CLAIMS

1. An infant car seat system for installation on a vehicle seat, comprising:

an infant car seat (102) having a seat shell including a seat back, a seat pan, a first seat shell rail and a second seat shell rail

wherein the second seat shell rail is spaced from the first seat shell rail to define a space therebetween, the first seat shell rail and the second seat shell rail extending from the seat shell in a direction away from the seat pan , wherein the first seat shell rail and the second seat shell rail directly support the infant car seat on the vehicle seat without using an infant car seat detachable base arranged between the first and second seat shell rails and the vehicle seat, and wherein the seat shell, the first seat shell rail, and the second seat shell rail form a unitary and non-separable structure, positions of the first seat shell rail and second seat shell rail being fixed relative to a remainder of the seat shell; and

an anchor system (104) coupled to the seat shell and configured to attach the infant car seat directly to the vehicle seat without using an infant car seat detachable base (20), the anchor system comprising:

a first infant car seat anchor (104A) coupled to the first seat shell rail of the seat shell outside of the space, to mechanically engage with a first vehicle anchor of the vehicle seat; and

a second infant car seat anchor (104B) coupled to the second seat shell rail of the seat shell outside of the space, to mechanically engage with a second vehicle anchor of the vehicle seat.

2. The infant car seat system of claim 1, wherein the anchor system further comprises:

a rigid cross-member (104D) passing through the first seat shell rail and the second seat shell rail, wherein:

the first infant car seat anchor is attached to the rigid cross-member and rotatable about a rotation axis defined by the rigid cross-member; and

the second infant car seat anchor is attached to the rigid cross-member and rotatable about the rotation axis defined by the rigid cross-member.

3. The infant car seat system of claim 1, wherein at least one of the first infant car seat anchor and the second infant car seat anchor is a rotatable and/or telescoping seat anchor to allow adjustability for fitting the infant car seat system to different vehicle seat shapes.

4. The infant car seat system of claim 1, wherein the infant car seat further comprises:

at least one storage area (160) to facilitate storage of at least one of the first infant car seat anchor and the second infant car seat anchor, via at least one of rotation and/or translation of the at least one of the first infant car seat anchor and the second infant car seat anchor, when the anchor system is not in use to attach the infant car seat to the vehicle seat.

5. The infant car seat system of claim 4, wherein:

the at least one storage area includes a first storage area to store the first infant car seat anchor and a second storage area to store the second infant car seat anchor;

the first storage area is positioned on a first outer side of the first seat shell rail; and

the second storage area is positioned on a second outer side of the second seat shell rail.

6. The infant car seat system of claim 4, wherein:

the at least one storage area includes a first storage area to store the first infant car seat anchor and a second storage area to store the second infant car seat anchor;

the first storage area is positioned on a first front edge of the first seat shell rail; and

the second storage area is positioned on a second front edge of the second seat shell rail.

7. The infant car seat system of claim 4, wherein:

the at least one storage area includes a first storage area to store the first infant car seat anchor and a second storage area to store the second infant car seat anchor;

the first storage area is positioned inside the first seat shell rail; and

the second storage area is positioned inside the second seat shell rail.

8. The infant car seat system of claim 1, wherein the infant car seat further comprises:

at least one actuator (180), coupled to the infant car seat and the anchor system, to release both of the first infant car seat anchor from mechanical engagement with the first vehicle anchor and the second infant car seat anchor from mechanical engagement with the second vehicle anchor via a single actuation of the at least one actuator.

9. The infant car seat system of claim 8, wherein the at least one actuator includes at least one actuator handle (182).

10. The infant car seat system of claim 9, wherein the at least one actuator handle is positioned on the backside of the infant car seat.

11. The infant car seat system of claim 9, wherein:

the infant car seat includes a carrying handle; and

the at least one actuator handle is positioned on the carrying handle of the infant car seat.

12. The infant car seat system of claim 1, wherein:

the vehicle seat includes a pair of LATCH system lower anchors;

the first infant car seat anchor includes a first infant car seat LATCH system connector;

the first vehicle anchor is a first vehicle LATCH system anchor of the pair of LATCH system lower anchors of the vehicle seat;

the second infant car seat anchor includes a second infant car seat LATCH system connector; and

the second vehicle anchor is a second vehicle LATCH system anchor of the pair of LATCH system lower anchors of the vehicle seat.

13. The infant car seat system of claim 1, wherein:

the vehicle seat includes a pair of ISOFIX system lower anchors;

the first infant car seat anchor includes a first infant car seat ISOFIX system connector;

the first vehicle anchor is a first vehicle ISOFIX system anchor of the pair of ISOFIX system lower anchors of the vehicle seat;

the second infant car seat anchor includes a second infant car seat ISOFIX system connector; and

the second vehicle anchor is a second vehicle ISOFIX system anchor of the pair of ISOFIX system lower anchors of the vehicle seat.

14. The infant car seat system of claim 1, further comprising an adjustment foot (170) disposed proximate to the front of the infant car seat between the first seat shell rail and the second seat shell rail.

15. The infant car seat system of claim 14, wherein the adjustment foot includes at least one adjustable mechanism to provide adjustable leverage against at least one of the seat back or a seat pan (58) of the vehicle seat to facilitate the tight fit to the vehicle seat. Adjustment foot may be telescoping and/or rotatable

16. The infant car seat system of claim 15, wherein at least one adjustable mechanism includes at least one of an adjustable telescoping mechanism or an adjustable rotating mechanism to provide the adjustable leverage.

17. The infant car seat system of claim 15, wherein:

the infant car seat has a center of gravity (330A) and further comprises:

a carrying handle (112);

a first carrying handle attachment mechanism (114A) to attach the carrying handle to a first side of the infant car seat; and

a second carrying handle attachment mechanism (114B) to attach the carrying handle to a second side of the infant car seat;

the first infant car seat anchor (104A) is coupled to the infant car seat at a first constraining point (322A); and

the second infant car seat anchor (104B) is coupled to the infant car seat at one of the first constraining point or a second constraining point (322B) different from the first constraining point, to mechanically engage with a second vehicle anchor (52B) of the vehicle seat.

18. The infant car seat system of claim 17, wherein:

the first infant car seat anchor is mechanically constrained by a first portion of the first seat shell rail proximate to the front of the infant car seat; and

the second infant car seat anchor is mechanically constrained by a first portion of the second seat shell rail proximate to the front of the infant car seat.

19. The infant car seat system of claim 17, wherein:

the first infant car seat anchor has a first connection end (324A) that mechanically engages with the first vehicle anchor of the vehicle seat;

the second infant car seat anchor has a second connection end (324B) that mechanically engages with the second vehicle anchor of the vehicle seat;

the infant car seat has a longitudinal plane (332) that divides the infant car seat into right and left parts;

a lower constraining boundary plane (310) of the infant car seat is defined by:

an axis (320) perpendicular to the longitudinal plane of the infant car seat and passing through the center of gravity of at least the infant car seat;

the first connection end of the first infant car seat anchor when engaged with the first vehicle anchor; and

the second connection end of the second infant car seat anchor when engaged with the second vehicle anchor; and

the first constraining point and the second constraining point are above the lower constraining boundary plane of the infant car seat.

20. The infant car seat system of claim 19, wherein:

an upper constraining boundary plane (312) of the infant car seat is perpendicular to the lower constraining boundary plane and includes the axis perpendicular to the longitudinal plane of the infant car seat and passing through the center of gravity of the infant car seat; and

the first constraining point and the second constraining point are between the lower constraining boundary plane and the upper constraining boundary plane of the infant car seat.

21. The infant car seat system of claim 19, wherein:

the vehicle seat includes a seat bight (54); and

the first constraining point and the second constraining point are between the lower constraining boundary plane and a vertical plane (375) passing through the seat bight when the first connection end of the first infant car seat anchor is engaged with the first vehicle anchor.

22. The infant car seat system of claim 1, wherein the first infant car seat anchor is rotatably coupled to the first seat shell rail and the second infant car seat anchor is rotatably coupled to the second seat shell rail.