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(54) Title: INTEGRATED CHILD SAFETY SEAT

(57) Abstract: An infant safety car seat (10) seamlessly and permanently integrated into the bench seat (14), or as a separate unit, with the same upholstery matching the design of other seats in the vehicle, assembled on the back row of a vehicle, on the center, or the sides, next or between two adult seats or replacing the adult seats if more than one is incorporated into the vehicle. The child seat is sunken or not below and behind the vehicle bench (26) and back rest (24), in a concave shape, and safety harnesses (22, 25), are permanently installed to secure an infant in the safety seat (10). The integrated seat (10) inclines smoothly to allow forward or rear facing configurations with different degrees, suitable to different ages of the child, from zero to eight years old, with rounded and protruding edge head/foot rests (88, 29, 28, 47, 57) that incline or elevate from upholstery and arm rests (23, 43) that raise, and padding and inserts for protection. The inserts may elevate from the seat as the arm-rests, manually or electronically. Security features are internally integrated to prevent the incidence of leaving an unbuckled and/or an unattended infant in a vehicle that includes some combination of a scale (30), hasps sensors (46,32) in display (50), unbuckling (59), and video monitor of cameras (35) in screen (52).



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1 **I. TITLE: "INTEGRATED CHILD SAFETY SEAT"**

2
3 **II. FIELD OF THE INVENTION**

4
5 The present invention relates to an integrated vehicle infant safety seat completely and
6 seamlessly inserted as part of the upholstery of a car seat, separated, or unified with other seats,
7 for infants from zero to eight years old and above, with an ergonomic design, in different
8 positions and inclinations, with a concave shaped seat, with head/foot rests that incline and arm
9 rests that raise electronically to different positions, or not, who are travelling in a vehicle, and
10 more particularly, to an infant safety car seat with all the security control features intertwined
11 with one another integrated into the seat and reflected and controlled in the dashboard.

12
13 **III. OTHER RELATED APPLICATIONS**

14
15 The present application relates to U.S. Patent Application No. 15/289,048 filed on 7
16 October 2016 titled "Integrated Child Safety Seat", which is hereby incorporated in its entirety
17 by reference.

18
19 **IV. DESCRIPTION OF THE RELATED ART**

20
21 Several designs for infant safety seats used in vehicles have been designed in the past.
22 None of them, however, includes a seat or seats for a infant since the time he is born, until the
23 ages of 6 to 8 years old and above in the rear seat of a vehicle that is permanently a part of the
24 vehicle's seat, with rear-facing and forward facing position integrated seat, with no external
25 attachments, with all the mechanisms invisible inside the internal parts of the car seat, and
26 includes safety integrated features to ensure that the infant is travelling with the utmost
27 protection as well as to prevent un-buckled infants or infant-left-in-car injuries and a monitoring
28 system that allows a driver to focus attention forward on the road and also to view the infant
29 without turning around.

30

1 Applicant believes that the closest reference corresponds to U.S. patent No. 4,756,573
2 issued to Simin. However, it differs from the present invention because while the Simin device
3 is partially integrated with the vehicle, the infant carrier is similar to most baby car seats in use
4 today and it is located externally on top or above a platform of the automobile front seat next to
5 the driver, facing backwards, needing an attended to look after the infant from the back seat.

6
7 In contrast, the integrated child safety seat (or seats) of the present disclosure includes, among
8 other features, a seat for an infant permanently formed into the rear seat of a vehicle allowing a
9 sturdier construction and absolute assimilation into the upholstery and aesthetic of the vehicle it was
10 specifically adapted for, united, or as a separate unit, between or next to the other seats. Other safety
11 features to allow the driver to more securely monitor the infant and to prevent accidental injury from
12 leaving an infant unattended, unbuckled or alone in a vehicle. Other similar patents have detached
13 parts, or are removable seats without the technology and features as well as the security elements of
14 the present art. In some cases some arts of detached seats facing backwards to the driver have an
15 additional pole to secure the baby seat to the base of the car to try to avoid movement of detached seat,
16 as well as a platform for the base of the detached car seat. The art in this patent avoids having to install
17 these accessories, because the Integrated Infant Safety Car Seat is part of the car itself, therefore the
18 infant secured to it is incorporated into a much stable and safer system.

19
20 Another difference with the Simin art is that they have seats incorporated in the back seat but
21 only for infants from 6 to 8 years old. Our art portrays an integrated infant car seat built in for an
22 infant since the time he is a new born with 2 Positions for different growing stages of the infant,
23 inclination of seats and head/foot rests separately, arm rests that rise, and inserts that elevate ensuring
24 all his safety with electronic, digital or other security features that work intertwined installed as part of
25 the Integrated Infant Safety Car Seat when the car is built.

26
27 The present design replaces the need to purchase detached seats for the different growing
28 stages of the infant.

29
30 The integrated infant safety seat is ideal for the consumers that are starting a family or have
31 children and feel the necessity of providing the highest safety and comfort to the infants at every stage

1 of their development while traveling in cars. It is designed to serve the needs and the safety of children
2 in cars.

3

4 The integrated infant safety seat is ideal for large vans or SUV's although the design also serves
5 smaller vehicles ensuring the safety of all infants. This art will serve the market with advanced
6 technological and novel improvements with a vision of present and future needs.

7

8 The difference of the other arts regarding the safety control features of the Integrated Infant
9 Safety Car Seat is that all the controls are intertwined with one another and are an internal part of the
10 seat. The safety control features are portrayed all together in a screen in the dashboard covering all the
11 possible situations in order to ensure the safety of an infant in a vehicle. It beholds possibility of un-
12 buckling an infant from the integrated safety car seat by a remote control in the display of the
13 dashboard to facilitate the process by following the safety sequence of the controls before leaving the
14 vehicle and not leaving an infant alone in car.

15

16 Other patents describing the closest subject matter provide for a number of more or less
17 complicated safety control features that fail to solve the problem in an efficient and economical
18 way. None of these patents suggest the novel features of the present invention that integrates all
19 the control systems together and incorporated into the car internally.

20

21 Most importantly, the infant will travel more safely when placed directly to a seat designed
22 for his needs as part of the car seat and buckled securely, instead of being buckled to a seat that
23 also requires buckling itself to the actual seat of the car which is more unstable, wiggly and
24 unsafe, especially at the moment of an abrupt use of the brakes, or in a collision or accident.

25

26 The integrated infant safety car seat provides the assurance that the infant(s) present in vehicles
27 are completely safe, monitored and protected, by the ergonomic design of the art enhanced by all the
28 security features it beholds.

29

30 **V. SUMMARY OF THE INVENTION**

31

1 It is one of the main objects of the present invention to provide an infant car safety seat
2 with an ergonomic design that seamlessly meshes with the interior décor and upholstery of the
3 vehicle into which it is installed.

4
5 It is another object of this invention to provide a safer infant car seat by integrating the
6 infant seat into the structure of the vehicle seat instead of using sometimes difficult to use and
7 unreliable seat belts, latches, tethers, or other strap-in systems for detached car seat units.

8
9 It is another object of this invention to provide an integrated infant seat with 2 Positions,
10 rear facing and forward facing, with several degrees of inclinations positions for the bench and
11 back rest, head/foot rests, and arm rests that rise, all controlled electronically, with a concave
12 shaped seat within an ergonomic concept.

13
14 It is still another object of the present invention to provide an integrated infant safety car
15 seat that includes factory-installed (or other high quality integration) of monitoring features to
16 prevent the occurrence of injury risks to the infant. These features contemplate a series of
17 controls put together with a system that covers all the possibilities to ensure maximum safety.

18
19 It is yet another object of this invention to provide such a device that is inexpensive to
20 manufacture and maintain while retaining its effectiveness.

21 Further objects of the invention will be brought out in the following part of the specification,
22 wherein detailed description is for the purpose of fully disclosing the invention without placing
23 limitations thereon.

24 25 **VI. BRIEF DESCRIPTION OF THE DRAWINGS**

26
27 With the above and other related objects in view, the invention
28 consists in the details of construction and combination of parts as will be more fully understood
29 from the following description, when read in conjunction with the accompanying drawings in
30 which:

31

1 **Figure 1** shows a perspective view of a forward facing position in an integrated safety
2 car seat.

3
4 **Figure 2** shows a perspective view of a rear facing position in an integrated infant safety
5 car seat.

6
7 **Figure 3** shows a perspective view of a vehicle dashboard demonstrating safety features
8 in an integrated infant safety car seat.

9
10 **Figure 4** shows all the security control elements in the dashboard
11 of an integrated infant safety car seat.

12
13 **Figure 5** shows a perspective view of an integrated infant safety seat additional elements,
14 such as padding, and elevating inserts.

15
16 **Figure 6** shows a perspective view of a top rearward view of an integrated infant safety
17 car seat with an elevated seat inclination.

18
19 **Figure 7** shows a plan view of a top and backward part of an integrated infant safety car
20 seat when a newborn infant is placed in it, with canopy.

21
22 **Figure 8** shows a side view of the concave shaped seat with different inclinations of the
23 bench and back- rest, as well as the head/foot rests of the Integrated Infant car seat, that recline
24 electronically or not.

25
26 **Figure 9** shows a side view of the arm-rests on the sides of the seat and back rests, that
27 raise from below electronically or not to different positions in the Integrated Infant Safety Car
28 Seat.

29
30 **Figure 10** shows a plan view of the head/foot rests rounded protruding edge protection of
31 the Integrated Infant Safety Car Seat.

1
2 **Figure 11** shows a plan view of a head- rest of a version of the device.
3

4 **VII. DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

5

6 The subject device and method of use is sometimes referred to as the device, the
7 invention, the car seat, the safety seat, the integrated infant safety car seat, the child integrated
8 safety car seat, the art, or other similar terms. These terms may be used interchangeably as
9 context requires and from use the intent becomes apparent. The masculine can sometimes refer
10 to the feminine and neuter and vice versa. The plural may include the singular and singular the
11 plural as appropriate from a fair and reasonable interpretation in the situation.
12

13 Referring now to the drawings, where the present invention is generally referred to with
14 numeral **10**, it can be observed that it basically includes, among claimed and contextual
15 elements, a back **12**, a seat **14**, a seatbelt **16**, a seatbelt **18**, a door **20**, a harness **22**, a hasp **46**, a
16 harness **25**, a hasp **32**, a harness adjuster **66**, an arm-rest **23**, an arm rest **43**, a back **24**, a seat **26**,
17 a head/foot rest **28**, a head/foot rest **29**, a head/foot rest **47**, a head/foot **57**, a newborn head-rest
18 **88**, a button **31**, a button **41**, a button **39**, a button **8**, a button **7**, a button **17**, a button **39**, a button
19 **37**, an arm-rest button **9**, an arm-rest button **11**, a scale **30**, a back of head rest **34**, a camera **35**, a
20 bench **36**, a headrest **38**, a back **40**, a camera **42**, a seat **44**, a lap-belts **27**, a hinge **33**, a canopy
21 **67**, a head-rest for new-born **87**, an insert **74**, an insert **76**, a padding **78**, a padding **74**, a screen
22 **52**, a rear-view child mirror **50** , a display **49**, an Infant in Car button **51**, an Infant in Seat sign
23 **53**, an Infant in Seat sign **55**, an Un-Buckled button **59**, alarms and alerts for **51**, **53**, **55**, a manual
24 key device **61**.
25

26 There are two positions to sit the infant in the Integrated Safety Seat:

27 **Position Infant 1:** When the infant is seated with his head in the lower area of the seat, and
28 lower part the bench, or his head laying in head/foot rest **29**, facing the opposite direction of the
29 driver or back-wards, when he is a small infant, from zero to two years old or below the
30 mandatory weight established by the AAP (American Association of Pediatrics), and up to 2 and

1 4 years old . With the concave shaped seat of the present art, the back rest 24 first section can
2 incline downward for the body of a growing child to fit, having space to extend his legs.

3 Position Infant 1: Head of Infant on head/footrest **29**. Or in new-born head rest **88**.

4 **Position Infant 2:** When the infant is seated with his head in the upper area of the seat, or head
5 rests **28, 47** or **57**, facing the same direction of the driver or frontwards, when he is a bigger
6 child, from 2 years old and or above the mandatory weight established by the AAP, and 4, 6, 8,
7 years old and above.

8
9 Position Infant 2: Head of Infant on head/foot rest **28, 47** or **57**, and **88** for a new-born.

10
11 **Figure 1** is an example of how a front facing integrated infant safety seat may be
12 positioned in the back seat area of a passenger vehicle, with absolute assimilation to the
13 upholstery with the other seats, or as a separate unit between or next to the other seats. As in
14 many vehicles the rear seat includes a back **12** and a seat **14** that span the width of the vehicle. A
15 door **20** is shown for context. The infant integrated safety car seat is positioned on a middle third
16 of the back **12** and seat **14** bounded by the left third and right third of the seat. There is a
17 placement of newborns until 6 months as shown in Figure 7, and progressively as the infant
18 grows, the seat is adapted to his size by padding and inserts that are part of the upholstery as
19 shown in Figure 1, Figure 2, Figure 6. The child safety seat could also be adapted to be
20 positioned on the center third, left third or right third, or as a separate unit between them. There
21 could be seats for older infants directly integrated of the same art, as an upgrade ordered when
22 purchasing a vehicle.

23
24 The left third and right third of the rear bench seat are engineered for an adult to
25 comfortably sit, or as expressed above, or for other integrated infant car seats, or for integrated
26 safety car seats for older infants, which could be ordered as upgrades. A seatbelt **16** is provided
27 for the right third. A seatbelt **18** is provided for the left, driver's side, rear seat position.

28
29 An important aspect of the invention is the child seat integrated into the upholstery and
30 structure of the back **12** and seat **14** between the left and right third adult seats. The seat **26** of the
31 child seat is structured below the surrounding seat **14** and the back **24** is structured inset into the

1 back **12**. Equally, there may be one, two or three child safety seats across the rear car seat so that
2 multiple children can be simultaneously transported or if the vehicle owner prefers to have child
3 safety seats in any of the right, center or left positions, and even in a third row of the vehicle for
4 multiple children.

5
6 When an infant is born, he is placed in Position 1, rear facing, in the base of the Seat, with
7 some inclination in his upper body (30 degrees) in head rest **88**, and with the corresponding harness
8 and lap- belt. As an infant grows older from being a new-born (Figure 7) to a toddler - zero to 2 years
9 old, in Position 1 (Figure 6) and then to becoming a child of 4 years old, he uses the head rest **29**. The
10 seat in Position 1, has semi-recumbent inclinations with standard recommended positions: 30, 40 or 45
11 degrees. With concave shaped seat, the lower section of the back-rest **24** fully inclines for a child from
12 2 to 4 years to extend his lower extremities, in the rear facing position. As he grows older, the seat
13 changes to Position 2, in which the child is placed onto the seat **26** and rests his back onto the back **24**,
14 with semi-recumbent inclinations 30, 45 and 60 degrees. The child's head can rest between the
15 headrests **28**, **47** and **57** for ages 4, 6, 8 or above. The head/foot rests **88** (new borns – Position 1) and
16 **29** Position 1, as well as head/foot rests **28**, **47** and **57** (Position 2), when not in use, are inserted
17 inwardly and seamlessly into the upholstery, and are covered by the padding. The head/foot rest **29**
18 when not in use, lays downward in 90 degrees. The harness for new-borns, zero to 6 months, and
19 harness from 6 months to 2 years old, and 2 years old to 4 years old in the Position 1, as well as
20 harness from 2 years old to 4 years old, and 4 to 6 , and 6 to 8 years old and above in Position 2,
21 are kept seamlessly under the inserts and padding as well when not in use. All harnesses are
22 represented by the numbers **22** and **25**, with hasps **46** and **32**, and adjusters **66**.

23
24 The same integrated infant safety car seat adapts to the age and size of a child by providing rear
25 and front Positions (1 and 2), with inclination degrees, in which the child is secured with harnesses,
26 lap-belts, designated head/foot rests, that incline accordingly as well as arm rests that raise, inserts
27 that elevate from the upholstery all integrated and complemented by security control features.
28 Different levels of inclination of the seat, as well as the head/foot rests, give an array of angles to
29 enable comfort and the proper positioning of the infant. Inserts and Padding are provided as part of the
30 design to make the seat. They elevate manually or electronically with the same technology of the arm-
31 rests, to 5 or 10 inches high approximately, and are part of the upholstery.

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When the infant is zero to two years old, or is below the mandatory weight (Position Infant 1), he will be placed on the lower extreme of the infant car seat facing opposite to the driver. (Position Infant 1).

The reclined head/foot rest will move forward with an automatic button **39** as well as at least one third of the lower part of the seat that moves with button **37** placed on the arm - rest **23** to raise upward in three higher positions. (30 for a small infant, 40 for a 2 year old child and 45 degrees for a 4 year old child). This is consistent with the mandatory regulations. The head/foot rests that nestle the neck and head of the child are rounded with a protruding edge of about 10 inches with a soft material to protect the neck and skull of the child. The upper body of the baby is raised by inclinations of seat and head/foot rests. There are side elevations which are arm-rests on both sides of the child all along the integrated infant safety car seat , tall enough to provide a barrier or separation wall to give him body protection. The height of these arm-rests or separation side walls of the integrated infant safety car seat design may vary, and they can elevate to 5 inches, 10 and 15 inches approx. The arm-rests (**37** and **43**) both on the seat **26** and back rest **24** – raise electronically or not from below to these three different positions.

There are seat belts and buckling harness systems all along the integrated infant safety car seat. Some begin on both extremes (three point harnesses) of the seat, and some begin on the sides (lap-belts). The harnesses of these systems also have cameras connected to each of their hasps facing the infant according to the position. The three point harnesses part from the extremes of each position. (Position Infant 1: Harness **22**, Hasp **46**), (Position Infant 2: Harness **25**, Hasp **32**). There are additional harnesses for a new-born in Position 1 and for an older child in Position 2., with the same numbers for all. When using either of them according to the position of the infant, the alternative ones will be covered with the inserts and padding. The inserts to provide a smaller barrier to the child may elevate from the seat as the arm-rests, manually or electronically.

The Lap Belts **27** part from the sides of each Position, Infant 1 and 2. The Position Infant 1 opposite to driver is designed in the integrated infant safety car seat to abide by the law to

1 protect the spine of the infants zero to two years old or below the mandatory weight in the event
2 of a car collision or accident. It is recommended that a child should remain in a rear-facing
3 position until he is 4 years old. This is possible to be done in the present art. With a concave
4 shaped seat, a child from 2 to 4 years old can extends his legs, when the lower section of the
5 back-rest **24** is fully reclined with inclination button **41**.

6
7 Two safety Harnesses **22** (position 1) and **25** (position 2) are provided to secure the infant
8 in the integrated safety seat on both extremes when he sits on either position. Additionally there
9 are other harnesses of the same kind for different sizes and ages of the child, which we refer to
10 with the same numbers. The harnesses have Cameras which we name **35** for all cameras to view
11 the infants face and body when sitting on either position reflected on the dashboard. This is
12 effective to control the child to be seated properly to avoid injuries in a collision as well as for
13 the general purpose of keeping the infant from unwanted movement about the vehicle during
14 driving. A hasp **46** (position 1) and a hasp **32** (position 2) are provided to allow easy and effective
15 entry and exit into the harness **22** (Position 1) and harness **25** (Position 2) restraint systems.
16 Other haps are present in additional harnesses.

17
18 As part of the electronic, digital or other safety features, a scale **30** is supplied internally
19 into to seat as part of a safety system in the Integrated Infant safety Car Seat to avoid infant left
20 un-buckled while car is in motion, as well as infants left in unattended vehicles. If a pre-
21 determined weight is detected by the scale **30**, which has sensors all along the seat of the
22 Integrated Infant Safety Car Seat, then the monitoring system is on alert and awaiting additional
23 signals to avoid these risks. The weight needed to activate the scale may be estimated to be that
24 of the infant plus any gear the infant is likely to have. It is generally more than a few pounds.
25 When adjusting it may be better to err on the lighter side and risk a false alert of an infant
26 improperly left in the vehicle than to not trigger and risk human injury.

27
28 The cameras named **35** for all of them, may be located on or near the armrest or in the
29 surface of the headrests of the opposite extreme of the seat so that the child's face may be seen
30 when rear facing or forward facing. The cameras **35** may also be integrated into the hasp **46** and
31 the hasp **32** and other additional hasps to cover any of the two directions the infant is facing. The

1 images of the cameras are reflected internally in a screen on the dashboard of the vehicle to be
2 viewed by the driver.

3
4 The integrated infant safety car seat provides the feature of different inclinations of the
5 seat, on back **24** and seat **26**. These numbers refer to the area for the back of a person sitting in a
6 regular car seat (**24**) also called back, and, the area for lower body of a person when sitting in a
7 regular car seat, also called bench. In an Integrated Infant Safety Car Seat, **24** and **26** serve as
8 back placement and lower body placing alternatively according to the position of the infant
9 (Position 1 or Position 2).

10
11 Button **37** will be located in one or both sides of the arm-rest **23** and will control the
12 inclination of **26** (being **26** the persons' sitting area or bench of a regular car seat). For Back
13 **24**, Button **41** will be located in one or both sides of the arm rests **43** and will control the
14 inclination of the lower part of back **24**, as well as Button **31** will be located in one or both sides
15 of the arm- rests **43** and will control the inclination of the end upper part of **24**(being **24** the
16 persons' back area of a regular car seat). This way the bench has one inclination button, and back
17 has two inclination buttons. This button **31** will give an additional position of inclination on the
18 upper part of the seat to provide more angles for either a grown infants' upper body, when sitting
19 in position 2. Button **41** will provide a low level of inclination for the extremities of a child 2 or
20 4 years old, sitting in Position 1. The Buttons **37** (Seat **26**), and buttons **41** and **31** (Seat **24**) are
21 found in the middle and upper extremes of the arm rests (on one or both arm rests on the sides of
22 the infant, that electronically or any other technological way, control the recline of the Integrated
23 Infant Safety Car Seat. In the example in figure 1 the button **37** is on a forward edge of the rear
24 Bench **26** seat but it could be located in any place convenient for the driver including remotely.
25 The Button **31**, **41**, and **37** may be a rocker switch (similar to the type used in many powered
26 windows). All these buttons will have hinges, seamless and internal, such as hinge **33** visible or
27 not, to move the mechanisms of inclination, by any existent technology, such as in reclining
28 chairs or mattresses available in the market. There will be internal hinges or devices that will
29 correspond to all the inclination control buttons, and will move accordingly to the buttons
30 pressed or manipulated with any technology, manual, electronic, digital or other. The internal
31 mechanism of inclination that responds to the buttons will provide many different angles in all

1 the parts of the integrated infant safety car seat, with smooth movement, to provide adaptability
2 and comfort for all the needs of the infant, in Position 1 and Position 2, as the infant grows in
3 Position 1 from zero to 6 months, from 6 months to 2 years old, from 2 to 4 years old, and in
4 Position 2 from 2 to 4 years old, from 4 to 6 years old, from 6 to 8 years old. (Figure 8). These
5 seat inclinations can also be adjusted in a remote control, together with the head/foot rest
6 inclinations and the arm rests elevation.

7
8 To control the inclination of the Head/Foot rests, which is head/foot Rests **29** when an
9 infants' head is in Position 1, in bench **26**, that is the lower position of a regular car seat, the
10 head/foot rest will have button **39**. This head/foot rest **29** will move in different angles (30,40, 45
11 degrees) or different degrees such as (35,45,50) to provide more comfort to the head, including a
12 90 degrees angle downwards for when it is not in use. There is also a head/foot rest control
13 button for Head-Rest **88** of new-born babies.

14
15 For the inclination of the three Head/Foot/Rests which are **28**, **47** and **57**, when the
16 infants' head is in Position 2, in bench **24**, which serve different accommodations for the head or
17 feet of growing infants according to the position 1 or 2 of placement, Button **8** will control the
18 inclination for head/foot rest **28**. Button **17** will control the inclination of head/foot rest **47**.
19 Button **7** will control the inclination of head/foot rest **57**. This may vary in terms of number of
20 head- foot rests and buttons assigned for the inclination feature. The head/foot rest **57**, at the
21 extreme of the back seat **26** will have the same inclinations as the upper section of the seat (for
22 example 30,45 or 60 degrees, or different ones such as (25, 40, 55), as an example, to provide
23 more comfort. The internal head-foot rests 28,47, and also 88 are inserted into the upholstery and
24 elevate with buttons 8,17 and a button for head-rest 88, or may be pulled and pushed outward
25 when in use and inward when not in use manually or electronically with these buttons.

26
27 The inclinations of the back or the bench controlled by the buttons will provide reclined
28 benches positions of 30, 40 or 45 degrees (Approx.) for Position Infant 1, and reclined back rests
29 positions of 40, 60, 80 degrees (Approx.) for Position Infant 2.

30

1 The inclination of the head/foot rests provide standard indicated reclined positions of 35,
2 45 or 50 degrees,) for Position Infant 1, and the same inclinations for Position Infant 2. These
3 inclination alternatives adjust to the anatomy of the infant. In this way, Head –Rest **29** together
4 with Foot- Rest **28**, **47** and **57** and its inclinations accommodate an infant from Zero to 4 years
5 old. Head rest **88** remains reserved for new-borns.

6
7 At the same time, head rests **28**, **47** and **57** together with Foot Rest **29** and its inclinations
8 accommodate an infant from 2 to 4, 4 to 6 and 6 to 8 years old. These head-foot /rests may have
9 their own angle of inclination, different from the bench or back rest. The inclination mechanisms
10 could have visible buttons, knobs, hinges, electronic or digital or any other technology, and be
11 completely seamless or not, such as inclined mattresses, airplane seats, massage chairs, and
12 others, on the market. The controls may also be in a separate control device in the hands of the
13 driver or care giver to control from the front seat. All of these inclination features of the seat,
14 back-rest, and head/foot rest, including the arm-rests, can also be adjusted by a remote control.

15
16 **Figure 2** is an example of a rear facing integrated infant safety seat. (Position Infant 1).
17 In many situations, particularly for smaller children and infants, a rear facing seat is safer and is
18 mandatory. Similar in inventive concept, the same seat is seamless, and automatically elevates to
19 upward positions with a button. Buttons **37** for bench **26** and buttons **41**, **31** for back **24**, located
20 in arm-rests **23** and **43** respectively. It includes head/foot rests (**29**, **28**, **47**, **57** and **88** for
21 newborns), The head/foot rests **29** and **57** also elevate with the seat or independently to different
22 angles by moving the buttons **39** and **7**. The internal head-foot/rests **29** **47**, and **88** for newborns
23 are inserted into the upholstery and elevate with buttons **39**, **17** and a button for **88**. There is side
24 protection provided by arm rests on both sides (**23**, **43**). On both extremes there area buckling
25 harness systems (**22**, **25**), and on both sides there are lap-belts, named **27** for all. There is a lap-
26 belt for every set of 3 point harness in the Integrated Infant Safety Car Seat. There may be
27 additional harnesses and lap-belts of the same type for different sizes and ages of the child. The
28 Position 1 is opposite to the driver to abide by the law to protect the spine of infants zero to two
29 years old or below the mandatory weight established by the governing regulatory bodies, in the
30 event of a car collision. With the concave shaped seat, the lower section of the back-rest **24** fully
31 inclines with button **41** for a child from 2 to 4 years to extend his lower extremities, in the rear

1 facing position. All the parts and buttons of the Integrated Infant Safety Car Seat work together
2 and/or and alternatively to adjust to the needs of the infant while travelling in vehicle since he is
3 a new born up to age 8 (Approx.).
4

5 In the Integrated Infant safety Car Seat the buttons to incline the seats may be different
6 than the buttons to incline the head/foot rests. The reason is to provide many more options to
7 comply with the infants' absolute safety and comfort, proper positioning and needs, such as
8 sleeping, drinking from a bottle, or keeping his upper body in a semi-recumbent manner, abiding
9 by the regulations. This ergonomic art in which the child is placed in an integrated safety seat is
10 a novel concept for the industry.
11

12 The head/foot rests at the extremes are extensions of the bench and back rest of the seat,
13 making the seat longer, when we refer to head/foot rests **29** and **57**, which means they are a
14 prominent structure that serves as additional space to fit the infant in both Positions Infant 1 and
15 2. Each of these two head/foot-rests may measure approximately 10 inches in length, which
16 provides enough space for the head and neck of an infant, or the feet accordingly. The head/foot
17 rests have a rounded shape and a soft texture inside with a protruding protection of approx. 7
18 inches or more.
19

20 In a front impact in Position Infant 1 the child is pressed into the bench **26** uniformly to
21 reduce injury from the collision. As with other variations of the device, if the bench **26** is slightly
22 below the surface of the surrounding bench **36** then some side impact protection is also afforded.
23 The shape of the back **24** and the bench **26** are slightly concave to partially surround the child's
24 body contour for additional side impact protection. Padding integrated into the seat **26** and the
25 back **24** further enhance impact survivability performance. The shape of the back **24** and the seat
26 **26** may be adjusted with all the automatic buttons **37**, **41**, **31** located in arm rests or remotely to
27 provide the inclinations to transition between the upward and inclined positions of the safety seat
28 (i.e. forward and rear facing configurations). In addition, head/foot rests provide other degrees of
29 inclination independently. Arm-rest that elevate protect form side impacts Inserts that elevate
30 from the upholstery behold the child's body in place.
31

1 The Integrated Infant Safety Car seat has Arm-Rest **23** for Position Infant 1 on both sides
2 of the child, and Arm-Rest **43** for Position Infant 2 on both sides of the infant. They are both
3 activated together in Position 1 and 2, for sides protection all along the integrated seat. The
4 height of Arm-Rests 23 and 43 raises to 5, 10 and 15 inches of elevation (Approx.), and will
5 provide protection and stability to keep the infant in the lateral limits of the safety seat, specially
6 in a side impact. The arm-rests in both sides of the seat and the back-rest may or may not raise
7 from below electronically to different elevations. (Figure 9). The arm-rests may have orifices to
8 hold bottles on each side. The vertical space at the lower end of the integrated infant safety car
9 seat, which is perpendicular to the floor of the car may have an opened or closed compartment
10 for dippers or blankets as well as any other small artifact that might be handy.
11

12 In the integrated infant safety car seat, the back **24** and seat **26** are seamlessly integrated
13 into the seat **36** so that the contours, upholstery and texture match. The materials may be leather
14 or fabric, following the design of the other seats of the car, with complete integration. This
15 ensures that the safety seat is unified with the structure of the seat **36** both for aesthetics and
16 safety by strengthening the structure together with the car. The Integrated Infant Safety Car Seat
17 could also be separate from the other seats, between or next to them. This is in contrast to the
18 prior arts that straps external or independent detached infant car seats onto the rear seat with
19 seatbelts or other available straps and mandatory latches or chassis or bases as well as tethers for
20 the top, that connect to an attachment point.
21

22 For all the different adaptable parts that are presented in the Figure drawings of the
23 integrated safety car seat, in order to satisfy the dimensions of a growing child in various stages,
24 a Three Point Harness **22** and a Three Point Harness **25** may provide additional security for the
25 child in any type of accident. This is re-enforced by the Lap-Belts **27**. In this example a three
26 point harness **22** and a harness **25** are shown. Other harnesses of the same type which we name
27 with the same numbers are contemplated. Other strapping systems or available types of child
28 restraint systems and methods may be employed as regulated by jurisdiction.
29

30 A Camera **35** is also optionally provided and directed to the Back **24** where the infant
31 would be secured into the safety seat. The Camera **35** may be alternatively positioned in the

1 head/foot rest **29** and **57** at the extremes of the integrated infant safety car seat, or other location
2 where it can image the child in the seat. In a forward facing seat, such as seen in Figure 1, the
3 Camera **35** may be in the top of the head/foot rest facing the child. There may be multiple
4 Cameras **35** showing different angles or for direct viewing of forward or rear facing seat
5 configurations. The associated displays may show multiple angles or can cycle through the
6 differing perspectives of the cameras. For example, one camera can be on or near the rear bench
7 facing forward to image a child in a rear facing configuration. A camera may also be on the child
8 seat or on the rear of the front seats pointing back to view the face of a forward facing child.
9 Cameras may also be integrated into the fastening mechanisms such as hasps (**46** and **32**) on both
10 ends of them, or buckles, to provide a close up view of the infant strapped therein and also to
11 visually verify that the buckle is latched. The camera should be positioned to view all aspects of
12 the child and seat in any configuration of the seat or for an infant of any age and size.

13
14 **Figure 3** With regards to the safety features of the integrated infant safety car seat, they
15 will all together be reflected in the dashboard ,where a perspective view of an example of a
16 dashboard is shown to include, among other features, a rearview mirror **48**, a display **50**, a screen
17 **52**, a radio **54**, a steering wheel **56**, a speaker **58** and a windshield **60**. All the safety features of
18 the integrated infant safety car seat are incorporated with controls and tools accessible to the
19 driver of the vehicle into which the system is installed. All of them are reflected in the dashboard
20 conveniently for the driver to monitor all the elements that comprise the utmost security of the
21 infant(s).

22
23 The safety system of the integrated infant safety car seat is based on a series of detectors that
24 are intertwined with one another and work together progressively in a sequence. This allows the driver
25 and/or the caregiver to take action when required in every possible status confined to the safety of the
26 infant.

27 These safety features of the Integrated Infant Safety Car Seat, reflected in the dashboard are:

28 Rear-view mirror – placed between the screen and the display. **50**

29 Cameras showed in screen –in hasps and or other surrounding areas. **52**

30 Display of electronic, digital, automatic or other internal signals: **49**

31 Weight of infant detected by scale 30 – INFANT IN SEAT. **51**

- 1 Buckling Systems – harnesses and hasps BUCKLED. **53**
2 Unbuckle button manually in the display for the driver. UNBUCKLE **59**
3 Alarms and alerts: sounds and lights regular and intermittent. (**51, 53, 55**)
4 Manual control: Infant left in car button - INFANT IN CAR. **55**
5 Manual Key device connected to dashboard - INFANT IN CAR. **61**
6

7 A rear-view mirror **50** is placed on the dashboard below the screen of the Cameras, as an
8 additional feature to watch the child in the safety seat without requiring the driver to turn around
9 to check on the infant, which could be a distraction and could lead to an accident.
10

11 Alternatively, the screen **52** that is part of the dash infotainment or navigation system can
12 be used to display the data captured by the all the cameras. The images captured by the cameras
13 are selectively viewable from the front seat. If more than one infant are placed in a vehicle that
14 contains more than one integrated infant safety car seats, then it will read, Camera 1, Camera 2,
15 Camera 3. Similar to how a back-up camera will show the area behind the vehicle to aid the
16 driver in safely backing up, the display **52** can be used for viewing the interior cameras as
17 needed. When not monitoring the child, the display **52** may remain useful for its other traditional
18 functionalities, like the radio and navigation, or the screen can be split to show all these functions
19 mentioned at once.
20

21 The scale **30** located internally all along the integrated infant seat may provide data to the
22 processor to aid in determining whether there is a child in the seat **26** or **24** or if the seat **26** or **24**
23 is vacant. For example, infants with clothing may weight from about three kilograms or more.
24 Therefore, the processor and scale **30** combination is set to indicate an occupied seat if about two
25 or more kilograms are detected on the scale **30**. This would avoid having an occupied
26 determination if a lighter blanket or some other gear is in the seat **26**.
27

28 An unfortunately frequent contributor to child safety risk relates to leaving an infant un-
29 buckled which refers to not being secured with fastening systems, both of the detached seat itself
30 in the existing car seats in the market that are separate units to place in vehicles, as well as from
31 the buckling system that holds the infant. Infants have been injured when un-buckled to their

1 car seat in the event of the vehicle stopping abruptly, speeding, and vehicle collision and
2 accidents.

3
4 Often, infants have died from exposure to excessive heat and cold while alone in a car for
5 protracted periods. An effective aid to avoid such tragedies should be included in all vehicles
6 where an infant is reasonably expected to be. Both situations, of infant left un-buckled and
7 infants left in vehicles, are very common in daily life in which there is an overwhelming number
8 of activities in which a small infant is incorporated to, by travelling in cars, and the drivers have
9 an enormous distraction increased by the excessive use of cell phones when accessing or exiting
10 a car, and even while driving. The present design specifically adapted for use with young or non-
11 verbal infants should preferably include automatic safety measures as part of the internal
12 integrated safety system reflected on dashboard to avoid exposure or other injuries that can result
13 from infants un-buckled and infants left in a vehicle.

14
15 In an integrated infant safety car seat, in addition to the inherent safety of securely
16 strapping the child into the car seat with harnesses **25**, and **22** and others, there will be electronic
17 protections included with the system to make sure the fastening of hasps is registered in the
18 controls with sign BUCKLED **53**.

19
20 This art presents the buckling safety feature as well as all other safety features reflected
21 in dashboard as features that are internally connected to a seat for infants that are part of the car
22 itself, built in when the vehicle is manufactured, not a detached car seat with any other artifacts
23 that are adapted or incorporated as an external feature or device connected in any technological
24 way to an infant car seat that is detached.

25
26 In order to cover the situations in which the infant is left in vehicle, be it in the integrated
27 safety seat or elsewhere in the vehicle, in other seats or standing, or in someone's lap and then
28 forgotten, it will be indicated by the control in dashboard INFANT IN CAR **55**. An infant
29 protection system should include features and functionality that do not distract drivers while
30 operating the vehicle.

31

1 Regarding the sign BUCKLED **53** in one embodiment of the invention the hasp **46** as part
2 of the harness **22**, and the hasp **32** as part of the harness **25** includes a sensor to detect when the
3 hasp **46** and the hasp **32** or others, are closed thereby likely to have a child strapped in the seat.
4 The sensor can send data to a processor, for a hasp that is open or closed. This will be expressed
5 in the display, as BUCKLED **53**, accordingly to the light, illuminated or not, and this sign will
6 also have an intermittent light if the previous button INFANT IN SEAT **51** that responds to the
7 scale determines an infant is actually seated and actions of buckling need to be taken in
8 BUCKLED **53**.

9
10 If the car is on and moving then the processor can assume that the infant is buckled in an
11 attended vehicle. Sensors may be attached to the engine control systems, speedometer,
12 transmission or other car data source to determine with a reasonable degree of certainty whether
13 the vehicle is attended or not when stopping or the ignition is turned off and therefore whether
14 the infant is attended to or might be alone, INFANT IN CAR **55**.

15
16 The cameras **35** in hasps **46**, **32** , or anywhere in the integrated infant safety car seat or
17 elsewhere inside the vehicle may also play a role in the system to prevent unwanted infant left in
18 car situations. All cameras **35**, connected to hasps or elsewhere in the integrated Infant Safety
19 Car seat, or other parts of the vehicle, along with the processor, may detect infant in movement,
20 heat, facial recognition or other sense-able information to provide a reasonable probability that a
21 child occupies the seat **24** or **26**. These sensors will be reflected in the screen **52**.

22
23 Any individual or combination of the scale **30**, camera **35** or hasp **32** and **46** sensors may
24 be used to determine whether an infant is in the integrated infant safety seat. This information
25 along with information from the vehicle indicating whether it is in motion, and therefore
26 necessarily occupied by an infant attendant which could be the driver or a caregiver, is used to
27 make a determination that the infant may be at risk of being unattended and at any other risk in
28 the event of an abrupt stop, collision or accident. If a preset combination of parameters is
29 determined to exist then an alert is generated to suggest to a driver or caregiver that the infant
30 seat or other areas inside the vehicle where the infant might be should be examined to determine
31 whether a truly risky situation is taking place.

1
2 The alert can be anything to signal to someone who may be able to verify the safety of
3 the infant. The processor may be connected electronically to the speakers **58** and radio **54** to
4 produce an audio alert or alarm. The system could broadcast through the speakers a tone, buzzer,
5 noise or pre-recorded statement to the effect of: “check the car seat” or “infant potentially at
6 risk” or a melody such as a lullaby.

7
8 The alert can also manifest as a light in the car or headlight, flashing an intermittent light
9 in the display **49** in a particular button or signal, honking the horn, sending a text, disabling the
10 car’s ability to lock remotely (key fob) or other notification means alone or in combination with
11 other means and types of alerts.

12
13 **Figure 4** shows by way of example, to indicate the intertwined system of the safety
14 features expressed in the dashboard of the design, this is one of the possible programmed actions
15 or the art including all the security elements working together in a sequence, found in the
16 Dashboard Display.

17
18 The driver or caregiver places the infant in the Integrated Infant Safety Car Seat. The
19 driver or caregiver must buckle the infant at that moment. (Three point harnesses **22** and **25**, and
20 others, complemented by lap belts **27**. The driver sits in his driver seat and starts the car. At the
21 same time, the driver presses the button INFANT IN CAR **55** manually. The light of this
22 manually controlled button **55** is illuminated. If the scale **30** determines that the infant is in the
23 seat **26** and/or **24** then the light of the signal INFANT IN SEAT **51** is illuminated. The feature
24 INFANT IN SEAT **51** may also be activated in connection to the Cameras in the SCREEN **52**,
25 responding to the images captured by sensors. When the light INFANT IN SEAT **51** is
26 illuminated it internally transmits an indication to the sign BUCKLED **53** to become
27 intermittently illuminated. The light of the second sign BUCKLED **53** should be illuminated,
28 because the driver or caregiver fastened the buckling system. In the case the driver of caregiver
29 did not buckle the infant, then the sign BUCKLED **53** will have an intermittent light,
30 accompanied by the alerting sounds described, such as a lullaby, voices, alarms etc. When the
31 infant is buckled, the sign BUCKLED **53** is illuminated. A lullaby or other sounds are de-

1 activated. The sign INFANT IN SEAT **51** remains lighted. When the vehicle is turned off, the
2 sign BUCKLED **53** is intermittently illuminated. A lullaby or other sounds are activated as a
3 reminder to un-buckle the infant. The sign INFANT IN SEAT **51** is illuminated. The INFANT
4 IN CAR is still pressed down with light. When the infant is un-buckled, it can be done
5 electronically with a button on the display to be pressed either manually UNBUCKLE **59** which
6 will open the hasps **46** and **32** electronically by an internal mechanism connected to the action of
7 pressing the button in the display, or directly on the buckling system of the seat. By unbuckling
8 either way, the sign BUCKLED **53** is not Intermittent and is not illuminated. The sign INFANT
9 IN SEAT **51** is lighted. The sign INFANT IN CAR **55** still remains pressed down with light. The
10 sounds of a lullaby or other are activated as a reminder of INFANT IN SEAT **51** and INFANT
11 IN CAR **55**. When the infant is removed from the seat by a caregiver, the sign INFANT IN
12 SEAT **51** is not illuminated. The button INFANT IN CAR **55** remains pressed with light. The
13 sound of a lullaby or others are activated as a reminder to take the infant out of the vehicle.
14 When the driver is about to leave his seat, and he is the person that will remove infant from the
15 seat once he is unbuckled electronically or manually, a lullaby or other sounds are a reminder
16 that the infant is in car. INFANT IN SEAT **51** is not illuminated. INFANT IN CAR **55** is
17 intermittent with alarm sound. The driver will have a remote control in his car keys pressing
18 down INFANT IN CAR **55** so the sound of lullaby or others are de-activated and he may lock
19 the vehicle.

20
21 **Figure 5** shows some optional elements that may be included in an integrated infant
22 safety car seat, including a bench **62**, a harness **64**, an adjuster **66**, a back **68**, a seat **70**, a seat **72**,
23 an insert **74**, an insert **76**, a padding **78**, a back **80**, a seat **82**, a head-rest for newborns **88**, a
24 head/foot rest **29**, a head/foot rest **28**, inclination control button for seat **37**, inclination control
25 button for back and back **41**, inclination control button **39** for head/foot rest **29**, inclination
26 control button **31** for head/foot rest **28**, hinge **33**, harness **22**, hasp **46**, harness **25**, hasp **32**, lap
27 belts **27**.

28
29 The hinges which we name **33** for all, laterally bisects the child seat to adjust the tilt or
30 recline of the seat. The hinges may be seamless, internal and invisible. The inclinations are
31 smooth and anatomic. By lifting the lower end of the seat **26** with inclination together with

1 headrest **29** the seat becomes rear facing Position Infant 1. For forward facing position Infant 2
2 lowering the headrest **29** essentially turns that headrest **29** functionally into a footrest. It also
3 bends vertically downward to 90 degrees when not in use, not visible and does not take space
4 when bend down through inclination button. The back-rest **24** terminating in headrest **57** may
5 also have internal hinges to recline as a forward facing position, and headrest **28**, **47** and **57** serve
6 as alternative head-rests according to the size of the child. When the head/foot **29** rest is in use in
7 Position Infant 1, it provides the necessary space to accommodate the infants head and neck,
8 giving enough elongated extension for an infant to sit comfortably as he grows and his legs and
9 feet extend comfortably to the lower area of back rest **24**, and may use head foot rest **28** as a foot
10 rest. accordingly. With this concave shaped integrated infant safety car seat seat, the lower
11 section of the back-rest **24** fully inclines with button **41** for a child from 2 to 4 years to extend his
12 lower extremities, in the rear facing position, which allows him to be protected from injuries in a
13 collision for a longer period of time, as recommended by institutions.

14

15 The adjusters **66** in various places can move the top point of the harness **64** to
16 accommodate a growing infant or with the elevation of inserts **74** or **76** that tend to reposition the
17 child in the seat **70**. Other harnesses are provided to fit the child perfectly, to strap the child's
18 shoulders from above or from below the shoulders as recommended by the standards.

19

20 With a seat **70** integrated into the form of the bench **62** and seat **72**, the seat **26** and back **24**
21 may be below the surface of the surrounding surfaces. Without any padding or inserts this might
22 be dimensioned for a larger infant not yet ready to be secured onto a traditional adult seat.

23

24 An insert **74** may be used alone on the seat **70** and back **68**. It may also be used with
25 insert **76** nested inside insert **74** to further diminish the size inside the safety seat for yet a smaller
26 infant. The inserts **74** and **76** are individually removable to accommodate growing infants so that
27 the safety seat may be used for several years of infants' development through the time when they
28 will be able to use a regular adult harness and seatbelt traditionally in cars and light trucks.

29

30 The insert **74** may further include a back **80** and a seat **82** that rest on the back **68** and seat
31 **70**, respectively. Padding **78** may be supplied around the periphery of the insert **74** to fill in the

1 space to make it suitable for smaller infants, generally under about two years of age. A head/foot
2 rest can also be integrated into the insert **74** at either end for forward or rear facing
3 configurations. The head/foot rests not in use are inserted into the surface of the upholstery of the
4 integrated seat and covered by padding.

5
6 The insert **76** may nest inside the insert **74** that is nested inside the back **68** and seat **70** of
7 the car seat bench **62** and seat **72**. Optionally, the insert **76** may directly fit onto the seat **70** and
8 back **68** without the intermediate insert **74**. A back **86** and seat **88** are surrounded by padding **84**
9 to protect and cushion the child. There are sets of padding for a child zero to 6 months, 6 months
10 to 1 year, 1 year to 2 years, 2 years to 4 years, 4 years to 6 years, 6 years to 8 years, and 8 years
11 and above, all included in one another. The inserts may elevate from the seat as the arm-rests,
12 manually or electronically.

13
14 The armrests **23** and **43** may surround the periphery of the seat to provide all around
15 protection, they provide the height to protect the child. Similarly, the padding **78** and padding **84**
16 may be placed between the inserts to provide protection in case of an accident. All the cushions,
17 paddings and protectors are from the same fabric or material as the upholstery and belong to the
18 upholstery, detachable or not. They could be leather, or fabric or other material, and always
19 appear like the rests of the car seats following the lines of design.

20
21 **Figure 6** shows a top and backwards view of the Integrated Infant Safety Car Seat, in
22 which head of infant is facing opposite to the driver, between zero and 2 years old, or below
23 mandatory weight, as well as an infant 2 to 4 years old (position 1). The infants' head lays on
24 head/foot rest **29**. There is a bench **26**, back **24**, head/foot rest **57**, a head/foot rest **47**, head foot
25 rest **28**, an arm-rest **23**, an arm rest **43**, a harness **22**, a hasp **46**, a harness **25**, a hasp **32**, lap rests
26 **27**, and button **39**.

27
28 **Figure 7** shows a top rearward view for newborn infants, from zero to the age of 6
29 months (Approx.). The newborn infant lays in the seat **26**, in Position Infant **1**. The infant's head
30 may be in the seat **26**, in head foot rest **88**, or in the head/foot rest **29**. There is a canopy **67** that
31 covers the area of the extreme of seat **26**, and it is attached on the sides of arm-rests **23**. The top

1 of the canopy is also attached to the base of the head/foot rest **29**. The canopy allows the
2 newborn infant to sleep comfortably being sheltered from noise and light. The canopy is made
3 with the same fabric as rest of the upholstery and it could be opened and closed in an accordion
4 shape. It may also be transparent to view the baby through it. It may be detached. The angle of
5 inclination for the newborns upper body is 30 degrees. There is padding and insert for the
6 newborn infant, **74** and **76** to protect and reduce the space that contains him, arm rest **43**,
7 harnesses **22** and **25**, hasps **46** and **32**, lap belts **27**. The inserts may elevate from the seat with the
8 same technology as the arm-rests, manually or electronically.
9

10 **Figure 8** of the Integrated Infant safety Seat shows the bench **26** ending with head-foot rest
11 **29**, with an example of the different angles of inclination (1,2,3,4,5) for the angles of (40,35,30)
12 degrees upward, for 1,2,3, and resting positions 4, 5, for angles of 45 and 90 degrees downward.
13 It shows seat **24**, ending with head/foot rest **57**, with the different angles of inclination (1, 2, 3, 4)
14 for the angles (45, 40, 60, 80 (degrees downward). These angles may vary with the degrees of
15 inclination. They move with buttons in both Positions Infant 1 and 2, to adjust to the needs of the
16 child's best position to be seated. The buttons raise electronically directly form the seat or by a
17 remote control.
18

19 **Figure 9** shows the raising elevations of the arm rests **23** and **43**, with the buttons **9** and
20 **11**, to three different positions on each arm rest that end in approximately to a height of 12
21 inches. This will protect the child all along the integrated infant safety car seat in all the growing
22 faces of his development, especially in side impacts. The buttons in the seat or a remote control
23 raise the arm rest electronically. They could also be raised and lowered manually.
24

25 **Figure 10** shows the head-foot rest **57**, that also applies to head/foot rests **28**, **29**, **47**, and
26 **88** for newborns, with a rounded shape, and a protruding edge of 7 to 10 inches approximately,
27 with a soft interior texture, that will protect the head and skull of the child, as he develops in
28 every age and size, from any impact.
29

1 **Figure 11**, shows a detail of the protruding edge of head/foot rests **28, 29, 47, 57, and 88**
2 in both Positions Infant 1 and 2 that will protect the child's head from abrupt movement in
3 impact and accidents.

4
5 An important version of the inventive concept can be fairly generally described as an infant
6 seat built into a bench seat in a vehicle, or as a separate unit. The bench seat on a right segment
7 has a first seat and a first back sized for normal adults. The first seat and the first back are
8 dimensioned to support an adult. The bench seat on a left segment has a second seat and a second
9 back. The second seat and the second back are dimensioned to support an adult. A medial (center
10 seat) segment of the bench seat has a third seat and a third back. The third seat and third back are
11 dimensioned to support an infant too small for an adult seat. The third seat is permanently
12 integrated with the bench seat between and below the first seat and the second seat. The third
13 back is permanently integrated with the bench seat between and behind the first seat and the
14 second seat. The bench has a first upholstery that matches and smoothly integrates the third seat
15 with the first seat and second seat. The bench has a second upholstery that matched a smoothly
16 integrated the third back with the first back and the second back. Both seat and bench are
17 reclined with buttons, as well as head/foot rests also reclined with buttons, to rear and forward
18 facing positions, and various degrees. The arm-rest may rise from below electronically. The
19 head/foot rests are rounded with protruding edge. The head foot rest on the extremes of the seat
20 incline with buttons, with bench and back-rest, or independently. The internal head-foot rests of
21 the seat are inserted into the upholstery and elevate with buttons or manually. All inclinations
22 and elevations could be in remote control. There is a canopy attached to arm rests and head/foot
23 rest to protect the newborn baby. There are inserts and padding to cushion and limit the spaces.
24 The inserts may elevate from the seat as the arm-rests, manually or electronically. A camera is
25 directed to the third back to view the infant (s) seated there. With the concave shaped Integrated
26 safety car seat seat, the lower section of the back-rest 24 fully inclines for a child from 2 to 4
27 years to extend his lower extremities, in the rear facing position . A screen is positioned visible
28 to a forward facing driver of the vehicle. The screen selectively shows an image from the
29 camera(s). The third seat includes an internal scale. Harnesses with hasps are provided to secure
30 an occupant of the third seat. The hasp includes a sensor to determine whether the hasp is closed.
31 A processor is connected to a sensor that determines whether the vehicle is in operation based on

1 any of: a speedometer, a transmission or an engine computer. If the processor determines that the
2 vehicle is not in operation and the scale indicates to the processor a preselected threshold weight
3 and the hasp sensor indicates closed then an alert is made. A display is positioned visibly to a
4 forward facing driver of the vehicle. The display shows the signals of the scale, the hasps and the
5 vehicle in operation, as well as a reminder that an infant is in the car, and an unbuckling
6 electronic remote button is an internal feature of the built in car seat. Optionally, inserts and
7 paddings are provided that are adapted to fit within the third back and third seat to reduce the
8 available size of the third back and third seat to fit children as they grow. Optionally, the alert is
9 any individual or combination of: a light, a display, a sound, disabling of a vehicle system or a
10 wireless message.

11
12 A version of the invention can be fairly described as an integrated infant safety car seat
13 built into a bench seat in a vehicle, or as a separate unit between or next to the other seats. The
14 bench seat on a right segment has a first seat and a first back. The first seat and the first back are
15 dimensioned to support an adult. The bench seat on a left segment has a second seat and a second
16 back. The second seat and the second back are dimensioned to support an adult. A medial
17 segment of the bench seat has a third seat and a third back. The third seat and third back are
18 dimensioned to support an infant too small for an adult seat. The third seat is permanently
19 integrated with the bench seat between and below the first seat and the second seat. The third
20 back is permanently integrated with the bench seat between and behind the first seat and the
21 second seat. The bench has a first upholstery that matches and smoothly integrates the third seat
22 with the first seat and second seat. The bench has a second upholstery that matched a smoothly
23 integrated the third back with the first back and the second back. A seat in all the positions has
24 inclinations on both lower and upper parts of the bench and back-rest, in different positions and
25 angles for different ages and sizes with a control button. Head/foot rest on each extreme of the
26 integrated safety seat are an extension of the seat, therefore providing more space for infant that
27 inclines to different angles by a control button. Internal head/foot rests raise from the upholstery.
28 The arm/rests raise from below electronically. Inserts elevate from the upholstery manually or
29 electronically. A remote control for all inclination and raising and elevating features. The
30 head/foot rests are rounded with protruding protection. A canopy for the newborn infants. With
31 concave shaped seat, the lower section of the back-rest fully inclines for a child from 2 to 4 years

1 to extend his lower extremities, in the rear facing position. A camera is directed to the third back
2 and another set of cameras are in hasps of harnesses and/or elsewhere. A screen is positioned
3 visible to a forward facing driver of the vehicle. A display with inner and also manual signs is
4 positioned visible forward facing driver. The screen selectively shows an image from the
5 cameras. The third seat includes a scale on bench and back-rest as an internal part of the
6 integrated infant safety car seat that is part of the vehicle. The harnesses with hasps are provided
7 to secure an occupant of the third seat. The hasps include sensors to determine whether the hasps
8 are closed. A processor is connected to the sensors that determine whether the vehicle is in
9 operation based on any of: a speedometer, a transmission or an engine computer. If the processor
10 determines that the vehicle is not in operation and the scale indicates to the processor a
11 preselected threshold weight and the hasp sensor indicates closed then an alert is made. A
12 processor indicates if infant is in car connected to safety seat. A processor indicates if infant is in
13 safety seat, connected to safety seat. A processor indicates if infant is buckled connected to
14 integrated infant safety car seat. A processor activates lights, sounds and alarms connected to
15 integrated infant safety car seat. A processor Unbuckled the hasps remotely and internally form
16 display, connected internally to integrated infant safety car seat. A processor is installed in key
17 device for Infant in car, connected to the integrated infant safety car seat connected internally.
18 The integrated infant safety car seat has adaptable positions facing the driver and opposite to the
19 driver, with inclinations of bench and back-rest rest as well as head/foot rests in the extremes that
20 also independently incline to different angles, and head/foot rests internally that elevate from
21 upholstery, as arm rests all along the seat that raise, as well as inserts that elevate. Optionally,
22 the integrated infant safety car seat further has inserts and padding provided that are adapted to
23 fit within the third back and third seat to reduce the available sizes of the third back and third
24 seat to fit a smaller infant. Optionally, the alert is any individual or combination of: a light or an
25 intermittent light in display, a sound, disabling of a vehicle system or a wireless message
26 internally connected to the integrated infant safety car seat. The inserts may elevate from the seat
27 as the arm-rests, manually or electronically. Optionally, the third seat and back is provided with a
28 mechanized recline to convert the third seat from forward facing to rear facing. Optionally,
29 head/foot rests have independent angles of inclination. Optionally the arm-rests raise from below
30 electronically on both seat and back rest.

31

1 Another version of the device embodied in its inventive concepts may be fairly described as
2 an integrated infant safety car seat built into a bench seat in a vehicle, or as a separate unit
3 between the seats. A segment of the bench seat has a built in assembled seat and a back.
4

5 The seat and back are dimensioned to support an infant, from a newborn to a toddler or
6 under the age of 8 who is too small for an adult seat. The seat is permanently integrated with the
7 bench seat below a seat surface of the bench. The back is permanently integrated with the bench
8 seat behind a back surface of the bench. The bench has a first upholstery that matches and
9 smoothly integrates the seat with the bench. The bench has a second upholstery that matches to
10 smoothly integrate the back with the back surface of the bench. With concave shaped Integrated
11 Infant Safety Car Seat the lower section of the back-rest fully inclines for a child from 2 to 4
12 years to extend his lower extremities, in the rear facing position. A camera is directed to the
13 back. Other cameras are in hasps and elsewhere in integrated seat and vehicle. A screen is
14 positioned visible to a forward facing driver of the vehicle. The screen selectively shows an
15 image from the cameras. A display is positioned visible to a forward facing driver of the vehicle.
16 The display has electronic and manual control signals.
17

18 A display is positioned visible to a forward facing driver of the vehicle; all the safety features are
19 reflected in display. The integrated infant safety car seat includes an internal scale. Harnesses
20 with hasps are provided to secure an occupant of the seat, internally connected to the integrated
21 infant safety car seat. The hasps include a sensor to determine whether the hasp is closed; a
22 processor is connected to a sensor that determines whether the vehicle is in operation based on
23 any of: a speedometer, a transmission or an engine computer. If the processor determines that the
24 vehicle is not in operation and the scale indicates to the processor a preselected threshold weight
25 and the hasp sensor indicates closed then an alert is made. Electronic signs of infant in seat, and
26 infant buckled are reflected in display, which are internally connected to the integrated infant
27 safety car seat. Manual sign of Infant in Car, is reflected in display, internally connected to the
28 integrated infant safety car seat. Electronic button to un-buckle, is reflected in display, internally
29 connected to the infant safety car seat. Electronic control of Infant in Car in key device is
30 internally connected to Integrated Infant Safety Car Seat. Lights, intermittent lights, sounds such
31 as a lullaby and other sound or voices and alerts are activated and de-activated according to

1 status of the infant in vehicle, the actions taken, and the control signs, internally connected to the
2 infant safety car seat. Optionally, inserts and paddings are provided that is adapted to fit within
3 the back and seat to reduce the available size of the back and seat to fit a smaller infant. The
4 inserts may elevate from the seat as the arm-rests, manually or electronically. Optionally, the
5 alert is any individual or combination of: a light, a display, a sound, disabling of a vehicle system
6 or a wireless message. Optionally, the bench seat includes more than one integrated infant safety
7 car seat. Optionally, the seat and back are provided with a mechanized recline to convert the seat
8 from forward facing to rear facing with different degrees of inclination, with rounded and
9 protruding edges head/foot rests that also recline in different angles, and arm-rests that elevate in
10 bench and back-rests to different heights, and head/foot rests in the extremes that may recline
11 independently, and head/foot rests along the bench and back-rest that elevate from the
12 upholstery.

13

14 The foregoing description conveys the best understanding of the objectives and
15 advantages of the present invention. Different embodiments may be made of the inventive
16 concept of this invention. It is to be understood that all matter disclosed herein is to be
17 interpreted merely as illustrative, and not in a limiting sense.

18

19 **VII. INDUSTRIAL APPLICABILITY**

20

21 It is evident that an invention such as the integrated child safety seat can increase the
22 safety factor and likelihood of survival in automobile collisions. The present invention satisfies
23 this goal and is expected to be preferred standard equipment on luxury large vehicles as well as
24 more commonly available vehicles. Further, the improved aesthetic of a design integrated with
25 the upholstery not only improves the appearance of a vehicle, it lends strength to securely
26 connecting a child occupant to the vehicle, increasing safety.

27

28 Prior art required children that travel in cars to use detached car seats of all shapes and
29 forms. Infants who don't fit properly in a traditional car seat in a rear-facing position or as they
30 start growing are not seated adequately and their lower extremities are impeded to extend.
31 Toddlers or small children are placed in a detached car seat in the forward facing position before

1 it is indicated are at risk of an injury to their skull and neck and are at increased risk of death in
2 the event of an accident.

3

4 The present invention contemplates all of these factors and holds the young travelers in a
5 natural, safe and protected fashion. Presently discussed is a better way of ensuring the children in
6 cars, in a comprehensive seat optimally designed recognizing the needs of the young travelers
7 while protecting their lives.

8

9 The Integrated Infant Safety Car Seat is an invention and a product development that
10 withholds all the technology advancements combined in a unique concept and art, surpassing all
11 existing alternatives. Consumers, car manufacturers and Institutions are more demanding.

12

13 Studies from around the world indicate it is imperative to place the child in a seat in a
14 rear facing position, for as long as possible, for the mandatory age of 2, and preferably until the
15 age of 4 years old, to avoid injuries and deaths in car collisions or accidents. As the infant starts
16 getting closer to being one year old, the rear facing position becomes a struggle. Space available
17 for them to stretch their legs, becomes limited. The present design solves these issues. It also
18 avoids complicated, risky and unsafe use of detached car seat units with the complimentary
19 separate pieces.

20

21

1 IX. CLAIMS

2
3 What is claimed is:

- 4
- 5 1. An integrated infant safety car seat built into a bench and back seat in a vehicle; or as
6 a separate unit between or next to other seats;
7 the bench seat on a right segment has a first seat and a first back;
8 the first seat and the first back are dimensioned to support an adult;
9 the bench seat on a left segment has a second seat and a second back;
10 the second seat and the second back are dimensioned to support an adult;
11 a medial segment of the bench seat has a third seat and a third back;
12 the third seat and third back are dimensioned to support an infant too small for an
13 adult seat;
14 the third seat is permanently integrated with the bench seat between and below the
15 first seat and the second seat;
16 the third back is permanently integrated with the bench seat between and behind the
17 first seat and the second seat;
18 the bench has a first upholstery that matches and seamlessly integrates the third seat
19 with the first seat and second seat;
20 the bench has a second upholstery that matches and seamlessly integrates the third
21 back with the first back and the second back;
22 the third seat inclines in different positions and angles for different ages and sizes with
23 a control button;
24 a head/foot rests in various positions rounded with protruding protection on each side
25 of a front and back of the third seat is an extension of the seat;
26 an arm-rest on the sides on both the seat and back rests that raises from below
27 electronically.
28 a concave shaped seat, the lower section of the back-rest 24 fully inclines for a child
29 from 2 to 4 years to extend his lower extremities, in the rear facing position.
30 a canopy is provided over the third seat to protect an occupant;
31 a first camera is directed to the third back;

1 a second camera is in a hasp connected to a harnesses;
2 a display is positioned visible to a forward facing driver of the vehicle;
3 a display with manual signs is positioned visible to a forward facing driver;
4 the display selectively shows an image from any of the cameras;
5 the third seat includes an internal scale as part of the integrated infant safety car seat
6 that is part of the vehicle;
7 a harness with a hasp in various positions is provided to secure an occupant of the
8 third seat;
9 the hasp includes sensors to determine whether the hasp is closed;
10 a processor is connected to the sensor that determines whether the vehicle is in
11 operation based on any of: a speedometer, a transmission or an engine computer;
12 if the processor determines that the vehicle is not in operation and the scale indicates
13 to the processor a preselected threshold weight and the hasp sensor indicates closed
14 then an alert is made;
15 the processor indicates if infant is in car connected to safety seat;
16 the processor determines and sends to the display an indication if an infant is in the
17 third seat;
18 the processor determines and sends to the display an indication if an infant is buckled
19 in the third seat;
20 the processor activates lights, sounds and alarms connected to integrated infant safety
21 car seat;
22 the processor can unbuckle the hasp of the integrated infant safety car seat;
23 the processor is wirelessly connected to a key fob device to play the alarm;
24 the integrated infant safety car seat has adaptable positions facing the driver and
25 opposite to the driver, with inclinations of benches and back-rest as well as headrests
26 and foot/rests that also independently incline to different angles., in the extremes, and
27 head/foot rests along the bench and back-rest that elevate.
28 The arm-rests raise from below electronically on seat and back rest;
29 The inserts that raise with the same technology as the arm rests.

30
31 **2.** The integrated infant safety car seat in claim 1 further

1 characterized in that inserts and paddings are provided that are adapted to fit within
2 the third back and third seat to reduce the available size of the third back and third
3 seat to fit smaller infants.

4
5 3. The integrated infant safety car seat in claim 2 further
6 characterized in that the alert is any individual or combination of: a light, an
7 intermittent light in display, a sound, disabling of a vehicle system or a wireless
8 message internally connected to the
9 integrated infant safety car seat.

10
11 4. The integrated infant safety car seat in claim 3 further characterized
12 in that the third seat and back is provided with recline mechanisms
13 to convert the third seat from forward facing to rear facing.

14
15 5. An integrated infant safety car seat built into a bench seat in a vehicle; or separate
16 between or next to other seats.
17 a segment of the bench seat has a seat and a back;
18 the seat and back are dimensioned to support an infant, from a newborn to a toddler
19 or to the age of eight and above.
20 the seat is permanently integrated with the bench seat below a seat surface of the
21 bench;
22 the back is permanently integrated with the bench seat behind a back surface of the
23 bench;
24 the bench has a first upholstery that matches and seamlessly integrates the seat with
25 the bench;
26 the bench has a second upholstery that matches to smoothly integrate the back with
27 the back surface of the bench;
28 a first camera is directed to the back;
29 a second camera is in a hasp integrated seat and vehicle.
30 a display is positioned visible to a forward facing driver of the vehicle;
31 the display selectively shows an image from any of the cameras;

1 the display is positioned visible to a forward facing driver of the vehicle;
2 the screen selectively shows an image from the cameras;
3 the display has electronic and manual control signals;
4 the display selectively shows an image from the cameras;
5 a display is positioned visible to a forward facing driver of the vehicle;
6 a safety feature is shown in the display.
7 the seat includes an internal scale;
8 harnesses with hasps are provided to secure an occupant of the seat and are internally
9 connected to the integrated infant safety car seat;
10 the hasps include a sensor to determine whether the hasp is closed;
11 a processor is connected to a sensor that determines whether the vehicle is in
12 operation based on any of: a speedometer, a transmission or an engine computer;
13 if the processor determines that the vehicle is not in operation and the scale indicates
14 to the processor a preselected threshold weight and the hasp sensor indicates closed
15 then an alert is made;
16 electronic signs of infant in seat, and infant buckled are shown on the display;
17 an infant in car notification, is shown in the display;
18 an electronic button to un-buckle, is provided on the display;
19 electronic control of infant in car in key fob is internally connected to integrated
20 infant safety car seat;
21 lights, intermittent lights, sounds, a lullaby voices alerts are activated and de-activated
22 according to status of the infant in vehicle, the actions taken, and the control signs,
23 internally connected to the infant safety car seat.

- 24
25 6. The integrated infant safety car seat in claim 5 further characterized in that an insert
26 and paddings are provided that are adapted to fit within the back and seat to reduce
27 the available sizes of the back and seat to fit a smaller infant. The inserts may elevate
28 from the seat as the arm-rests, manually or electronically.
29

- 1 7. The integrated infant safety car seat in claim 6 further characterized in that the alert is
2 any individual or combination of: a light, a display, a sound, disabling of a vehicle
3 system or a wireless message.
4
- 5 8. The integrated infant safety car seat in claim 7 further characterized in that the bench
6 seat includes more than one integrated infant safety car seat.
7
- 8 9. The integrated infant safety car seat in claim 8 further characterized in that the
9 concave shaped seat, with a bench and back is provided with a recline to convert the
10 seat from forward facing to rear facing, with rounded headrest and footrests with
11 protruding edges that also recline in different angles, and head/foot rests along the
12 bench and back-rest that elevate from the upholstery, with arm rests for side protection
13 and inserts for barriers that raise from below electronically or manually.
14
15
16
17
18
19
20
21

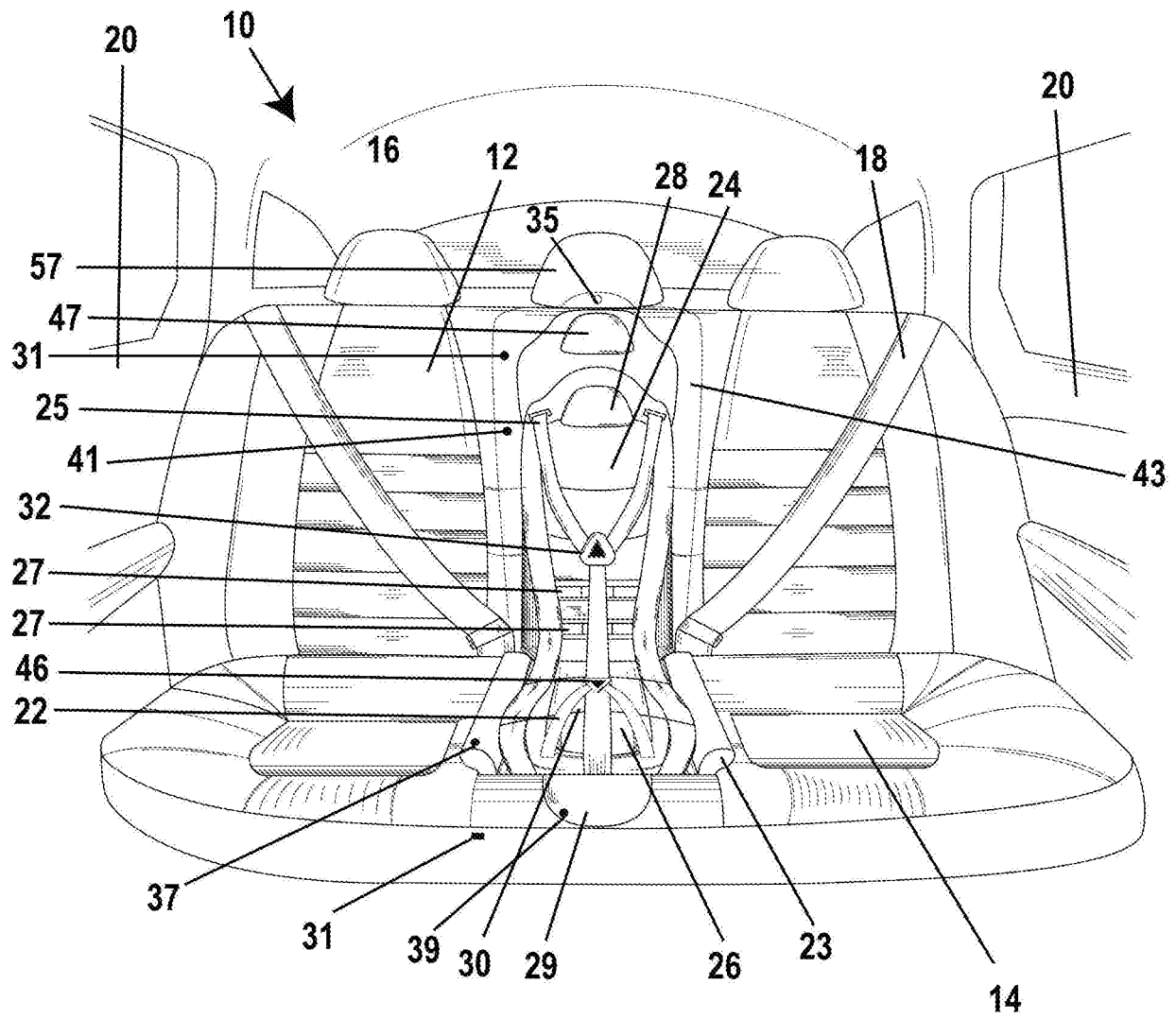


FIG. 1

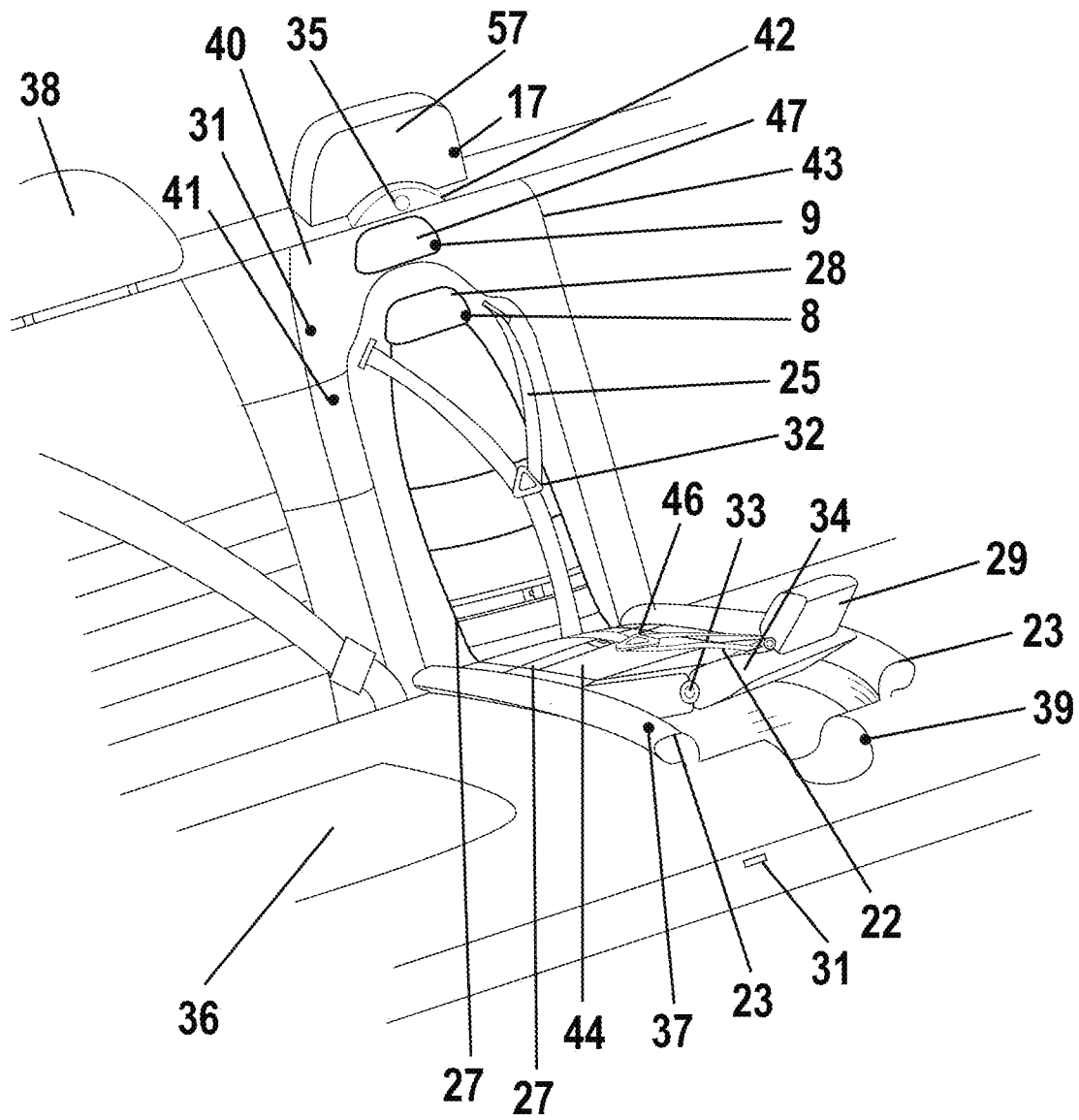


FIG. 2

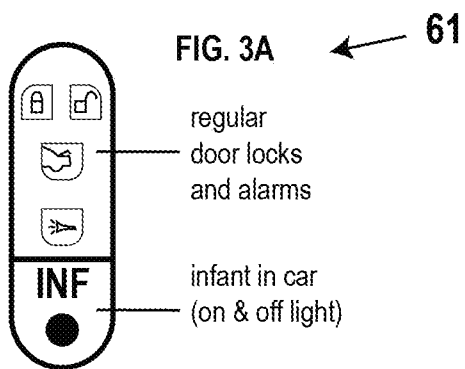
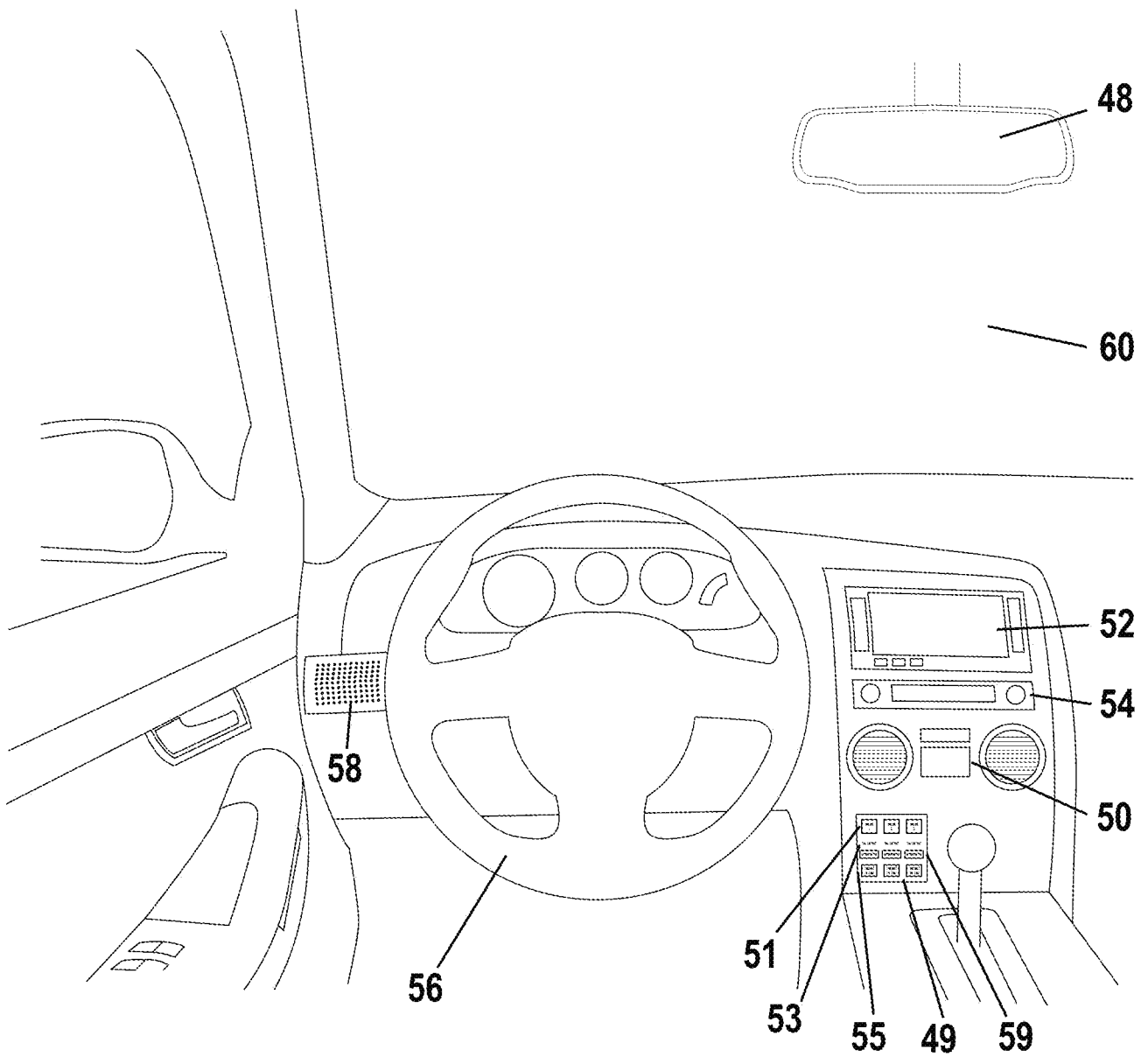


FIG. 3

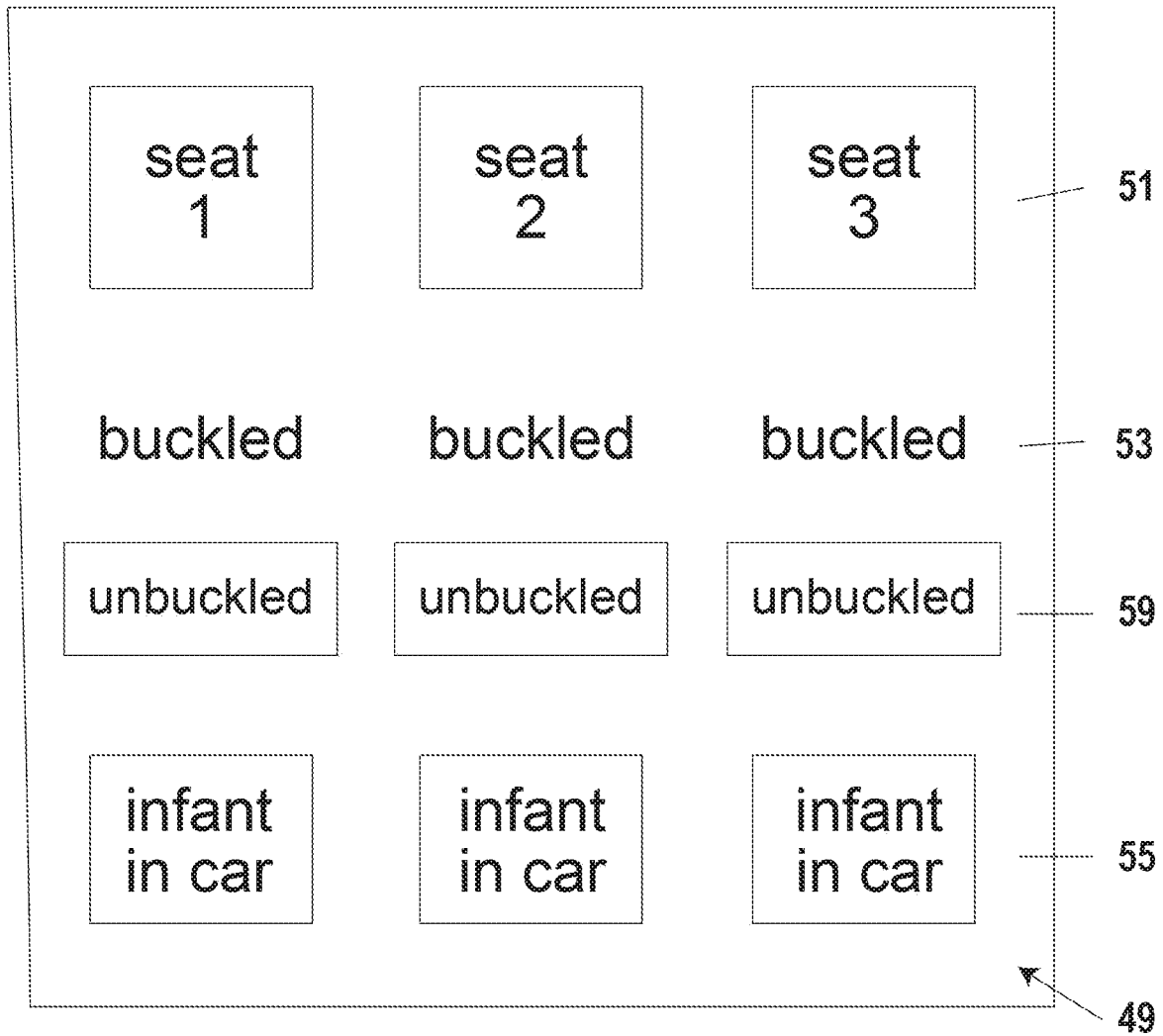


FIG. 4

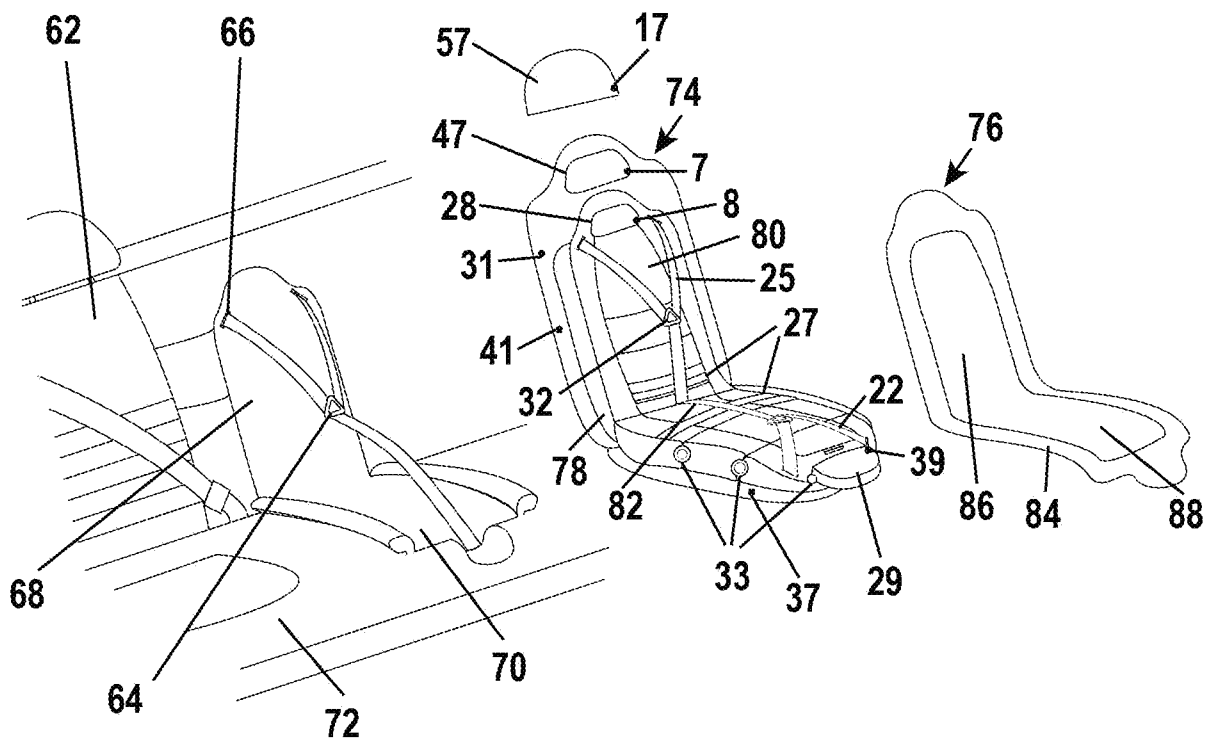


FIG. 5

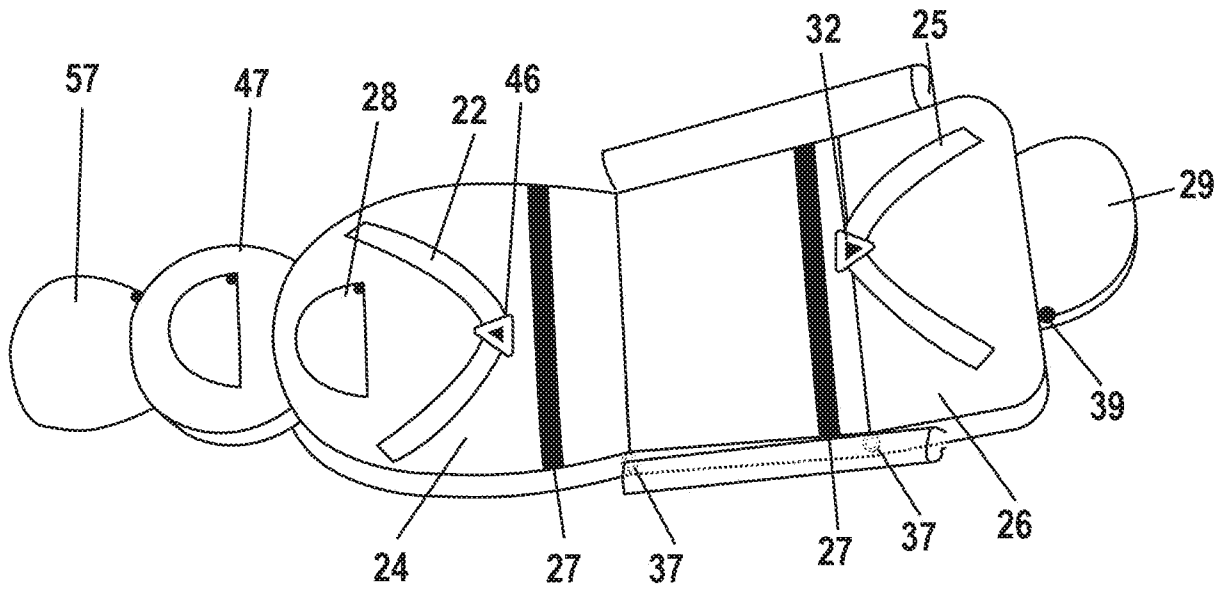


FIG. 6

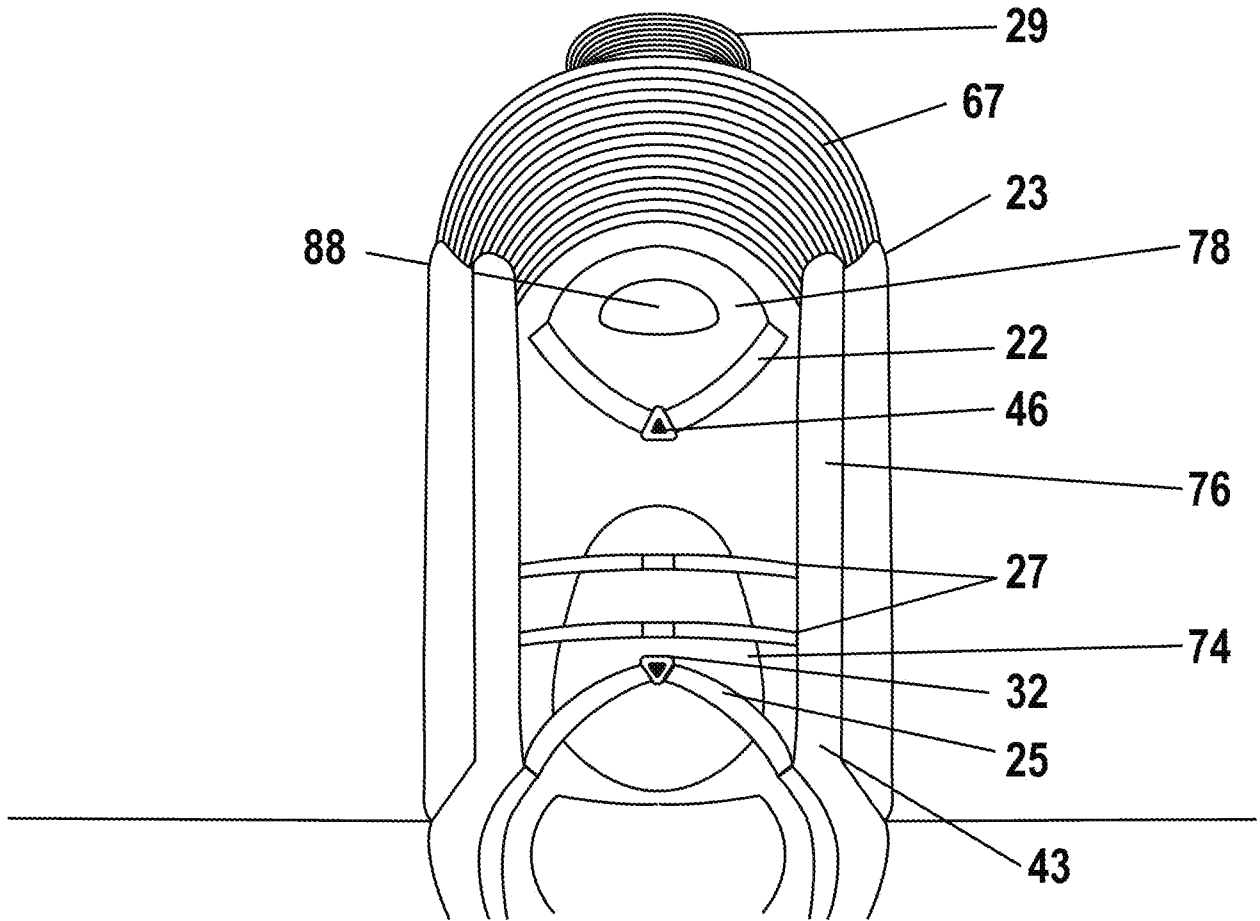


FIG. 7

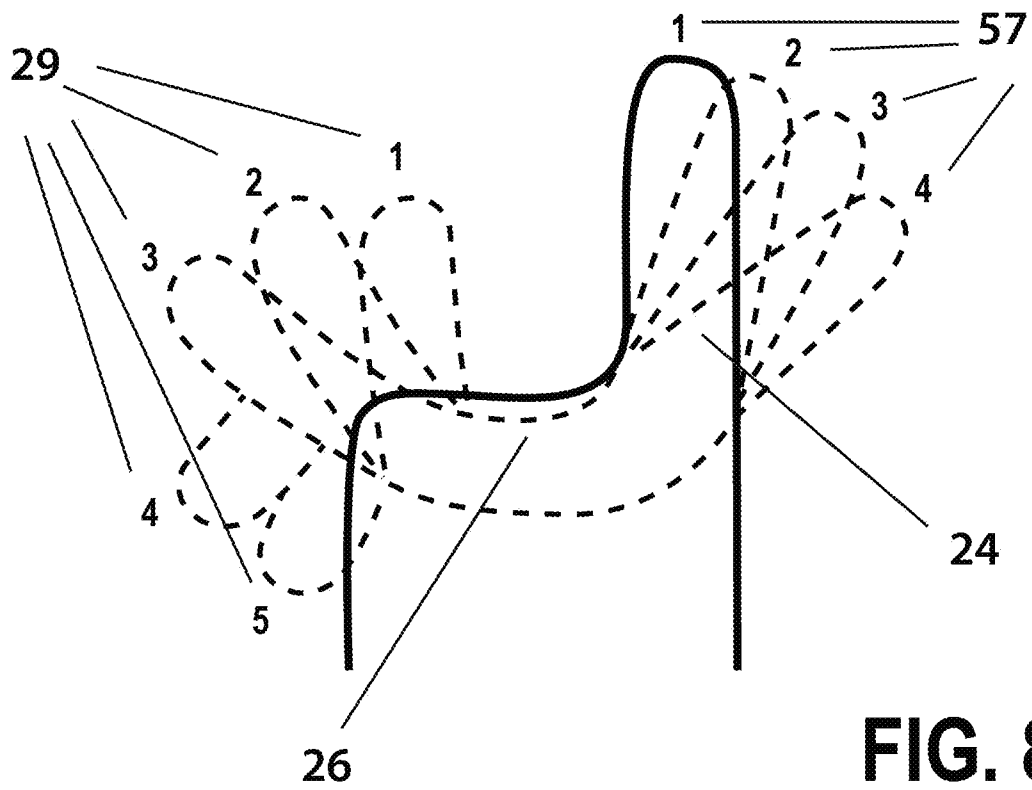


FIG. 8

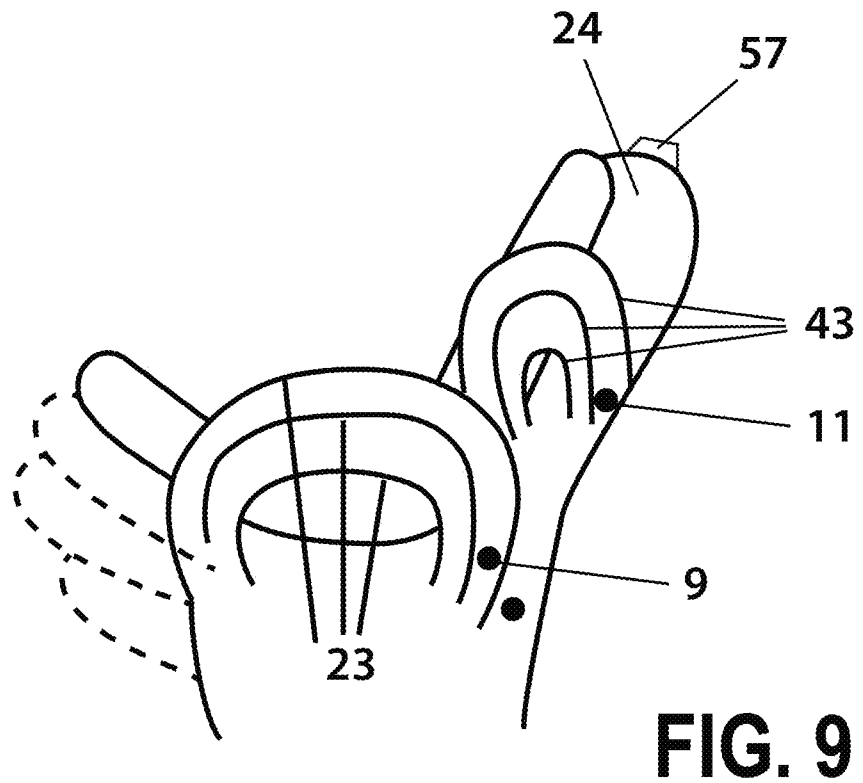


FIG. 9

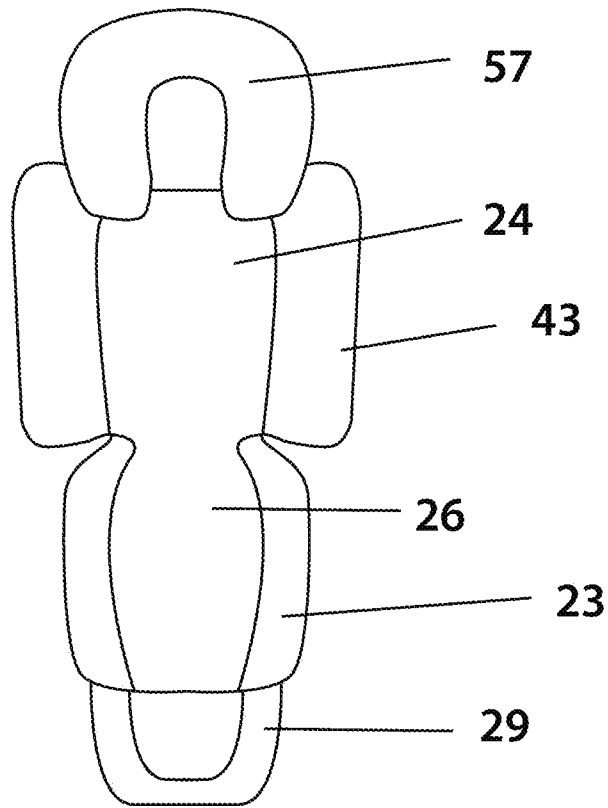


FIG. 10

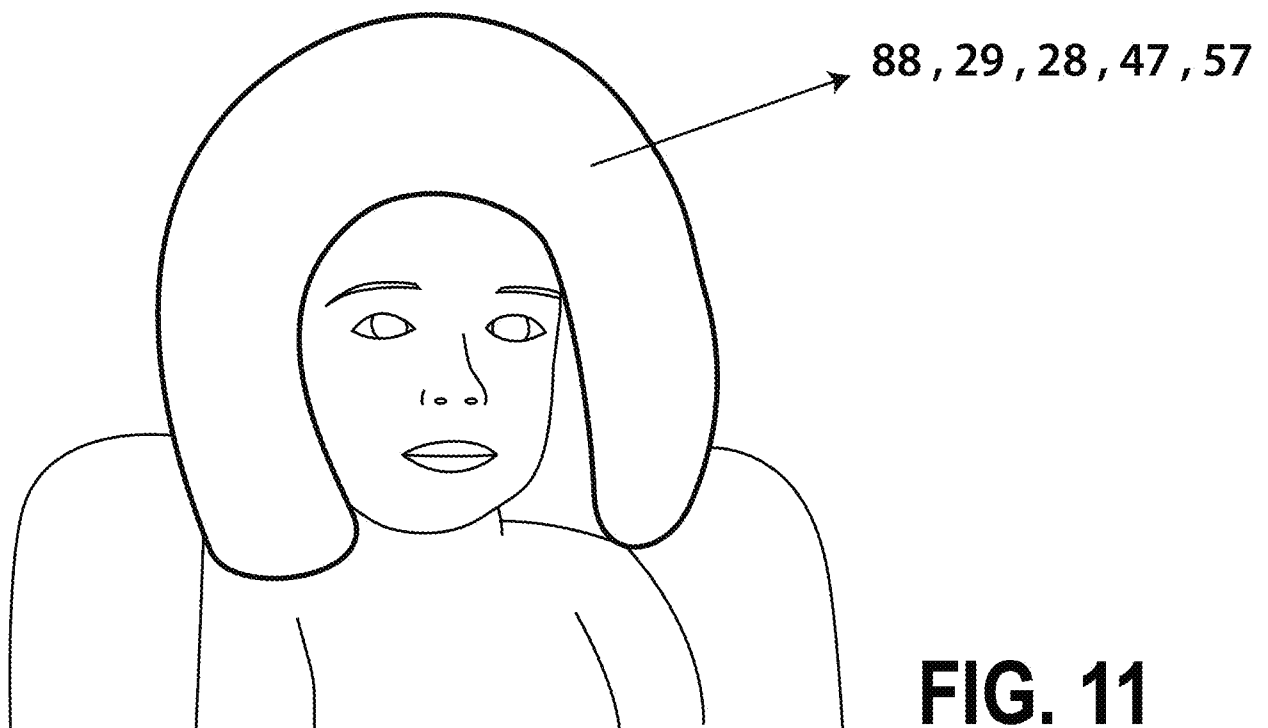


FIG. 11

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 2016/067411

A. CLASSIFICATION OF SUBJECT MATTER		
B60N2/26 (2006.01) B60N2/30 (2006.01) G08B21/22 (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 2/00-2/72, A47C 7/00-7/74, B60K 37/00-37/02, B60Q 1/00-1/56, 5/00, 9/00, G08B 21/00-21/24		
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)		
DWPI, EAPATIS, ESP@CENET, KIPRIS, PAJ, PATSEARCH, RUPTO, SIPO, USPTO		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2599660 A1 (RODRIGO PERENA et al.) 05.06.2013, paragraphs [0001], [0004]-[0010], [0013]-[0015], figs. 2-6	1-9
A	US 9403437 B1 (SCOTT D. MCDONALD et al.) 02.08.2016, col.1 line 53 – col.2 line 7, col.8 line 35 – col.29 line 65, figs.1-16	1-9
A	EP 2028035 A2 (FORD GLOBAL TECHNOLOGIES, LLC) 25.02.2009, paragraphs [0088]-[0090], [0092], figs. 17-18	1-9
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:		
“A” document defining the general state of the art which is not considered to be of particular relevance		“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
“E” earlier document but published on or after the international filing date		“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
“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)		“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
“O” document referring to an oral disclosure, use, exhibition or other means		“&” document member of the same patent family
“P” document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search	Date of mailing of the international search report	
26 May 2017 (26.05.2017)	06 July 2017 (06.07.2017)	
Name and mailing address of the ISA/RU: Federal Institute of Industrial Property, Berezhkovskaya nab., 30-1, Moscow, G-59, GSP-3, Russia, 125993 Facsimile No: (8-495) 531-63-18, (8-499) 243-33-37	Authorized officer O.Smurygina-Antonova Telephone No. (8-495) 531-65-15	