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(54) **INTERIOR TRIM ASSEMBLY FOR A VEHICLE**

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(57) **ABSTRACT**

An interior trim assembly includes a door trim substrate, a compartment supported by the door trim substrate, and an armrest connected by a hinge along an edge to an inner side wall of the compartment. The compartment includes the inner side wall, and end walls, and supports at least one sub-compartment for storing items therein. At least one of the inner side wall, the end walls, and the at least one lidded sub-compartment for storing items therein is reinforced to absorb a force caused by a side impact to the vehicle. The at least one sub-compartment for storing items therein includes a lid and may support a cup holder. The hinge includes a coil spring and is non-energized in a closed position. A latch may be used to secure the armrest in the closed position.

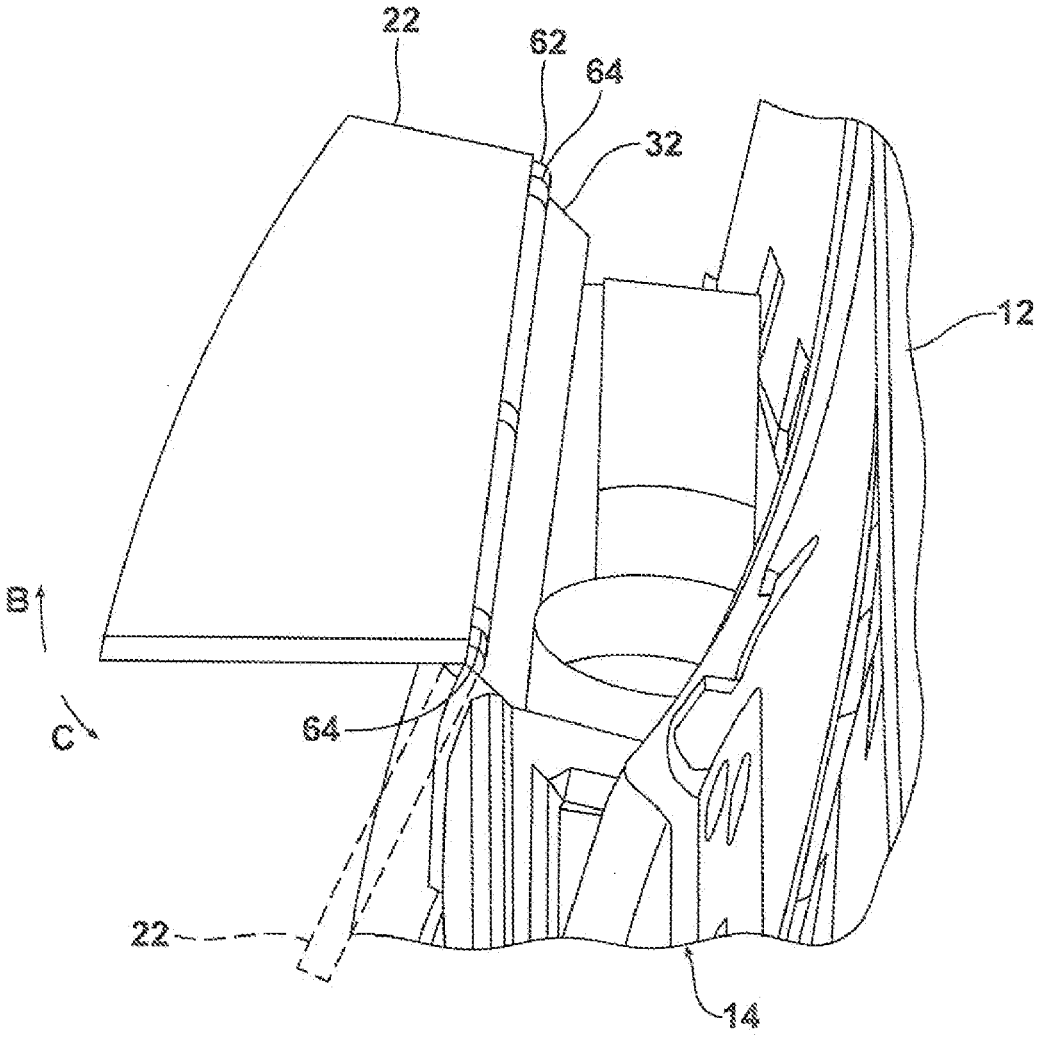


FIG. 1

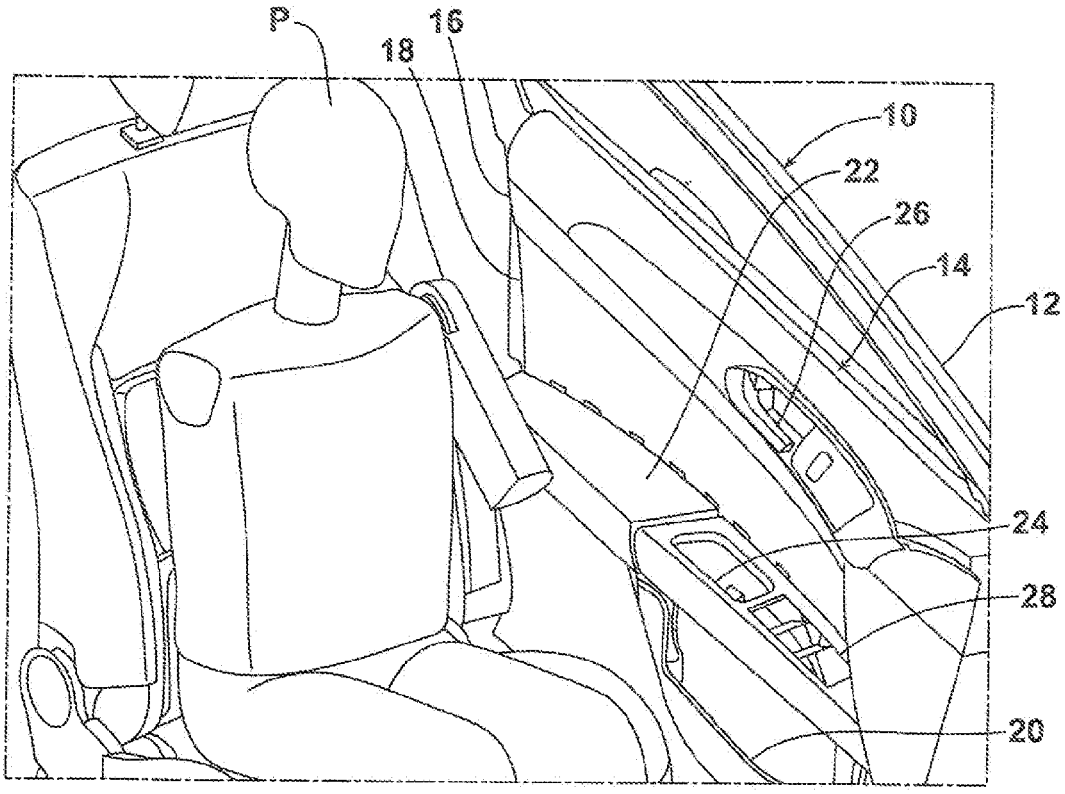


FIG. 2

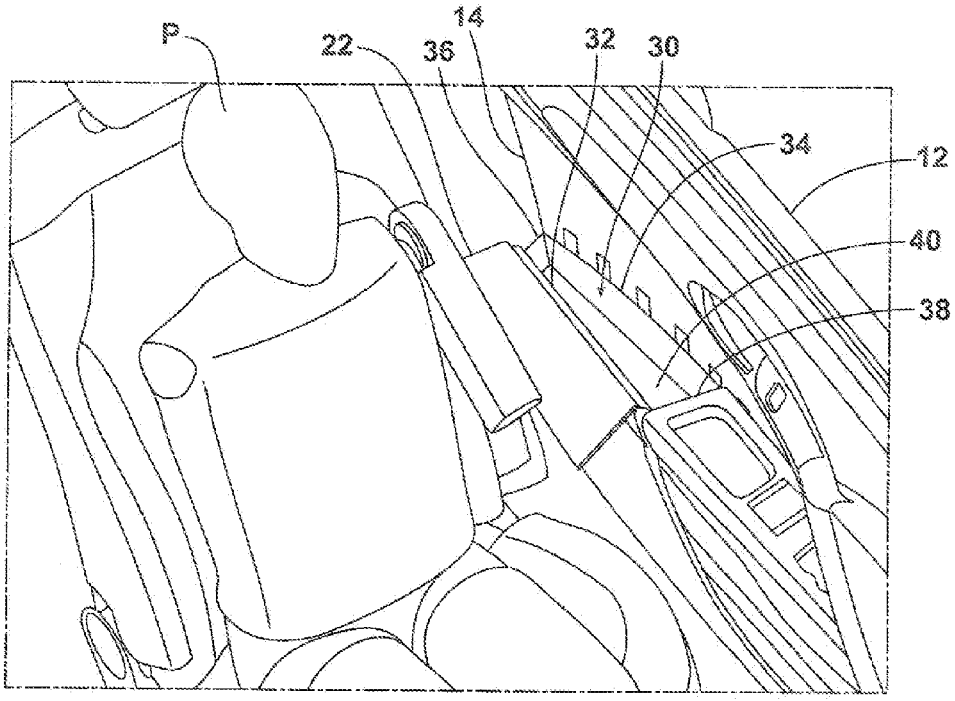


FIG. 3

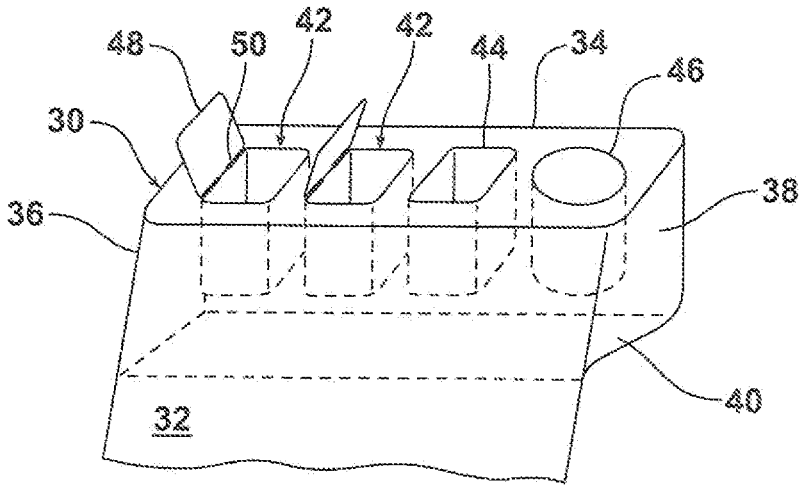


FIG. 4

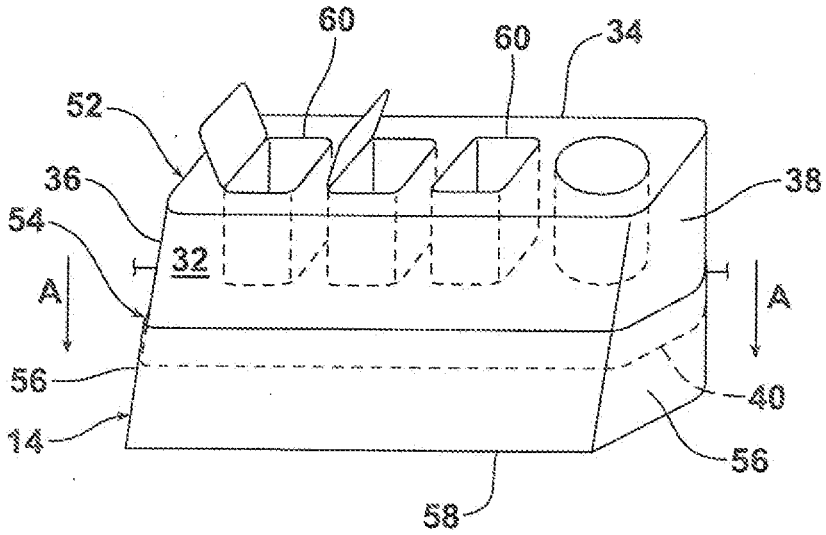
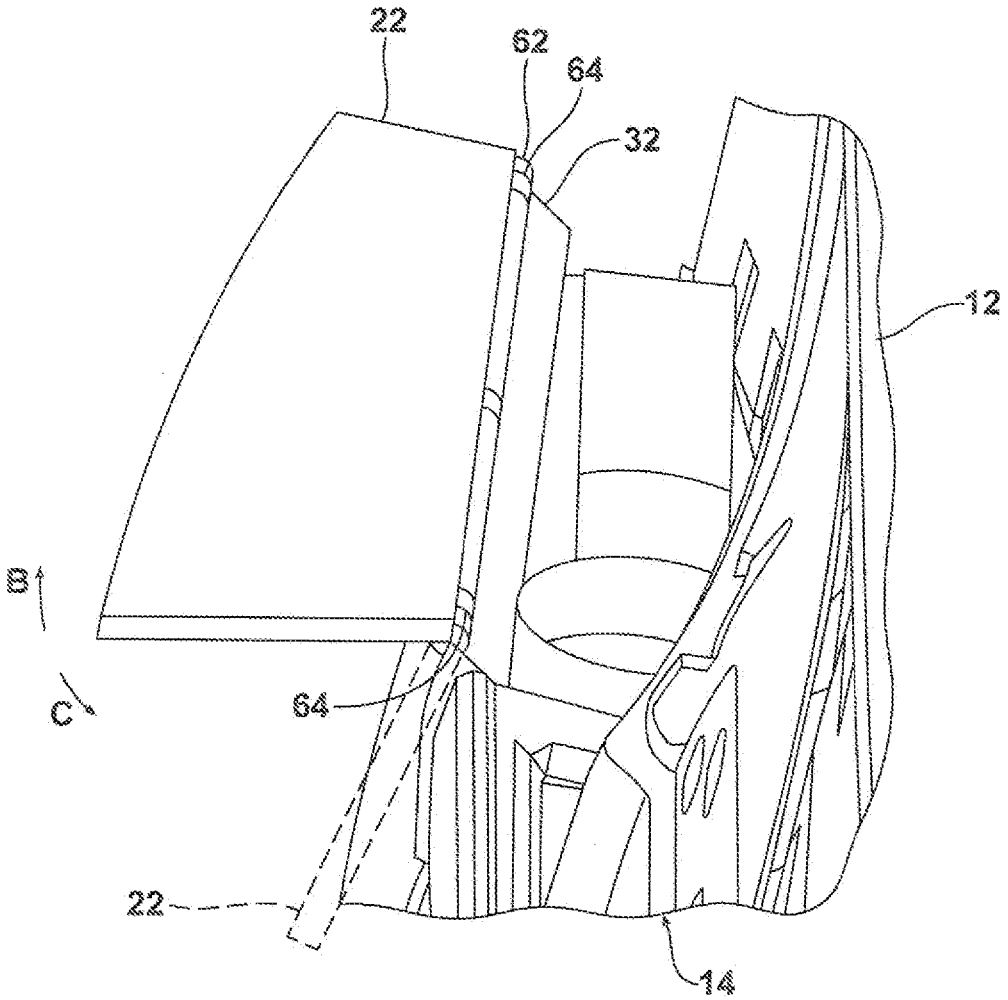


FIG. 5



INTERIOR TRIM ASSEMBLY FOR A VEHICLE

TECHNICAL FIELD

[0001] This document relates generally to trim assemblies for vehicle interiors, and more specifically to a multi-function armrest.

BACKGROUND

[0002] It is known to provide automotive interiors with various trim assemblies to improve the aesthetic appearance of the automotive interior and for the comfort and convenience of vehicle passengers. Examples of such interior trim assemblies include the instrument panels, armrests, door trim panels, and consoles. In many of these, various storage areas are incorporated therein that allow the vehicle occupant to conveniently store one or more items, such as maps, glasses, tire gauges, coins, and other items typically carried in a vehicle. In many cases, such as for storage compartments in door panels, it is desirable for the compartment to include a door or cover that overlies the opening and secures the items within the compartment. The cover is typically attached to the compartment and moveable, such as by a hinge mechanism, so that the articles in the compartment may be accessed. Moreover, the cover may be supported by additional padding and provide an armrest for the door panel.

[0003] Such storage compartments in door panels, including beneath an armrest, however, have typically only provided a large singular storage space in the area where a core structure that supports the weight of the passenger's arm at rest and has sufficient stiffness beneficial for side or pole impact events typically resides. Accordingly, a need exists for a multi-purpose storage area positioned beneath an armrest. The storage area should provide multiple sub-compartments including lidded and unlidded sub-compartments, cup-holders, and possibly change holders and/or electronic ports for connecting hand-held devices to the audio system or charging such devices. Such a storage area should also account for the loss of the traditional core structure and include elements which are reinforced to absorb a force caused by a side or pole impact to the vehicle. These elements could include any combination of walls/floors of the compartment and sub-compartments, and may include use of corrugated plastics and various metal or plastic brackets to absorb the forces.

SUMMARY OF THE INVENTION

[0004] In accordance with the purposes and benefits described herein, an interior trim assembly for a vehicle is provided. The interior trim assembly may be broadly described as comprising a door trim substrate, a compartment supported by the door trim substrate, the compartment comprising an inner side wall, and end walls, and supporting at least one lidded sub-compartment for storing items therein, and an armrest connected by a hinge along an edge to the inner side wall of the compartment.

[0005] In one possible embodiment, the hinge includes a coil spring. In another, the coil spring is selected such that the spring is non-energized in a closed position.

[0006] In one other possible embodiment, the automotive interior trim assembly further includes a latch for securing the armrest in a closed position.

[0007] In another possible embodiment, the hinge allows the armrest to open to an open position more than 180 degrees from a closed position.

[0008] In still another possible embodiment, the compartment further supports a cup holder positioned within the compartment.

[0009] In one other possible embodiment, at least one of the inner side wall, the end walls, and the at least one lidded sub-compartment for storing items therein is reinforced to absorb a force caused by a side impact to the vehicle.

[0010] In yet another possible embodiment, at least one of the door trim substrate and the compartment are attached to a door of the vehicle, if not both.

[0011] In accordance with another possible embodiment, an interior trim assembly for a vehicle includes a door trim substrate, a compartment attached to the door trim substrate, the compartment comprising an inner side wall, end walls, and a floor, and supporting at least one sub-compartment for storing items therein, and an armrest hingedly connected to the inner side wall of the compartment, wherein at least one of the inner side wall, the end walls, and the floor are reinforced to absorb a force caused by a side impact to the vehicle.

[0012] In one possible embodiment, the at least one sub-compartment for storing items therein includes a lid.

[0013] In another possible embodiment, the hinge includes a coil spring. In another, the coil spring is non-energized in a closed position.

[0014] In yet another possible embodiment, the automotive interior trim assembly further includes a latch for securing the armrest in the closed position.

[0015] In still another possible embodiment, the hinge compartment is attached to a door of the vehicle.

[0016] In accordance with another possible embodiment, an interior trim assembly for a vehicle includes a door trim substrate, a compartment attached to the door trim substrate, the compartment comprising an inner side wall, and end walls, and supporting a sub-compartment comprising at least one lidded sub-compartment for storing items therein and a cup holder, and an armrest connected to the compartment by a coil spring hinge along an edge of the compartment.

[0017] In another possible embodiment, the at least one lidded sub-compartment for storing items therein includes side walls, end walls, and a floor, and at least one of the end walls and the floor are reinforced to absorb a force caused by a side impact to the vehicle. In another, the coil spring is non-energized in a closed position. In still another, the interior trim assembly further comprises a latch for securing the armrest in the closed position.

[0018] A vehicle incorporating any of the interior trim assemblies for a vehicle described above.

[0019] In the following description, there are shown and described several preferred embodiments of the interior trim assemblies for a vehicle. As it should be realized, the assemblies are capable of other, different embodiments and their several details are capable of modification in various, obvious aspects all without departing from the assemblies as set forth and described in the following claims. Accordingly, the drawings and descriptions should be regarded as illustrative in nature and not as restrictive.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0020] The accompanying drawing figures incorporated herein and forming a part of the specification, illustrate sev-

eral aspects of the interior trim assembly for an vehicle and together with the description serve to explain certain principles thereof. In the drawing figures:

[0021] FIG. **1** is a partial perspective view of a typical vehicle door assembly showing an arm rest in a closed position;

[0022] FIG. **2** is a partial perspective view of a typical vehicle door assembly showing the arm rest in an open position providing access to a compartment;

[0023] FIG. **3** is a partial perspective view of a compartment showing lidded sub-compartments, a sub-compartment, and a cup holder positioned therein;

[0024] FIG. **4** is a partial perspective view of an alternate removeable compartment having lidded sub-compartments, a sub-compartment, and a cup holder; and

[0025] FIG. **5** is a partial perspective view of the compartment showing lidded sub-compartments, a sub-compartment, and a cup holder, and an armrest supported in an open position by a hinge.

[0026] Reference will now be made in detail to the present preferred embodiments of the interior trim assemblies for a vehicle, examples of which are illustrated in the accompanying drawing figures, wherein like numerals are used to represent like elements.

DETAILED DESCRIPTION

[0027] Reference is now made to FIG. **1** which illustrates a typical door assembly **10** of a vehicle (not shown). The door assembly **10** includes a door **12** and an interior trim assembly **14** which covers a portion of the interior of the vehicle to provide an aesthetically pleasing appearance and additional comfort to the vehicle's passengers. While the described interior trim assembly is for a front door assembly, those having ordinary skill in the art will recognize that the interior trim assembly may be used in association with other vehicle doors, for example, a rear door or a third row door.

[0028] The interior trim assembly **14** includes a door trim substrate **16** which generally defines the shape of the interior trim assembly. The door trim substrate **16** may be a plastic, rigid or semi-rigid, or other materials such as a composite material. Portions of the door trim substrate **16**, for example panel **18**, may be made of a decorative fabric, a plastic having a wood grain, wood trim, or other materials known in the art. In the present described embodiment, the door trim substrate **16** is a molded plastic that supports a pocket **20** for receiving books, maps, etc., an armrest **22** for supporting a forearm of a passenger (P) and providing the noted additional comfort to the vehicle's passenger (P), a door grip **24**, a door release lever **26**, and various electrical controls **28**.

[0029] As shown in FIG. **2**, the door trim substrate **16** also supports a compartment **30**. Armrest **22** serves as a lid for the compartment **30** which includes an inner side wall **32** adjacent the passenger (P), an outer side wall **34**, end walls **36**, **38**, and a floor **40**. Although not shown, the compartment **30** may be attached directly to the door **12** or to brackets attached to the door to provide additional support beyond that provided by the door trim substrate **16**.

[0030] As shown in FIG. **3**, the inner side wall **32** of the compartment **30** may be integrally formed and extend below the floor **40**. Alternatively, the inner side wall may extend only to the floor **40**. As shown, the compartment **30** includes two lidded sub-compartments **42**, a sub-compartment **44**, and a cup holder **46**. Other arrangements may include any combination of one or more lidded sub-compartments, one or more sub-compartments, and/or one or more cup holders.

[0031] The lidded sub-compartments **42** necessarily include a lid **48** hingedly connected thereto. The hinge **50** may be a living hinge integrally molded with the sub-compartment **42** or, as shown in the described embodiment, a hinge. The hinge **50** may be spring loaded or otherwise. The lid **48** may be connected to the sub-compartment **42** along a rear edge as shown, or along any of the four upper edges of the sub-compartment.

[0032] In the described embodiment, the armrest **22** is capable of moving to a closed position as shown in FIG. **1**. In this closed position, the two lidded sub-compartments **42**, sub-compartment **44**, and cup holder **46** are enclosed within the compartment **30**. In other words, when the lids **48** of the two lidded sub-compartments **42** are in the closed position, the armrest **22** itself is able to be moved to a closed position without interference from any of the items positioned inside the compartment **30**.

[0033] A latch (not shown) secures the armrest **22** in the closed position (shown in FIG. **1**). As shown in FIG. **5**, the armrest **22** may be moved to an open position by pressing down on the armrest which releases the latch and allows the armrest to rotate about a hinge **62** providing access to the compartment **30**. Similarly, to move the armrest from the open position to the closed position, the passenger (P) may rotate the armrest **22** (as shown by action arrow B) to a position adjacent the closed position. Pressing down on the armrest **22** further causes the latch to capture the armrest in the closed position. Other latching and/or locking mechanisms may be utilized in alternate embodiments to secure the armrest in the closed position and release the armrest for movement to an open position.

[0034] In an alternate described embodiment shown in FIG. **4**, a compartment **52** may be removeably supported by the interior trim assembly **14**. As shown by action arrows A, the compartment **52** may be inserted within a cavity, generally designed numeral **54**, formed in the interior trim assembly **14**. The compartment **52** may be supported by the interior trim assembly **14** by clips or fasteners (not shown) and/or may be attached directly to the door **12**.

[0035] In both embodiments, the compartments **30**, **52** may include elements which are reinforced to absorb a force caused by a side impact to the vehicle. More specifically, any combination of the inner side wall **32**, the outer side wall **34**, the end walls **36**, **38**, and/or the floor **40** may be reinforced as desired. Even more, walls **56** or floor **58** of the cavity **54** formed in the interior trim assembly **14**, and side walls **60** of the sub-compartments may be likewise reinforced. Reinforcement beneath an armrest in a typical door assembly may include use of corrugated plastics and various metal or plastic brackets to absorb the forces associated with a side impact, such as a pole impact, to the vehicle. Since the space where such reinforced materials are typically located is utilized in accordance with the present invention, by a compartment **30** or **52**, reinforcing materials, if used, must be positioned elsewhere. As noted above, these reinforcing materials may be utilized in various ways within the components of the compartment **30** or **52**.

[0036] As noted above, the interior trim assembly **16** supports a compartment **30**. As shown in FIG. **5**, the armrest **22** serves as a lid for the compartment **30** in addition to its primary function of supporting a forearm of the passenger (P). The armrest **22** is connected to the inner side wall **32** of

the compartment **30** by a hinge **62**. In the described embodiment, the hinge **62** includes spring coils **64** which are non-energized in the closed position. In other words, the armrest **22** is biased by the spring coils **64** toward the closed position when the armrest is in the open position as shown.

[0037] In an alternate embodiment shown by dashed lines in FIG. **5**, the hinge **62** may not include a spring coil allowing rotation of the armrest **22** from the closed position to an open position more than 180 degrees from the closed position, or a fully open position, wherein the armrest is essentially hanging adjacent the door trim substrate **16**. In yet another embodiment, a stop (not shown) may be utilized to maintain the armrest **22** in an open position wherein the armrest is essentially horizontal. In this position, the armrest **22** may serve as a tray similar to a seat back tray of an airplane.

[0038] In summary, numerous benefits result from an interior trim assembly for a vehicle as illustrated in this document. The interior trim assembly is capable of providing additional, specific storage area beneath an armrest. The additional storage area may include various combinations of lidded and unlidded sub-compartments and cup holders. In addition, elements of the compartments **30**, **52** may be reinforced to absorb a force caused by a side impact to the vehicle.

[0039] The foregoing has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the embodiments to the precise form disclosed. Obvious modifications and variations are possible in light of the above teachings. All such modifications and variations are within the scope of the appended claims when interpreted in accordance with the breadth to which they are fairly, legally and equitably entitled.

1. An interior trim assembly for a vehicle, comprising:

a door trim substrate;

a compartment supported by said door trim substrate, said compartment comprising an inner side wall, and end walls, and supporting at least one lidded sub-compartment for storing items therein; and

an armrest connected by a hinge along an edge to said inner side wall of said compartment,

wherein at least one of said inner side wall, said end walls, and said at least one lidded sub-compartment for storing items therein is reinforced to absorb a force caused by a side impact to the vehicle.

2. The interior trim assembly for a vehicle of claim **1**, wherein said hinge includes a coil spring.

3. The interior trim assembly for a vehicle of claim **2**, wherein said coil spring is non-energized in a closed position.

4. The interior trim assembly for a vehicle of claim **3**, further comprising a latch for securing said armrest in a closed position.

5. The interior trim assembly for a vehicle of claim **1**, wherein said hinge allows said armrest to open to an open position more than 180 degrees from a closed position.

6. The interior trim assembly for a vehicle of claim **1**, wherein said compartment further supports a cup holder positioned within said compartment.

7. (canceled)

8. A vehicle incorporating the interior trim assembly for a vehicle of claim **1** wherein at least one of said door trim substrate and said compartment are attached to a door of said vehicle.

9. An interior trim assembly for a vehicle, comprising:

a door trim substrate;

a compartment attached to said door trim substrate, said compartment comprising an inner side wall, end walls, and a floor, and supporting at least one sub-compartment for storing items therein; and

an armrest hingedly connected to said inner side wall of said compartment, wherein at least one of said inner side wall, said end walls, and said floor are reinforced to absorb a force caused by a side impact to the vehicle.

10. The interior trim assembly for a vehicle of claim **9**, wherein said at least one sub-compartment for storing items therein includes a hinged lid.

11. The interior trim assembly for a vehicle of claim **9**, wherein a hinge connecting said armrest and said inner side wall of said compartment includes a coil spring.

12. The interior trim assembly for a vehicle of claim **11**, wherein said coil spring is non-energized in a closed position.

13. The interior trim assembly for a vehicle of claim **11**, further comprising a latch for securing said armrest in a closed position.

14. The interior trim assembly for a vehicle of claim **9**, wherein said compartment is attached to a door of said vehicle.

15. A vehicle incorporating the interior trim assembly for a vehicle of claim **9**.

16. An interior trim assembly for a vehicle, comprising:

a door trim substrate;

a compartment attached to said door trim substrate, said compartment comprising an inner side wall, and end walls, and supporting a sub-compartment comprising at least one lidded sub-compartment for storing items therein and a cup holder; and

an armrest connected to said compartment by a coil spring hinge along an edge of said compartment,

wherein said at least one lidded sub-compartment for storing items therein includes side walls, end walls, and a floor, and at least one of said end walls and said floor are reinforced to absorb a force caused by a side impact to the vehicle.

17. (canceled)

18. The interior trim assembly for a vehicle of claim **16**, wherein said coil spring is non-energized in a closed position.

19. The interior trim assembly for a vehicle of claim **18**, further comprising a latch for securing said armrest in the closed position.

20. A vehicle incorporating the interior trim assembly for a vehicle of claim **19**.

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