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(54) Title: VEHICLE CARGO MANAGEMENT APPARATUS HAVING MOVABLE CARGO SUPPORT ARM

(57) Abstract: Cargo management include a housing, a movable load floor operably secured to the housing for movement between a closed position and one or more open positions, and a cargo support arm that is movably secured to the vehicle compartment and that is movable between stored and operative positions. The arm includes a plurality of projections extending therefrom in adjacent, spaced-apart relationship. Each projection is configured to support one or more articles suspended therefrom. The arm may be operably connected with the load floor such that, when the arm is moved to an operative position, the load floor can be supported in an open position.
VEHICLE CARGO MANAGEMENT APPARATUS
HAVING MOVABLE CARGO SUPPORT ARM

RELATED APPLICATION
This application claims the benefit of U.S.
Provisional Application No. 60/439,733, filed January 13,
2003, the disclosure of which is incorporated herein by
reference in its entirety as if set forth fully herein.

FIELD OF THE INVENTION
The present invention relates generally to
vehicles and, more particularly, to storage apparatus for
use within vehicles.

BACKGROUND OF THE INVENTION
Motor vehicles are typically provided with a
cargo storage compartment of some type. For example,
sedan-style automobiles are conventionally equipped with
a trunk. Sport/utility vehicles, mini-vans, station
wagons, and other vehicles in which there are two or more
rows of seating, are conventionally provided with a cargo
storage area behind the last row of seating. Items
carried within vehicle cargo storage areas are often free
to move about during vehicle operation, which may be
undesirable. In addition, in vehicles such as
sport/utility vehicles and mini-vans, cargo storage space
may be somewhat limited. Accordingly, a need exists to
maximize the efficiency and utilization of existing cargo
storage space without intruding on passenger space. In
addition, a need exists to restrain items from moving
about in vehicle cargo storage areas during vehicle operation.

Plastic "T-shirt" style shopping bags are increasingly being utilized by consumers to transport purchased items, such as groceries. Unlike a box or other container with rigid confines, T-shirt style shopping bags typically do not have the ability to maintain any shape apart from the shape of whatever items the bag may be enveloping and typically are unable to prevent items therewithin from causing the shape and position of the bag to shift. While T-shirt style shopping bags may be convenient for personal carrying, because their handles are readily accessible and a plurality of bags can be gripped for carrying, they may be relatively inconvenient when placed within a vehicle. During vehicle operation, items within T-shirt style shopping bags may tend to move, roll about, shift position and fall out as a vehicle moves and turns.

**SUMMARY OF THE INVENTION**

In view of the above discussion, a cargo management apparatus, according to embodiments of the present invention includes a cargo support arm that is movably secured to a vehicle compartment and is movable between stored and operative positions. The arm is positioned adjacent to the floor of a vehicle compartment when in the stored position and extends outwardly from the floor into a vehicle compartment for convenient use thereof by a user when in the operative position. The cargo support arm includes a plurality of projections extending therefrom in adjacent, spaced-apart relationship. Each projection is configured to support one or more articles (e.g., shopping bags, etc.) suspended therefrom.

A cargo management apparatus according to another embodiment of the present invention includes a
housing, a movable load floor operably secured to the housing for movement between a closed position and one or more open positions, and a cargo support arm that is movably secured to the vehicle compartment and that is movable between stored and operative positions. The cargo support arm includes a plurality of projections extending therefrom in adjacent, spaced-apart relationship. Each projection is configured to support one or more articles (e.g., shopping bags, etc.) suspended therefrom. The cargo support arm may be operably connected with the load floor such that, when the arm is moved to an operative position, the load floor can be supported in one or more open positions.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawing, which forms a part of the specification, illustrates key embodiments of the present invention. The drawing and description together serve to fully explain the invention.

Figs. 1A-1B are perspective views of a cargo management apparatus, according to an embodiment of the present invention, wherein a cargo support arm is in a stored position (Fig. 1A) and an operative position (Fig. 1B).

Figs. 2A-2B are perspective views of a cargo management apparatus, according to another embodiment of the present invention, wherein a movable load floor is in a closed position (Fig. 2A) and supported in an open position by a cargo support arm (Fig. 2B).

Fig. 2C is an enlarged, partial view of the cargo management apparatus of Figs. 2A-2B illustrating how the cargo support arm of Figs. 2A-2B supports the movable load floor in an open position, according to an embodiment of the present invention.
Figs. 3-6 are perspective views of the cargo management apparatus of Figs. 2A-2B illustrating various other embodiments of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention now is described more fully hereinafter with reference to the accompanying drawing, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

In the drawings, the thickness of lines, layers and regions may be exaggerated for clarity. It will be understood that when an element is referred to as being "on" another element, it can be directly on the other element or intervening elements may also be present. In contrast, when an element is referred to as being "directly on" another element, there are no intervening elements present. It will be understood that when an element is referred to as being "connected" or "attached" to another element, it can be directly connected or attached to the other element or intervening elements may also be present. In contrast, when an element is referred to as being "directly connected" or "directly attached" to another element, there are no intervening elements present. Terms such as "upward", "downward", "vertical", "horizontal", and the like, used herein are for the purpose of explanation only.

Referring now to Figs. 1A-1B, a cargo management apparatus 10 for vehicles, according to an embodiment of the present invention, is illustrated. The illustrated cargo management apparatus 10 is configured -4-
to be installed within a vehicle compartment 12 (e.g., the trunk portion of sedan-style vehicles, the rear portion of SUVs, station wagons, mini-van vehicles, etc.).

The illustrated cargo management apparatus 10 includes a cargo support arm 14 that is movably secured to the vehicle compartment 12 and that is movable between a stored position (Fig. 1A) and one or more operative positions (Fig. 1B). The arm 14 is positioned adjacent to the floor 13 of the vehicle compartment 12 when in the stored position and extends outwardly from the floor 13 into the vehicle compartment 12 for convenient use thereof by a user when in an operative position. In the illustrated embodiment, a channel 15 is formed within the floor 13 and is configured to receive the arm 14 such that the arm 14 is substantially flush with the floor 13 when in the stored position. However, embodiments of the present invention are not limited to the illustrated configuration and do not require that the arm 14 be substantially flush with a vehicle floor when in a stored position.

The illustrated arm 14 has a generally U-shaped configuration defined by a pair of support members 14a, 14b, each pivotally secured within the vehicle compartment (e.g., via a pivot pin or other type of movable connector that would be known to those skilled in the art), and a cross member 14c extending between the support members 14a, 14b. Embodiments of the present invention are not limited to the illustrated U-shaped configuration of arm 14. Arm 14 may have various shapes and configurations. In addition, embodiments of the present invention may include multiple cargo support arms 14.

In the illustrated embodiment, cross member 14c includes a plurality of projections 16 extending
therefrom in adjacent, spaced-apart relationship. Each projection 16 is configured to support one or more articles 17 (e.g., shopping bags, articles, etc.) suspended therefrom (Fig. 1B). In Fig. 1B, arm 14 is supporting a loaded shopping bag 17 by the handles thereof and maintains the loaded shopping bag 17 in an upright position during operation of the vehicle. Projections 16 may have various shapes and configurations and are not limited to the illustrated embodiment. In addition, various numbers of projections 16 may be utilized.

In the illustrated embodiment, when arm 14 is in the stored position, cross member 14c is adjacent the rear portion 12a of vehicle compartment 12. However, embodiments of the present invention are not limited to the illustrated stored position of arm 14. According to an alternative embodiment, arm 14 may be in a stored position such that the cross member 14c is adjacent the front portion 12b of vehicle compartment 12. According to an alternative embodiment of the present invention, cargo support arm 14 may be in a stored position such that cross member 14c is adjacent a side portion 12c, 12d of the vehicle compartment 12.

According to embodiments of the present invention, arm 14 may have more than one operative positions. For example, arm 14 may have operative positions that define one or more angles between about thirty degrees and ninety degrees (30°-90°) relative to the floor 13. The arm 14 may be configured to be positioned at virtually any angle relative to the floor 13. The arm 14 can be movably supported in one or more operative positions via various devices known to those skilled in the art including, but not limited to, ratchet teeth mechanisms, spring actuated mechanisms, and the like.
Referring now to Figs. 2A-2B, a cargo management apparatus 110 for vehicles, according to another embodiment of the present invention, is illustrated. The illustrated cargo management apparatus 110 is configured to be installed within a vehicle compartment 12 (e.g., the trunk portion of sedan-style vehicles, the rear portion of SUVs, station wagons, minivan vehicles, etc.).

The illustrated cargo management apparatus 110 includes a housing 20 disposed within the floor 13. The housing 20 includes a plurality of walls 22 and a base 23 that define a storage compartment 24. A movable load floor 30 is operably associated with the housing 20 for movement between a closed position (Fig. 2A) and one or more open positions (Fig. 2B).

In the illustrated embodiment, the load floor 30 overlies the storage compartment 24 when in the closed position and permits access to the storage compartment 24 when in an open position. The illustrated load floor 30 includes a pair of movable panels 32, 34 that are pivotally connected to each other along respective edge portions 32a, 34a. The panels 32, 34 may be pivotally connected together in various ways understood by those skilled in the art (e.g., pivot pins, hinges, etc.).

In the illustrated embodiment, when the load floor 30 is moved to an open position (Fig. 2B), the panels 32, 34 move upwardly and slightly toward each other. When the load floor 30 is moved to the closed position (Fig. 2A), the panels 32, 34 are substantially coplanar. The present invention is not limited to the illustrated load floor 30. A load floor having a single panel or more than two panels may be utilized in accordance with alternative embodiments of the present invention.

In the illustrated embodiment, load floor panel
34 includes recessed portions 40 formed therein for receiving and supporting various articles. Embodiments of the present invention are not limited to the illustrated recessed portions 40. Recessed portions having various shapes and sizes may be utilized without limitation. Moreover, various numbers of recessed portions 40 may be utilized. However, the present invention does not require recessed portions 40 in either panel 32, 34.

Also in the illustrated embodiment, the load floor 30 includes a locking mechanism 50 that is configured to maintain the load floor 30 in the closed position and to prevent unauthorized opening of the load floor 30. Various types of locking mechanisms can be utilized as would be understood by those skilled in the art and need not be discussed further herein.

The illustrated cargo management apparatus 110 also includes a cargo support arm 114 that is movably secured to the vehicle compartment 12 and that is movable between a stored position (Fig. 2A) and one or more operative positions (Fig. 2B). Cargo support arm 114 of Figs. 2A-2B is similar to cargo support arm 14 of Figs. 1A-1B and is positioned adjacent to a floor 13 of a vehicle compartment 12 when in the stored position and extends outwardly from the floor 13 into a vehicle compartment 12 for convenient use thereof by a user when in one or more operative positions. In the illustrated embodiment, the arm 114 is substantially flush with the floor 13 when in the stored position. However, embodiments of the present invention do not require that the arm 114 be flush with a floor of a vehicle when in a stored position.

The illustrated arm 114 has a generally U-shaped configuration defined by a pair of support members 114a, 114b, each pivotally secured within the vehicle compartment (e.g., via a pivot pin or other type of
movable connector known to those skilled in the art), and a cross member 114c extending between the support members 114a, 114b. Embodiments of the present invention are not limited to the illustrated U-shaped configuration of arm 114. Arm 114 may have various shapes and configurations. In addition, there may be multiple arms 114.

In the illustrated embodiment, cross member 114c includes a plurality of projections 116 extending therefrom in adjacent, spaced-apart relationship. Each projection 116 is configured to support one or more articles 17. For example, each projection can support one or more loaded shopping bags 17 by the handles thereof and maintain the one or more loaded shopping bags 17 in an upright position during operation of the vehicle. Projections 116 may have various shapes and configurations and are not limited to the illustrated embodiment. In addition, various numbers of projections 116 may be utilized.

In the illustrated embodiment, when arm 114 is in the stored position, cross member 114c is adjacent the rear portion 12a of vehicle compartment 12. However, embodiments of the present invention are not limited to the illustrated stored position of arm 114. According to an alternative embodiment, arm 114 may be in a stored position such that the cross member 114c is adjacent the front portion 12b of vehicle compartment 12. According to an alternative embodiment of the present invention, cargo support arm 114 may be in a stored position such that cross member 114c is adjacent a side portion 12c, 12d of the vehicle compartment 12.

According to embodiments of the present invention, the arm 114 may have more than one operative positions. For example, the arm 114 may be positioned at any angle relative to the floor 13.
The illustrated arm 114 is configured to support the load floor 30 in an open position (Fig. 2B) when in an operative position such that user access to the storage compartment 24 is permitted. In the illustrated embodiment, a pair of pins 36 extend from respective edge portions 34b, 34c of panel 34. Each pin 36 is configured to be slidably received within a respective slot 37 formed in each support member 114a, 114b. The illustrated slots 37 each have a generally "S-shaped" configuration; however, slots having various configurations may be utilized in accordance with embodiments of the present invention. Each slot 37 has a first portion 37a and a second portion 37b. A user slides a respective pin 36 into a slot 37 at slot first portion 37a and moves the pin 36 (and, thus, panel 34) to slot position 37b whereby the panel 34 is supported in an open position. The arm 114 is configured to maintain the load floor 30 in an open position when the arm 114 is in an operative position, as illustrated in Fig. 2B.

In addition, the pins 36 of panel 34 may be engaged within slots 37 when the load floor is in a closed position. Movement of arm 114 to an operative position moves panel 34 to an open position.

Additional embodiments of the present invention are illustrated in Figs. 3-6. In Fig. 3, a light 60 is disposed within the storage compartment 24 of the cargo management apparatus 110 of Figs. 2A-2B. The light 60 is configured to illuminate the storage compartment 24. Light 60 may be configured to turn on when the load floor 30 is moved to an operative position. Alternatively or in addition to, a user-actuated switch may be provided. A plurality of lights may be utilized in accordance with alternative embodiments of the present invention.
In Fig. 4, one or more of the storage compartment walls 22 of the cargo management apparatus 110 contain thermal insulation material 70 such that the storage compartment 24 can serve as a food and beverage cooler. Various types of thermal insulation material(s) may be utilized. Thermal insulating materials are well understood by those skilled in the art and need not be described further herein.

In Fig. 5, cargo netting 80 and one or more partitions 90 for restraining movement of articles stored within the storage compartment 24 are provided.

In Fig. 6, a privacy shade 100 that is configured to shield articles from view is operably associated with arm 14 of Figs. 1A-1B and is movable between an open position exposing portions of the storage compartment 12 and a closed position covering one or more portions of the storage compartment 12.

The foregoing is illustrative of the present invention and is not to be construed as limiting thereof. Although a few exemplary embodiments of this invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the claims. The invention is defined by the following claims, with equivalents of the claims to be included therein.
THAT WHICH IS CLAIMED IS:

1. A cargo management apparatus for use within a vehicle compartment having a floor, the apparatus comprising:
   a cargo support arm movably secured to the vehicle compartment and movable between a stored position and one or more operative positions, wherein the cargo support arm is positioned adjacent to the floor when in the stored position, and wherein the cargo support arm extends outwardly from the floor into the vehicle compartment for convenient use thereof by a user when the cargo support arm is in an operative position; and
   at least one projection extending from the cargo support arm that is configured to support one or more loaded shopping bags by the handles thereof and to maintain the one or more loaded shopping bags in an upright position during operation of the vehicle.

2. The apparatus of Claim 1, wherein the cargo support arm is substantially flush with the floor when in the stored position.

3. The apparatus of Claim 1, wherein the cargo support arm has a generally U-shaped configuration and comprises a pair of members, each member pivotally secured within the vehicle compartment.

4. The apparatus of Claim 1, wherein the at least one projection comprises a plurality of projections in adjacent, spaced-apart relationship.

5. A cargo management apparatus for use within a vehicle compartment having a floor, the apparatus comprising:
a housing disposed within the floor, wherein the housing comprises walls that define a storage compartment;

a load floor operably secured to the housing for movement between a closed position and one or more open positions, wherein the load floor overlies the storage compartment when in the closed position and permits user access to the storage compartment when in the one or more open positions;

a cargo support arm movably secured to the vehicle compartment and movable between a stored position and one or more operative positions, wherein the cargo support arm is positioned adjacent to the floor when in the stored position, and wherein the cargo support arm extends outwardly from the floor and above the load floor for convenient use thereof by a user when the cargo support arm is in an operative position; and

at least one projection extending from the cargo support arm that is configured to support one or more loaded shopping bags by the handles thereof and to maintain the one or more loaded shopping bags in an upright position during operation of the vehicle.

6. The apparatus of Claim 5, wherein the cargo support arm is substantially flush with the floor when in the stored position.

7. The apparatus of Claim 5, wherein the cargo support arm has a generally U-shaped configuration and comprises a pair of members, wherein each member is movably secured within the vehicle compartment.

8. The apparatus of Claim 5, wherein the at least one projection comprises a plurality of projections in adjacent, spaced-apart relationship.
9. The apparatus of Claim 5, wherein the load floor comprises a pair of movable panels pivotally connected to each other such that when the load floor is moved to an open position, the panels move upwardly and toward each other, and such that when the load floor is moved to the closed position, the panels are substantially coplanar.

10. The apparatus of Claim 5, wherein the cargo support arm is configured to be operably connected with the load floor such that when the cargo support arm is moved to an operative position the load floor can be supported in an open position.

11. The apparatus of Claim 5, wherein the load floor comprises one or more recessed portions formed therein for receiving and supporting objects.

12. The apparatus of Claim 5, further comprising a locking mechanism configured to maintain the load floor in the closed position and to prevent unauthorized opening of the load floor.

13. The apparatus of Claim 5, further comprising a light disposed within the storage compartment that is configured to illuminate the storage compartment.

14. The apparatus of Claim 5, wherein the storage compartment walls comprise thermal insulation material such that the storage compartment can serve as a food and beverage cooler.

15. The apparatus of Claim 5, further comprising a cargo net disposed within the storage compartment for removably retaining items within the
storage compartment.

16. The apparatus of Claim 5, further comprising one or more partitions disposed within the storage compartment.

17. The apparatus of Claim 5, further comprising a security shade operably associated with the storage compartment and movable between an open position exposing the storage compartment and a closed position covering one or more portions of the storage compartment.

18. A cargo management apparatus for use within a vehicle compartment having a floor, the apparatus comprising:
   a housing disposed within the floor, wherein the housing comprises walls that define a storage compartment;
   a load floor operably secured to the housing for movement between a closed position and one or more open positions, wherein the load floor overlies the storage compartment when in the closed position and permits user access to the storage compartment when in the one or more open positions, wherein the load floor comprises a pair of movable panels pivotally connected to each other such that when the load floor is moved to an open position, the panels move upwardly, and such that when the load floor is moved to the closed position, the panels are substantially coplanar;
   a cargo support arm movably secured to the housing and movable between a stored position and one or more operative positions, wherein the cargo support arm is positioned adjacent to the housing when in the stored position, and wherein the cargo support arm extends outwardly from the housing and above the load floor for convenient use thereof by a user when the cargo support
arm is in an operative position, and wherein the cargo support arm is operably connected with the load floor such that when the cargo support arm is moved to an operative position the load floor is moved automatically to an open position; and

at least one projection extending from the cargo support arm that is configured to support one or more loaded shopping bags by the handles thereof and to maintain the one or more loaded shopping bags in an upright position during operation of the vehicle.

19. The apparatus of Claim 18, wherein the cargo support arm is substantially flush with the housing when in the stored position.

20. The apparatus of Claim 18, wherein the cargo support arm has a generally U-shaped configuration and comprises a pair of members, wherein each member is movably secured to the housing.

21. The apparatus of Claim 18, wherein the at least one projection comprises a plurality of projections in adjacent, spaced-apart relationship.

22. The apparatus of Claim 18, wherein the cargo support arm is configured to maintain the load floor in an open position when the cargo support arm is in an operative position.

23. The apparatus of Claim 18, wherein the load floor comprises one or more recessed portions formed therein for receiving and supporting objects.

24. The apparatus of Claim 18, further comprising a locking mechanism configured to maintain the load floor in the closed position and to prevent
unauthorized opening of the load floor.

25. The apparatus of Claim 18, further comprising a light disposed within the storage compartment that is configured to illuminate the storage compartment.

26. The apparatus of Claim 18, wherein the storage compartment walls comprise thermal insulation material such that the storage compartment can serve as a food and beverage cooler.

27. The apparatus of Claim 18, further comprising a cargo net disposed within the storage compartment for removably retaining items within the storage compartment.

28. The apparatus of Claim 18, further comprising one or more partitions disposed within the storage compartment.

29. The apparatus of Claim 18, further comprising a security shade operably associated with the storage compartment and movable between an open position exposing the storage compartment and a closed position covering one or more portions of the storage compartment.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : B62D 43/00
US CL : 296/037.1

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. : 296/24.44, 37.1, 37.14, 37.16, 193.07; 224/925

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)

**USPAT**

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

Citation of document, with indication, where appropriate, of the relevant passages

**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 novel or 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

**P** document published prior to the international filing date but later than the priority date claimed

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