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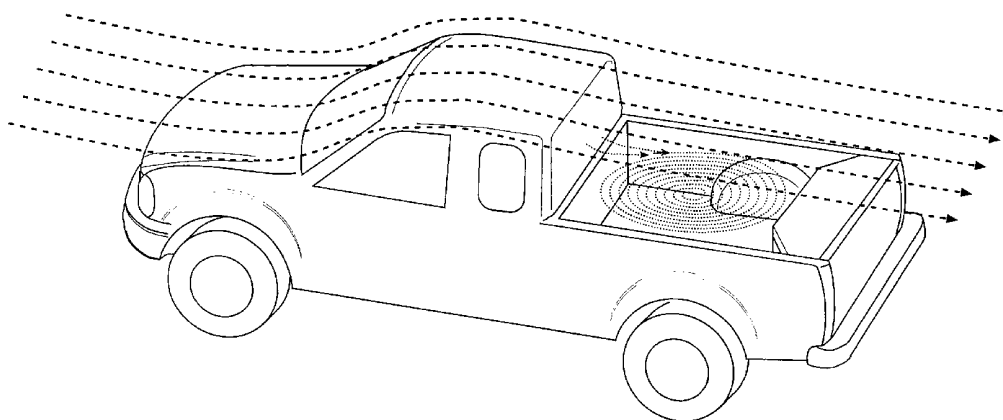
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(54) Title: VEHICLE CARGO AREA EXTENDER



(57) Abstract: A vehicle cargo area extender (40, 240) including a pair of sidewalls (42, 242), a center wall (44, 244) extending between the pair of sidewalls (42, 242) and a lid (46, 246) removably disposed relative to the pair of sidewalls (42, 242) and the center wall (44, 244). The sidewalls (42, 242), the center wall (44, 244) and the lid (46, 246) cooperate to define an enclosure (48, 248) having an open end (50, 250). The vehicle cargo area extender (40,240) is moveably mounted between a stored position relative to a vehicle cargo area (24) wherein the open end (50, 250) of the enclosure (48, 248) is adjacent to the rear wall (30) of the vehicle cargo area (24) and a deployed position so as to be supported by the rear wall (30) of the vehicle cargo area (24) when it is in its extended position such that the open end (50, 250) of the enclosure (48, 248) faces the vehicle cargo area (24) thereby increasing the effective size of the vehicle cargo area (24).



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VEHICLE CARGO AREA EXTENDER

BACKGROUND OF THE INVENTION

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1. Field of the Invention

The present invention relates, generally, to a vehicle cargo area extender, and more specifically, to a vehicle cargo area extender that defines an enclosure and that
10 may be movably supported with respect to the cargo area of a vehicle between a stored position forward of the tailgate and a deployed position wherein it is supported by the tailgate when the tailgate is "down" or in an extended position.

2. Description of the Related Art

15 Pickup trucks and like vehicles have cargo areas that are employed for utilitarian purposes. A representative example of this type of vehicle is generally indicated at 20 in Figure 1. As is well known in the art, such vehicles typically include a cab 22 in which the vehicle operator sits and a cargo area, generally indicated at 24. The cargo area 24 is typically disposed adjacent and to the rear of the
20 cab 22. The cargo area 24 is typically defined by a bed 26 (Figure 2) and pair of upstanding sidewalls 28 spaced from one another on either side of the bed 26. In addition, the vehicle 20 typically includes a rear wall or "tailgate" 30 that extends between the pair of sidewalls 28 at one end of the bed 26 and a front wall 32 located at the other end of the bed 26 opposite to the tailgate 30. The rear wall or tailgate 30
25 is usually hingedly mounted to the bed 26 so as to be rotatable between an upright position (Figure 1) and an extended position as shown in Figure 2. When it is in its extended position, the tailgate 30 is said to be "down" or "open" and is usually disposed substantially co-planar with the bed 26 of the vehicle cargo area 24. When it

is disposed in its upright position, the tailgate 30 extends substantially perpendicularly between the pair of sidewalls 28. In this disposition, together the sidewalls 28, the tailgate 30 and front wall 32 define a perimeter of the vehicle cargo area 24.

Numerous accessories have been developed for the purpose of augmenting the utilitarian functions of the cargo area 24 in such vehicles. For example, toolboxes and other, similar storage devices have been employed to provide a secure enclosure for storing tools and other valuable implements in the otherwise open cargo area 24 of vehicles, such as pickup trucks 20. Such toolboxes and the like are typically mounted between the sidewalls 28 and the front wall 32 proximate to the cab 22 of the vehicle 20. While such toolboxes adequately function for their intended purposes, they also act to reduce the remaining available cargo area 24 of the vehicle 20.

Another common accessory employed in connection with the cargo area of a vehicle such as a pickup truck is known as a "Tonneau Cover". Tonneau covers known in the related art are often constructed of canvas, wood, or metal panels that extend between the upper margins of the sidewalls 28 from the front wall 32 to the tailgate 30. Tonneau covers serve to enclose the cargo area 24 thereby providing a modicum of protection for tools and other cargo. Tonneau covers also act to reduce the aerodynamic drag caused by uncovered cargo areas. However, tonneau covers suffer from the disadvantage that they inhibit free access to the entire cargo area 24 of the vehicle 20.

Another vehicle accessory that has gained popularity in recent years is generally known as a "Truck Bed Extender". Truck bed extenders known in the related art are usually employed with the tailgate 30 "down" or in the extended position as shown in Figure 2. The bed extender is mounted to the sidewalls 28 and is

supported by the tailgate 30. In this way, truck bed extenders known in the related art serve to increase the effective length of the bed 26 of the pickup truck 20.

Numerous variations on the truck bed extender theme have been proposed in the related art. For example, such devices may be manufactured of steel, can be relatively heavy and adapted for use only when the tailgate 30 is down. Alternatively,
5 other bed extenders known in the related art include a series of light-weight panels that are designed to be foldable when not in use or when the tailgate 30 is disposed in its upright position. In addition, bed extenders consisting of flexible netting or perforated steel grating have been proposed as a substitute for the tailgate 30 itself.
10 These devices are designed to extend the useful length of the truck bed 26 while reducing the aerodynamic drag caused by the tailgate 30 when it is in its upright position.

While such bed extenders known in the related art have generally worked for their intended purposes, disadvantages still remain. For example, generally speaking,
15 the bed extenders known in the related art provide no means for securely storing or protecting cargo from the elements or from theft. In addition, some bed extenders that have been proposed in the related art tend to be mechanically complex, involve cumbersome mounting requirements and related hardware.

Accordingly, there remains a need in the art for a device that serves to extend
20 the effective cargo area defined by the vehicle bed 26, sidewalls 28 and tailgate 30 while providing a means for securely storing tools and other valuable cargo, and at the same time protecting such valuable cargo from the elements and from theft. In addition, there is a need in the art for such a device that reduces the aerodynamic drag nominally caused by the vehicle cargo area, especially when the tailgate 30 is
25 disposed in its upright position. Furthermore, there is a need in the related art for such

a device that encompasses all of these features while still allowing open access to a portion of the cargo area 24 of the vehicle 20.

SUMMARY OF THE INVENTION AND ADVANTAGES

5 The present invention overcomes the disadvantages in the related art in a vehicle cargo area extender that is adapted to be employed in conjunction with a vehicle having a cargo area defined by a bed and a pair of upstanding sidewalls. In such vehicles, the upstanding sidewalls are typically spaced from one another on either side of the vehicle bed. A rear wall is disposed between the upstanding
10 sidewalls at one end of the vehicle bed. Furthermore, the rear wall is typically rotatable from an upright position to an extended position so as to be disposed substantially coplanar with the bed. Accordingly, the vehicle cargo area extender of the present invention includes a pair of sidewalls spaced from one another, a center wall that extends between the pair of sidewalls and a lid that is removably disposed
15 relative to the pair of sidewalls and the center wall. The pair of sidewalls, the center wall and the lid cooperate to define an enclosure having an open end. Furthermore, the vehicle cargo area extender of the present invention is removably mountable between a stored position wherein the open end of the enclosure is adjacent to the rear wall of the vehicle cargo area when it is disposed to in its upright position thereby
20 closing the open end of the cargo area extender. In addition, the vehicle cargo area extender of the present invention may be moved to a deployed position so as to be supported by the rear wall of the vehicle cargo area when the rear wall is in its extended position such that the open end of the enclosure faces the vehicle cargo area thereby increasing the effective size of the vehicle cargo area.

Accordingly, one advantage of the vehicle cargo area extender of the present invention is that it serves to it increase the effective cargo area defined by the vehicle bed 26, sidewalls 28 and tailgate 30 while, at the same time, providing a means for securely storing tools and other valuable cargo, and protecting such cargo from the elements and theft.

Another advantage of the vehicle cargo area extender of the present invention is that it reduces the aerodynamic drag nominally caused by the vehicle cargo area.

Another advantage of the vehicle cargo area extender of the present invention is that it provides the above-identified features while still allowing open access to a portion of the cargo area 24 of the vehicle 20.

Still another advantage of the vehicle cargo area extender of the present invention is that it is light-weight, durable, versatile, and user-friendly. Furthermore, the present invention is inexpensive to manufacture, cost effective and facilitates enhanced utility of the cargo area 24 found in pickup trucks and like vehicles.

Other advantages of the present invention will be readily appreciated, as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings as described below.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a vehicle having a cargo area defined by a pair of sidewalls, a front wall and a rear wall, with the rear wall disposed in its upright "closed" position;

Figure 2 is a vehicle having a cargo area defined by a pair of sidewalls, a front wall and a rear wall, with the rear wall disposed in its extended, "down" or "opened" position;

Figure 3 is a perspective view of the vehicle cargo area extender of the present invention;

Figure 4 is a side view of the lid of the present invention;

Figure 5 is an end view of the lid of the present invention;

5 Figure 6 is a cross-section taken substantially through lines at 6-6 of Figure 4;

Figure 7 is a partial broken-away perspective view of the lid retaining mechanism of the present invention;

Figure 8 is a cross-sectional side view of the lid hinging mechanism of the present invention;

10 Figure 9 is an assembly view of the pivoting mechanism of the present invention; and

Figure 10 and is an exploded view of an alternative embodiment of the present invention manufactured using a blow molding process;

15 Figure 11 is a perspective view of the present invention shown in its stored position with respect to a vehicle cargo area;

Figure 12 is a perspective view of the present invention shown in its stored position with the lid removed;

Figure 13 is a perspective view of the present invention shown in its stored position with the lid removed and the tailgate down;

20 Figure 14 is a perspective view of the present invention shown in its stored position with the lid partially rotated to an intermediate opened position;

Figure 15 is a perspective view of the present invention with the lid removed and shown in its deployed position over the rear wall of the vehicle cargo area; and

25 Figure 16 is a perspective view of the present invention with the lid on and shown in its deployed position over the rear wall of the vehicle cargo area;

Figure 17 is a partial broken away perspective view of the present invention with the lid on and shown in its stored position with the tailgate down;

Figure 18 is a perspective view of the present invention shown in its stored position with respect to a vehicle cargo area and illustrating the Aerodynamic effect it has in reducing drag on the vehicle.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

With the foregoing description of the related art in mind, the present invention is a vehicle cargo area extender, generally indicated at 40, 240 in Figures 3-18, where like numerals are used to designate like structure throughout the drawings. The vehicle cargo area extender 40, 240 is adapted to be employed in conjunction with a vehicle 20 of the type generally illustrated in Figures 1 and 2. As noted above, such vehicles 20 typically have a cargo area 24 defined by a bed 26 and a pair of upstanding sidewalls 28 spaced from one another on either side of the vehicle bed 26. In addition, the cargo area 24 is defined by a rear wall 30 extending between the upstanding sidewalls 28 at one end of the vehicle bed 26. The rear wall 30 is typically rotatable from an upright position to an extended position so as to be disposed substantially coplanar with the vehicle bed 26.

Referring now specifically to Figure 3, the cargo bed extender 40 of the present invention includes a pair of sidewalls, generally indicated at 42, disposed spaced from one another, a center wall, generally indicated at 44, extending between the pair of sidewalls 42 and a lid, generally indicated at 46. The lid 46 is removably disposed relative to the pair of sidewalls 42 and the center wall 44 as will be described in greater detail below. The pair of sidewalls 42, the center wall 44 and the lid 46 cooperate to define an enclosure 48 having an open end 50 (Figure 7, 11, 14 and 17).

In addition, the pair of sidewalls 42 and the center wall 44 cooperate to define a pair of swept-back portions 52 extending at obtuse angles relative to and between the planes defined by the adjacent side 42 and center walls 44.

5 More specifically, each swept-back portion 52 is disposed between an associated sidewall 42 and the center wall 44. Each of the sidewalls 42, the center wall 44 and the swept-back portions 50 define substantially vertical or upright planes relative to the vehicle bed 26 when the cargo area extender 40 is mounted to a vehicle as will be described in greater detail below.

10 Together, the planer sidewalls 42, center wall 44 and swept-back portions 52 define a perimeter of the enclosure 48. On the other hand, and referring now to Figure 4, the lid 46 defines a six-sided perimeter that is coextensive with the perimeter defined by the sidewalls 42, center wall 44 and swept-back portions 52. As best shown in Figures 4 and 6, in its operative mode, the lid 46 defines a downwardly extending flange 54 that extends for at least a substantial portion of the perimeter defined by the lid 46. The distal end 56 of the flange 54 is adapted for abutting contact with the upper margin of the sidewalls 42, center wall 44 and swept-back portions 52. Furthermore, the interaction of the flange 54 with the upper margins of the side and center walls as well as the swept-back portions may act to seal the enclosure 48 from above as will be explained in greater detail later in this description
15
20 of the preferred embodiments.

Each of the pair of sidewalls 42, the center wall 44 and the lid 46 may include reinforced portions that provide strength to the vehicle cargo area extender 40. More specifically, with continuing reference to Figure 4, reinforced portions may include ribs 58 defined on the inner surface 60 of the lid 46 that faces the enclosure 48.
25 Similarly, with additional reference to Figure 17, it will be appreciated that the

reinforced portions may include ribs 62 on the inner surfaces 64, 65, 66 of each of the pair of sidewalls 42 the swept-back portions 52 and the center wall 44, respectively. The inner surfaces 64, 65, 66 preferably face the enclosure 48. However, those having ordinary skill in the art will appreciate that the strengthening ribs 58 on the lid 46 as well as the strengthening ribs 62 on the sidewalls 42, the center wall 44 and the swept-back portions 52 may also be formed on the surfaces of the these components opposite the enclosure 48. Furthermore, the reinforced portions may also include steel reinforcements extending for a portion of at least one of the pair of sidewalls 42, the center wall 44, the swept-back portions 52 and the lid 46. For example, with reference back to Figures 4 and 5, the lid 46 may include steel reinforcements 68 spaced from one another in any convenient manner and extending for a substantial portion of the width of the lid 46. The steel reinforcements 68 may be rectangular, tubular, hollow or solid and may extend on the lid 46 between the upper margins of the sidewalls 42 and the swept-back portions 52. Similar structure may also be employed in connection with the sidewalls 42, center wall 44 and the swept-back portions 52.

As best shown in Figures 8 and 14, in the preferred embodiment, the lid 46 is hingedly supported by the pair of sidewalls 42, the center wall 44 and the swept-back portions 52 for rotation about an axis extending parallel to the plane defined by the center wall 44. Thus, the hinging function of the lid 46 allows access to the enclosure 48 defined by the vehicle cargo area extender 40.

More specifically, and with reference to Figure 8, the lid 46 may include one or more hinge portions, generally indicated at 70, that, when the lid is in its operative mode, extend downwardly from the lid 46 toward the vehicle bed 26. As illustrated in these figures, the hinge portions 70 may be located along the shorter edge 72 of the lid

46 opposite the open end 50 defined by the enclosure 48. However, those having ordinary skill in the art will appreciate that the lid 46 may be hingedly supported to any one of the sidewalls 42, the center wall 44 or the swept-back portions 52 without departing from the scope of the claimed invention.

5 Each hinge portion 70 defines an inwardly extending lip 74. On the other hand, the center wall 44, for example, may include upstanding struts, generally indicated at 76, located thereon so as to correspond to the location of the hinge portions 70. Each strut 76 includes a corresponding ledge 78 defined proximate its terminal end 80. The ledge 78 is configured to cooperate with the lip 74 defined by
10 the hinge portion 70 on the lid 46. The cooperative interaction of the lip 74 and the ledge 78 function to allow rotation of the lid 46 about an axis contained in a plane that is parallel to the center wall 44, as noted above. Furthermore, the lip 74 and ledge 78 also function to assist in the retention of the lid 46 upon the upper margins of the side and center walls 42, 44 as well as the swept-back portions 52 so as to define the
15 enclosure 48. However, those having ordinary skill in the art will appreciate that numerous structural variations and substitutions may be employed at the relevant juncture to provide the hinging and/or retaining function of the lid 46 relative to the side and center walls 42, 44, as well as the swept-back portions 52, respectively, without departing from the scope of the claimed invention. For example only, and not
20 by way of limitation, the sidewalls, center wall, as well as the lid may be configured so as to present cooperating flanges and channels at the appropriate locations on the upper margins of the side and center walls and the perimeter of the lid which cooperate such that the lid may be slidably retained with respect to the side and center walls.

Further, as best shown in Figure 7 with respect to the preferred embodiment, the cargo area extender 40 includes a retainer mechanism, generally indicated at 82. The retainer mechanism 82 is located opposite the hinge portion 70 and, in the preferred embodiment disclosed herein, is adjacent to the open end 50 defined by the enclosure 48. More specifically, the retainer mechanism 82 may include a yoke 84
5 mounted, for example, to a steel-reinforcing member 68 presented by the inner surface 60 of the lid 46. A saddle, generally indicated at 86, is mounted to the sidewall 42. More specifically, the saddle 86 is preferably mounted to a strut 88 located near the marginal edge of the sidewall 42 proximate to the opening 50 defined
10 by the enclosure 48. The saddle 86 is spaced from, but substantially aligned with the yoke 84. The saddle 86 presents a keeper bracket that is defined by a pair of spaced fingers 90. An elastic member 92 is fixedly attached to the yoke 84 and terminates in a T-shaped cleat 94. The T-shaped cleat 94 has a bulging spherical member 95 that may be engaged by the fingers 90 of the saddle 86 thereby biasing the lid 46 toward
15 the upper margins of the side and center walls 42, 44, as well as the swept-back portions 52, respectively. In this way, the lid 46 may be releasably retained in its closed position relative to the side and center walls. However, like the structure illustrated in connection with the hinging function of the lid 46, those having ordinary skill in the art will appreciate that numerous variations and substitutions for the
20 structure described herein to releasably retain the lid in its closed position may be employed without departing from the scope of the claimed invention.

The vehicle cargo area extender 40 of the present invention is movably mounted between a stored position (Figures 11-14, 17 and 18) and a deployed position (Figures 15 and 16). In its stored position, the open end 50 of the enclosure
25 48 is adjacent to the rear wall 30 of the vehicle cargo area 24 when the rear wall 30 is

disposed in its upright position (Figures 11 and 14). In this way, the rear wall acts to close the open end 50 of the cargo area extender 40 but allows for selective access into the enclosure 50 as shown in Figure 17. On the other hand, and when it is disposed in its deployed position, the vehicle cargo area extender 40 of the present invention is supported by the rear wall 30 when it is “down” or in its extended position. In this operative mode, the open end 50 of the enclosure 48 faces the vehicle cargo area 24. In this way, the present invention increases the effective size of the vehicle cargo area 24.

More specifically and as illustrated in Figures 9 and 15, the vehicle cargo area extender 40 of the present invention is pivotably mounted to the vehicle 20 about an axis extending between the pair of side walls 42. Thus, the vehicle cargo area extender 40 is pivotable between a stored position and a deployed position as noted above. To this end and with reference to Figures 3 and 9, each of the sidewalls 42 includes a bracket 96 having a slot 98 and a retainer 100. Preferably, and as illustrated in Figure 9, the bracket 96 is mounted to a boss 102 formed on each sidewall 42 of the present invention. The slot 98 in each bracket 96 defines an open end 104 and a closed end 106. Each slot 98 is adapted to receive a stud 108 presented by the adjacent upstanding wall 28 on the vehicle 20. Preferably, the stud 108 extends from the D-pillar 109 of the vehicle cargo area, which is typically formed on the rear inner portion of the upstanding sidewall 28.

Thus, in one installation mode contemplated in the preferred embodiment, the cargo area extender 40 of the present invention is positioned above the vehicle bed 26 so as to align the open end 104 of the slot 98 with the stud 108. The cargo area extender 40 is then lowered relative to the vehicle bed 26 so that the stud 108 is received through the open end 104 of the slot 98 and into registry with the closed end

106. In the preferred embodiment, the slot 98 may be defined in the bracket 96 such that the open end 104 faces in the direction of the vehicle bed 26 when the cargo area extender 40 is in its stored position. Alternatively, the slot 98 may be defined in the bracket 96 such that the open end 104 faces in the direction of the vehicle cargo area 24 when the cargo area extender 40 is in its deployed position. In this operative installation mode, the vehicle cargo area extender 40 is supported upon the extended tailgate 30 and slid forward relative to the vehicle cargo area 24 until the stud 108 is received in the slot 98.

The retainer 100 acts to prevent inadvertent disengagement between the slot 98 and the stud 108. To this end, the retainer 100 is defined by a tongue 110 which is biased to a first position so as to close the open end 104 of the slot 98. The tongue 110 is moveable between a first position wherein the retainer 100 acts to close the open end 104 of the slot 98 and a second position disposed spaced from the open end 104 of the slot 98. The tongue 110 may be manually moved to its second, open position or under the influence of the stud 108 as the cargo area extender 40 is lowered onto the bed. In either event, the stud 108 may be received and retained in the slot 98.

The vehicle cargo area extender 40 of the present invention may be removed from the vehicle cargo area 24 only when the tongue 110 is depressed or moved to its open position thereby allowing the stud to move past the open end 104 of the slot 98, for example, as the vehicle cargo area extender 40 of the present invention is lifted in either a generally vertical direction or rearwardly away from the cargo area 24 as illustrated in these figures. In this way, the vehicle cargo area extender 40 of the present invention may be releasably mounted to the vehicle 20 such that it is pivotable about the axis defined by the studs 108 between its stored and deployed positions.

In any event, those having ordinary skill in the art will appreciate that numerous variations and/or substitutions may be made to the specific structure described and illustrated herein in connection with the pivoting function of the present invention without departing from the scope of the claimed invention.

5 In the preferred embodiment illustrated in Figures 3-9 the sidewalls 42, center wall 44, and lid 46 are manufactured of plastic using an injection molded process, a gas-assisted injection-molding process, or a structural foam-molding process. Furthermore, as presently contemplated, the sidewalls 42, center wall 44 as well as the swept-back portions 52 may be molded as one integral plastic component.

10 Alternatively, those having ordinary skill in the art will appreciate that the sidewalls 42, center wall 44 and swept-back portions 52 may be molded as individual components and fastened together using any suitable fastening mechanism now known or invented in the future.

Alternatively, the sidewalls, center wall, swept-back portions and lid may be

15 manufacturing using a blow-molding process. For example, an alternate embodiment of the vehicle cargo area extender of the present invention is generally indicated at 240 in the exploded view of Figure 10, where like numerals are used to designate like structure of the type illustrated in Figures 3-9, but increased by a factor of 200. More specifically, and like the embodiment described above, the vehicle cargo area

20 extender 240 includes a pair of sidewalls, generally indicated at 242 disposed spaced from one another, a center wall, generally indicated at 244 that extends between the pair of sidewalls 242 and a lid, generally indicated at 246. The lid 246 is removably disposed relative to the pair of sidewalls 242 and center wall 244 in the same or similar manner as described above.

In addition, each sidewall 242 defines a pair of swept-back portions 252 and a forward terminal edge panel 251. Each forward terminal edge panel 251 presents a flange 253 at its lateral distal edge. The center panel 244 includes a pair of corresponding flanges 245 extending along either lateral edge thereof and adapted for mating engagement with the distal flanges 253 formed on the forward, terminal edge panel 251 of the sidewalls 242. The center panel 244 and side panel 242 are interconnected at their respective flanges 251, 245 using any suitable fastening mechanism. In addition, this juncture may be strengthened by struts 276. Each strut 276 may include a ledge 278 that cooperates with a hinge portion (not shown in Figure 10) of the type described with respect to Figure 8. Furthermore, the inner surfaces of the sidewalls 242, swept-back portions 252 and center wall 244 may be strengthened by ribs 262.

The vehicle cargo area extender 240 is pivotally mounted to the vehicle 20 about an axis extending between the pair of sidewalls 42 in the same manner as described above. To this end, the cargo area extender 240 may include rear struts 288 mounted to the inner surface 264 of each sidewall 242. Each strut 288 includes a bracket 296 having a slot 298 and a retainer. Each sidewall 242 includes a notch 247 that corresponds to the bracket 296. The bracket 296 extends through the notch 247 to present the slot 298 and retainer for engagement with the stud 108 on the adjacent upstanding wall 28 of the vehicle 20 in the manner described above. In addition, the struts 288 may also include buttons 289 located at their upper terminal ends which are adapted to be received in corresponding recesses formed on the underside of the lid 246 for the purpose of retaining the lid 246 relative to the sidewalls 242.

Referring now to Figures 11, 17 and 18 it will be appreciated that in one operative mode, the lid 46, 246 defines a substantially planar surface that extends

across the rear portion of the vehicle cargo area 24 adjacent to the rear wall 30 when the rear wall 30 is disposed in its upright position. Furthermore, the lid 46, 246 extends inward relative to the rear wall 30 when the vehicle cargo area extender 40, 240 is disposed in its stored position. When it is disposed in its stored position, the
5 vehicle cargo area extender 40, 240 of the present invention reduces aerodynamic drag on the vehicle 20 as will be described in greater detail below.

Alternatively and as illustrated in Figure 12, the lid 46, 246 may be removed such that the enclosure 48, 248 opens upwardly. This feature thereby presents a partial enclosure 48, 248 which may be used to segregate selective cargo from the
10 remaining cargo area. Furthermore, and as shown in Figures 14 and 16, the lid 46, 246 may be hingedly fastened to the sidewalls 42, 242 and center wall 44, 244 as described above when the cargo area extender 40, 240 is disposed in both its stored or deployed position. In this operative mode, the sidewalls 42, 242 and the center wall 44, 244 along with the lid 46, 246 define an open-ended enclosure 48, 248 such that
15 the open end 50, 250 of the enclosure 48, 248 faces the cargo bed area 24.

Figure 15 illustrates the pivoting functionality of the vehicle cargo area extender 40, 240 of the present invention. The pivoting action is illustrated in phantom in this figure. The cargo area extender 40, 240 is shown in solid lines in its deployed position supported by the tailgate 30 with the lid off. In this way, the entire
20 cargo area 24 of the vehicle 20 is thereby enlarged.

As best shown in Figure 18, forward movement of the vehicle 20 creates an aerodynamic flow of air over the cab 22 toward the rear wall or tailgate 30 of the vehicle. An area, generally indicated at 34, undisturbed by the flow of air over the cab 22 develops in the cargo area 24 adjacent to the cab 22 and the front wall 32.
25 However, in the absence of the vehicle cargo bed extender of the present invention,

the airflow will move in a downward direction toward the vehicle bed 26 as viewed in this figure and engage the tailgate 30 as is commonly known in the art. When this occurs, the tailgate 30 acts as a brake on the vehicle 20 thereby reducing its fuel efficiency. However, as illustrated in Figure 18, when the cargo area extender 40, 240
5 of the present invention is disposed in its stored position inward relative to the rear wall 30, the lid 46, 246 eliminates the braking action caused by the tailgate 30. Thus, airflow studies indicate that the vehicle cargo area extender 40, 240 of the present invention improves the fuel economy of vehicles, such as pickup trucks and the like while minimizing added weight.

10 When considered in connection with the detailed description set forth above, it is readily apparent that the vehicle cargo area extender 40, 240 of the present invention may serve to increase the effective cargo area of the vehicle (Figures 15 and 16) while, at the same time, providing a means for securely storing tools and other valuable cargo, and protecting this cargo from the elements and from theft. To this
15 end, the invention incorporates a releasable and/or pivotable lid that allows selective access to the enclosure 48 defined by the present invention. In addition, and as noted above, the vehicle cargo area extender 40, 240 of the present invention reduces the aerodynamic drag nominally caused by the vehicle cargo area. At the same, the vehicle cargo area extender 40, 240 of the present invention provides the above-
20 identified features and advantages while still allowing open access to a portion of the cargo area 24 of the vehicle 20 even when it is disposed in its stored position forward of the tailgate 30. Finally, the vehicle cargo area extender 40, 240 of the present invention is lightweight, durable, versatile, easy to install and remove and is user-friendly. It is inexpensive to manufacture, cost-effective and facilitates the enhanced
25 utility of the cargo area 24 found in pickup trucks and like vehicles.

The invention has been described in an illustrative manner. It is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation. Many modifications and variations of the invention are possible in light of the above teachings. Therefore, within the scope
5 of the appended claims, the invention may be practiced other than as specifically described.

We claim:

1. A vehicle cargo area extender (40, 240) adapted to be employed in conjunction with a vehicle (20) having a cargo area (24) defined by a bed (26) and a pair of upstanding sidewalls (28) spaced from one another on either side of the vehicle bed (26) and a rear wall (30) extending between the upstanding sidewalls (28) at one end of the bed (26), wherein the rear wall (30) is rotatable from an upright position to an extended position so as to be disposed substantially co-planar with the vehicle bed (26), said cargo bed extender (40, 240) comprising:

a pair of sidewalls (42, 242) spaced from one another, a center wall (44, 244) extending between said pair of sidewalls (42,242) and a lid (46, 246) removably disposed relative to said pair of sidewalls (42, 242) and said center wall (44, 244), said pair of sidewalls (42, 242), said center wall (44, 244) and said lid (46, 246) cooperating to define an enclosure (48, 248) having open end (50, 250);

said vehicle cargo area extender (40, 240) movably mounted between a stored position wherein the open end (50, 250) of said enclosure (48, 248) is adjacent to the rear wall (30) of the vehicle cargo area (24) when it is disposed in its upright position thereby closing the open end (50, 250) of said cargo area extender (40, 240), and a deployed position so as to be supported by the rear wall (30) of the vehicle cargo area (24) when it is in its extended position such that the open end (50, 250) of said enclosure (48, 248) faces the vehicle cargo area (24) thereby increasing the effective size of the vehicle cargo area (24).

2. A vehicle cargo area extender (40, 240) as set forth in claim 1 wherein said lid (46, 246) defines a substantially planar surface extending across the rear portion of the vehicle cargo area (24) adjacent to the rear wall (30) when it is disposed

in its upright position and inward relative to the rear wall (30) when it is disposed in its stored position.

3. A vehicle cargo area extender (40, 240) as set forth in claim 1 wherein
5 said lid (46, 246) is hingedly supported by said pair of sidewalls (42, 242) and said center wall (44, 244) for rotation about an axis extending parallel to a plane defined by said center wall (44, 244) to allow access to said enclosure (48, 248) defined by said vehicle cargo area extender (40, 240).

10 4. A vehicle cargo area extender (40, 240) as set forth in claim 1 wherein said lid (46, 246) may be supported by said pair of sidewalls (42, 242) and said center wall (44, 244) to define an open ended enclosure (48, 248) when said open end (50, 250) of said enclosure (48, 248) faces the cargo area (24) when said vehicle cargo area extender (40, 240) is disposed in its deployed position.

15 5. A vehicle cargo area extender (40, 240) as set forth in claim 1 wherein said pair of sidewalls (42, 242) and said center wall (44, 244) cooperate to define a pair of swept-back portions (52, 252) extending at obtuse angles relative to and between the planes defined by the adjacent side (42, 242) and center walls (44, 244).

20 6. A vehicle cargo area extender (40, 240) as set forth in claim 5 wherein said lid (46, 246) defines a six sided perimeter that is coextensive with respect to the perimeter defined by said pair of sidewalls (42, 242), said center wall (44, 244) and said swept-back portions (52, 252) defined between adjacent portions of said side (42,
25 242) and center walls (44, 244).

7. A vehicle cargo area extender (40, 240) as set forth in claim 1 wherein said pair of sidewalls (42, 242) and said center wall (44, 244) and said lid (46, 246) include reinforced portions that provide strength to said vehicle cargo area extender.

5

8. A vehicle cargo area extender (40, 240) as set forth in claim 7 wherein said reinforced portions include ribs (58, 62) defined in each of said pair of sidewalls (42, 242), said center wall (44, 244) and said lid (46, 246).

10

9. A vehicle cargo area extender (40, 240) as set forth in claim 8 wherein said reinforced portions include steel reinforcements (68) extending for a portion of at least one of said pair of sidewalls (42, 242), said center wall (44, 244) and said lid (46, 246).

15

10. A vehicle cargo area extender (40) as set forth in claim 1 wherein said pair of sidewalls (242), said center wall (244) and said lid (246) are manufactured using an injection molding process.

20

11. A vehicle cargo area extender (40, 240) as set forth in claim 1 wherein said pair of sidewalls (242), said center wall (244) and said lid (246) are manufactured using a blow molding process.

25

12. A vehicle cargo area extender (40, 240) adapted to be employed in conjunction with a vehicle (20) having a cargo area (24) defined by a bed (26) and a pair of upstanding sidewalls (28) spaced from one another on either side of the bed

(26) and a rear wall (30) extending between the upstanding sidewalls (28) at one end of the vehicle bed (26), wherein the rear wall (30) is rotatable from an upright position to an extended position so as to be disposed substantially co-planar with the vehicle bed (26), said cargo bed extender (40, 240) comprising:

5 a pair of sidewalls (42, 242) spaced from one another, a center wall (44, 244) extending between said pair of sidewalls (42, 242) and a lid (46, 246) removably disposed relative to said pair of sidewalls (42, 242) and said center wall (44, 244), said pair of sidewalls (42, 242), said center wall (44, 244) and said lid (46, 246) cooperating to define an enclosure (48, 248) having an open end (50, 250);

10 said vehicle cargo area extender (40, 240) pivotally mounted to the vehicle cargo area (24) about an axis extending between said pair of sidewalls (42, 242) between a stored position wherein the open end (50, 250) of said enclosure (48, 248) is adjacent to the rear wall (30) of the vehicle cargo area (24) when it is disposed in its upright position thereby closing the open end (50, 250) of said cargo area extender
15 (40, 240), and a deployed position so as to be supported by the rear wall (30) of the vehicle cargo area (24) when it is in its extended position such that the open end (50, 250) of said enclosure (48, 248) faces the vehicle cargo area (24) thereby increasing the effective size of the vehicle cargo area (24).

20 13. A vehicle cargo area extender (40, 240) as set forth in claim 12 wherein each of said pair of sidewalls (42, 242) includes a bracket (96, 296) having a slot (98, 298) and a retainer (100), each slot (98, 298) adapted to receive a stud (108) presented by the adjacent upstanding sidewalls (28) on the vehicle, said retainer (100) acting to prevent inadvertent disengagement between said slot (98, 298) and said stud

(108), said vehicle cargo area extender (40, 240) being pivotable about an axis defined by said studs (108) between said stored and said deployed positions.

14. A vehicle cargo area extender (40, 240) as set forth in claim 13
5 wherein said slot (98, 298) is has an open end (104) and a closed end (106), said
retainer (100) movable between a first position wherein said retainer acts to close said
open end (104) of said slot (98, 298) and a second position disposed spaced from said
open end (104) of said slot (98, 298) such that the stud (108) may be received and
retained in said slot (98, 298).

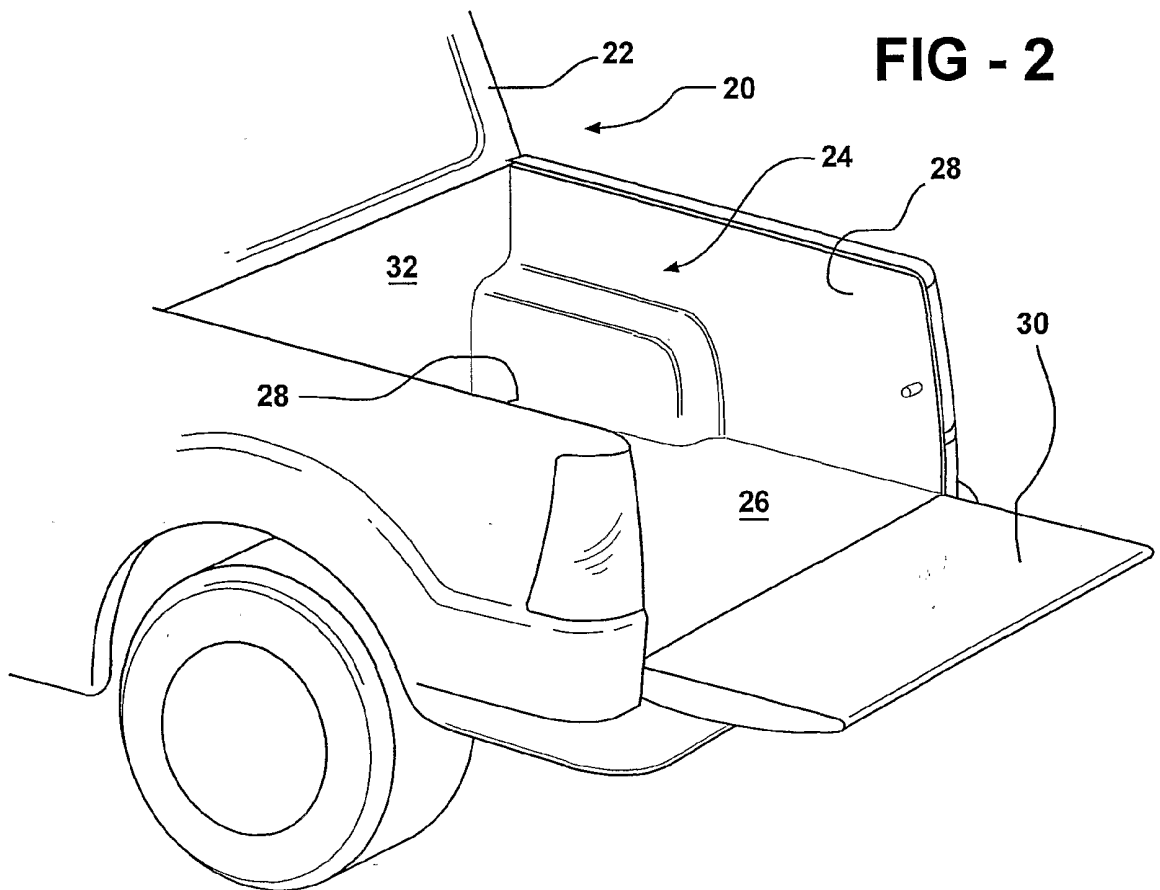
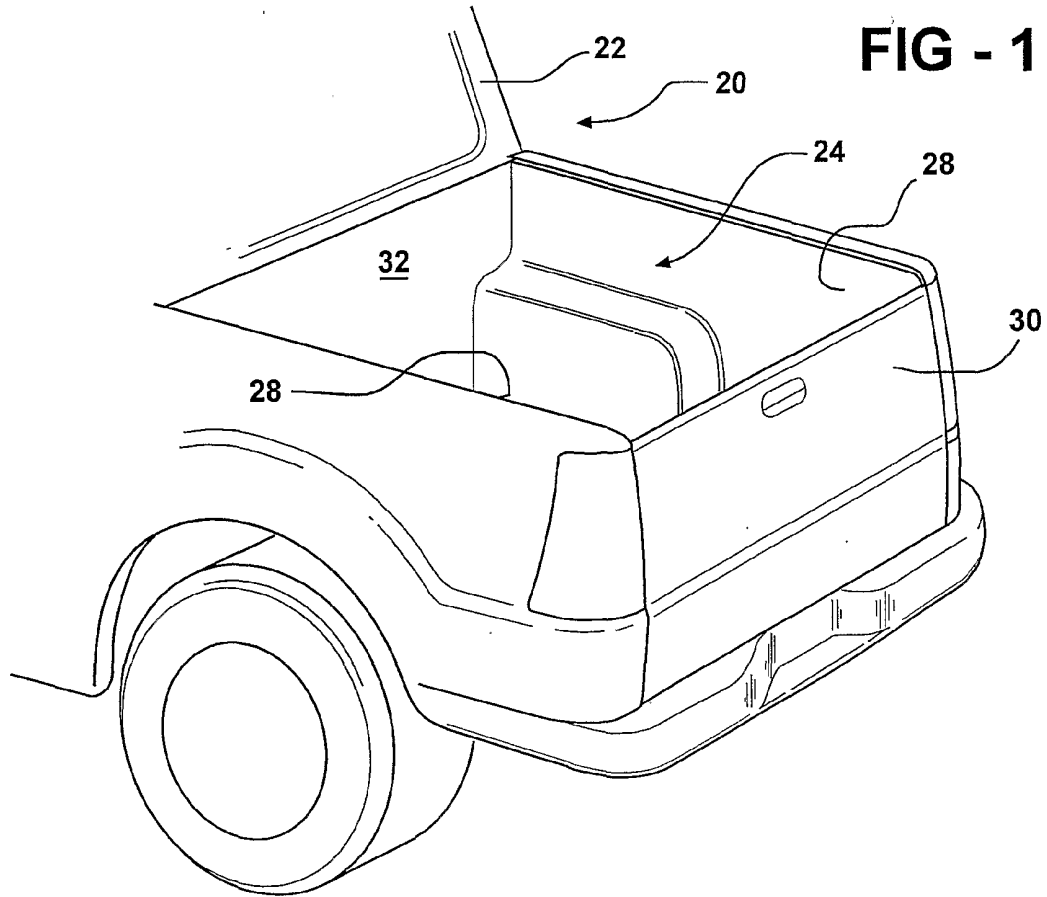
10

15. A vehicle cargo area extender (40, 240) as set forth in claim of 14
wherein said retainer (100) is defined by a tongue (110) biased to said first position so
as to close said open end (104) of said slot (98, 298).

16. A vehicle cargo area extender (40, 240) as set forth in claim 15
15 wherein said slot (98, 298) is defined in said bracket (96, 296) such that said open end
(104) faces in the direction of the vehicle bed (26) when said vehicle cargo area
extender (40, 240) is in its stored position.

17. A vehicle cargo area extender (40, 240) as set forth in claim 15
20 wherein said slot (98, 298) is defined in said bracket (96, 296) such that said open end
(104) faces in the direction of the vehicle cargo area (24) when said cargo area
extender (40, 240) is in the its deployed position.

18. A vehicle cargo area extender (40, 240) as set forth in claim that 15 wherein each of said pair of sidewalls (42, 242) includes a boss (102) formed thereon, said bracket (96, 296) being mounted to said boss (102).



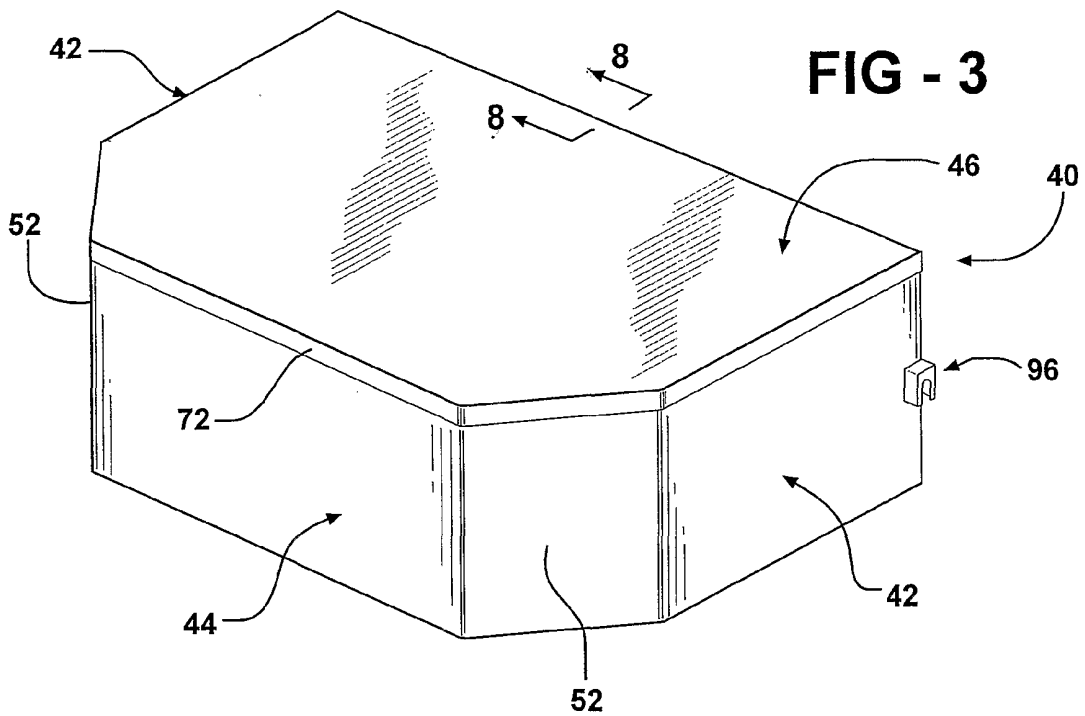


FIG - 3

FIG - 4

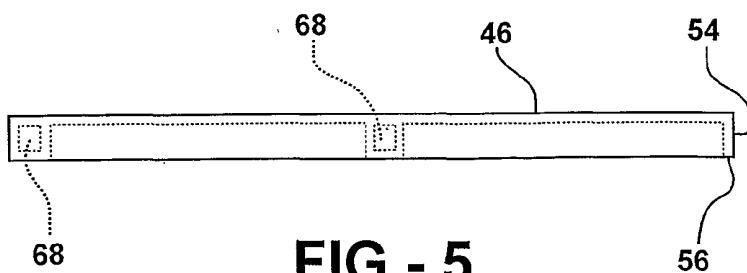
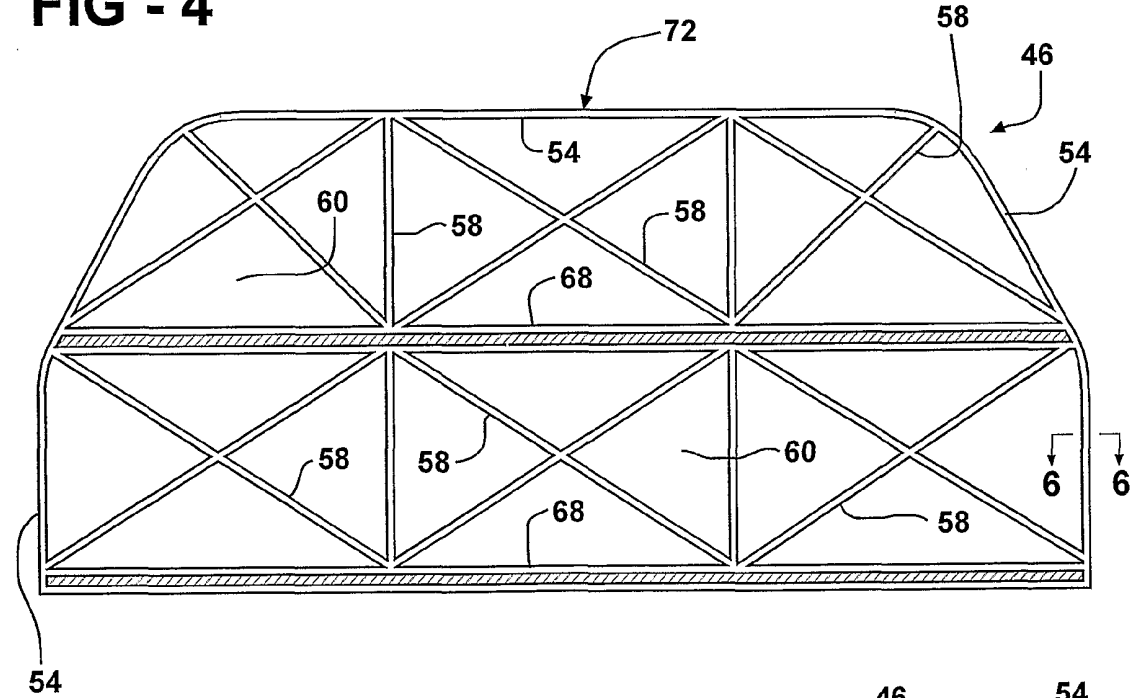


FIG - 5

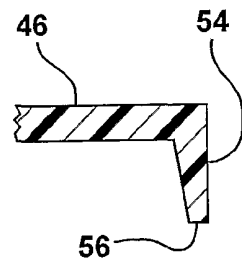


FIG - 6

FIG - 9

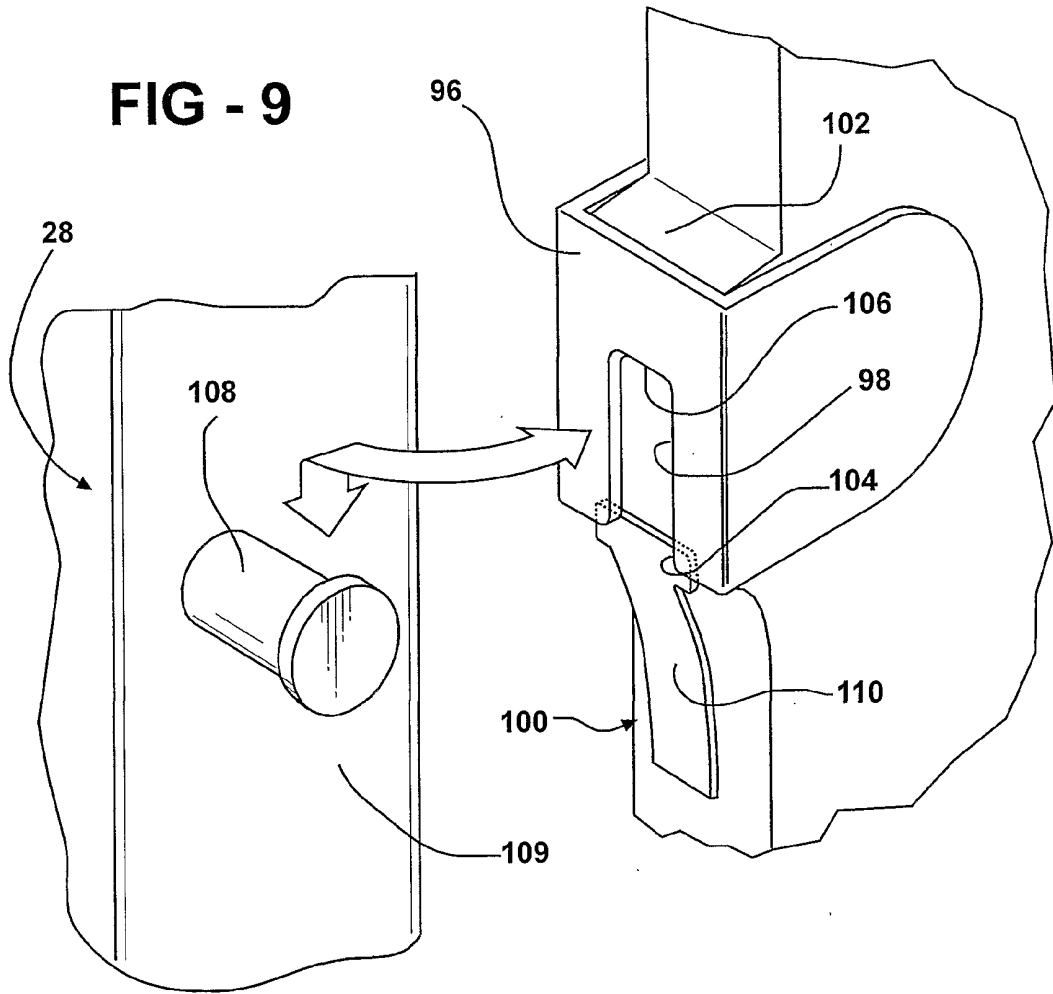
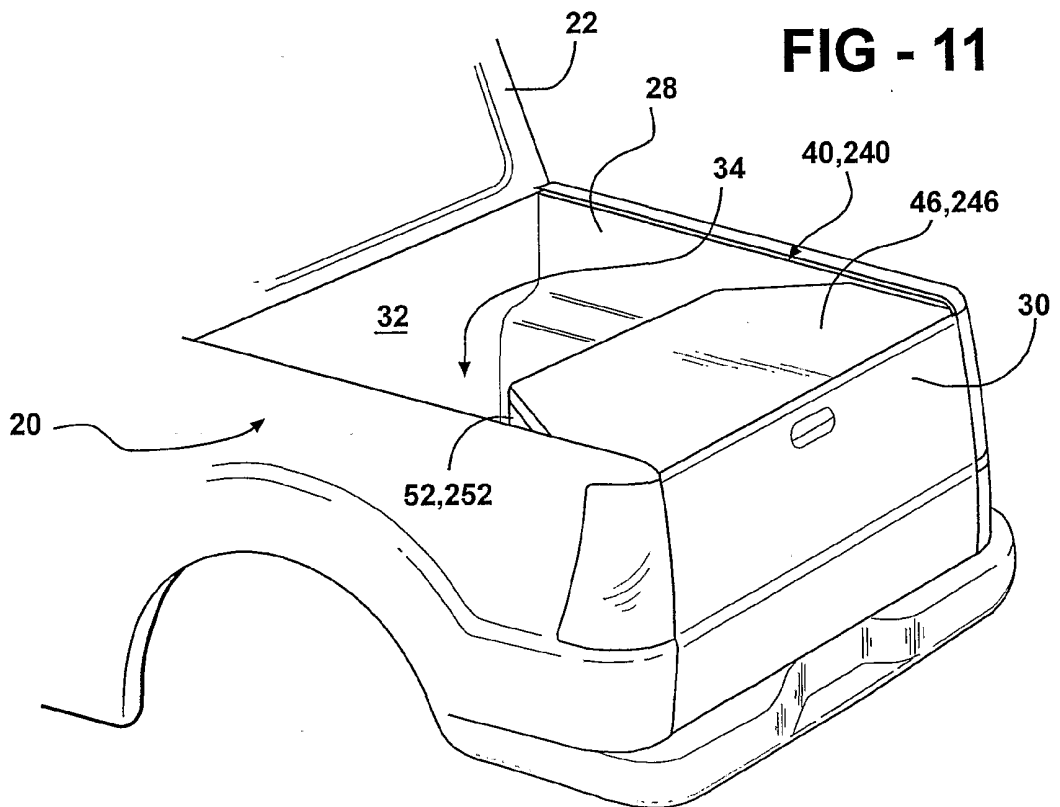


FIG - 11



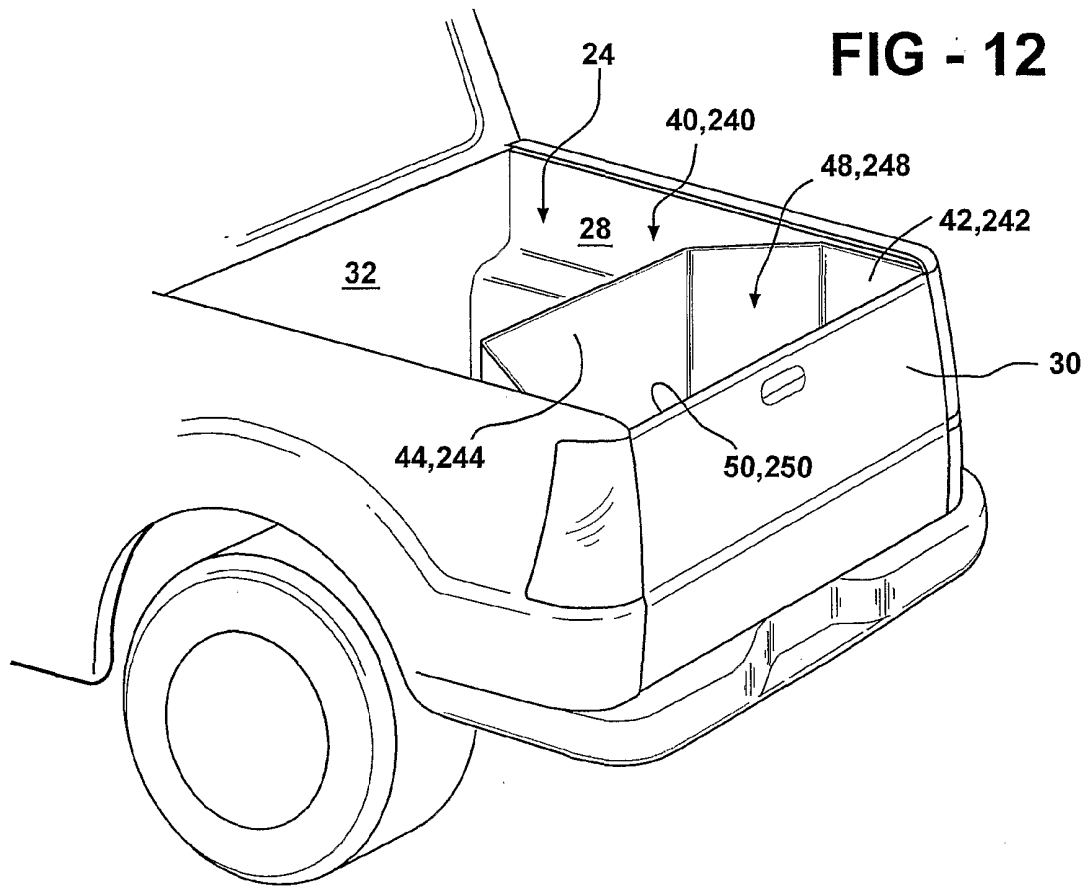


FIG - 12

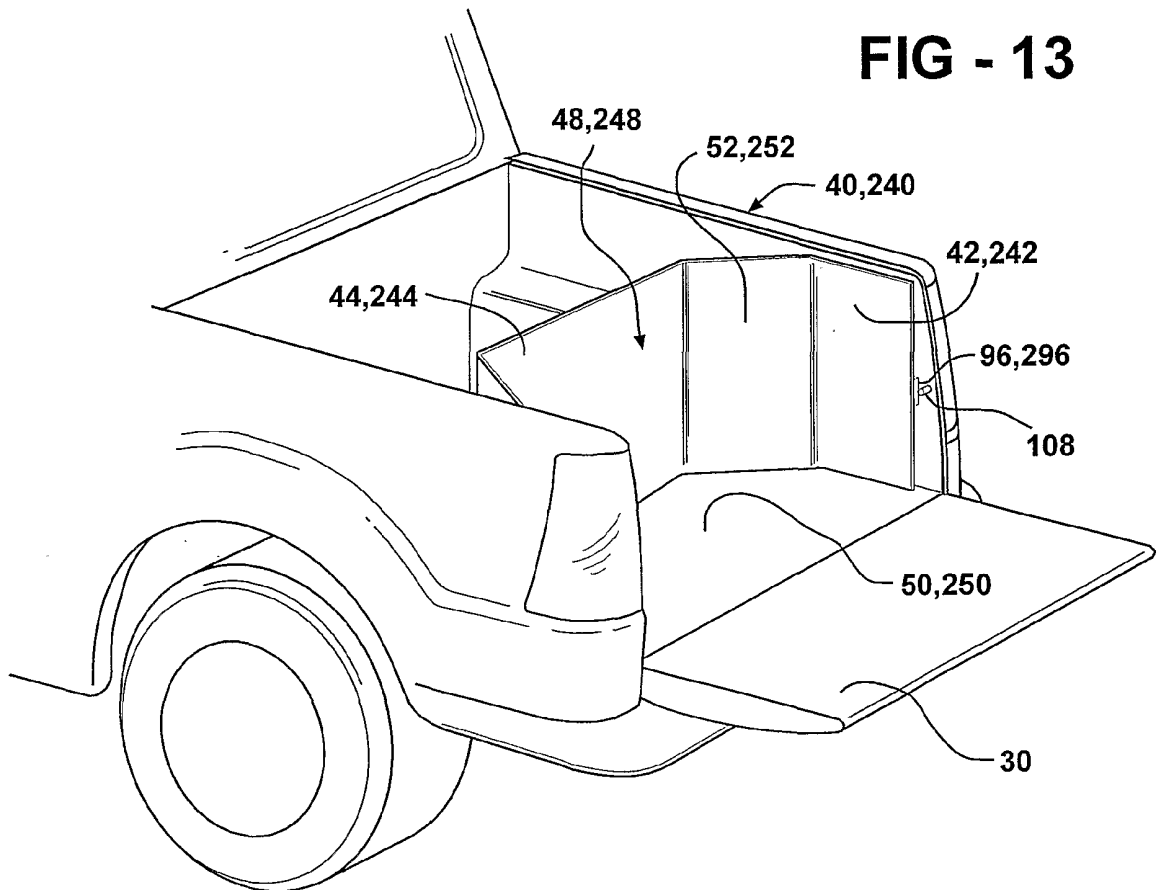
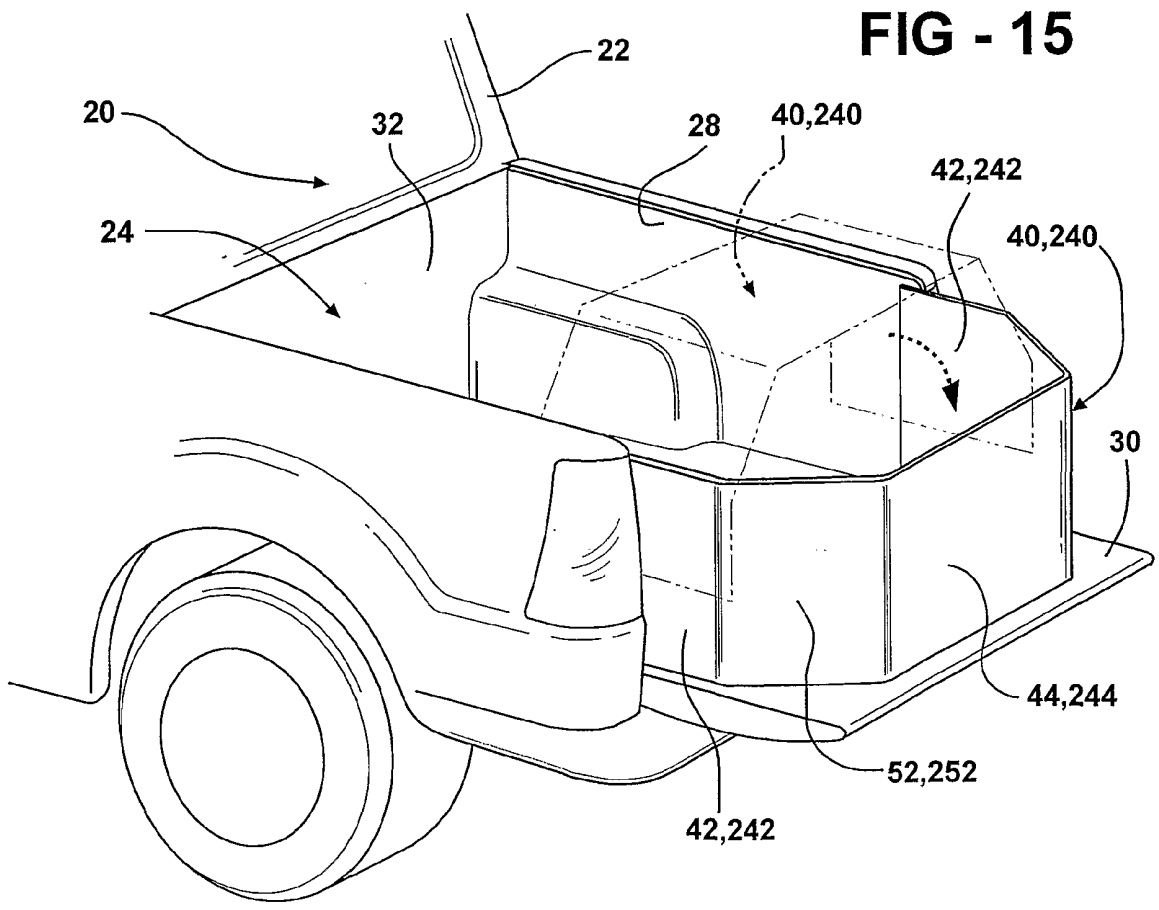
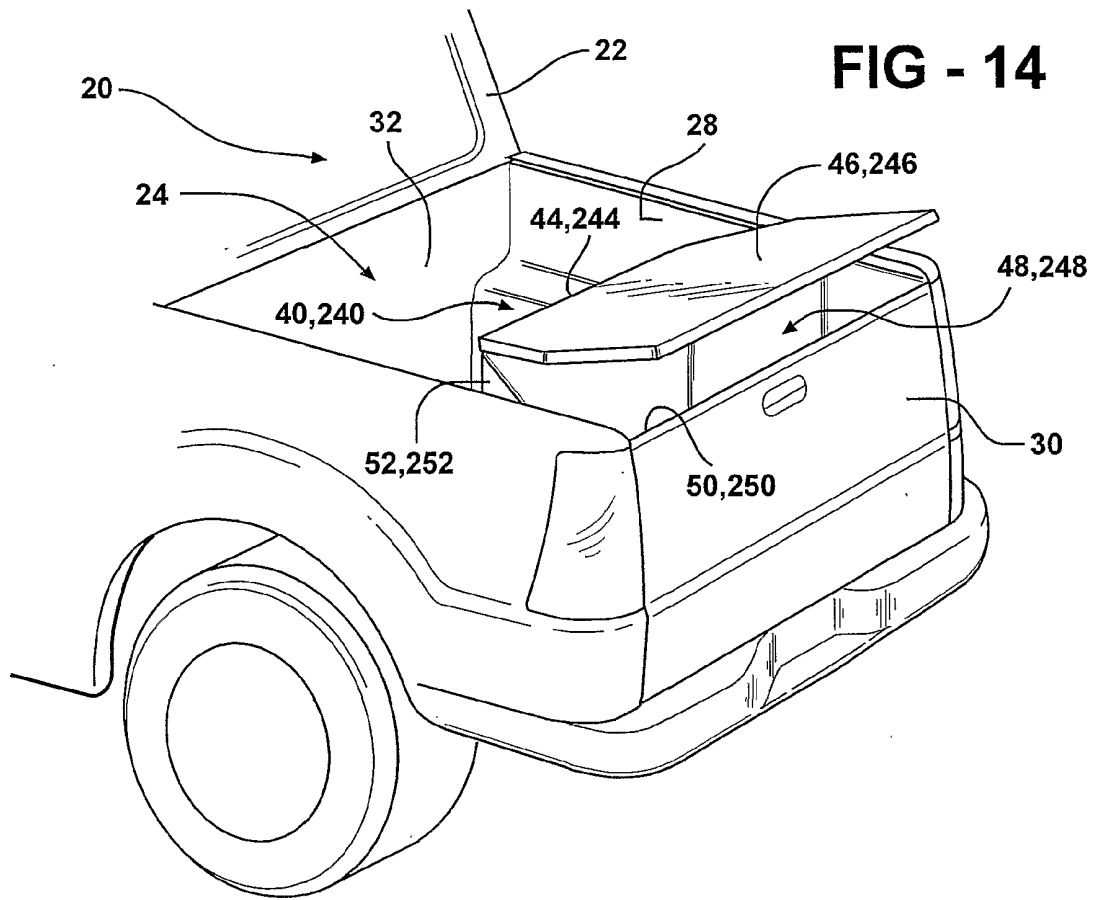
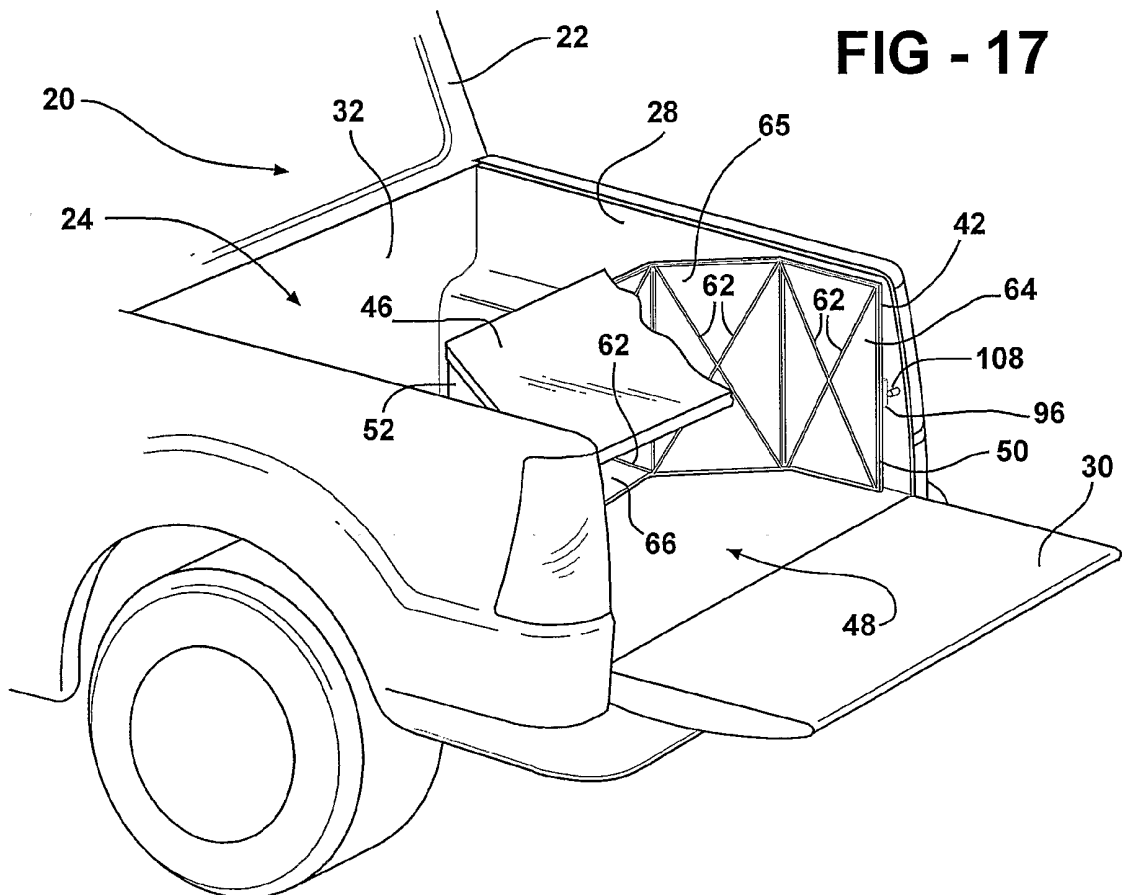
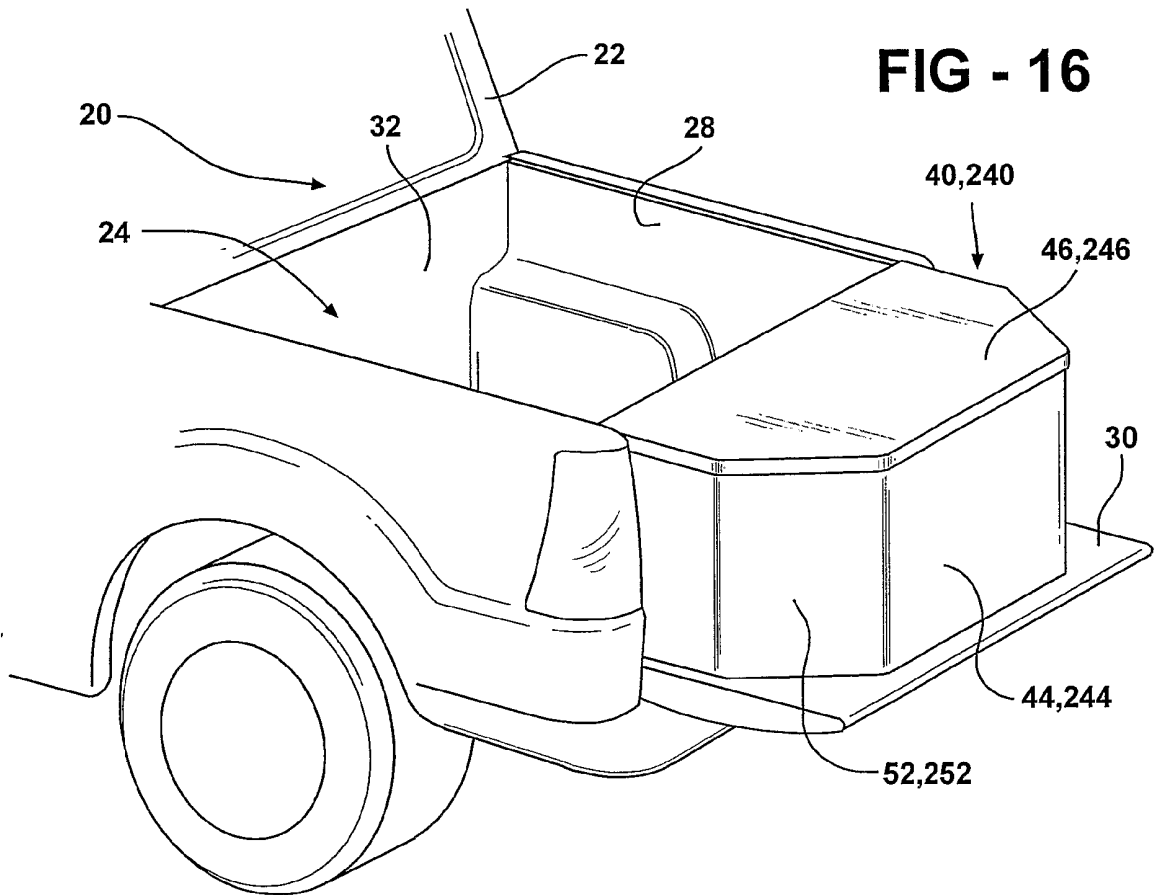


FIG - 13





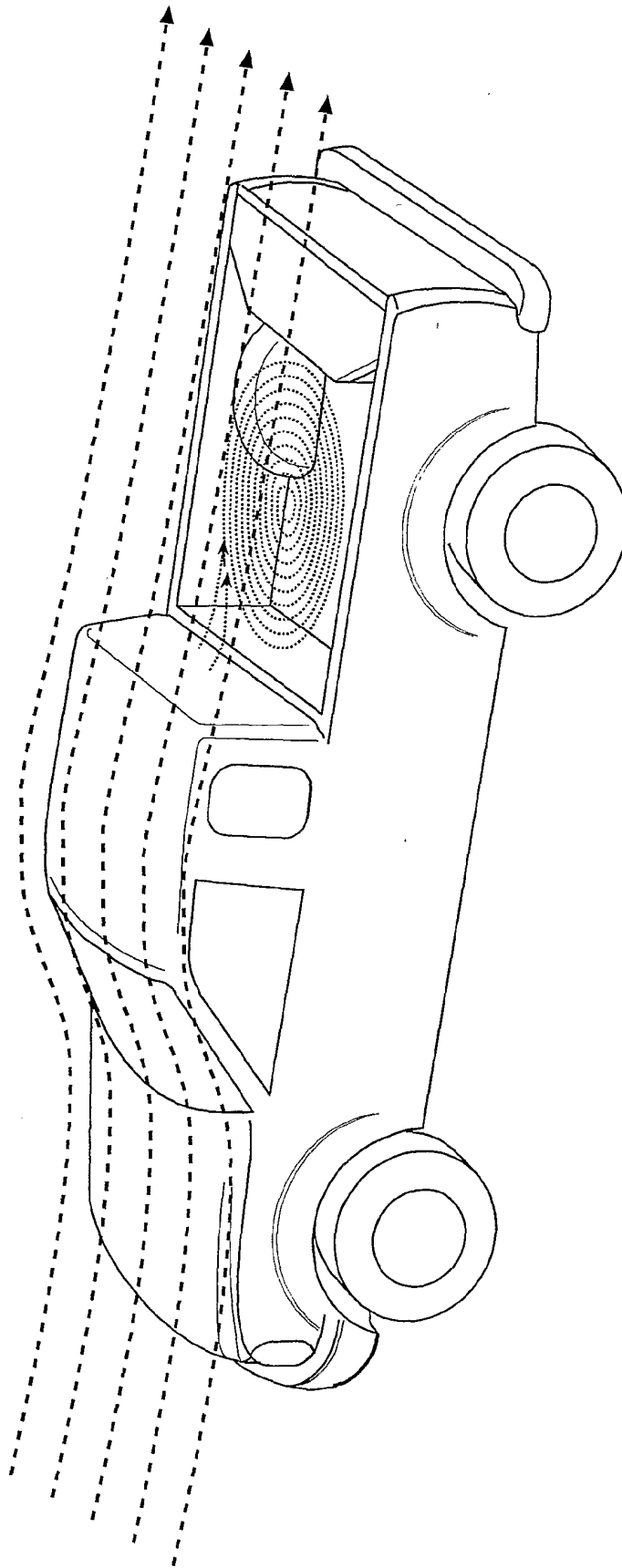


FIG - 18

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/25182

A. CLASSIFICATION OF SUBJECT MATTER		
IPC(7) : B62D 33/023; B60P 9/00		
US CL : 296/26.08,26.11,37.6,50		
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) U.S. : 296/26.08,26.11,37.6,50		
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)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,853,116 A (Schreiner) 29 December 1998 (29.12.1998)	1-18
A	US 5,700,047 A (Leitner et al.) 23 December 1997 (23.12.1997)	1-18
A	US 5,498,049 A (Schlachter) 12 March 1996 (12.03.1996)	1-18
<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 "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
Date of the actual completion of the international search		Date of mailing of the international search report
15 October 2001 (15.10.2001)		15 NOV 2001
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230		Authorized officer Glenn Dayoan <i>Diane Smith f</i> Telephone No. (703)308-1113