

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
25 January 2007 (25.01.2007)

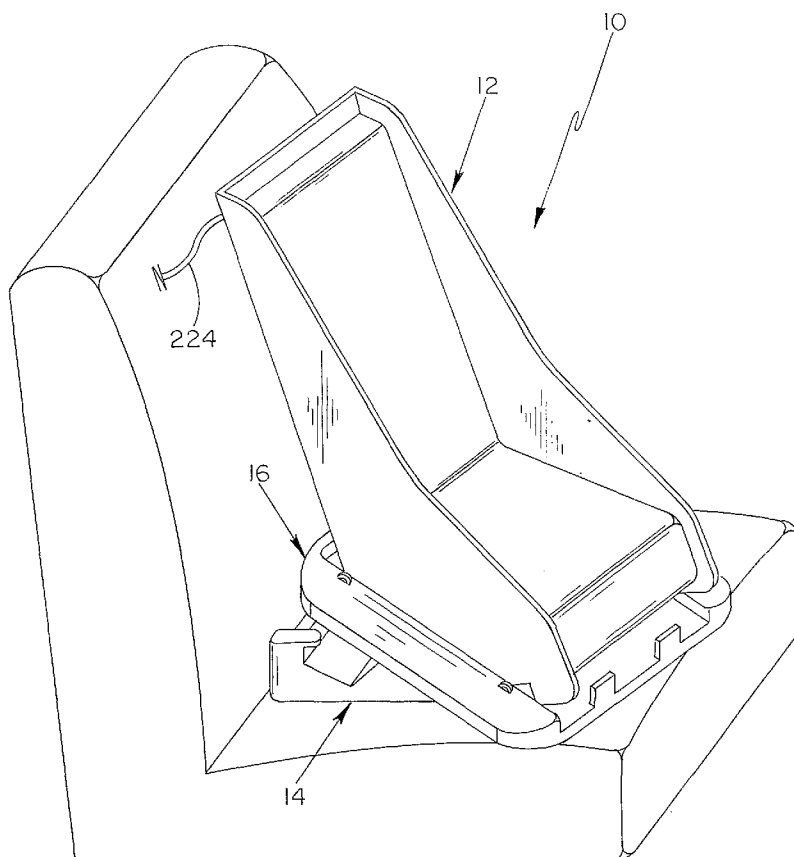
PCT

(10) International Publication Number
WO 2007/011342 A1

- (51) **International Patent Classification:**
A47C 1/08 (2006.01)
- (21) **International Application Number:**
PCT/US2005/025199
- (22) **International Filing Date:** 15 July 2005 (15.07.2005)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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(54) **Title:** CHILD SAFETY SEAT



(57) **Abstract:** A rotatable child safety seat mounting apparatus for use in combination with a vehicular child safety seat includes a base structure and an interface structure that is removably and rotatably engageable with the base structure. The interface structure and the base structure each include respective guide structures disposed thereon which enable relative rotational motion therebetween while remaining in an engaged relationship with one another. The interface structure is specifically configured for adaptation to conventional vehicular child safety seats.

WO 2007/011342 A1

**Declaration under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian

patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Atty. Docket No. 2005-2628.WP

CHILD SAFETY SEAT

Field of the Invention

5 The present invention relates to child safety seats generally, and more particularly to a child safety seat mounting apparatus which provides a rotational capability of the seat while in a mounted and secured condition, and which incorporates a retractable tie-down safety strap system in
10 the seat structure.

Background of the Invention

 Infant and child vehicular safety seats have become widely available since legislation was passed in the United States making use of such safety seats mandatory in the
15 automotive transportation of infants and small children. The tremendous demand for vehicular safety seats has resulted in continual refinements and improvements to initial designs. One such improvement is the adoption of standardized seat sizing for enhanced modularity and
20 portability of such seats for use in applications outside the automobile. For example, conventional infant vehicular safety seats typically are configured so as to be removably mountable to a base member that is secured in place in the respective vehicle via seat belts or other latch means, as
25 well as to strollers and the like.

 As a result, many presently-utilized vehicular safety seats incorporate a distinct base unit that is intended to remain securely positioned in the vehicle while the seat element may be selectively secured thereto. The seat
30 element itself, therefore, may be utilized as a child carrying apparatus, and used alone or in combination with mating base structures such as a vehicular base unit, a

stroller, a shopping cart, or the like. Such a feature adds significant utility to child safety seats.

Another feature that has been addressed in certain vehicular safety seat designs is that of a pivotable characteristic to the seat. In such a manner, the safety seat may be rotated while remaining in a secured relationship within the vehicle. The user may therefore load and unload the child from the safety seat in a more convenient fashion.

10 The rotatable vehicular safety seats proposed to date, however, comprise relatively complex assemblies that are expensive to manufacture. Typically, such assemblies require uniquely manufactured components to operate as designed. Moreover, such components fail to provide
15 compatibility to conventional systems.

It is therefore a principle object of the present invention to provide a vehicular child safety seat mounting apparatus that enables rotational mounting of a conventional child safety seat thereto.

20 It is another object of the present invention to provide a rotatable child safety seat mounting apparatus that enables a conventional child safety seat to rotate along a plane parallel with its base while the seat is securely connected to the vehicle seats.

25 It is a further object of the present invention to provide a rotatable vehicular child safety seat mounting apparatus that is compatible with conventional child safety seats.

30 It is a still further object of the present invention to provide a rotatable vehicular child safety seat mounting apparatus that is relatively inexpensive to manufacture.

It is another object of the present invention to provide a child safety seat having a retractable harnessing means incorporated therewith for securing the child safety seat to a corresponding vehicular seat.

5

Summary of the Invention

By means of the present invention, a rotatable vehicular child safety seat mounting apparatus is provided for operably receiving child safety seats thereto. The mounting apparatus of the present invention enables the mounting of a conventional child safety seat to a modified base, which base provides a rotating and sliding utility to the child safety seat while the seat is in a secured relationship with the base. Such a sliding and rotating utility gives rise to more convenient access to the operably engaged child safety seat, so that child ingress and egress to the safety seat is facilitated. The mounting apparatus is preferably configured for adaptation to conventional vehicular child safety seats.

In addition, the vehicular child safety seat of the invention preferably incorporates a retractable harnessing apparatus for operably securing the child safety seat to the corresponding vehicular seat. The retractable harnessing apparatus allows the user to adjustably position the child safety seat in a secured orientation with respect to the vehicular seat without the need to manually adjust respective safety strap lengths. As such, the retractable/extendable nature of the harnessing apparatus of the present invention facilitates ease of securement of the safety strap to securing receptacles attached to the vehicle, without compromising the effectiveness of the safety strap in the event of an automobile accident.

In a particular embodiment of the present invention, the rotatable mounting apparatus includes a base structure having an upper surface, a front end, a rear end, and opposing sides connecting the front and rear ends, with the
5 base structure further including an elongated aperture extending therethrough from the upper surface to the lower surface. The aperture has a longitudinal axis extending substantially parallel to the sides, and a lateral axis extending substantially parallel to the front and rear ends,
10 with the longitudinal axis being relatively longer than the lateral axis. The base structure preferably further includes a first guide element disposed on the upper surface thereof, as well as a releasable lock mechanism. The rotatable mounting apparatus preferably further includes an
15 interface structure that is removably and rotatably engageable with the base structure, with the interface structure having a mating element extending from a lower surface thereof, with the mating element being configured for operable, slidable, and rotatable engagement with the
20 aperture in the base structure, thereby removably securing the interface structure to the base structure. The interface structure also includes a second guide structure on the lower surface thereof that is matingly engageable with the first guide element such that relative rotational
25 motion between the interface structure and the base structure, while the first and second guide elements are operably engaged with one another, causes the interface structure to progressively displace toward the front end of the base structure. The upper surface of the interface
30 structure is preferably configured to operably and retainably receive the vehicular child safety seat thereto.

In another embodiment of the present invention, the child safety seat of the present invention includes a retractable harnessing apparatus for securing the child safety seat to a vehicular seat, with the retractable
5 harnessing apparatus having a safety strap that is retractably extended out from a strap housing. The retractable harnessing apparatus is preferably integrally mounted within the child safety seat, and includes a locking mechanism for responsively locking the safety strap in a
10 fixed degree of extension from the housing upon a sudden force urging the safety strap out from the housing.

In certain embodiments, the child safety seat of the present invention is specifically configured to be removably matingly engageable with a rotatable mounting apparatus.

15

Brief Description of the Drawings

Figure 1 is a perspective view of the mounting apparatus of the present invention having a vehicular child safety seat operably engaged therewith.

20 Figure 2 is a perspective view of the assembly illustrated in Figure 1, with the child safety seat being rotated from a locked position while engaged with the mounting apparatus of the present invention.

Figure 3 is an isolation top perspective view of a base structure of the present invention.

25 Figure 4 is a bottom view of the base structure illustrated in Figure 3.

Figure 5 is an isolation top perspective view of an interface structure of the present invention.

30 Figure 6 is a bottom view of the interface structure illustrated in Figure 5.

Figure 7 is a top perspective view of the combination of an interface structure and a base structure of the present invention.

Figure 7A is an enlarged view of a portion of the combination illustrated in Figure 7.

Figure 8 is a bottom view of the assembly illustrated in Figure 7.

Figure 9 is a cut-away side view of a child safety seat of the present invention.

Figure 10 is a partial cut-away perspective view of a child safety seat of the present invention.

Figure 11 is an isolation view of a safety strap guide component of a child safety seat of the present invention.

Detailed Description of the Preferred Embodiments

The objects and advantages enumerated above together with other objects, features, and advances represented by the present invention will now be presented in terms of detailed embodiments described with reference to the attached drawing figures which are intended to be representative of various possible configurations of the invention. Other embodiments and aspects of the invention are recognized as being within the grasp of those having ordinary skill in the art.

Referring now by characters of reference to the drawings, and first to Figure 1, a child safety seat apparatus 10 is shown including a seat 12, a base portion 14, and an interface portion 16. Seat 12 is preferably removably secured to interface portion 16, while interface portion 16 is rotatably and slidably secured to base portion 14. Seat 12 may be configured with a conventional undersurface arrangement that is capable of being removably mounted to interface portion 16.

Interface portion 16 is preferably configured to be adaptable to conventional infant or child safety seat undersurface arrangements. In other embodiments, seat 12 may be specially designed for particular use with interface portion 16 of the present invention. In such embodiments, the bottom surface of seat 12 is preferably configured to removably engage with interface portion 16. The present invention further contemplates the utilization of safety harnessing belts incorporated into the seat, and which are anchored to the vehicular seat for further securing apparatus 10 in place. The harnessing apparatus preferably includes means for automatically locking the safety harnessing belts upon the incursion of a predetermined degree of separation force between the child safety seat and the vehicular seat.

In a particular embodiment of such a harnessing apparatus, as illustrated in Figure 9, seat 12 of the present invention preferably includes a retractable harnessing apparatus 220 operably coupled thereto. In particular, harnessing apparatus 220 includes a strap housing 222 that is preferably integrally mounted within the perimetorial confines of seat 12, and more preferably within seatback 13. Housing 222 of harnessing apparatus 220 preferably encloses a winding of safety strap material 224, with such a safety strap 224 extensably and retractably coupled to a spool within housing 222. As a result, safety strap 224 retractably extends out from housing 222 in a preferred fashion so as to be in a disposition convenient for securement with latching features of a corresponding vehicular seat.

In the partial cut-away view of Figure 10, seatback 13 of child safety seat 12 preferably includes lower and upper

apertures 232, 234 extending therethrough and being sized and configured to allow the passage of safety strap 224 therethrough. Lower and upper apertures 232, 234 in seatback 13 are preferably sufficiently spaced apart so that safety strap 224 bears against a substantial length of front surface 11 of seatback 13 while in operable threaded disposition through lower and upper apertures 232, 234. As a consequence, safety strap 224 acts as a restraint to movement of seat 12 when safety strap 224 is operably secured to a tie-down element of the vehicle.

To effect affixation of safety strap to the corresponding vehicular seat, harnessing apparatus 220 preferably includes an attachment device 226 such as a hook, or the like, secured to a distal end 225 of safety strap 224. Attachment device 226 operably couples to an anchoring utility either in the vehicular seat or otherwise attached to the vehicular frame. In recent model vehicles, the federal government has mandated the installation of "LATCH" anchoring elements which are specifically designed to operably attach to devices such as attachment device 226 of the present invention for operably anchoring child safety seats to a corresponding vehicular seat.

In the embodiment illustrated in Figures 9 and 10, safety strap 224 is operably threaded through both lower and upper apertures 232, 234 so as to facilitate attachment to a LATCH-type anchoring element, particularly at or near an upper portion of the seat, when child safety seat 12 is in a forward-facing orientation. The mounting apparatus of the present invention contemplates the utilization of child safety seat 12 in either a rearwardly or forwardly facing orientation during use.

Housing 222 of harnessing apparatus 220 preferably includes a locking mechanism integrated therewith for responsively locking safety strap 224 in a fixed degree of extension from housing 222 upon incursion of a sudden force urging safety strap 224 out from housing 222. For example, safety strap 224 is preferably mounted in housing 222 so as to be relatively freely extensible and retractable therefrom, even while attachment device 226 is operably secured to an anchoring element in the corresponding vehicle. Such a relatively free extensibility and retractability characteristic of safety strap 224 enables the user to operably secure attachment device 226 to a corresponding LATCH-type element without time-consuming manual adjustment to a fixed length of safety strap 224. Moreover, the relatively free extensibility and retractability characteristic of safety strap 224 enables seat 12 to be operably secured to a rotatable mounting apparatus that provides for the operable rotation of seat 12 while secured to the corresponding vehicular seat. Thus, safety seat 12 may be rotated about a plane defined by seat portion 15 thereof without having to disengage safety strap 224 from respective anchoring elements in the corresponding vehicular seat.

In addition to the above, the locking mechanism provided in housing 222 of harnessing apparatus 220 acts as a lockable ratchet system for locking safety strap 224 in place when a sudden force is imparted upon safety strap 224 to pull such strap 224 out from housing 222, such as would be the case if seat 12 of the present invention were involved in an accident urging seat 12 forward and away from the corresponding vehicular seat.

Retractable safety strap assemblies like those utilized in apparatus 10 of the present invention are available from Beam's Industries of Oklahoma City, Oklahoma.

A further aspect and embodiment of the present invention is illustrated in isolation view in Figure 11, wherein safety strap guide 252 is operably mountable to front surface 11 of seatback 13. Safety strap guide 252 includes an at least partially enclosed channel 254 extending from bottom end 256 to a position adjacent top end 258, which channel 254 is sized and configured to receive safety strap 224 therethrough. Accordingly, safety strap guide 252 retains safety strap 224 in a predefined orientation with respect to front surface 11 of seatback 13.

In addition, safety strap guide 252 preferably further includes an open slot 260 that is in operable alignment with upper aperture 234 of seatback 13 such that safety strap 224 extends through slot 260 and subsequently through upper aperture 234 toward a corresponding LATCH anchoring element. Slot 260 is formed with first and second curved regions 262, 264 to accommodate safety strap 224 when safety seat 12 is rotated about its base unit.

With reference back to Figure 2, seat 12, in operable combination with interface portion 16, may be operably rotated on a plane parallel to lower surface 17 of interface portion 16. Such rotation enables the user to load and unload the child from seat 12 in a more convenient manner, and without having to detach seat 12 from its mounting base, which, in the present invention, is the combination of interface portion 16 and base portion 14.

In preferred embodiments, seat 12 preferably includes a seat belt apparatus that is configured for operable engagement with appropriately configured receptacles in

interface portion 16. Such a seat belt apparatus is commonly incorporated into conventional child and infant safety seats.

An isolation perspective view of base portion 14 is illustrated in Figure 3. Base portion 14 is generally defined by an upper surface 20, a front end 22, a rear end 24, and opposing sides 26, 28. Upper surface 20 of base portion 14 preferably includes an elongated aperture 34, which aperture 34 has a longitudinal axis "A" extending substantially parallel to sides 26, 28, and a lateral axis "B" extending substantially parallel to front and rear ends 22, 24, respectively. Preferably, the dimension of longitudinal axis "A" is greater than lateral axis "B".

As further illustrated in Figure 3, upper surface 20 of base portion 14 preferably includes a first guide means 38 disposed thereon and preferably extending upwardly therefrom. Though first guide means 38 may be formed in a variety of configurations, a particular example contemplated by the present invention is that of a protrusion extending substantially perpendicularly upwardly from upper surface 20 of base portion 14. In the embodiments illustrated in Figure 3, first guide means 38 and elongated aperture 34 are formed along a central longitudinal axis of base portion 14. However, the present invention contemplates the relative positioning of aperture 34 and first guide means 38 in any of a variety of locations in base portion 14.

A bottom view of base portion 14 is illustrated in Figure 4, which shows a releasable lock mechanism 42 that is engageable in aperture 34. In a particular embodiment of the present invention, releasable lock mechanism 42 includes first and second lock arms 44, 48 that are pivotably mounted about respective pivot points 50, 52, which pivot points 50,

52 provide for pivoting motion of first and second lock arms 44, 48 along a plane substantially parallel to lower surface 21 of base portion 14. Preferably, pivot points 50, 52 comprises threaded rods, bushings, or the like that define
5 respective axes of rotation for first and second lock arms 44, 48.

As shown in Figure 4, first and second lock arms 44, 48 each include distal ends 54, 56 that are operably urged into contact with one another by biasing means 60, which are
10 configured to deliver bias force to the respective first and second lock arms 44, 48 via respective coupling bodies 62, 64 of manual release unit 68. At the behest of biasing means 60, respective coupling bodies 62, 64 are operably promoted to direct respective first and second lock arms 44,
15 48 in a direction toward rear end 24 of base portion 14. Since first and second lock arms 44, 48 are anchored to base portion 14 at respective pivot points 50, 52, biasing motion transmitted to first and second lock arms 44, 48 via coupling bodies 62, 64 results in a pivoting of respective
20 lock arms 44, 48 about pivot points 50, 52. Accordingly, respective distal ends 54, 56 of first and second lock arms 44, 48 are naturally urged by biasing means 60 toward one another and ultimately into contact with one another. To assist in facilitating substantially planar pivoting about
25 respective pivot points 50, 52 by first and second lock arms 44, 48, respective position retainers 72, 74 may be provided in the present invention. Such position retainers 72, 74 each include bushings, washers, or the like that are specifically positioned and secured in place by a vertical
30 post such as a threaded screw or the like to thereby retain respective first and second lock arms 44, 48 in a desired level orientation. To accommodate position retainers 72,

74, first and second lock arms 44, 48 preferably include positional slots 76, 78 respectively disposed therein. As a result, first and second lock arms 44, 48 are maintained in a desired positional relationship with position retainers 5 72, 74 through respective positional slots 76, 78.

In order to effectuate pivotal motion of first and second lock arms 44, 48, biasing means 60 must be manually compressed so as to promote motion of coupling bodies 62, 64 in a direction toward front end 22 of base portion 14. 10 Manual release unit 68 includes an actuator 69 that is coupled to a platform portion 70 thereof through a slot in front end 22 of base portion 14. Platform portion 70 is preferably configured to apply compressive forces to biasing means 60 upon actuation of actuator 69. In a particular 15 embodiment, actuator 69 is a handle that may be pulled outwardly from base portion 14 by a user, which pulling action correspondingly moves platform portion 70 in a direction toward front end 22 of base portion 14, thereby compressing biasing means 60 so as to cause pivoting motion 20 to first and second lock arms 44, 48. Such pivoting of first and second lock arms 44, 48 moves respective distal ends 54, 56 thereof away from one another, thereby releasing the lock established when distal end 54, 56 of first and second lock arms 44, 48 are in contact with one another.

25 The present invention contemplates a number of configurational variants to releasable lock apparatus 42, so long as such an apparatus provides a similar functionality to that described above. For example, releasable lock apparatus 42 may include only a single pivoting lock arm 30 that extends across lateral axis "B" of aperture 34 when in a fully biased orientation.

A perspective top view of interface portion 16 is illustrated in Figure 5. Upper surface 112 of interface portion 16 is preferably specifically configured to matingly engage with conventional vehicular child safety seats in either a forward or rearwardly-facing orientation. For example, intermediate ridge 114 disposed on upper surface 112 is configured to operably receive a clamping portion provided on the bottom sides of conventional vehicular child safety seats. Thus, interface portion 16 acts as a universal receiving platform upon which conventional child safety seats may be operably secured.

A bottom view of interface portion 16 is shown in Figure 6 having a mating protrusion 122 extending from lower surface 114 of interface portion 16. Mating protrusion 122 is preferably sized and configured to operably engage with aperture 34 by extending therein when interface portion 16 is aligned in superimposed and adjacent relationship with base portion 14. As so aligned, mating protrusion 122 is configured for slidable and rotatable engagement with aperture 34. Accordingly, the diameter of mating protrusion 122 is similar to, but slightly smaller than, lateral axis "B" of aperture 34. Thus, mating protrusion 122 only has freedom to move along longitudinal axis "A", as well as the freedom to rotate within aperture 34 when not locked in place by locking mechanism 42.

Lower surface 114 of interface portion 16 further includes a second guide utility in the form of channel 128 that is configured to matingly engage with first guide means 38 on upper surface 20 of base portion 14. When first guide means 38 is in an engaged relationship within channel 128, rotation of interface portion 16 with respect to base portion 14 causes first guide means 38 to travel within

channel 128. Preferably, rotational motion between interface portion 16 and base portion 14, while in an engaged relationship, causes interface portion 16 to progressively displace toward front end 22 of base portion 14. Such displacement is a direct consequence of the two-dimensional parabolic shape of channel 128.

Figures 7 and 8 illustrate a top view and a bottom view, respectively, of interface portion 16 in engaged relationship with base portion 14. With reference to Figures 6-8, the operational relationship between interface portion 16 and base portion 14 will now be described. A detachable flanged or cap member 130 is preferably removably securable to distal end 123 of mating protrusion 122, with flanged member 130 having a diameter that is larger than lateral axis "B" of aperture 34. In such a manner, flanged member 130 may selectively be secured to mating protrusion 122 from the underside of base portion 14 such that flanged member 130 retains interface portion 16 in juxtaposition with base portion 14 by operably contacting lower surface 21 of base portion 14. Even with flanged member 130 being secured to mating protrusion 122, interface portion 16 remains rotatably and slidably coupled to base portion 14. So long as flanged member 130 is selectively secured to distal end 123 of mating protrusion 122, interface portion 16 is held in adjacent engagement with base portion 14.

With flanged member 130 secured to mating protrusion 122, interface portion 16 is positioned with respect to base portion 14 as is shown in Figures 7-8. With releasable lock mechanism 42 being in a fully biased orientation, or locked position, respective distal ends 54, 56 of lock arms 44, 48 bear against mating protrusion 122 and retainably secure mating protrusion 122 between lock arms 44, 48 and rear end

35 of aperture 34. This relative orientation between interface portion 16 and base portion 14 is a "locked" position. Releasable lock mechanism 42 acts to retain the locked position of interface portion 16 on base portion 14 through the configuration of first and second lock arms 44, 48, in that force imparted on distal ends 54, 56 thereof by mating protrusion 122 acts to increase the closing pressure asserted at distal ends 54, 56 of first and second lock arms 44, 48. Specifically, respective distal ends 54, 56 are tapered so that force directed in a direction toward front end 22 of base portion 14 enhances a rotational force generated by biasing means 60 in a locking or closing direction. Accordingly, mating protrusion 122 is maintained in a locked position so long as releasable locking mechanism 42 is not released through the actuation of handle 69.

In addition to the above, the relationship between first guide means 38 and channel 128 is such that when interface portion 16 is in the locked position, first guide means 38 is disposed at a front end 131 of radial portion 132 of channel 128. Accordingly, the lateral walls of channel 128 at end 131 enclose first guide means 38 on three sides, thereby preventing rotational movement of interface portion 16 with respect to base portion 14. The locked position, therefore, retains interface portion 16 in a stationary and fixed relationship with base portion 14.

When handle 69 is actuated to thereby retract biasing means 60 and correspondingly to pivot first and second lock arms 44, 48 out from aperture 34, mating protrusion 122 becomes free to slidably move within aperture 34 toward front end 22 of base portion 14. To enable the rotational capability of the present invention, interface portion 16 is slid forward with respect to base portion 14, such that

mating protrusion 122 slidably moves within aperture 34 toward front end 36 of aperture 34. In addition, first guide means 38 correspondingly moves along radial portion 132 of channel 128 toward apex 134. Once first guide means 5 38 is moved to a position corresponding to apex 134 of channel 128, rotation of interface portion 16 with respect to base portion 14 may be accomplished, as first guide means 38 selectively slidably moves toward one of distal ends 136, 138 of channel 128. Since the above described movement is 10 accomplished between interface portion 16 and base portion 14 while engaged through flanged member 130, the child safety seat need not be removed from interface portion 16 during the sliding and rotating procedures. Accordingly, the child is transported in the safety seat while interface 15 portion 16 is in a locked position with respect to base portion 14, with such a locked position being selectively deactivated through actuation of handle 69 such that interface portion 16, with the child safety seat securely attached thereto, may be rotated into a position convenient 20 for egress and ingress to the seat.

As is illustrated in Figure 6, channel 128 is preferably configured in a substantially parabolic shape such that rotation of interface portion 16 with respect to base portion 14 causes the corner of interface portion 16 25 nearest to the automobile seat during such rotation to correspondingly displace forwardly so as to prevent interference between the attached child safety seat and the vehicle seat.

A variety of configurations for channel 128 are 30 contemplated by the present invention, with the parabolic shape illustrated in Figure 6 being a preferred example for desirably guiding interface portion 16 along with the

attached child safety seat during rotation of the child seat with respect to base portion 14. As noted above, the lock/unlock and sliding and rotational procedures are particularly useful when the child safety seat is maintained
5 in a secured engaged relationship with interface portion 16. However, such motions and permutations may be performed without the child safety seat being engaged with interface portion 16, as desired.

The above-describe elements of the present invention
10 are preferably manufactured from lightweight and durable materials that are accepted by governmental safety standards for infant and child vehicular safety seat mounting devices. In some embodiments of the invention, interface portion 16 and base portion 14 are fabricated from polymeric materials
15 such as ABS or high-density polypropylene.

An additional feature of the present invention is illustrated in Figures 7, 7A and 8, which show safety retention features 152 extending upwardly from upper surface
20 of base portion 14. Safety retention features 152 are preferably configured and spaced from upper surface 20 of base portion 14 so as to operably grasp interface portion 16. In such a manner, safety retention features 152 act to further operably retain interface portion 16 in a secure adjacent relationship with base portion 14. In particular,
25 safety retention features 152 preferably assist in clamping the rear end of interface portion 16 down to base portion 14, and prevent undesired lifting or disengagement of interface portion 16 from base portion 14 in the event of a substantial lifting force upon interface portion 16, such as
30 in the event of a vehicular accident wherein the weight of the child safety seat carries sufficient momentum so as to act to lift interface portion 16 from base portion 14.

Since base portion 14 is secureably held in place to the vehicle seats via seat belt anchors and the like, safety retention features 152 preferably operably retain interface portion 16 in a desired engaged relationship with base portion 14, even in the event of a relatively large disengaging force applied. In preferred embodiments of the present invention, safety retention features 152 are integrally formed with base portion 14. Preferably, safety retention features 152 are co-molded with base portion 14.

10 A still further aspect of the present invention is illustrated in Figures 5 and 7, which show anchoring means 172 extending upwardly from interface portion 16, with such anchoring means 172 each including at least one tie aperture 174 disposed therethrough and in a portion thereof above upper surface 112 of interface portion 16. Such anchoring means 172 are preferably mounted at lower surface 114 of interface portion 16, and are utilized to receive one or more tie straps (not shown) for operably anchoring items such as the child safety seat to interface portion 16. In some embodiments of the present invention, anchoring means 172 are integrally formed with interface portion 16 and extend upwardly from upper surface 112 thereof. Anchoring means 172 are preferably fabricated from a strong material such as steel or the like.

25 The invention has been described herein in considerable detail in order to comply with the patent statutes, and to provide those skilled in the art with the information needed to apply the novel principles and to construct and use embodiments of the invention as required. However, it is to be understood that the invention can be carried out by specifically different devices and that various

modifications can be accomplished without departing from the scope of the invention itself.

Claims

What is claimed is:

1. A rotatable child safety seat mounting apparatus for use in combination with a vehicular child
5 safety seat, said rotatable mounting apparatus comprising:

(a) a base means having an upper surface, a front end, a rear end, and opposing sides connecting said front and rear ends, said base means further including an elongated aperture extending therethrough from said upper
10 surface to said lower surface, with said aperture having a longitudinal axis extending substantially parallel to said sides, and a lateral axis extending substantially parallel to said front and rear ends, with said longitudinal axis being longer than said lateral axis, said base means further
15 including a first guide means disposed on said upper surface thereof, and a releasable lock means; and

(b) an interface means that is removably and rotatably engageable with said base means, said interface means having a mating means extending from a lower surface
20 thereof, said mating means being configured for operable, slidable, and rotatable engagement with said aperture to thereby removably secure said interface means to said base means, said interface means further including a second guide means on said lower surface thereof that is matingly
25 engageable with said first guide means such that relative rotational motion between said interface means and said base means while said first and second guide means are operably engaged with one another, causes said interface means to progressively displace towards said front end of said base
30 means, an upper surface of said interface means being specifically configured to operably and retainably receive said vehicular child safety seat thereto.

2. A rotatable mounting apparatus as in claim 1 wherein said first guide means is a first protrusion that is configured for mating engagement with said second guide means.

5 3. A rotatable mounting apparatus as in claim 2 wherein said second guide means is a channel formed in said interface means, the channel having a substantially parabolic shape in a plane parallel to said lower surface of said interface means, with the parabolic shape of the
10 channel having an apex disposed toward a rear end of said interface means, and respective distal ends of the parabolic channel being disposed toward a front end of said interface means.

4. A rotatable mounting apparatus as in claim 3
15 wherein said substantially parabolic second guide means includes a radial channel portion extending radially from the apex toward said front end of said interface means.

5. A rotatable mounting apparatus as in claim 1 wherein said releasable lock means releasably engages said
20 mating means in said elongated aperture, said lock means include biasing means which bias said lock means to a lock position, and manual release means coupled to said biasing means and said locked means, said manual release means having an actuator for selectively applying compressive
25 force to said biasing means, thereby moving said coupled lock means to an unlocked position and, correspondingly, disengaging said lock means from said mating means.

6. A rotatable mounting apparatus as in claim 5 wherein said actuator is handle disposed adjacent to said
30 front end of said base means.

7. A rotatable mounting apparatus as in claim 1 wherein said mating means comprises a second protrusion

having a proximal portion and a distal portion, with said proximal portion being disposed adjacent to said lower surface of said interface means, and a detachable flanged member that is selectively securable to said distal portion
5 of said second protrusion, said flanged member having a diameter that is larger than said lateral axis of said aperture, such that said flanged member retains said interface means in juxtaposition with said base means by operably contacting said lower surface of said base means
10 when said flanged member is operably engaged with said second protrusion.

8. A rotatable mounting apparatus as in claim 1 wherein said base means and said interface means are fabricated from polymeric materials.

15 9. A rotatable mounting apparatus as in claim 1, including safety retention means coupled to said base means and selectively engageable with said upper surface of said interface means for operably retaining said interface means in juxtaposition with said base means, said safety retention
20 means extending upwardly from said rear end of said base means and including a retention portion extending substantially horizontally from an upstanding portion thereof, such that said safety retention means is configured to operably grasp said interface means between said
25 retention portion and said upper surface of said base means.

10. A rotatable mounting apparatus as in claim 9 wherein said safety retention means is integrally formed with said base means.

11. A rotatable mounting apparatus as in claim 1,
30 including harnessing means extending upwardly from said interface means, said harnessing means having at least one tie aperture formed in a portion thereof above said upper

surface of said interface means, such that one or more tie straps may be operably threaded through such tie aperture to thereby operably anchor such one or more tie straps to said interface means.

5 12. A child safety seat for use in combination with a vehicular seat, said child safety seat comprising:

 a retractable harnessing means for securing said child safety seat to said vehicular seat, said retractable harnessing means having a safety strap retractably extending
10 out from a strap housing, and being integrally mounted within said child safety seat and including a locking means for responsively locking said safety strap in a fixed degree of extension from said housing upon incursion of a sudden force urging said safety strap out from said housing.

15 13. A child safety seat as in Claim 12 wherein a first end of said safety strap is specifically configured for mating engagement with LATCH receptacles.

 14. A child safety seat as in Claim 12 that is specifically configured for removable mating engagement with
20 a rotatable mounting apparatus comprising:

 (a) a base means having an upper surface, a front end, a rear end, and opposing sides connecting said front and rear ends, said base means further including an elongated aperture extending therethrough from said upper
25 surface to said lower surface, with said aperture having a longitudinal axis extending substantially parallel to said sides, and a lateral axis extending substantially parallel to said front and rear ends, with said longitudinal axis being longer than said lateral axis, said base means further
30 including a first guide means disposed on said upper surface thereof, and a releasable lock means; and

(b) an interface means that is removably and rotatably engageable with said base means, said interface means having a mating means extending from a lower surface thereof, said mating means being configured for operable, 5 slidable, and rotatable engagement with said aperture to thereby removably secure said interface means to said base means, said interface means further including a second guide means on said lower surface thereof that is matingly engageable with said first guide means such that relative 10 rotational motion between said interface means and said base means while said first and second guide means are operably engaged with one another, causes said interface means to progressively displace towards said front end of said base means, an upper surface of said interface means being 15 specifically configured to operably and retainably receive said child safety seat thereto.

Fig.-1

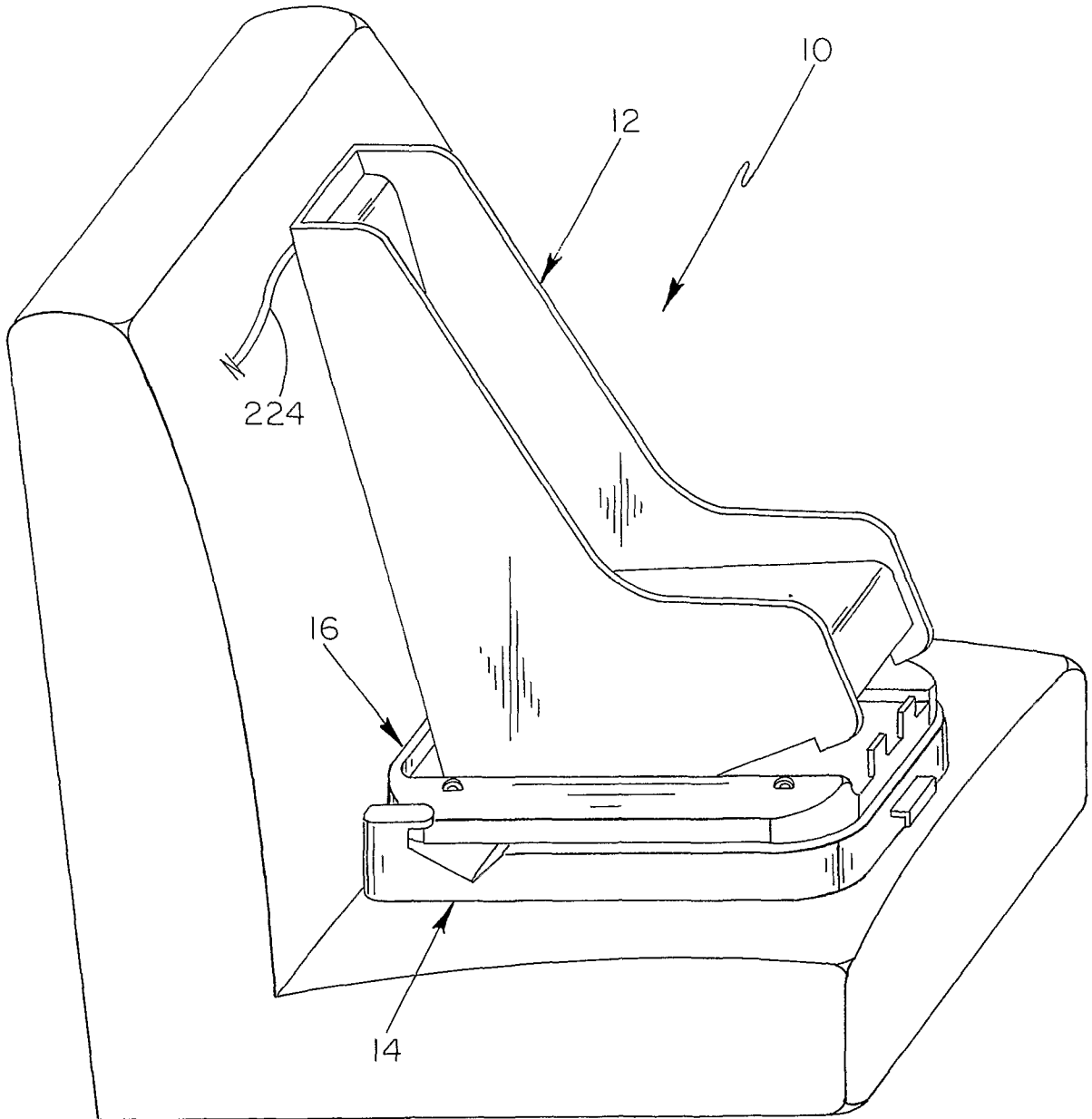


Fig. -2

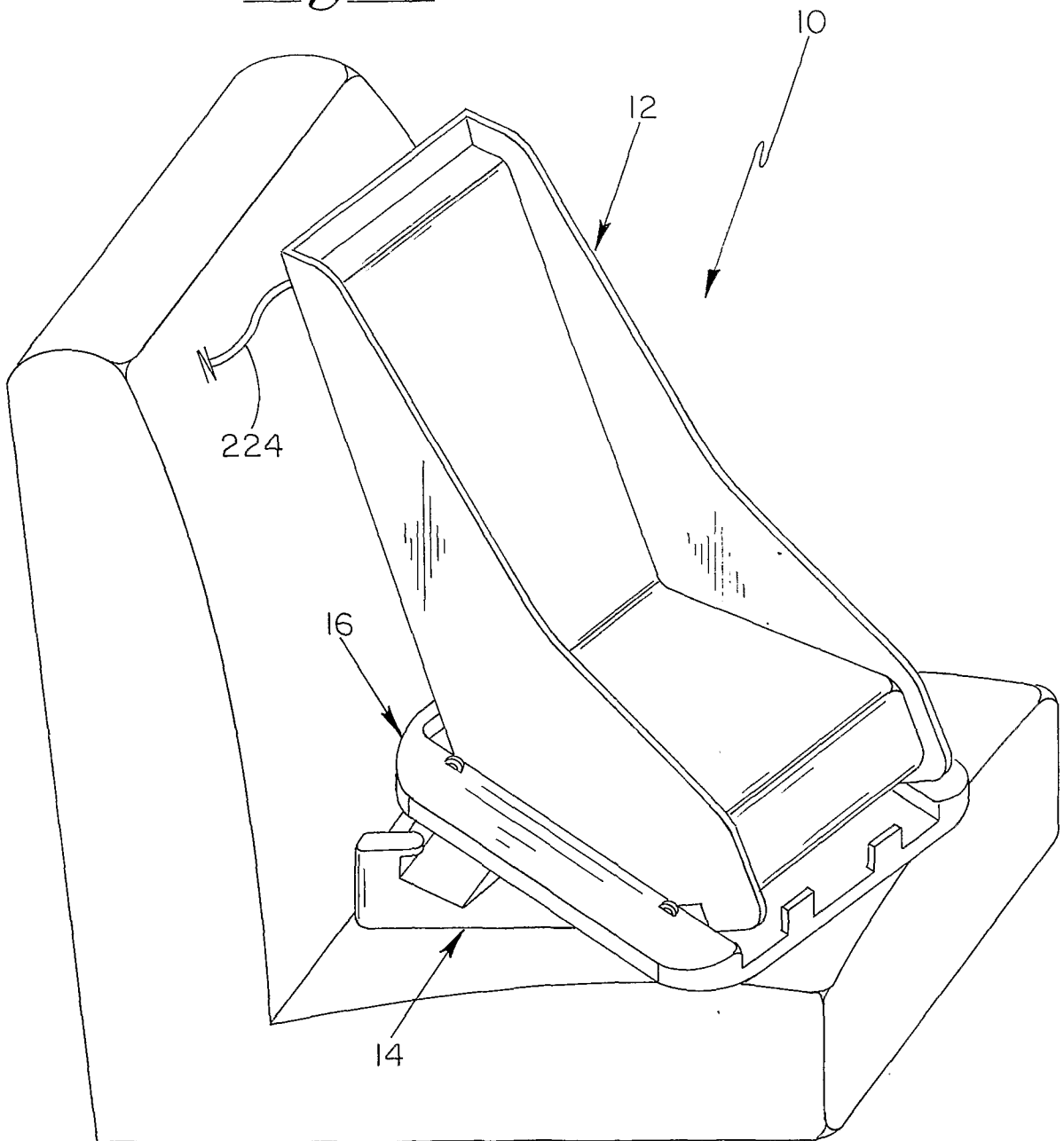
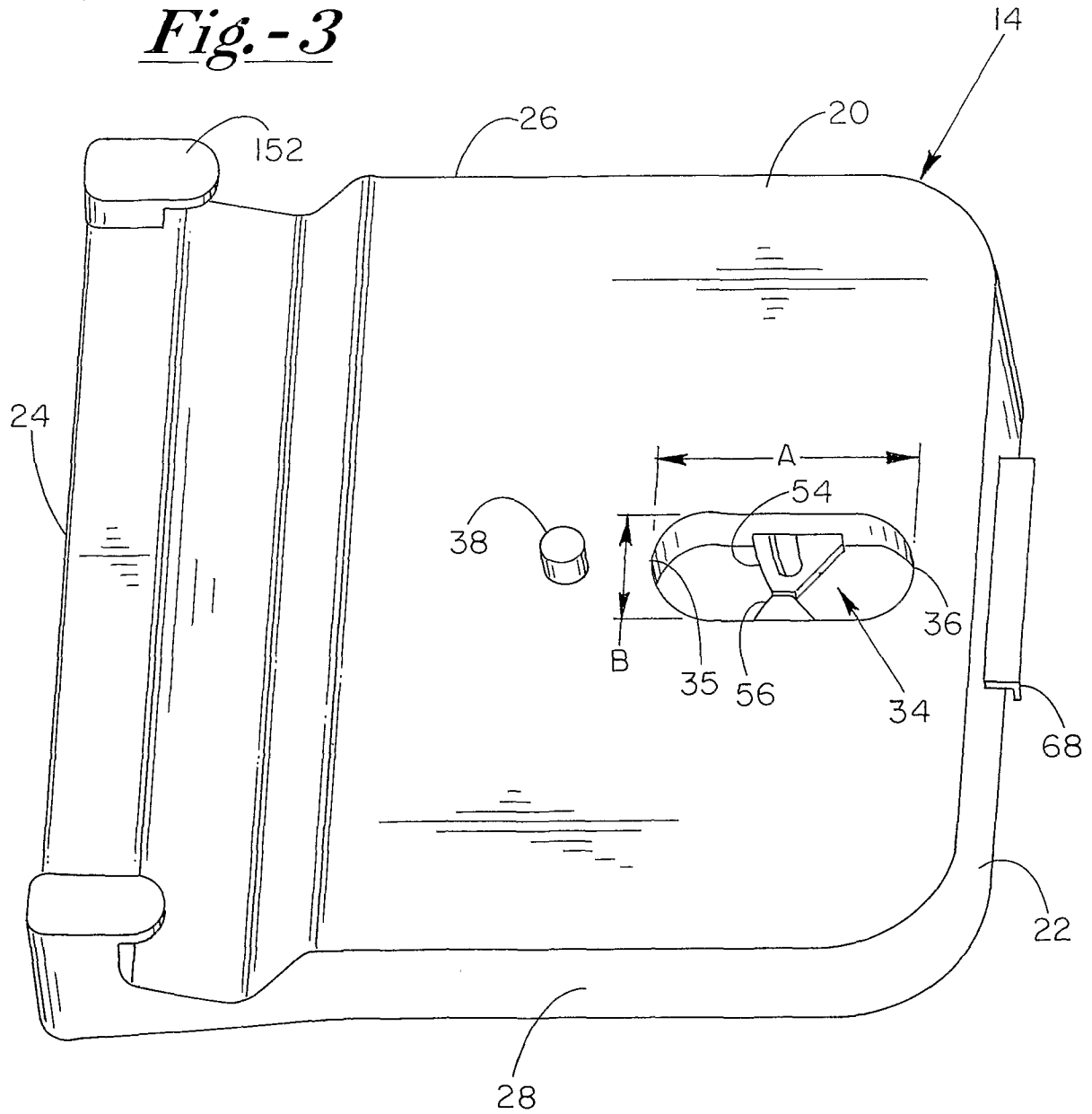


Fig.-3



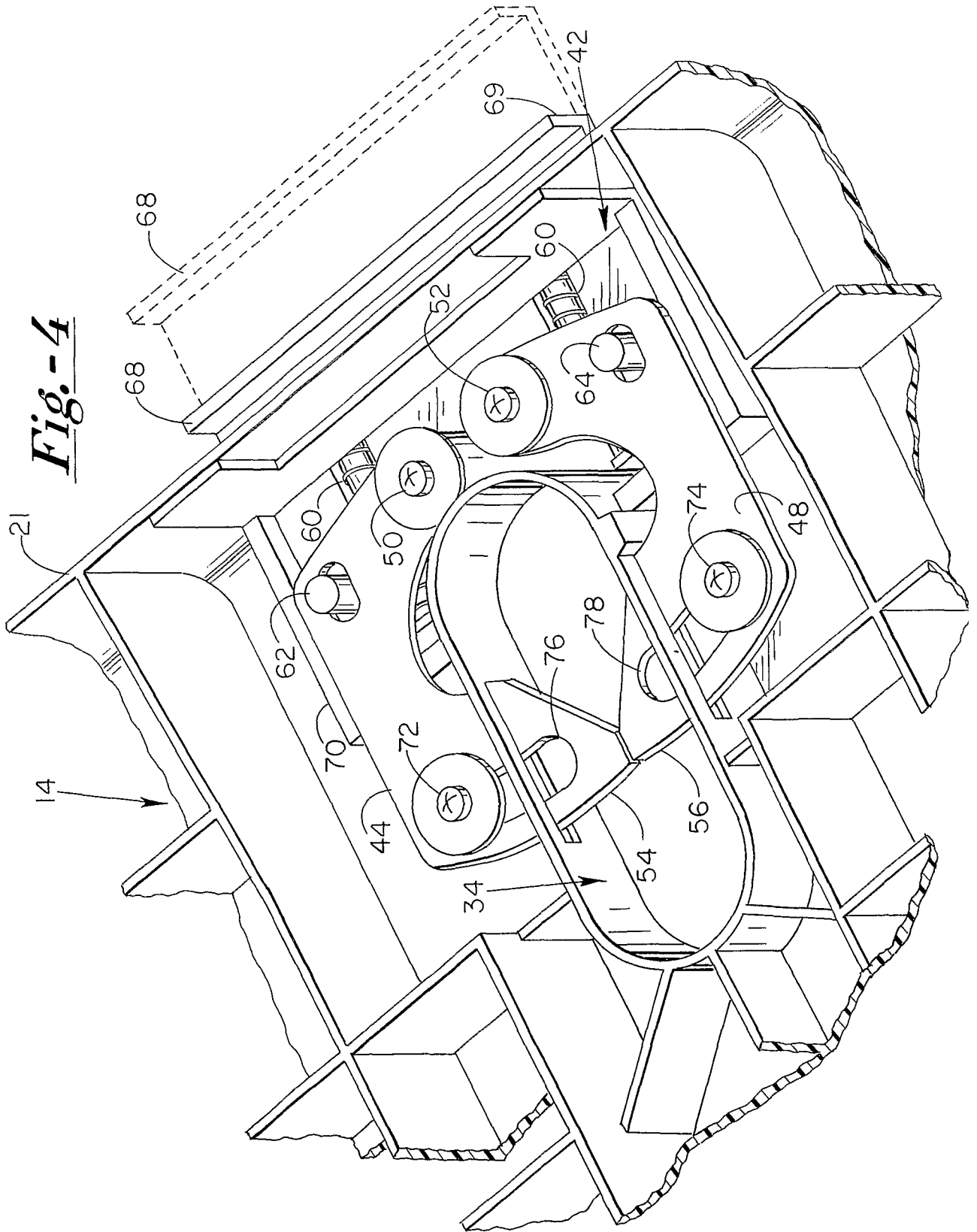


Fig.-5

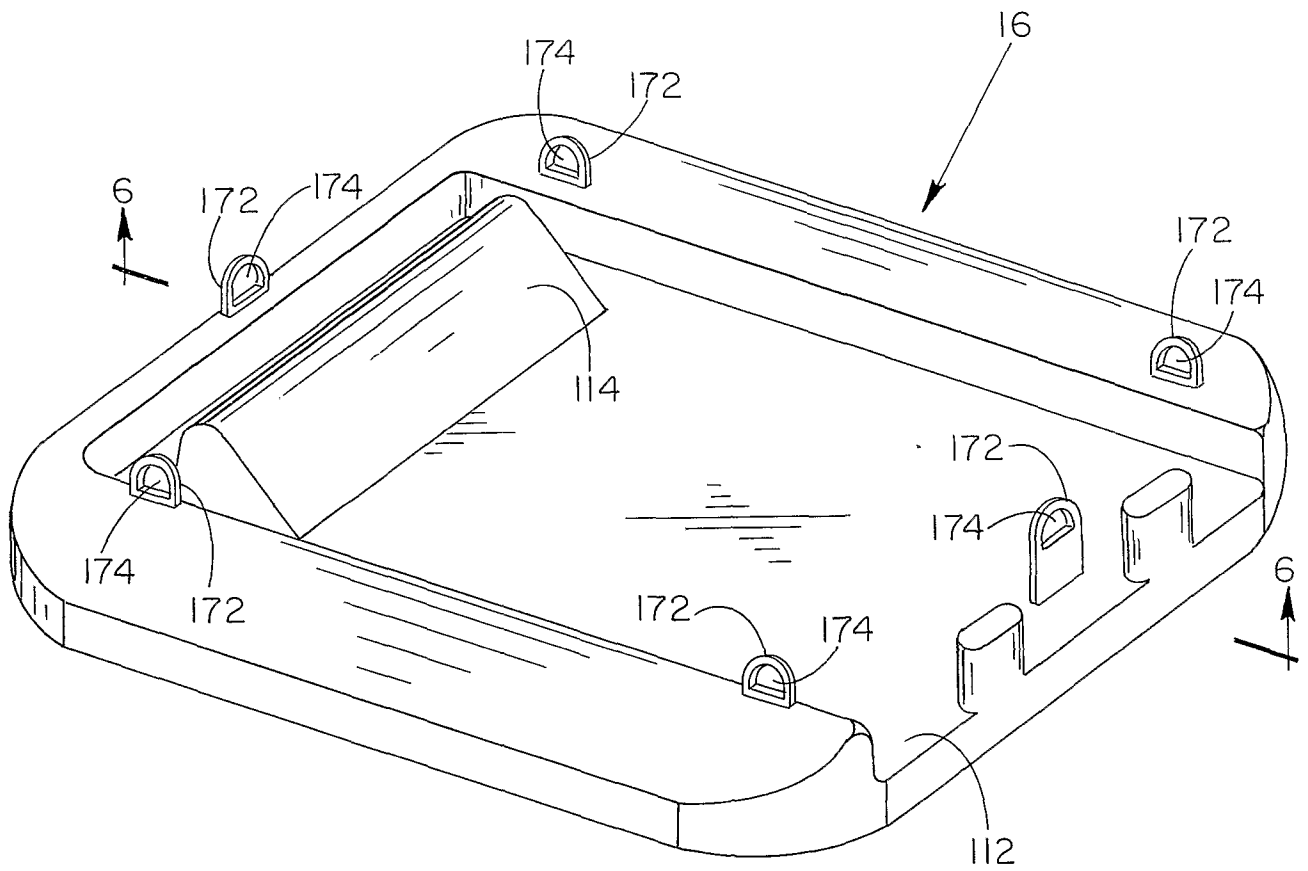


Fig. - 6

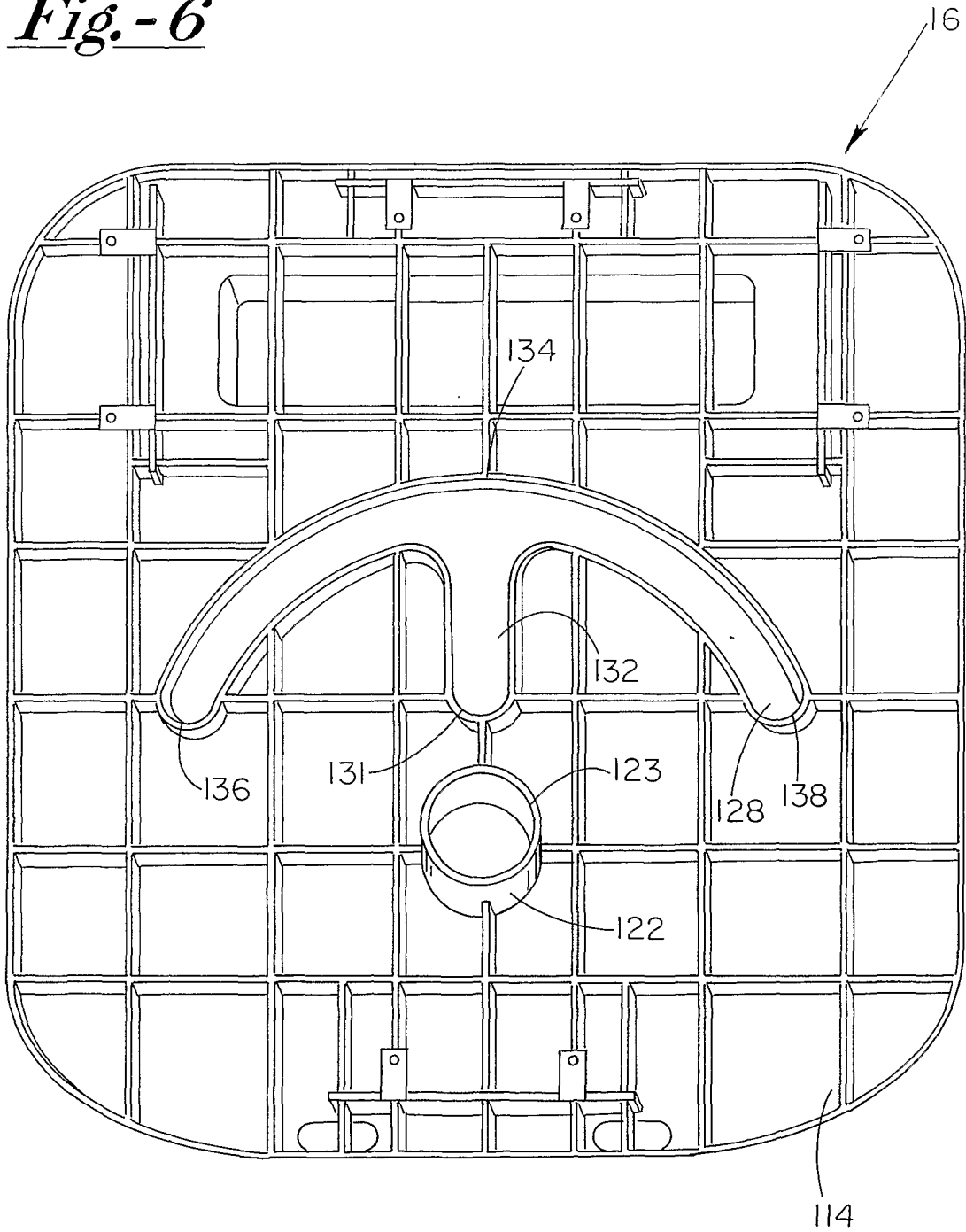


Fig.-7

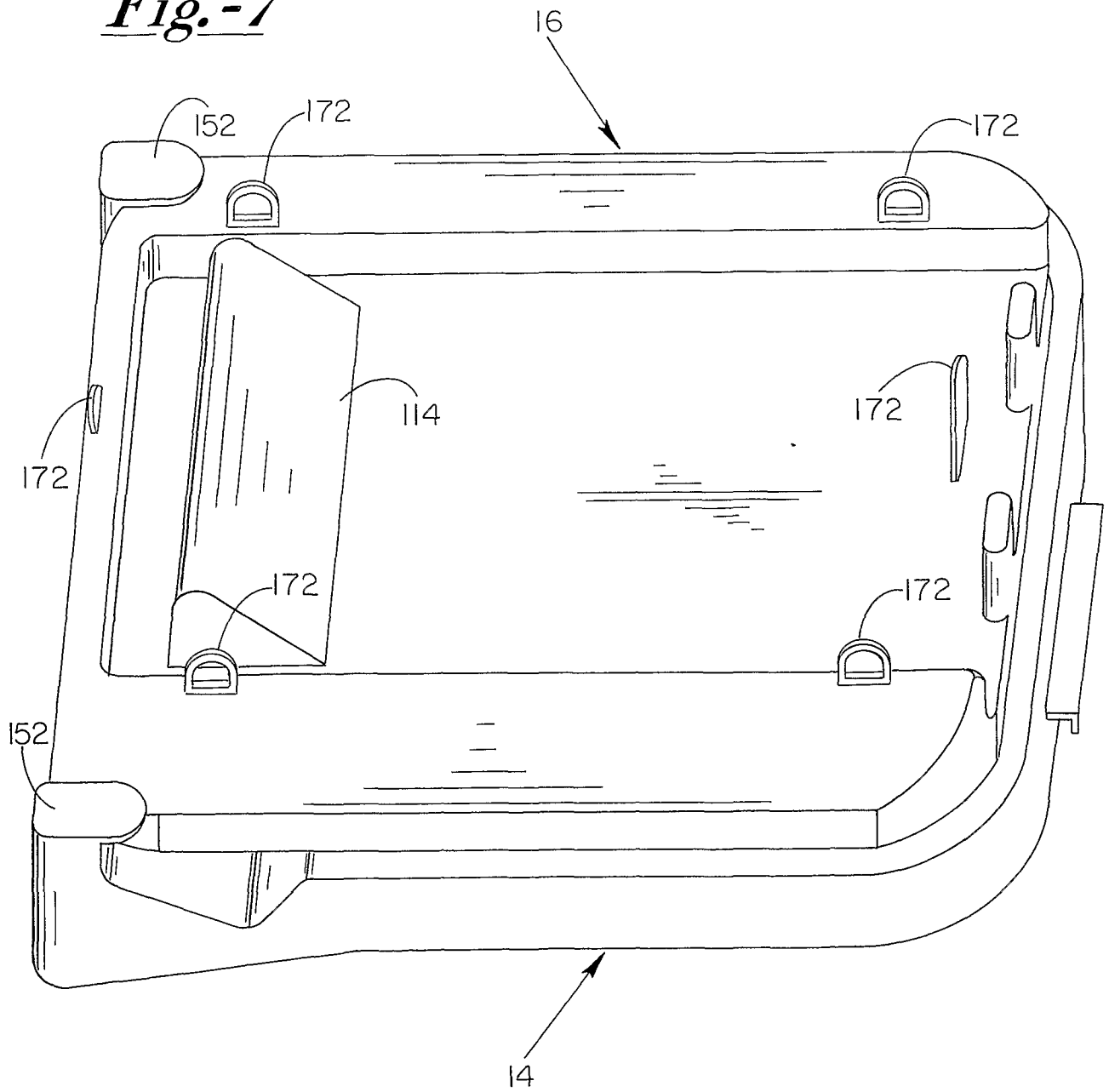


Fig. -7A

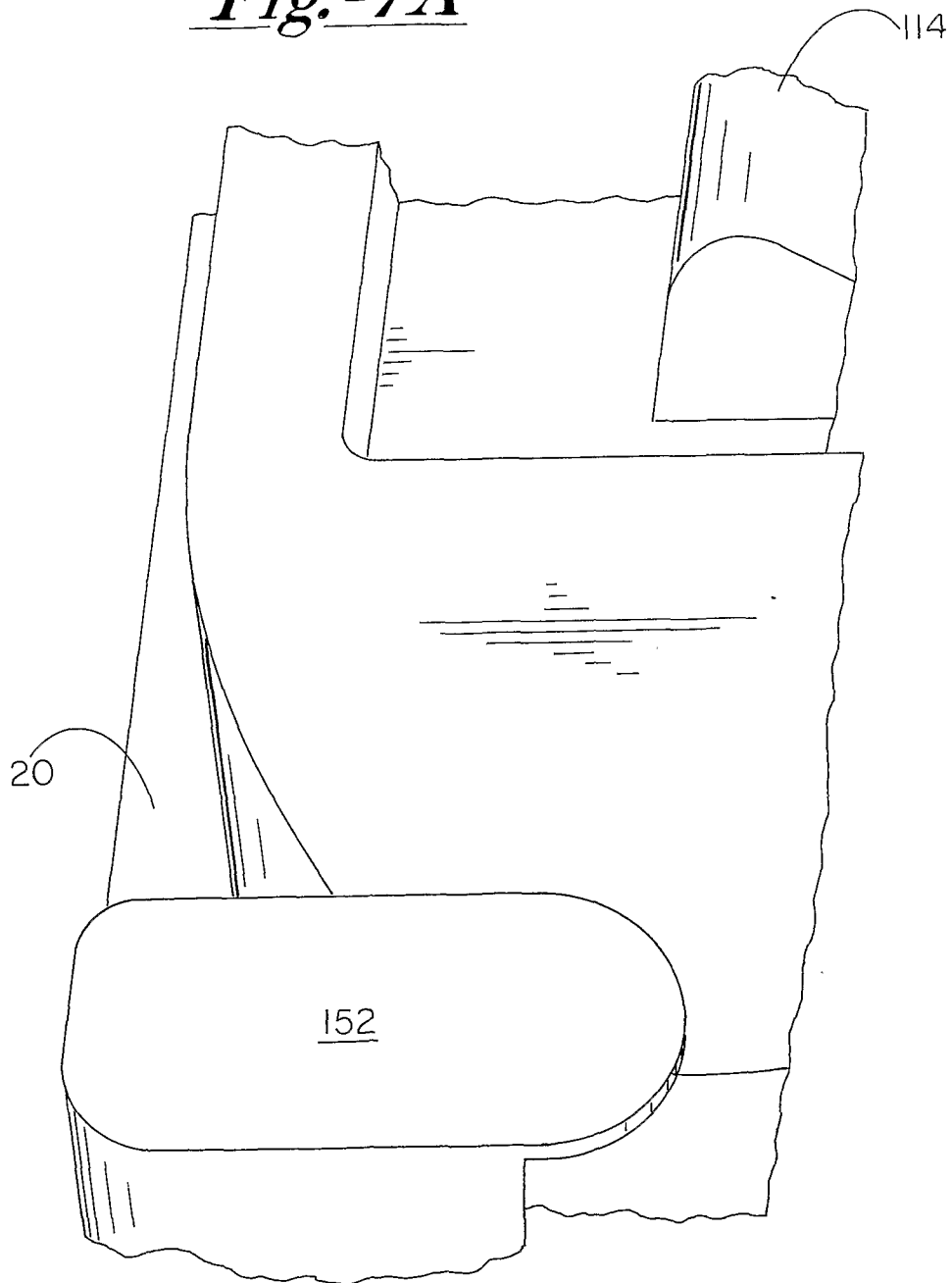


Fig. -8

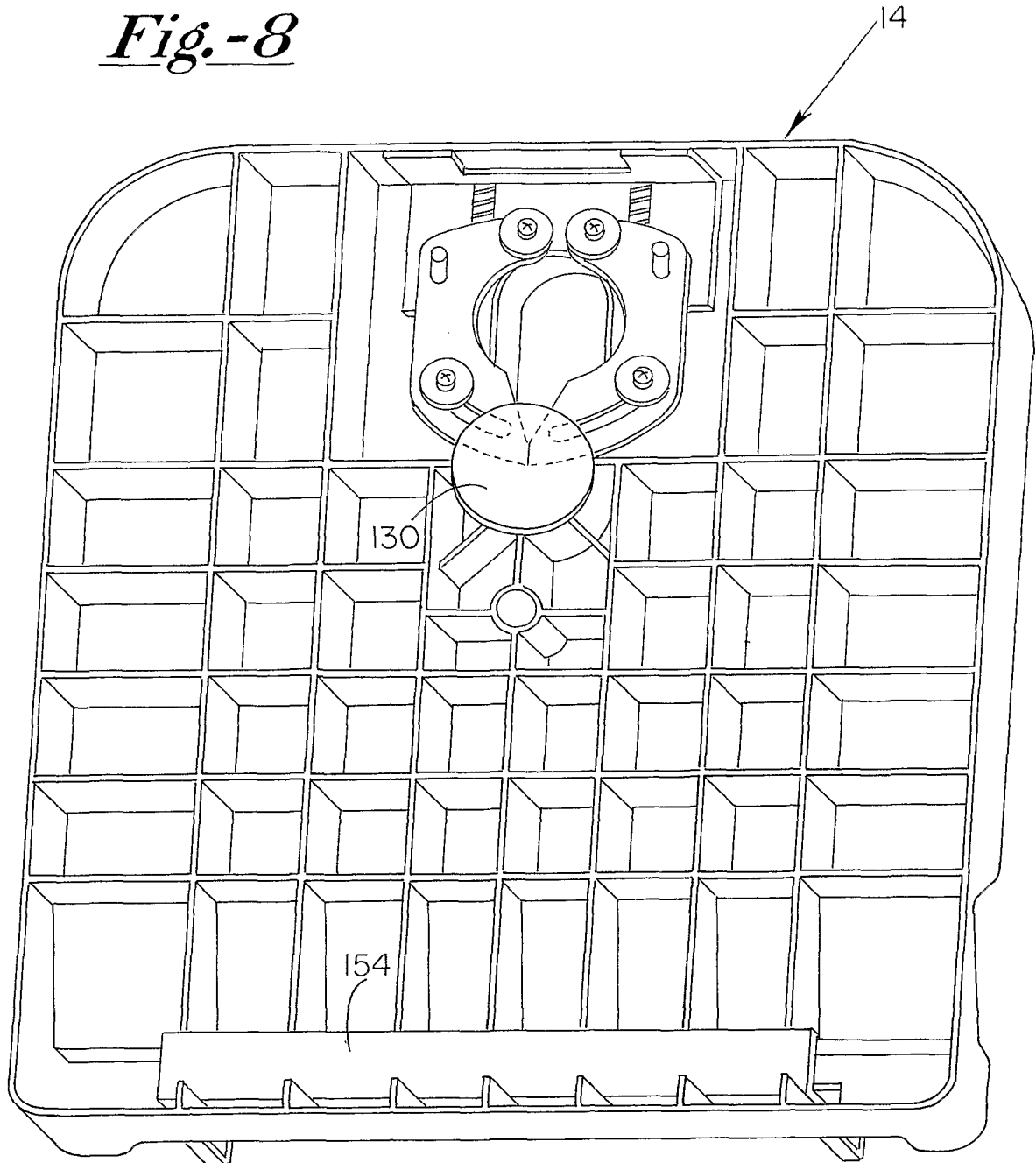


Fig.-9

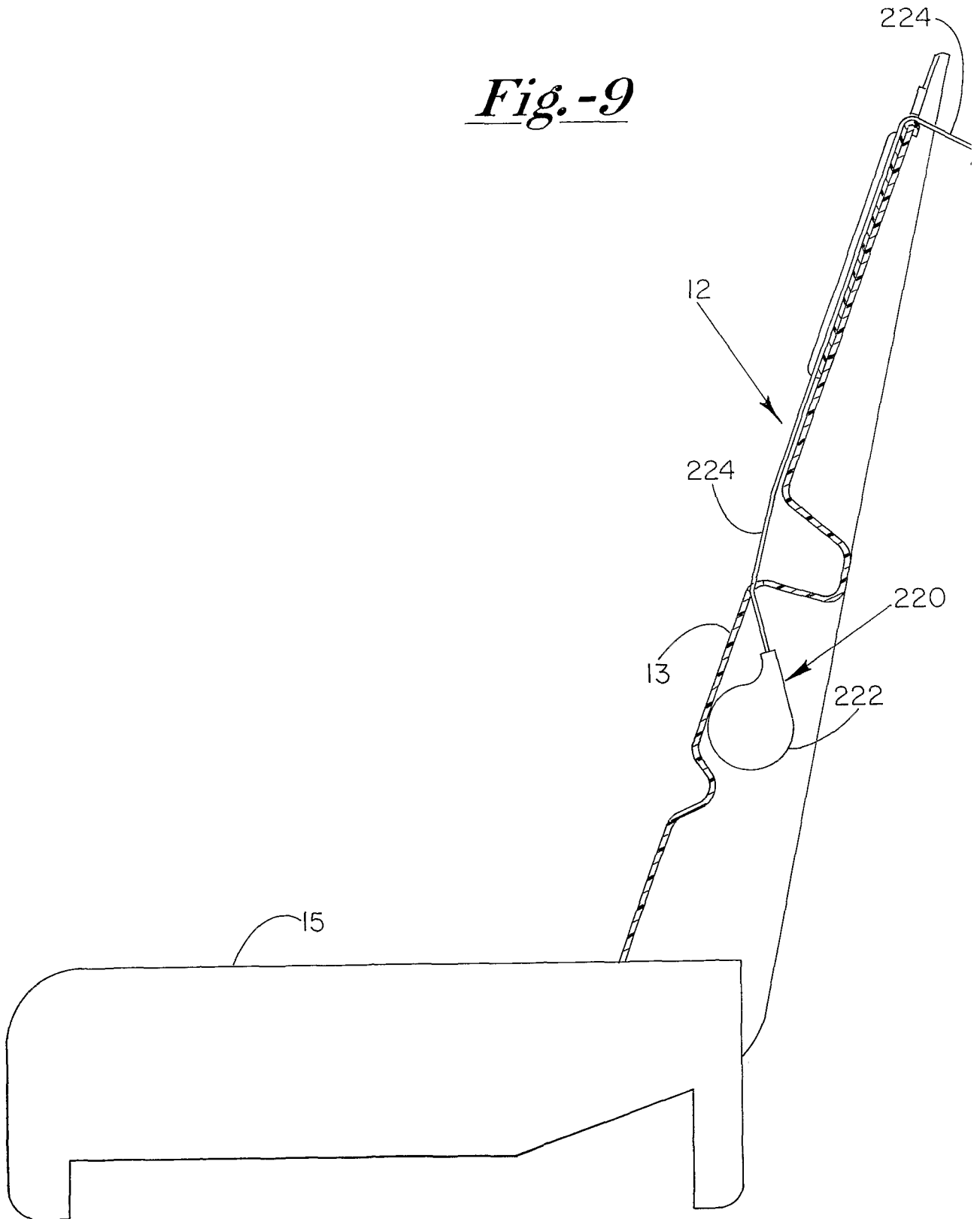


Fig. -10

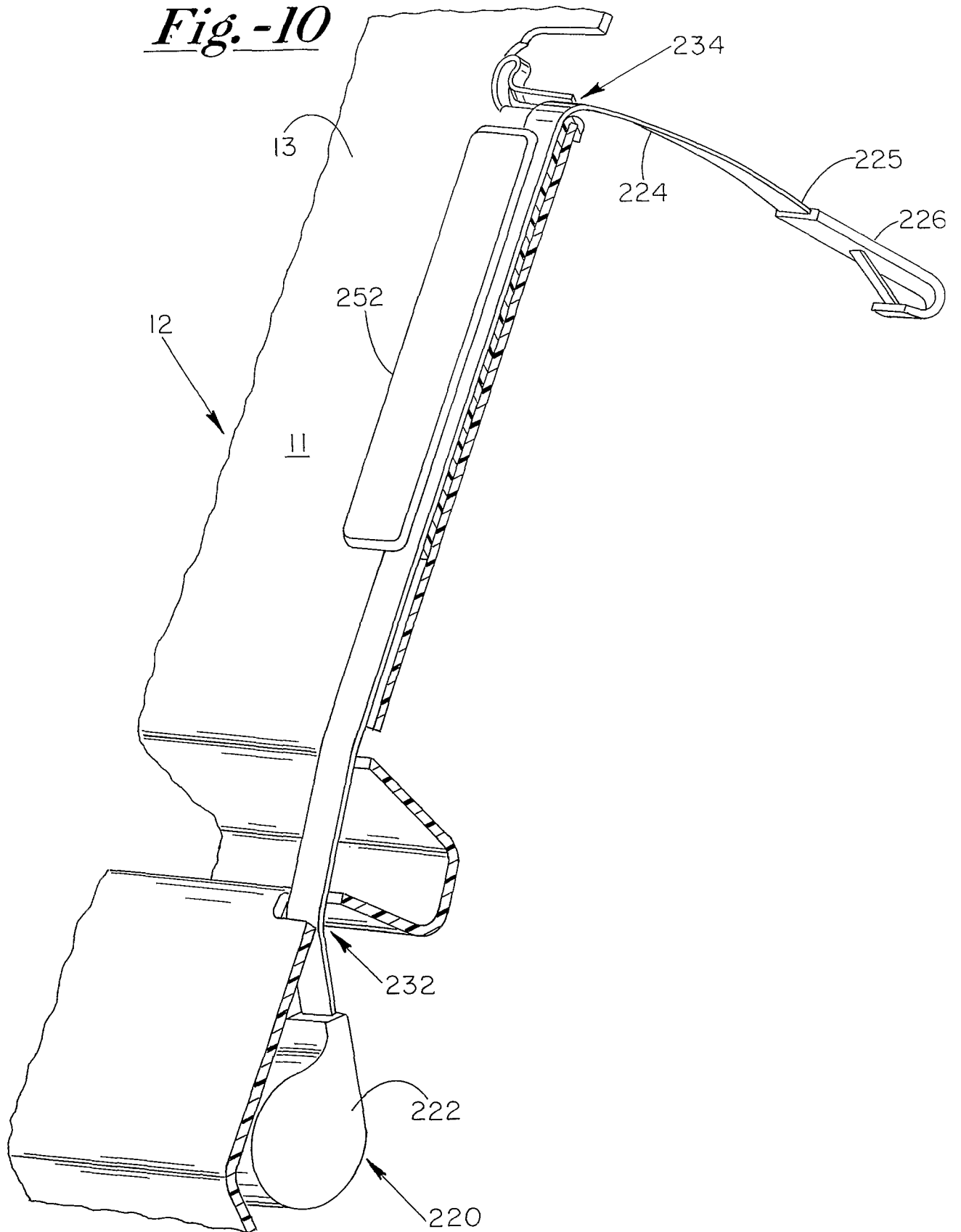
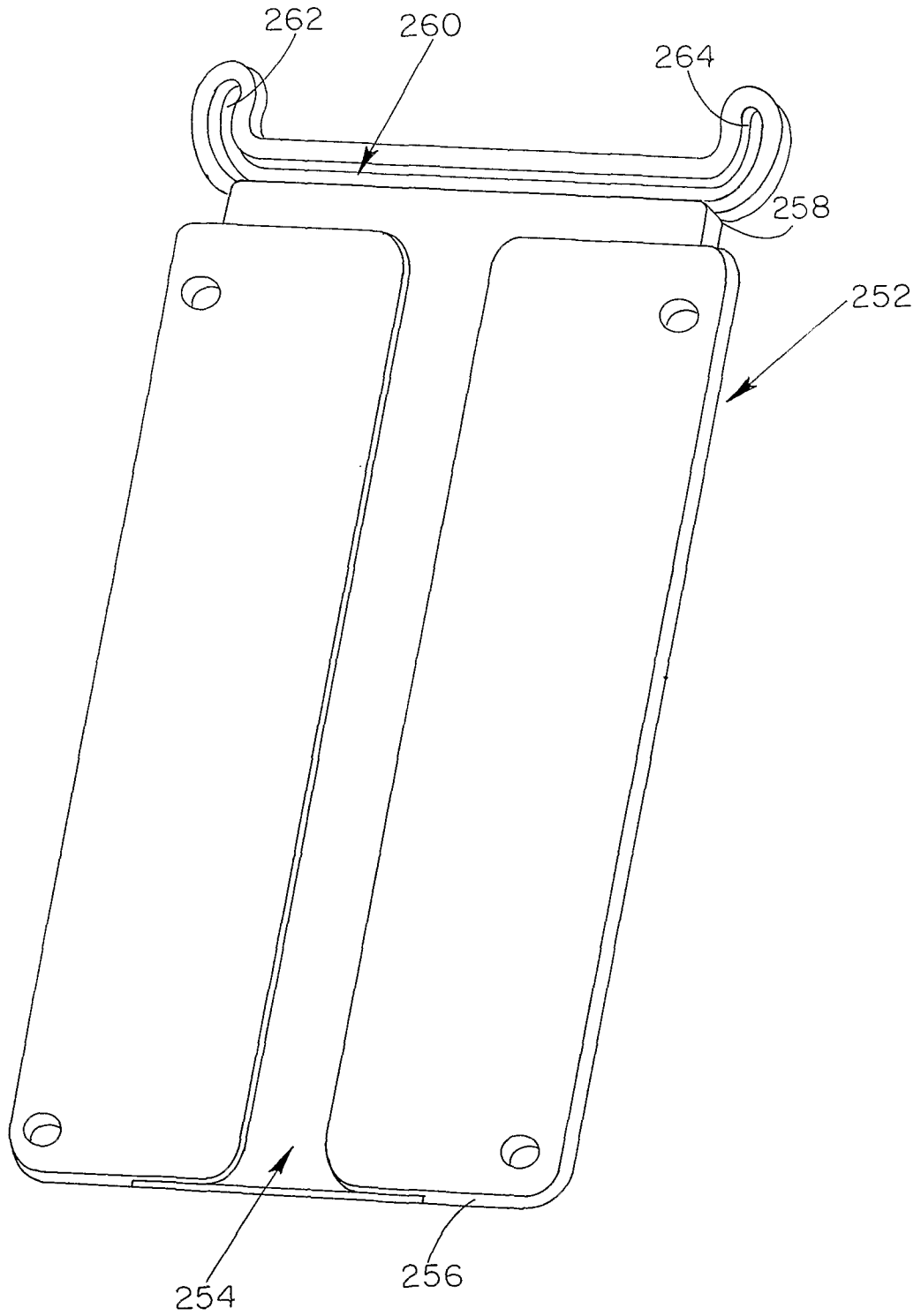
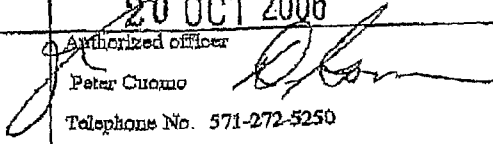


Fig.-11



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US05/25199

<p>A. CLASSIFICATION OF SUBJECT MATTER IPC: A47C 1/08(2007.01) US CL : 287/256.12 According to International Patent Classification (IPC) or to both national classification and IPC</p>																										
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) U.S. : 297/256.12, 250.1, 256.1, 256.16, 240</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)</p>																										
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category *</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>US 6,322,142 B1 (YOSHIDA ET AL.) 27 November 2001, entire document.</td> <td>1</td> </tr> <tr> <td>Y</td> <td>US 6,634,708 B2 (GUENTHER) 21 October 2003, column 5, lines 25-30.</td> <td>8</td> </tr> <tr> <td>Y</td> <td>US 3,442,466 A (FRITSCHER) 8 April 1966, column 3, lines 64-72.</td> <td>12-14</td> </tr> <tr> <td>A</td> <td>US 4,971,392 A (YOUNG) 20 November 1990.</td> <td></td> </tr> <tr> <td>A</td> <td>US 6,746,080 A (TSUGIMATSU ET AL.) 8 June 2004.</td> <td></td> </tr> <tr> <td>T</td> <td>US 6,938,954 B1 (HENDREN ET AL.) 6 September 2005</td> <td>1-11</td> </tr> <tr> <td>A</td> <td>US 6,505,887 B2 (HAMPTON) 14 January 2003.</td> <td></td> </tr> </tbody> </table>			Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	US 6,322,142 B1 (YOSHIDA ET AL.) 27 November 2001, entire document.	1	Y	US 6,634,708 B2 (GUENTHER) 21 October 2003, column 5, lines 25-30.	8	Y	US 3,442,466 A (FRITSCHER) 8 April 1966, column 3, lines 64-72.	12-14	A	US 4,971,392 A (YOUNG) 20 November 1990.		A	US 6,746,080 A (TSUGIMATSU ET AL.) 8 June 2004.		T	US 6,938,954 B1 (HENDREN ET AL.) 6 September 2005	1-11	A	US 6,505,887 B2 (HAMPTON) 14 January 2003.	
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<p>Date of the actual completion of the international search 12 December 2005 (12.12.2005)</p>		<p>Date of mailing of the international search report 20 OCT 2006</p>																								
<p>Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201</p>		<p>Authorized officer Peter Cuomo  Telephone No. 571-272-5250</p>																								

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