a brace portion and a second pair of flanges in which a first flange of the second pair of flanges is positioned proximate to the sidewall proximate the first safety belt path adjuster and a second flange of the second pair of flanges is affixed to the brace portion, wherein the brace portion comprises an offset portion positioning the brace portion and the opposite flange at a predetermined offset distance from the sidewall to define a second channel between the first and second flanges of the second pair of flanges, wherein the second flange is extends from the offset portion to define a third channel between the second channel and the second flange.

2. The safety belt path adjuster assembly of claim 1, wherein a safety belt affixable to a vehicle seat at both ends can be threaded through the first channel such that the safety belt can be secured along the sidewall and across the front side of the car seat to retain the car seat against the vehicle seat.

3. The safety belt path adjuster assembly of claim 2, wherein the brace portion is positioned to receive the safety belt threaded through the first channel into the second channel, wherein the second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall.

4. The safety belt path adjuster assembly of claim 1, wherein a safety belt affixed to a vehicle seat at both ends can be threaded through the second channel and the third channel such that the safety belt is folded over the brace portion to retain the car seat against the vehicle seat, wherein the second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall.

5. The safety belt path adjuster assembly of claim 1, wherein the second safety belt path adjuster further comprises a hanging portion having an arched shape for nestably receiving an edge of the sidewall, wherein the first safety belt path adjuster is affixed to the hanging portion.

6. The safety belt path adjuster assembly of claim 5, wherein the hanging portion further comprises at least one hole for receiving a fastener to secure the safety belt path adjuster assembly to the sidewall.

7. The safety belt path adjuster assembly of claim 5, wherein the first safety belt path adjuster is affixed to the hanging portion at the apex of the arched shape.

8. The safety belt path adjuster assembly of claim 5, wherein the second safety belt path adjuster further comprises a plate extending from the hanging portion to the offset portion of the brace portion, wherein the plant engages the corresponding sidewall to align the first and second channels.

9. A car seat securable to a vehicle seat, comprising:

a rigid car seat body comprising a pair of sidewalls, a front side and a back rest portion in which the sidewalls extend generally perpendicularly forward from the front side to define a recessed seating portion; and

a pair of safety belt path adjuster assemblies each positioned on one of the sidewalls, further comprising:

a first safety belt path adjuster comprising a first pair of flanges spaced apart to define a first channel positioned above and generally perpendicular to the sidewalls;

a second safety belt path adjuster affixed to the first safety belt path adjuster and comprising a brace portion and a second pair of flanges in which a first flange of the second pair of flanges is positioned proximate to the sidewall proximate the first safety belt path adjuster and a second flange of the second pair of flanges is affixed to the brace portion, wherein the brace portion comprises an offset portion positioning the brace portion and the opposite flange at a predetermined offset distance from the sidewall to define a second channel between the first and second flanges of the second

pair of flanges, wherein the second flange is extends from the offset portion to define a third channel between the second channel and the second flange.

10. The car seat of claim 9, wherein a safety belt affixable to the vehicle seat at both ends can be threaded through the first channel of each safety belt path adjuster such that the safety belt can be secured along the sidewall and across the front side of the car seat body to retain the car seat body against the vehicle seat.

11. The car seat of claim 10, wherein the brace portion is positioned to receive the safety belt threaded through the first channel into the second channel, wherein the second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall.

12. The car seat of claim 9, wherein a safety belt affixed to a vehicle seat at both ends can be threaded through the second channels and the third channels of each belt path adjuster assembly such that the safety belt is folded over each brace portion to retain the car seat against the vehicle seat, wherein the second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall.

13. The car seat of claim 12, further comprising a third safety belt path adjuster affixed to a rear face of the back rest portion and further comprising a third pair of flanges defining a fourth channel for receiving the safety belt and guiding the safety belt along the rear face of the car seat body.

14. The car seat of claim 9, wherein each second safety belt path adjuster further comprises a hanging portion having an arched shape for nestably receiving an edge of the sidewall, wherein the first safety belt path adjuster is affixed to the hanging portion.

15. The car seat of claim 14, wherein the hanging portion further comprises at least one hole for receiving a fastener to secure the safety belt path adjuster assembly to the sidewall.

16. The car seat of claim 14, wherein the first safety belt path adjuster is affixed to the hanging portion at the apex of the arched shape.

17. The car seat of claim 14, wherein the second safety belt path adjuster further comprises a plate extending from the hanging portion to the offset portion of the brace portion, wherein the plant engages the corresponding sidewall to align the first and second channels.

18. A wheeled conveyance securable to a vehicle seat, comprising:

a rigid seat body comprising a pair of sidewalls, a front side and a back rest portion in which the sidewalls extend generally perpendicularly forward from the front side to define a recessed seating portion;

a wheel assembly positionable beneath the rigid seat body; and

a pair of safety belt path adjuster assemblies each positioned on one of the sidewalls, further comprising:

a first safety belt path adjuster comprising a first pair of flanges spaced apart to define a first channel positioned above and generally perpendicular to the sidewalls;

a second safety belt path adjuster affixed to the first safety belt path adjuster and comprising a brace portion and a second pair of flanges in which a first flange of the second pair of flanges is positioned proximate to the sidewall proximate the first safety belt path adjuster and a second flange of the second pair of flanges is affixed to the brace portion, wherein the brace portion comprises an offset portion positioning the brace portion and the opposite flange at a predetermined offset distance from the sidewall to define a second channel between the first and second flanges of the second pair of flanges, wherein the second flange is extends from the offset portion to define a third channel between the second channel and the second flange.

19. The wheeled conveyance of claim 18, wherein a safety belt affixable to the vehicle seat at both ends can be threaded through the first channel of each safety belt path adjuster such that the safety belt can be secured along the sidewall and across the front side of the seat body to retain the seat body against the vehicle seat.

20. The wheeled conveyance of claim 19, wherein the brace portion is positioned to receive the safety belt threaded through the first channel into the second channel, wherein the

second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall.

21. The wheeled conveyance of claim 18, wherein a safety belt affixed to a vehicle seat at both ends can be threaded through the second channels and the third channels of each belt path adjuster assembly such that the safety belt is folded over each brace portion to retain the car seat against the vehicle seat, wherein the second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall.

22. The wheeled conveyance of claim 21, further comprising a third safety belt path adjuster affixed to a rear face of the back rest portion and further comprising a third pair of flanges defining a fourth channel for receiving the safety belt and guiding the safety belt along the rear face of the seat body.

23. The wheeled conveyance of claim 18, wherein each second safety belt path adjuster further comprises a hanging portion having an arched shape for nestably receiving an edge of the sidewall, wherein the first safety belt path adjuster is affixed to the hanging portion.

24. The wheeled conveyance of claim 23, wherein the hanging portion further comprises at least one hole for receiving a fastener to secure the safety belt path adjuster assembly to the sidewall.

25. The wheeled conveyance of claim 23, wherein the first safety belt path adjuster is affixed to the hanging portion at the apex of the arched shape.

26. The wheeled conveyance of claim 23, wherein the second safety belt path adjuster further comprises a plate extending from the hanging portion to the offset portion of the brace portion, wherein the plant engages the corresponding sidewall to align the first and second channels.

27. A convertible car seat and stroller, comprising:

a rigid seat body comprising a pair of sidewalls, a front side and a back rest portion in which the sidewalls extend generally perpendicularly forward from the front side to define a recessed seating portion, wherein the rigid seat body defines a downwardly directed cavity;

a wheel assembly including an elongated wheel support member in said cavity and extending substantially parallel to the back rest portion, pairs of front and rear legs extending downwardly from the elongated wheel support member and at least one of said pairs of front and rear legs being pivotal with respect to the elongated wheel support member, pairs of front and rear wheels journaled to lower ends of said pairs of front and rear legs, respectively, and release means connected between said pairs of front and rear legs and said wheel support member for advancing said pairs of front and rear legs and associated wheels between a lowered, downwardly divergent stroller position extending beneath the rigid seat body and an upper retracted position within said cavity;

a pair of safety belt path adjuster assemblies each positioned on one of the sidewalls, further comprising:

a first safety belt path adjuster comprising a first pair of flanges spaced apart to define a first channel positioned above and generally perpendicular to the sidewalls;

a second safety belt path adjuster affixed to the first safety belt path adjuster and comprising a brace portion and a second pair of flanges in which a first flange of the second pair of flanges is positioned proximate to the sidewall proximate the first safety belt path adjuster and a second flange of the second pair of flanges is affixed to the brace portion, wherein the brace portion comprises an offset portion positioning the brace portion and the opposite flange at a predetermined offset distance from the sidewall to define a second channel between the first and second flanges of the second pair of flanges, wherein the second flange is extends from the offset portion to define a third channel between the second channel and the second flange.

28. The convertible car seat and stroller of claim 27, wherein a safety belt affixable to the vehicle seat at both ends can be threaded through the first channel of each safety belt path adjuster such that the safety belt can be secured along the sidewall and across the front side of the seat body to retain the seat body against the vehicle seat.

29. The convertible car seat and stroller of claim 28, wherein the brace portion is positioned to receive the safety belt threaded through the first channel into the second channel, wherein the second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall.

30. The convertible car seat and stroller of claim 27, wherein a safety belt affixed to a vehicle seat at both ends can be threaded through the second channels and the third channels of each belt path adjuster assembly such that the safety belt is folded over each brace portion to retain the car seat against the vehicle seat, wherein the second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall.

31. The convertible car seat and stroller of claim 30, further comprising a third safety belt path adjuster affixed to a rear face of the back rest portion and further comprising a third pair of flanges defining a fourth channel for receiving the safety belt and guiding the safety belt along the rear face of the seat body.

32. The convertible car seat and stroller of claim 27, wherein each second safety belt path adjuster further comprises a hanging portion having an arched shape for nestably receiving an edge of the sidewall, wherein the first safety belt path adjuster is affixed to the hanging portion.

33. The convertible car seat and stroller of claim 32, wherein the hanging portion further comprises at least one hole for receiving a fastener to secure the safety belt path adjuster assembly to the sidewall.

34. The convertible car seat and stroller of claim 32, wherein the first safety belt path adjuster is affixed to the hanging portion at the apex of the arched shape.

35. The convertible car seat and stroller of claim 32, wherein the second safety belt path adjuster further comprises a plate extending from the hanging portion to the offset portion of the brace portion, wherein the plant engages the corresponding sidewall to align the first and second channels.

36. A method of securing car seat having a rigid car seat body comprising a pair of sidewalls, a front side and a back rest portion in which the sidewalls extend generally perpendicularly forward from the front side to define a recessed seating portion to a vehicle seat, comprising:

affixing a first safety belt path adjuster assembly to one of the sidewalls and a second safety belt path adjuster assembly to the opposing sidewall, each safety belt path adjuster assembly further comprising:

a first safety belt path adjuster comprising a first pair of flanges spaced apart to define a first channel positioned above and generally perpendicular to the sidewalls,

a second safety belt path adjuster affixed to the first safety belt path adjuster and comprising a brace portion and a second pair of flanges in which a first flange of the second pair of flanges is positioned proximate to the sidewall proximate the first safety belt path adjuster and a second flange of the second pair of flanges is affixed to the brace portion, wherein the brace portion comprises an offset portion positioning the brace portion and the opposite flange at a predetermined offset distance from the sidewall to define a second channel between the first and second flanges of the second pair of flanges, wherein the second flange is extends from the offset portion to define a third channel between the second channel and the second flange;

affixing one end of a safety belt to the vehicle seat;

threading the opposing end of the safety belt through the first channel such that the safety belt can be secured along the sidewall and across the front side of the car seat to retain the car seat against the vehicle seat;

removing the opposing end of the safety belt from the first channel;

threading the safety belt through the second channel and the third channel such that the safety belt is folded over the brace portion to retain the car seat against the vehicle seat, wherein the second channel is positioned along an outer face of the corresponding sidewall to guide the safety belt along the outer face of the corresponding sidewall; and

affixing the opposing end of the safety belt to the vehicle seat.

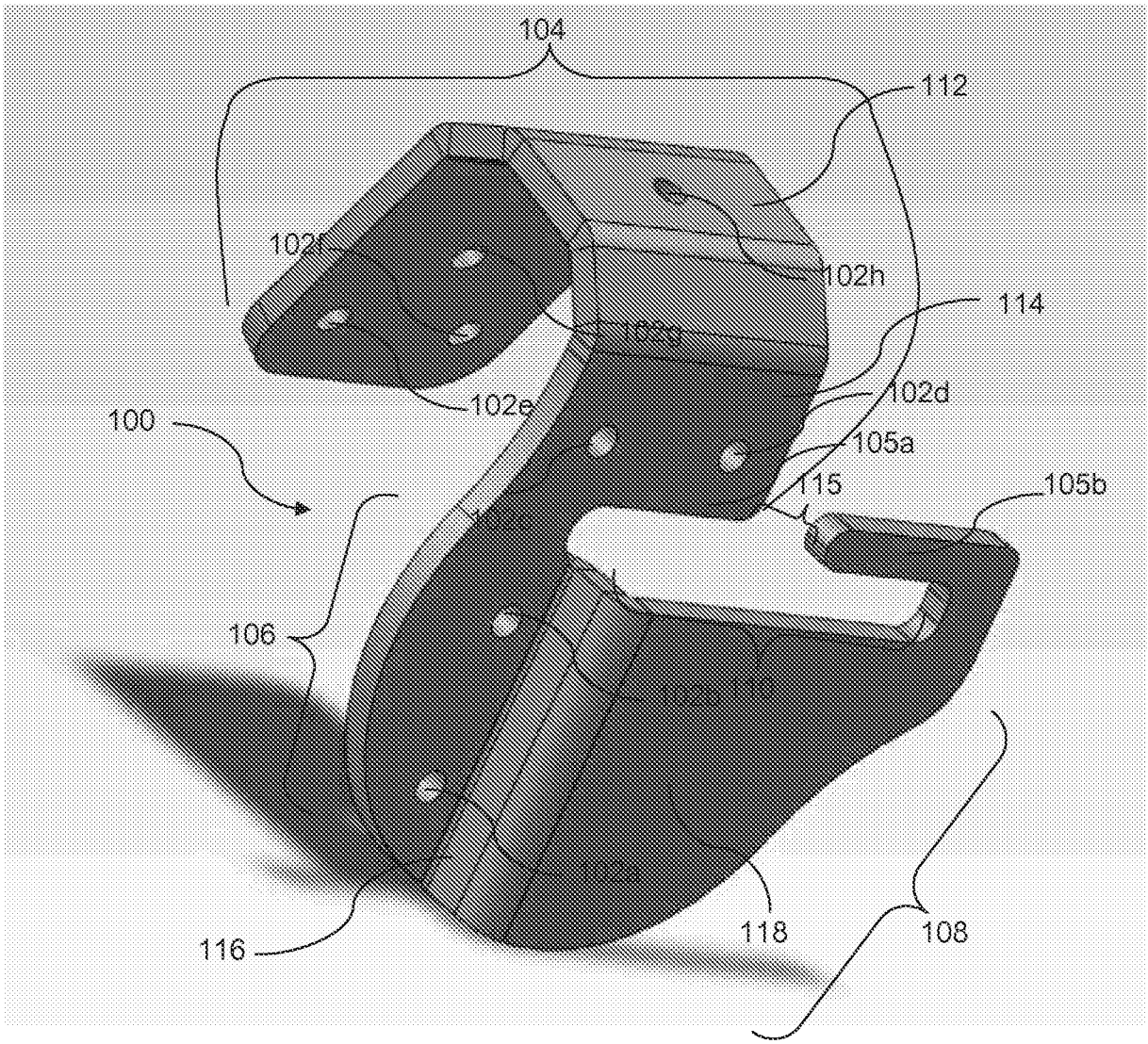
104
112
102f
102h
114
102g
102e
102d
100
105a
115
105b
106
116
118
108

FIG. 1

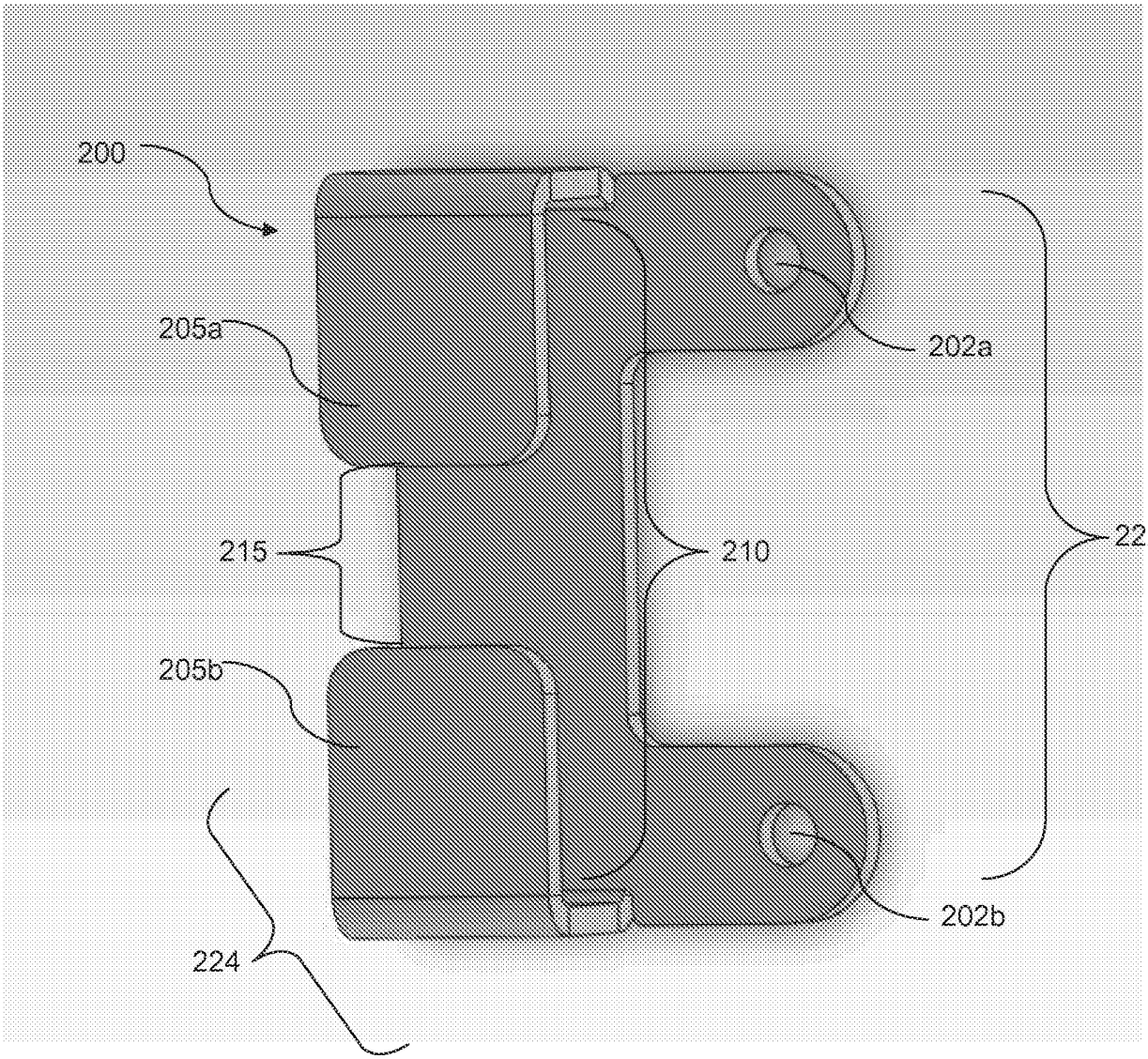

FIG. 2

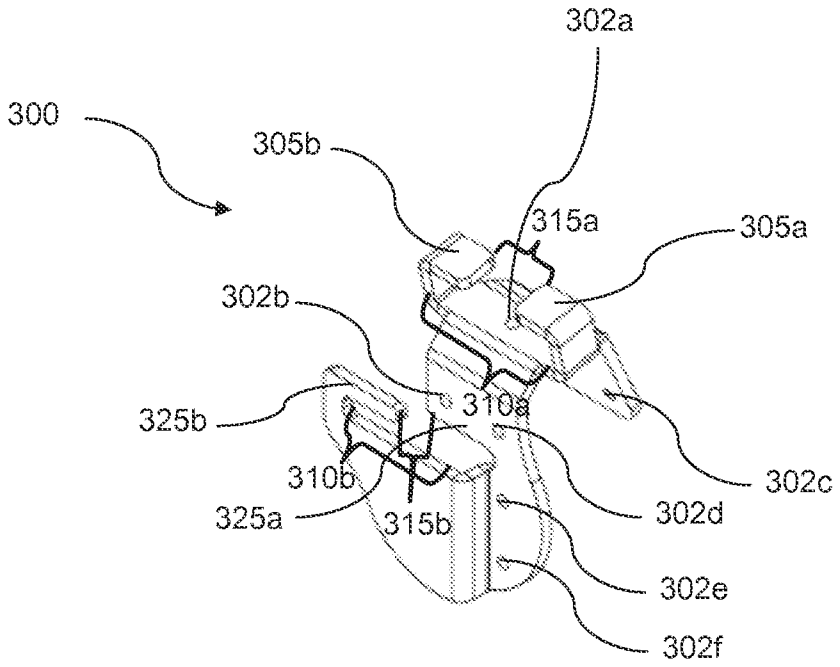
302a
300
305b
315a
305a
302b
325b
310a
310b
302c
325a
315b
302d
302e
302f

FIG. 3

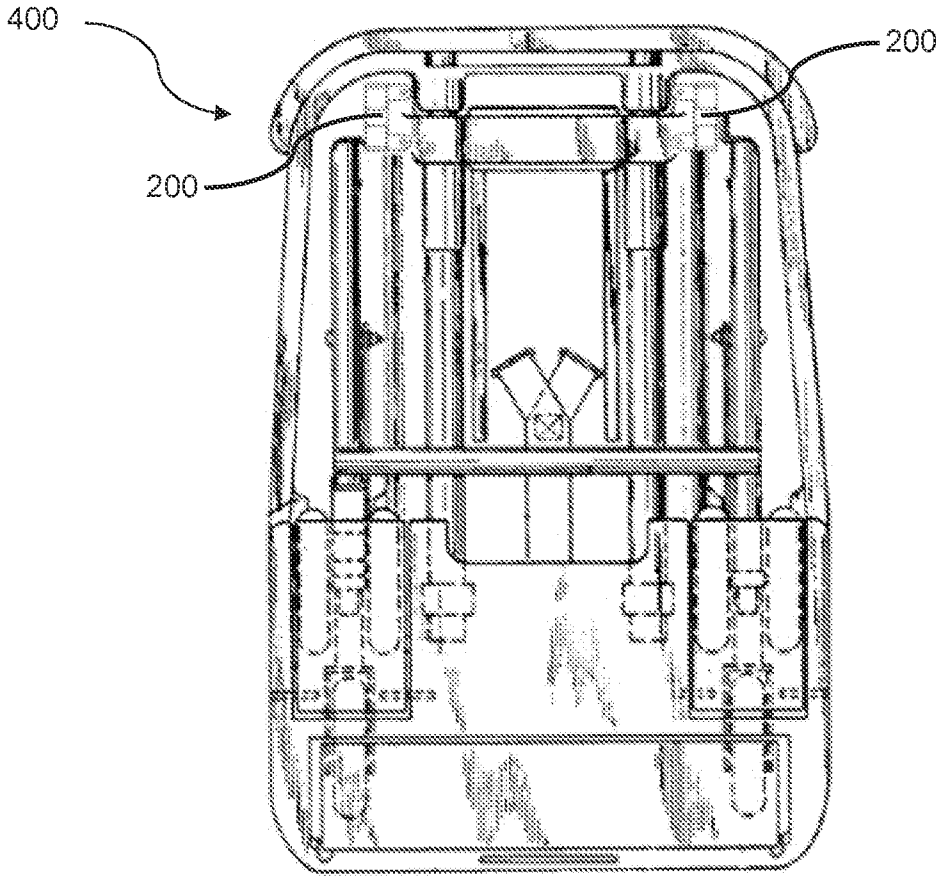

FIG. 4

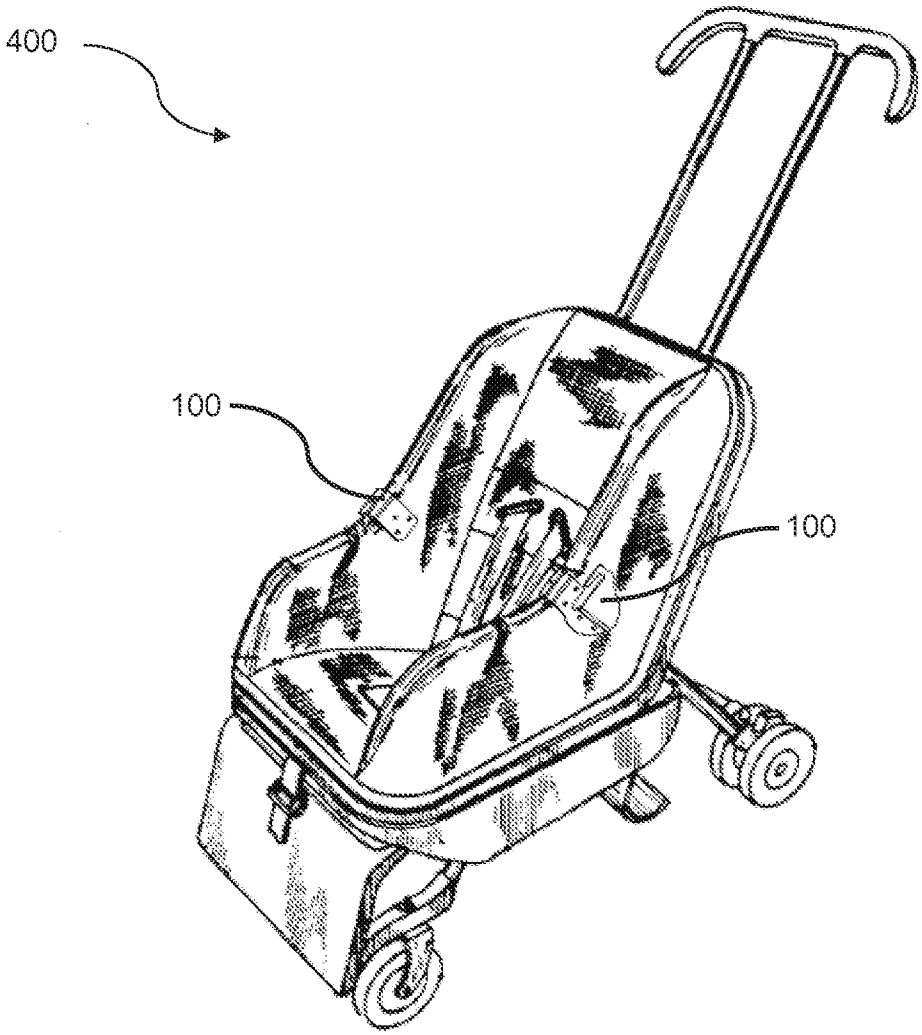

FIG. 5

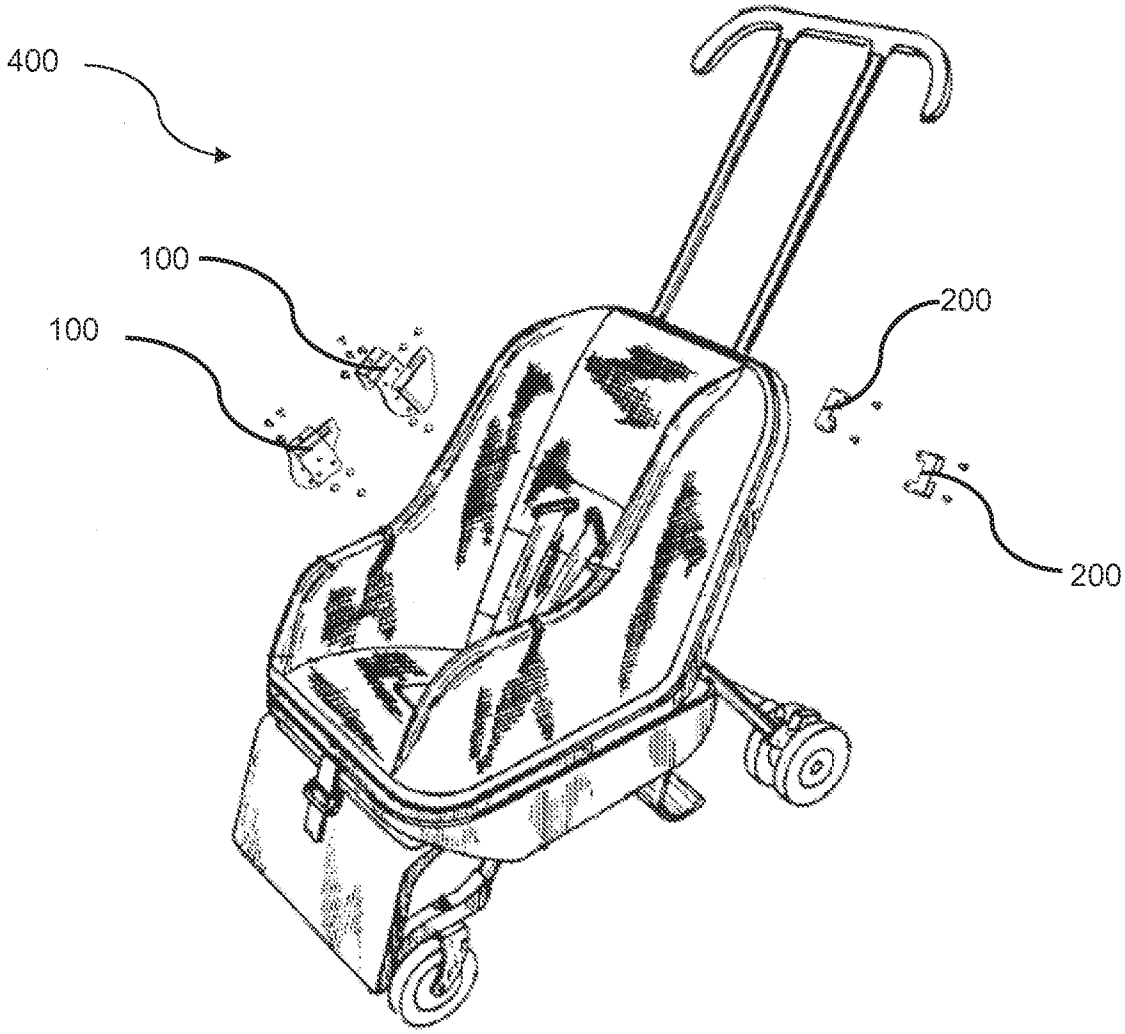

FIG. 6

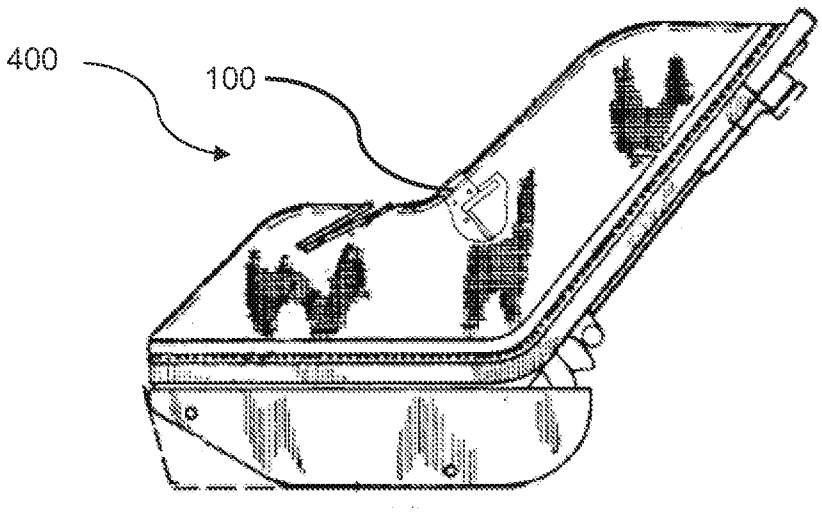

FIG. 7

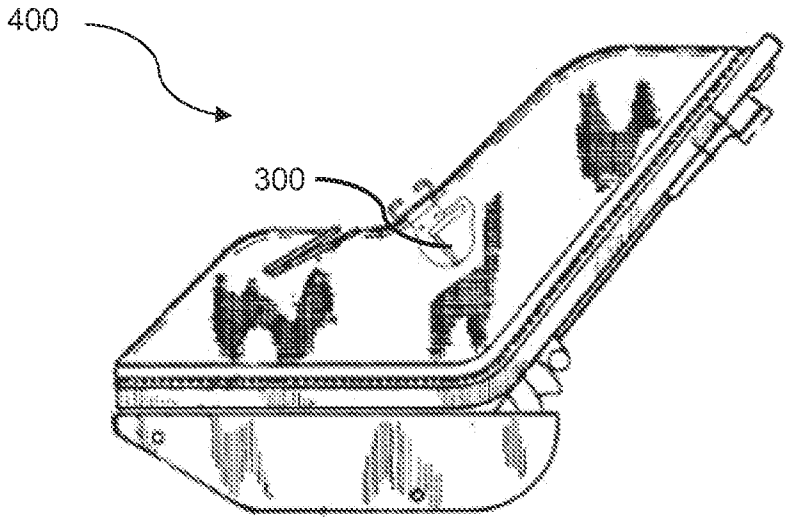

FIG. 8

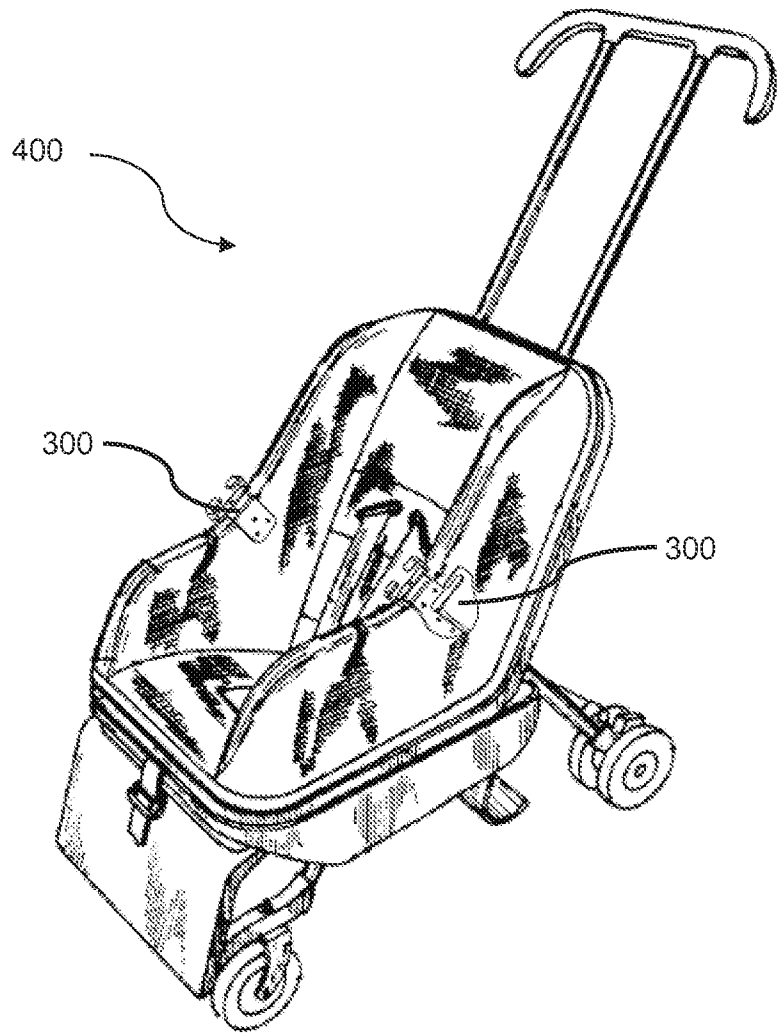

FIG. 9

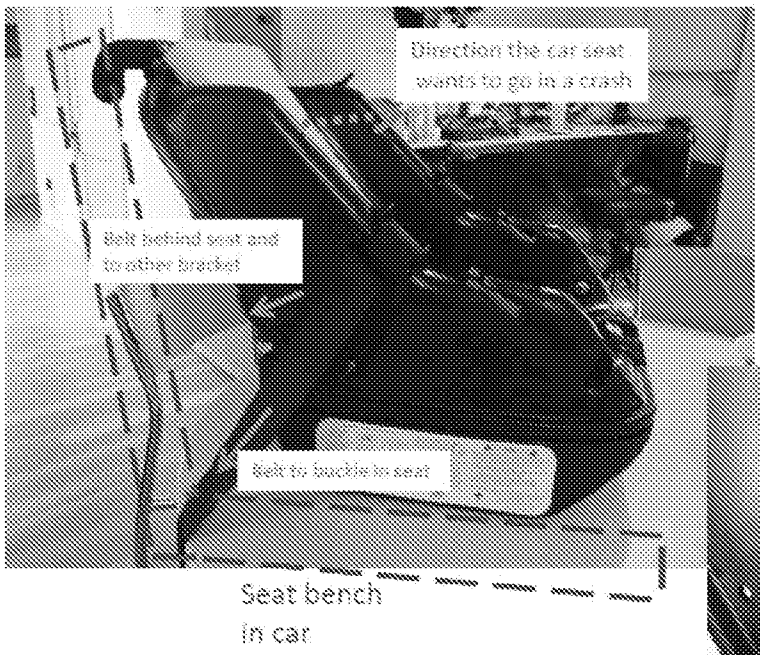

FIG. 10a

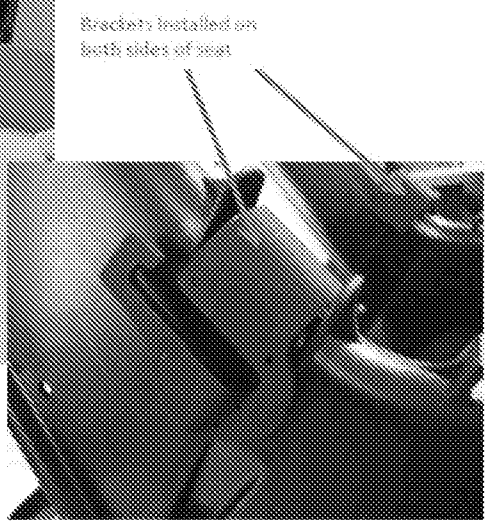

FIG. 10b

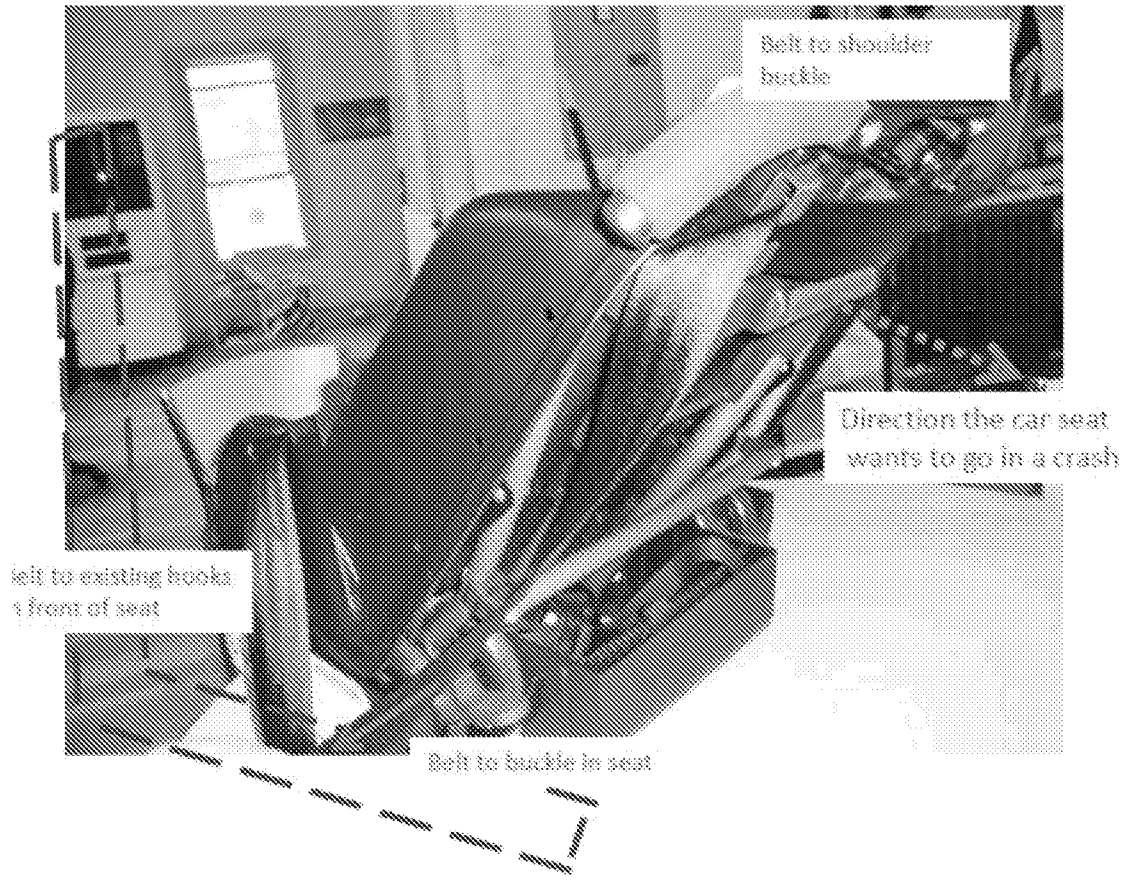
Belt to shoulder buckle
Direction the car seat wants to go in a crash
lelt to existing hooks
s from of seat
Belt to buckle in seat

FIG. 11

FIG. 12b

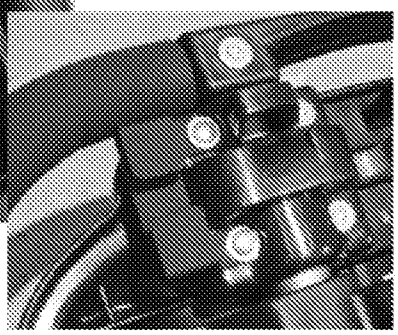

FIG. 12a

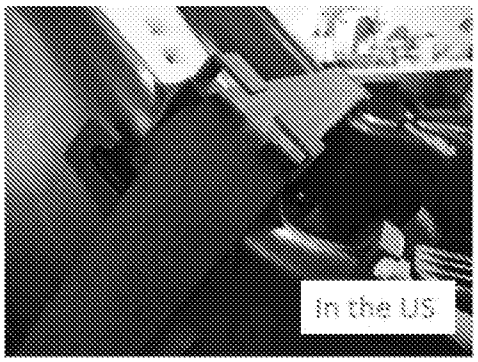

FIG. 13b

FIG. 13a

FIG. 13c

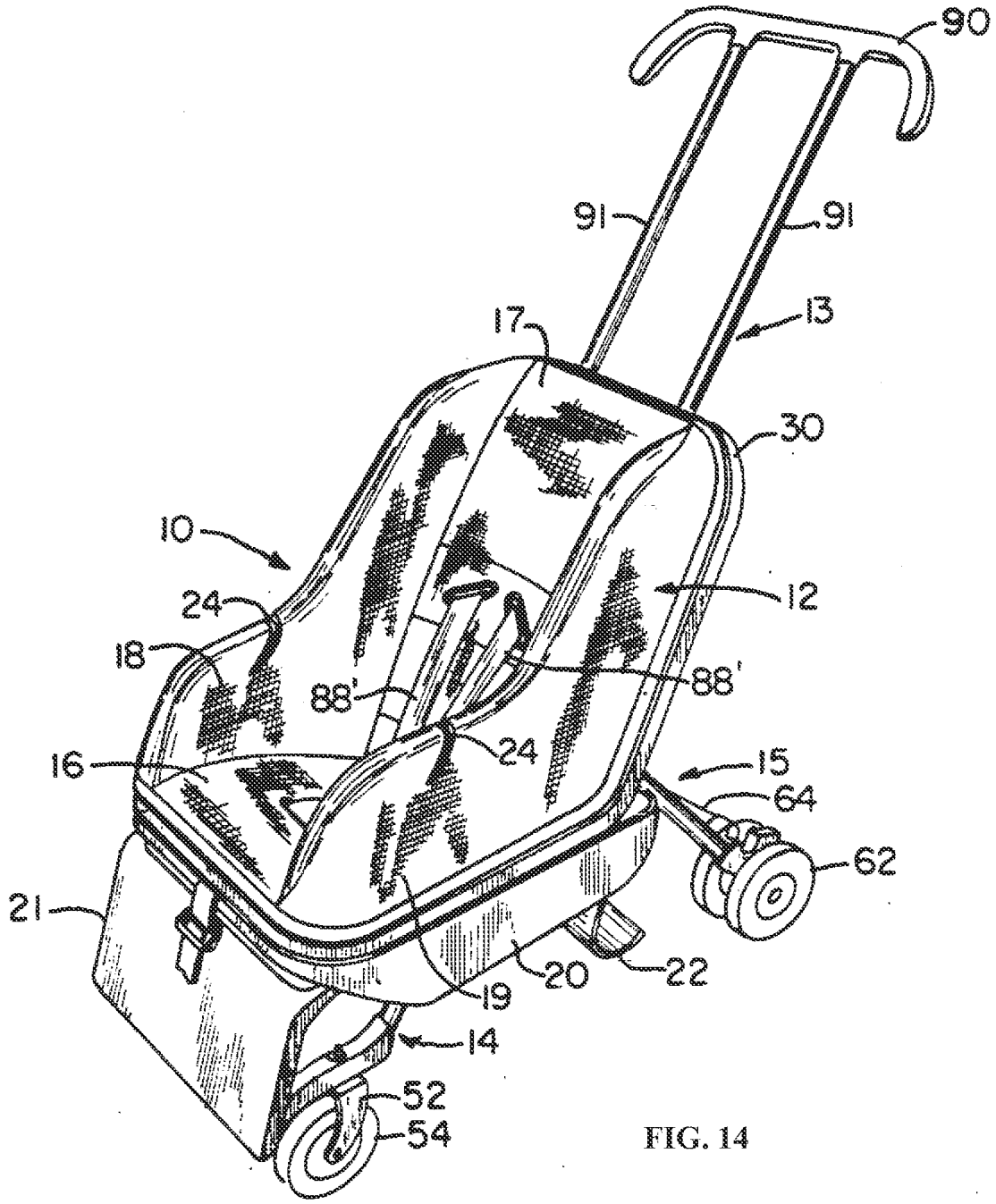

FIG. 14

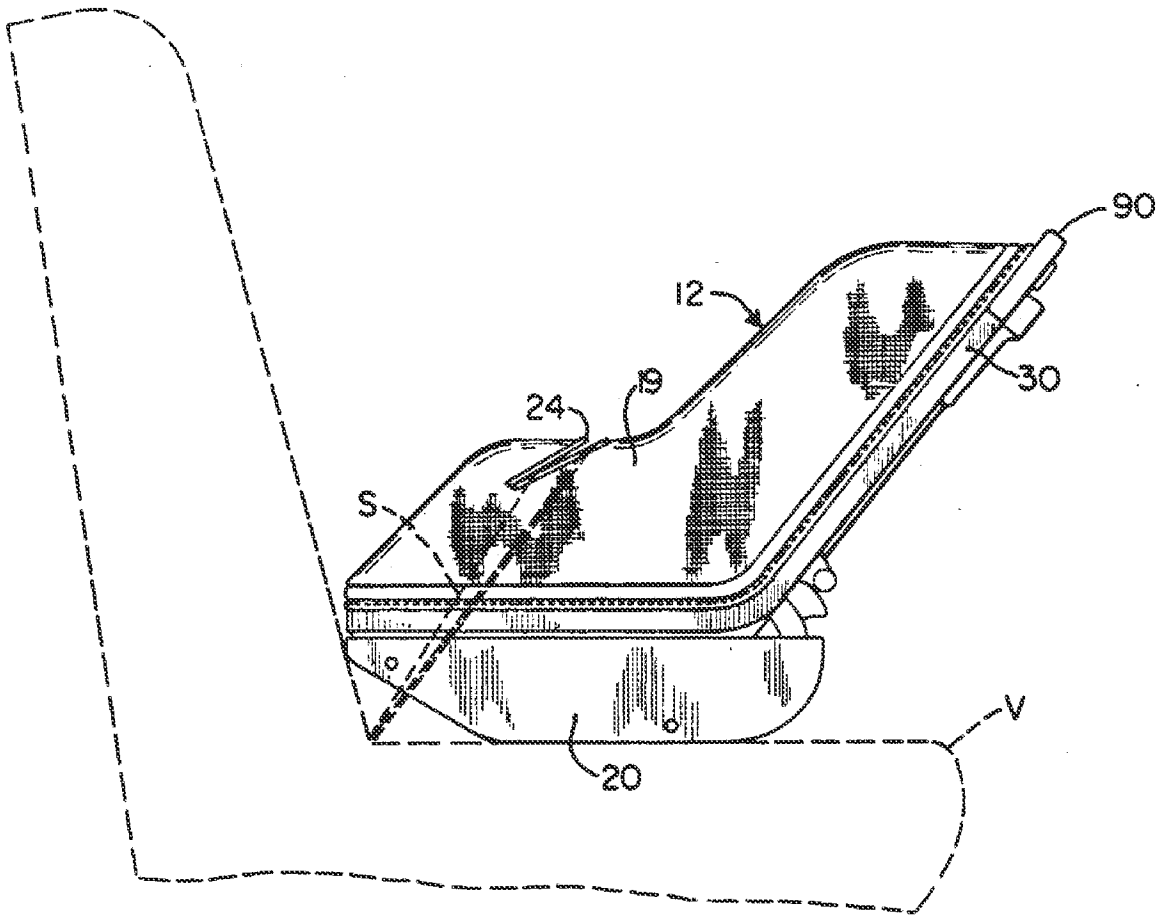

FIG. 15

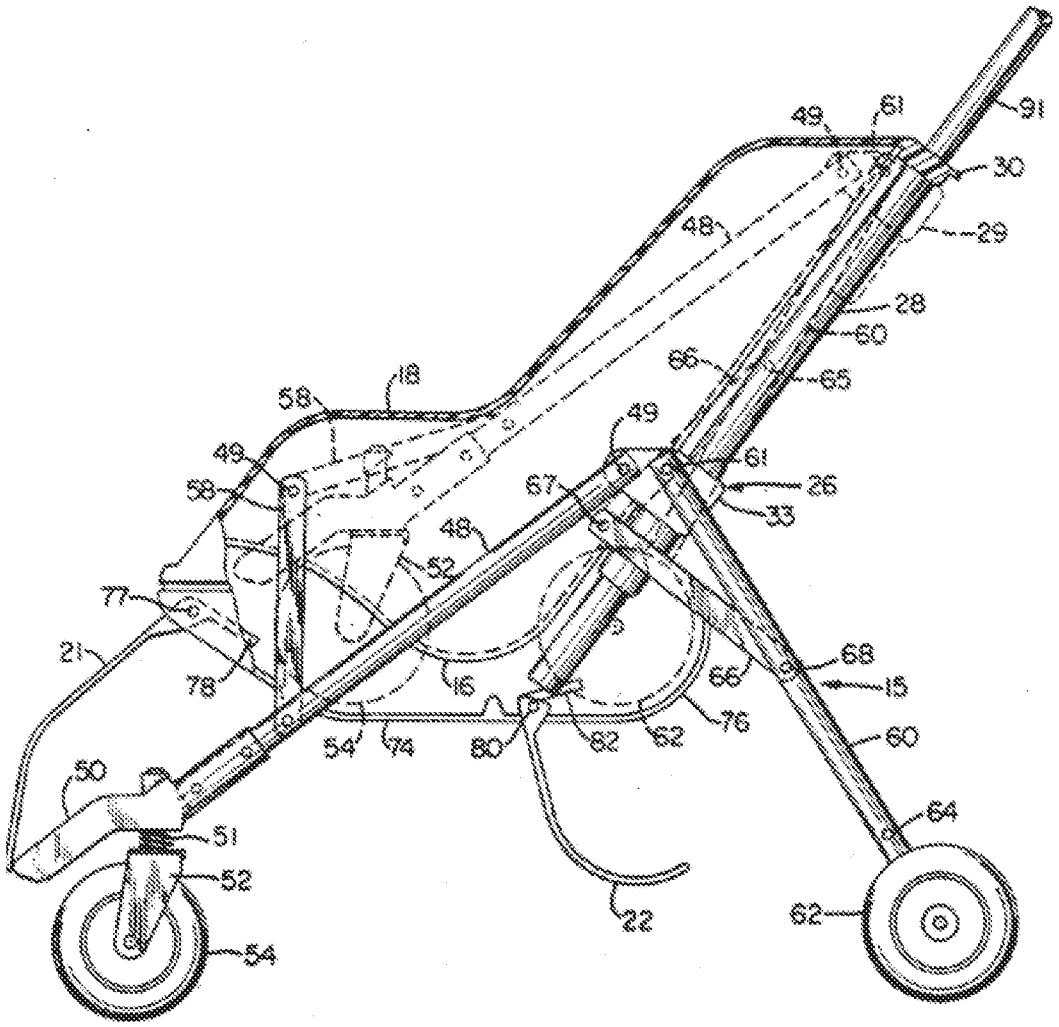
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FIG. 16

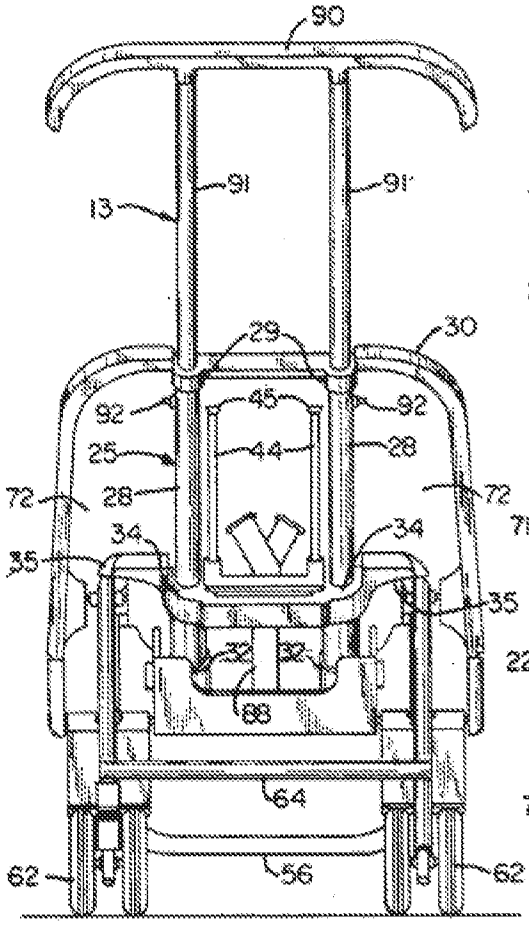

FIG. 17

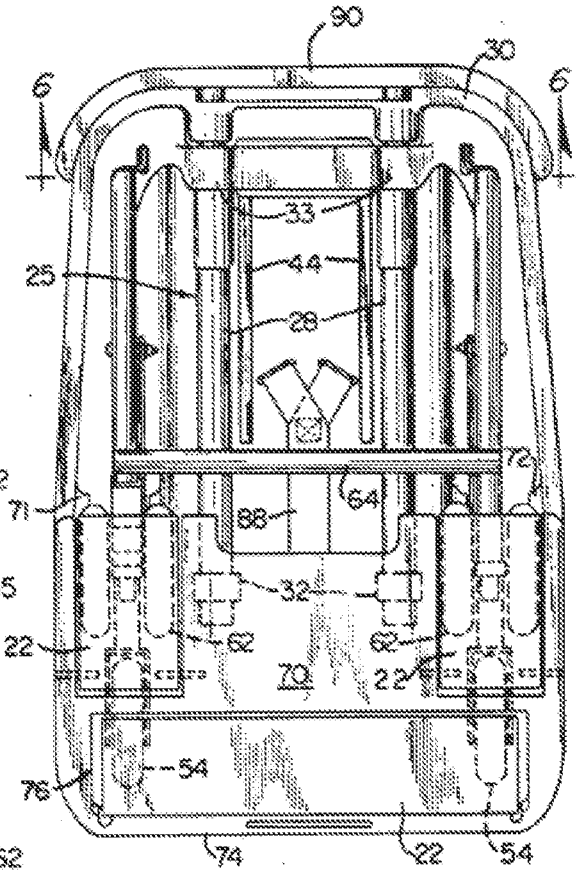

FIG. 18

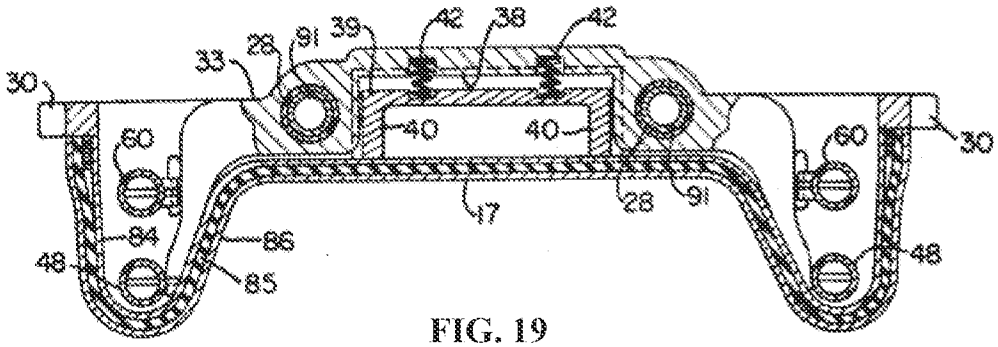

FIG. 19

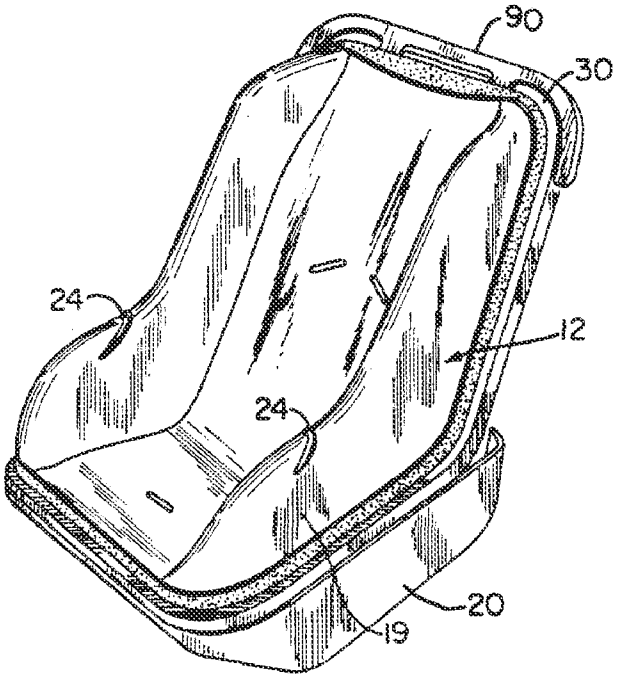

FIG. 20

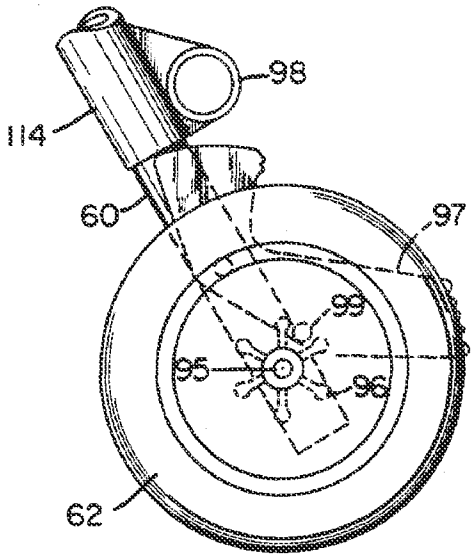

FIG.21

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 2013/026432

A. CLASSIFICATION OF SUBJECT MATTER
B60R 22/10 *(2006.01)*
B60N 2/26 *(2006.01)*

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B60N 2/00, 2/26, 2/28, B60R 22/00, 22/02, 22/04, 22/10, 22/12, 22/18, 22/26

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

RUPAT, Esp@cenet, USPTO DB, PAJ, EAPATIS, KIPRIS, K-PION

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 102004048997 A1 (TAKATA-PETRI AG) 06.04.2006, abstract, fig. 1-5, paragraphs [0027]-[0034]	1-36
A	US 5104134 A (RAINBOW ROLLER VENTURE) 14.04.1992, abstract, col. 3, line 20- col. 4, line 21, fig. 1-9	1-36
A	DE 102008009070 A1 (AUTOLIV DEVELOPMENT AB) 03.09.2009, abstract, paragraphs [0016]-[0019], fig. 1-8	1-36
A	WO 2003/008226 A2 (HTS HANS TORGERSEN & SONN AS et al.) 30.01.2003, abstract, claims, fig. 1-3	1-36
A	JP 2001047902 A (KANO YOSHIYUKI) 20.02.2001, abstract, fig. 1-14	1-36

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 April 2013 (24.04.2013)	27 June 2013 (27.06.2013)
Name and mailing address of the ISA/ FIPS Russia, 123995, Moscow, G-59, GSP-5, Berezhkovskaya nab., 30-1 Facsimile No. +7 (499) 243-33-37	Authorized officer N. Bedretdinov Telephone No. 8(495)531-64-81

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