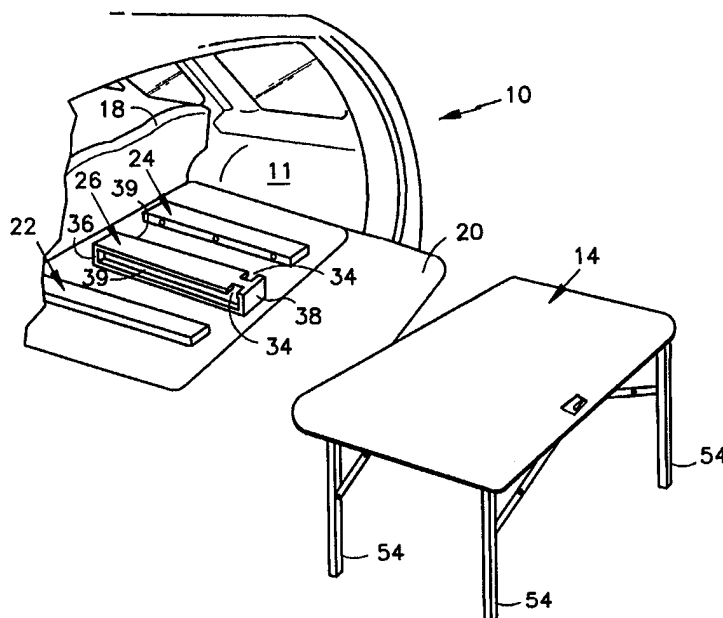




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(21) International Application Number: PCT/US98/05656 (22) International Filing Date: 20 March 1998 (20.03.98) (30) Priority Data: 08/838,550 9 April 1997 (09.04.97) US (71) Applicant: UT AUTOMOTIVE DEARBORN, INC. [US/US]; 5200 Auto Club Drive, Dearborn, MI 48126-9982 (US). (72) Inventor: CROKE, Joseph, C.; 47905 Freedom Valley, Ma- comb, MI 48044 (US). (74) Agent: DOIGAN, Lloyd, D.; UT Automotive Dearborn, Inc., Legal Dept., 5200 Auto Club Drive, Dearborn, MI 48126-9982 (US).	(81) Designated States: CA, JP, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>	

(54) Title: MOVABLE LOAD FLOOR AND TABLE FOR A VEHICLE



(57) Abstract

A vehicle includes a cargo department (11). The floor (12) of the cargo compartment is equipped with a load floor assembly (13) to assist in loading and unloading the vehicle. The load floor assembly (13) includes a load floor (14), a mechanism (17) for rollingly releasably mounting the load floor (14) to the vehicle floor (12), and a locking mechanism (52). The load floor (14) can be moved longitudinally within the cargo compartment (11), while the locking mechanism (52) allows the load floor (14) to be releasably locked in various longitudinal positions. Since the load floor (14) is removable, and includes a plurality of folding legs (54), upon removal the load floor (14) functions as a table independent of the vehicle.

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DESCRIPTION

MOVABLE LOAD FLOOR AND TABLE FOR A VEHICLE

Technical Field

The present invention relates to load carrying devices, and more particularly to slidable load carrying floors or tables for vehicles.

5 **Background of the Invention**

Sport utility and minivan vehicles, as well as station wagons, typically include a large cargo area behind the passenger seats. The cargo area provides ample room for storage. Users can access the cargo area by opening a liftgate or rear door. Sometimes, in order for users to load and unload heavy or bulky items from the cargo area, they may have to stretch forward or crawl into the cargo area. Therefore, a number of slidable cargo load floors are known. These load floors move from a stowed position within the cargo area to an extended position where the floor extends rearwardly from the cargo area.

There are a number of problems with the conventional slidable load floors. The first problem is that many of these floors are complex, and consequently undesirably expensive for mass manufacture in the automotive industry. The second problem is that some of these floors are permanently attached to the vehicle which may limit the functionality and aesthetic appeal of the vehicle. Of those floors that are removably attached, some have the additional problem of requiring the attachment of a base to the floor of the vehicle prior to use of the load floor. This can be undesirable, because two separate pieces increases the difficulty of installation. One common problem with slidable load floors is that they are unable to function both as a load device and as a planar surface, such as a table.

Sport utility and minivan vehicles are often used when engaging in activities, such as tailgating, camping, picnicking, or working. It is desirable in all of these situations to have a surface for eating, playing games, or working. Typically this need is satisfied with a

portable table that is separate from the vehicle. The table will not be within the vehicle when needed, unless the vehicle operator remembers to put it there.

Therefore, a load floor is sought, which aids in loading and unloading items from a vehicle cargo area.

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Summary

One object of the load floor of the present invention is that the load floor assist during loading and unloading of objects and function as a table. It is further an object that the load floor be lightweight, aesthetically pleasing, require minimal packaging area, and have a relatively simple design.

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According to an embodiment of the present invention, a load floor assembly for a cargo compartment of a vehicle is disclosed. The cargo compartment includes a floor. The load floor assembly includes a load floor, a mechanism for rollingly releasably mounting the load floor to the vehicle floor, and a locking mechanism. The load floor includes a plurality of folding legs. The load floor is removable and upon removal of the load floor from the vehicle, the load floor functions as a table independent of the vehicle. The locking mechanism allows the load floor to be releasably locked in various longitudinal positions.

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In one embodiment the mechanism for rollingly releasably mounting the load floor to the vehicle floor includes at least two peripheral tracks, a central track, and a load floor with a plurality of wheels. The peripheral tracks extend longitudinally parallel to one another and spaced from one another. The peripheral tracks are coupled to the floor of the vehicle. The central track extends longitudinally between the peripheral tracks parallel thereto. The central track is also coupled to the floor of the vehicle. The load floor includes peripheral wheels and central wheels. At least two arrays of peripheral wheels are rotatably mounted to the lower surface of the load floor. The arrays of peripheral wheels are aligned with the peripheral tracks. Each array further includes peripheral wheels disposed at spaced longitudinal positions. The array of central wheels is rotatably mounted to the lower surface of the load floor. The array of central wheels is aligned with the central track. The array of central wheels further includes central wheels disposed at spaced longitudinal positions. The central wheels cooperate with the central track so that

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the load floor is releasably engageable therewith. In use the peripheral wheels roll on top of the peripheral tracks, and the central wheels roll within the central track. This allows the load floor to move smoothly between longitudinal positions. The central track may include a notch through which the central wheels can disengage the central track, so that the load floor can be completely removed from the vehicle.

The foregoing invention will become more apparent in the following detailed description of the best mode for carrying out the invention and in the accompanying drawings.

Brief Description of the Drawing

Fig. 1 is a partial perspective view of a sport utility vehicle containing a load floor of the present invention, the load floor is in a stowed position.

Fig. 2 is a partial perspective view of the sport utility vehicle of Fig. 1 containing the load floor in an extended position.

Fig. 3 is a partial perspective view of the sport utility vehicle of Fig. 1 with the load floor in a detached position.

Fig. 4 is a bottom view along arrow 4 in Fig. 2 of the load floor of the present invention.

Fig. 5A is a cross-sectional view along line 5A-5A in Fig. 4 of the load floor of the present invention.

Fig. 5B is a cross-sectional view along line 5B-5B in Fig. 4 of the load floor of the present invention.

Best Mode for Carrying Out an Embodiment the Invention

Referring to Figs. 1 and 2, a sport utility vehicle 10 includes a cargo compartment 11. The cargo compartment includes a floor 12 and a load assembly 13.

The load floor assembly 13 includes a removable load floor 14, a mechanism 17 for rollingly releasably mounting the load floor 14 to the vehicle floor 12, and a locking mechanism 52 (as shown in Fig. 4). The load floor 14 is designed to be mounted on top of

the floor 12 within the cargo compartment 11 between the passenger seats 18 and the liftgate 20.

Referring to Figs. 2 and 4, the mechanism 17 for rollingly releasably mounting includes tracks 22, 24 and 26, and wheels 46 and 48.

5 The vehicle floor 12 includes a plurality of low profile tracks 22, 24 and 26 mounted thereon. The tracks longitudinally extend parallel to one another at spaced transverse locations. The peripheral tracks 22 and 24 include a horizontal surface 28 and a vertical surface 30. Each horizontal surface 28 faces upward. Each vertical surface 30 faces inward toward the central track 26. Each vertical surface 30 includes a plurality of
10 longitudinally spaced holes 32 disposed at selected locking positions.

Referring to Fig. 3, the central track 26 includes a sideways H-shaped cross-section, two notches 34, a forward stopping surface 36, and a rearward stopping surface 38. The H-shaped cross-section creates two divided longitudinally extending channels 39. Each notch 34 is disposed at the rear of the track 26 on opposite sides of the track. The
15 notches 34 allow access to the channels 39. The forward and rearward stopping surfaces 36 and 38 are vertical surfaces disposed at the ends of the central track 26.

Referring to Fig. 2, the load floor 14 includes an upper surface 40 and a lower surface 42. The upper surface 40 includes a handle 44 disposed at the rear of the load floor.

20 Referring to Figs 4, 5A and 5B, the lower surface 42 includes two arrays of peripheral wheels 46, an array of central wheels 48, a plurality of U-shaped brackets 50, a locking mechanism 52, and a plurality of folding legs 54 (as shown on Fig. 3).

The arrays of peripheral wheels 46 are spaced apart on the load floor 14. Each array is positioned so that it is aligned with the associated peripheral track 22 and 24, respectively (as shown in Fig. 3). The wheels 46 of in one array are at spaced longitudinal
25 locations. The wheels 46 of the other array are at matched spaced longitudinal locations. In this embodiment, there are four wheels in each array.

Referring to Fig. 5B, a bracket 54 is fixed to the lower surface 42 of the load floor for rotatably mounting each wheel 46. The wheel 46 is rotatably connected to the bracket
30 54. In this embodiment, the wheels 46 can be machined or molded from a plastic, such as nylon or DelronTM manufactured by Dow.

Referring to Figs. 4 and 5, the array of central wheels 47 are disposed at the center of the load floor 14 aligned with the central track 26. There are two types of central wheels. The first type of central wheels are mounted in pairs 48 which are spaced from the lower surface of the load floor. A sideways C-shaped bracket 56 is fixed to the lower surface 42 for supporting the wheels 48 spaced from the lower surface. Each bracket 56 supports two wheels 48, one adjacent each free end of the bracket 56. Each wheel 48 is rotatably connected to the bracket 56. Thus, the wheels 48 can be releasably rollably engaged in the channels 39. In this embodiment, the central wheels 48 are steel wheels with bearings therein, because these will hold the central track better. However, other materials such as plastic or nylon can be used.

Referring to Fig. 5A, the second type of central wheels 49 are similar in material and attachment to the peripheral wheels 46. The wheels 48 and 49 are at spaced longitudinal locations, the wheels alternate between the first type 48 and the second type 49.

One U-shaped bracket 50 is disposed between each of the arrays of peripheral wheels 46 and the array of central wheels 48 and 49. The brackets 50 are longitudinally extending, and add structural rigidity and/or strength to the load floor.

The locking mechanism 52, in this embodiment, is a retractable pin assembly. The locking mechanism 52 includes the handle 44, a primary rod 58, a spring loaded pivot 60, two supports 62, two secondary rods 64 and 65, and pins 66. In another embodiment, the primary and secondary rods 64 and 65 can be replaced with cable.

Referring to Figs. 2 and 4, the handle 44 is pivotally attached to the load floor 14, so that it extends from the lower surface 42 to the upper surface 40. The handle 44 engages a spring (not shown) which biases the locking mechanism toward a locked position, as shown. In the locked position, the handle 44 is flush with the upper surface 40 of the load floor 14.

The handle 44 is pivotally attached to the primary rod 58 which extends longitudinally along the lower surface 42. The primary rod 58 is pivotally coupled to the upper section of the pivot 60 via member 68. The pivot 60 is pivotally attached to the load floor 14 and has a spring 70, which biases the pivot 60 in the locked position. The upper end of the pivot 60 is pivotally attached to the secondary rod 64. The lower end of

the pivot 60 is pivotally attached to the secondary rod 65. Each secondary rod 64 and 65 has one pin 66 attached to the free end. Each secondary rod 64 and 65 extends laterally across the load floor 14 in opposite directions. Each of the secondary rods 64 and 65 are slidably engaged with the associated support 62, which is fixed to the load floor.

5 Referring to Fig. 3, each leg is connected adjacent to a corner of the load floor 14 using conventional hardware. The legs should be a means for supporting the load floor 14, having a retracted position adjacent the lower surface, and a supporting, extended position. The load floor 14 should include means to lock legs flush to surface, such as a bracket. In this embodiment, the legs are standard legs used with portable tables.
10 However, any other manner of legs can be used which allow the load floor to be supported, and which can be moved from the retracted to the extended position.

The load floor is formed from an aluminum base which includes an upper layer made of a suitable plastic. The upper layer includes a substantially flat portion. The upper layer can be blown or injection molded from a suitable plastic, such as polypropylene,
15 EBS, nylon and the like. In some embodiments the upper surface may be carpeted to match the vehicle interior. If the load floor is formed of plastic or nylon material cargo, tie down brackets (not shown) can be integrally formed therewith.

The handle for the locking mechanism is formed from plastic. The rods and pins are formed from aluminum. Other materials are possible, including but not limited to steel.

20 Use of the load floor will now be discussed. Referring to Fig. 3, the load floor 14 can be changed from being independent to attached to the vehicle 10 by folding the forward legs 54 and moving the floor into contact with the vehicle. The floor 14 should be raised so that the forward first type of central wheels 48 enter the longitudinally extending channels in the center track 38 via the notches 34. Now, the load floor is prevented from
25 moving laterally and vertically. The central wheels 48 cooperate with the central track so that the load floor is releasably engageable therewith. The arrays of peripheral wheels 46 roll upon the horizontal surfaces of the peripheral tracks 22 and 24. The array of the second type of central wheels 49 roll upon the upper surface of the central track 38. Once the pins 66 enter the holes 32, the floor is locked in its longitudinal position.

30 In order to move the load floor 14 from the extended position to the stowed position, the rear legs must be moved to the retracted position and secured to the lower

surface of the load floor. Referring to Figs. 2 and 4, the handle 44 is raised so that the pins 66 are not the holes 32 of the vertical surfaces 30 of the peripheral tracks 22 and 24. As the load floor 14 is inserted into the cargo area 16, each of the first set of central wheels 48 must be placed into the channels 39 through the notches 34. Continuing to hold the handle 44 up, the floor 14 is pushed into the stowed position. The wheels 46 and 49 roll along the upper surface of the tracks, which allows for smooth movement of the floor. The forward central wheels 48 will encounter the forward stopping surface 36. Once there the handle 44 is released, through rotation of the pivot 60 the pins 66 move outward into the holes 32 in the peripheral tracks 22 and 24. Thus, the locking mechanism releasably locks the load floor 14 in various longitudinal positions.

In order to move the load floor 14 from the stowed position to an intermediate position, the handle 44 is raised. Actuation of the handle causes the primary rod 58 to rotate the pivot 60, which causes the secondary rods 64 and 65 to move the pins 66 out of the holes 32. In this unlocked state, the floor 14 is free to move and can be pulled forward, and when in the desired position the handle 44 can be released so that the pins 66 can enter the nearest holes 32, thus locking the floor in the desired position.

In order to remove the load floor completely, the user must remove the wheels 48 from the central track 26 via the notches 34.

The principal advantage of the present invention is that the load floor can function both as an aid to loading and unloading and as a table. The load floor can function as a table dependent to or independent from the vehicle. A further advantage is that the table can be used while attached to the vehicle, or removed for use.

Additional advantages of the load floor are that its design is simple, robust, and achieves a lightweight table, which weighs between about 10 to 20 pounds. Furthermore, the table can be removed and attached to the vehicle by one person, and is easy to install.

While a particular invention has been described with reference to illustrated embodiments, various modifications of the illustrative embodiments, as well as additional embodiments of the invention, will be apparent to persons skilled in the art upon reference to this description without departing from the spirit and scope of the invention, as recited in the claims appended hereto. These modifications include, but are not limited to, modifying the vehicle floor so that the tracks are beneath the surface of the floor for a

more aesthetically pleasing look. The locking mechanism can also be modified to a variety of other linkage or mechanism designs which are well known in the art. Another modification is a plurality of upwardly extending walls (not shown) may be formed about the edges of the load floor. The edges prevent any load on the floor from falling off the front or sides of the load floor. If the peripheral tracks are removed, the wheels could rollably engage the floor of the vehicle. The upper surface may also include a plurality of brackets (tie-downs) at various locations, which are pivotally attached to the floor. The tie-downs can be flush to the floor when not in use, and accessible when it is necessary to secure a load within the cargo area. It is therefore contemplated that the appended claims will cover any such modification or embodiments that fall within the true scope of the invention.

I claim:

Claims

1. A load floor assembly for a cargo compartment of a vehicle, the cargo compartment including a floor, said load floor assembly comprising:

a removable load floor including a plurality of folding legs;

a mechanism for rollingly releasably mounting said load floor to said vehicle floor, such that upon removal of the load floor from said vehicle said load floor functions as a table independent of the vehicle; and

a locking mechanism for releasably locking said load floor in various longitudinal positions.

2. A load floor assembly for a cargo compartment of a vehicle, the cargo compartment including a floor, said load floor assembly comprising:

at least one longitudinally extending track, said track including a substantially enclosed longitudinally extending channel, said track being coupled to the floor of the vehicle;

a removable load floor including

wheels for rollably engaging the floor of the vehicle mounted to the lower surface of said load floor;

means for coupling a pair of wheels to the lower surface of the load floor such that said wheels are releasably rollably engaged in said channel;

a locking mechanism for retaining the load floor at various longitudinal positions; and

a plurality of folding legs, said legs having a retracted position adjacent said lower surface of said load floor and an extended position for supporting the load floor.

3. A load floor assembly for a cargo compartment of a vehicle, the cargo compartment including a floor, said load floor assembly comprising:

at least two longitudinally extending peripheral tracks, said peripheral tracks being parallel to one another and spaced from one another, said tracks being coupled to the floor of the vehicle;

a longitudinally extending central track, said central track being disposed between said peripheral tracks parallel thereto, said central track being coupled to the floor of the vehicle; and

a removable load floor including

at least two arrays of peripheral wheels rotatably mounted to the lower surface of said load floor, said arrays of peripheral wheels being aligned with said peripheral tracks; each array of peripheral wheels further including peripheral wheels being at spaced longitudinal locations;

an array of central wheels rotatably mounted to the lower surface of said load floor, said array of central wheels being aligned with said central track, said array of central wheels further including central wheels being at spaced longitudinal locations, said central wheels cooperating with said central track so that said load floor is releasably engagable therewith;

25 a locking mechanism for retaining the load floor at various longitudinal
 positions; and

 a plurality of foldable legs, said legs having a retracted position adjacent said
 lower surface of said load floor and an extended position for supporting the
30 load floor.

4. The load floor assembly of claim 3, wherein first central wheels are mounted in
pairs on a bracket so that the first central wheels are spaced from the lower surface
of the load floor, said central track further includes a sideways H-shaped cross-
section thus forming two longitudinally extending divided channels, said pair of
5 central wheels being disposable within opposed channels.

5. The load floor assembly of claim 4, wherein the first central wheels are steel
wheels with bearings therein.

6. The load floor assembly of claim 4, wherein the first central wheels are plastic.

7. The load floor assembly of claim 4, wherein the first central wheels are nylon.

8. The load floor assembly of claim 4, wherein second central wheels are mounted
at alternate longitudinal locations between said first central wheels, upon installation
of the load floor said second central wheels for rolling upon the central track.

9. The load floor assembly of claim 8, wherein said second central wheels are
plastic.

10. The load floor assembly of claim 8, wherein said second central wheels are
nylon.

11. The load floor assembly of claim 4, wherein said central track further includes
a forward stopping surface disposed at the forward end of the central track;

5 a rearward stopping surface disposed at the rearward end of the central track; and
notches adjacent the rearward stopping surface for allowing the first central wheels
to be received into said channels.

12. The load floor assembly of claim 3, wherein said peripheral tracks further
include a vertical surface having a plurality of longitudinally spaced holes therein, and
said locking mechanism further includes:

5 a handle pivotally attached to the rear of the load floor, said handle being flush with
the upper surface of said load floor;

a primary rod extending longitudinally along the lower surface of said load floor and
being pivotally attached to said handle;

10 a spring loaded pivot being biased in a locked position, and coupled to the primary
rod;

15 two secondary rods are each attached at opposite ends of said spring loaded pivot;
each rod extends in opposite directions perpendicular to the primary pivot rod;

two supports are coupled to the lower surface of the load floor, said supports for
supporting said secondary rods, said secondary rods being slidably engaged with said
supports; and

20 two pins, one of said pins attached to each of free end of said associated secondary
rod, such that in the locked position said pins enter said holes in the peripheral

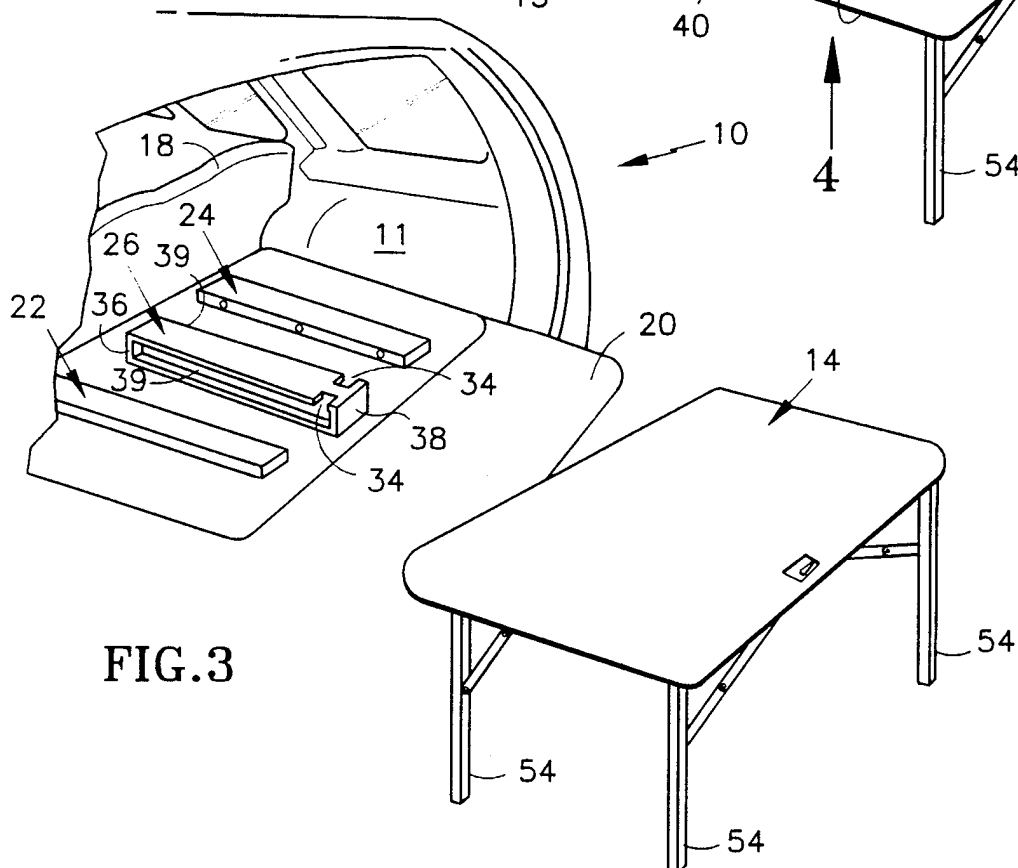
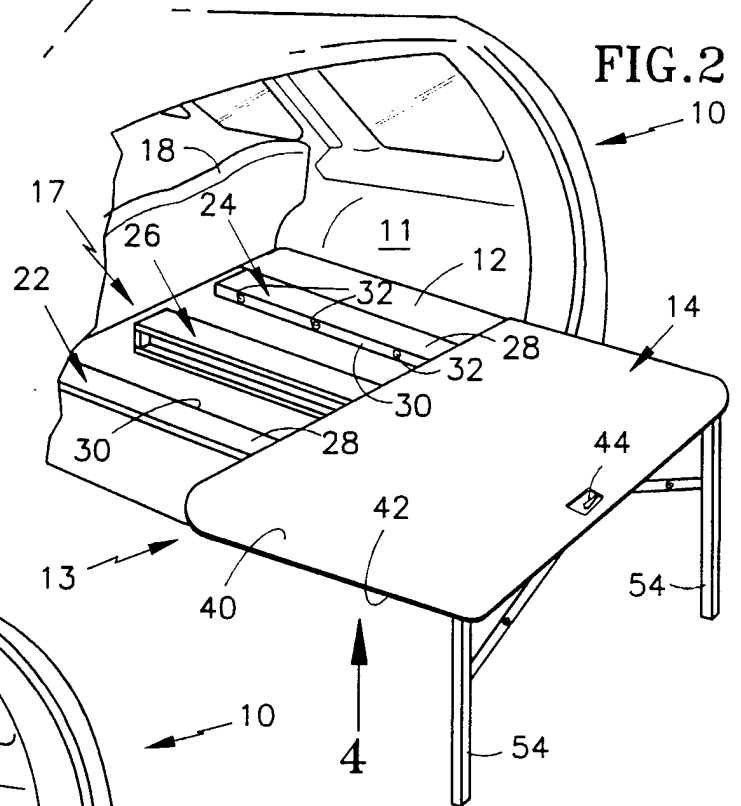
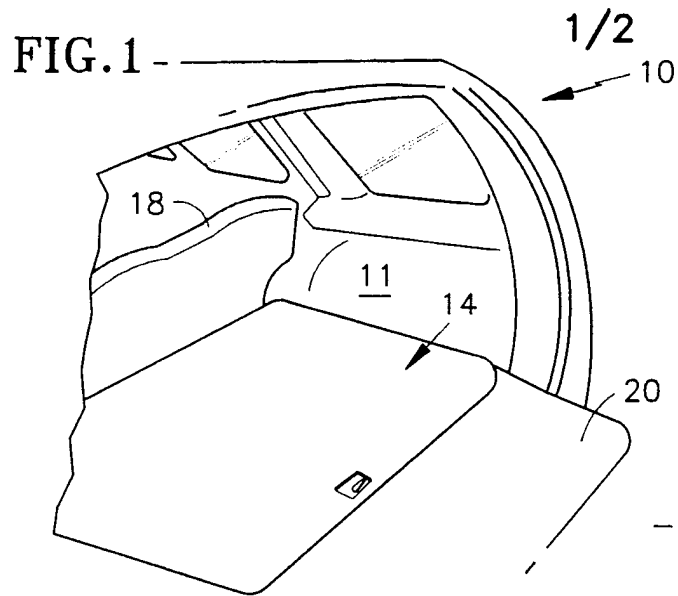


FIG.4

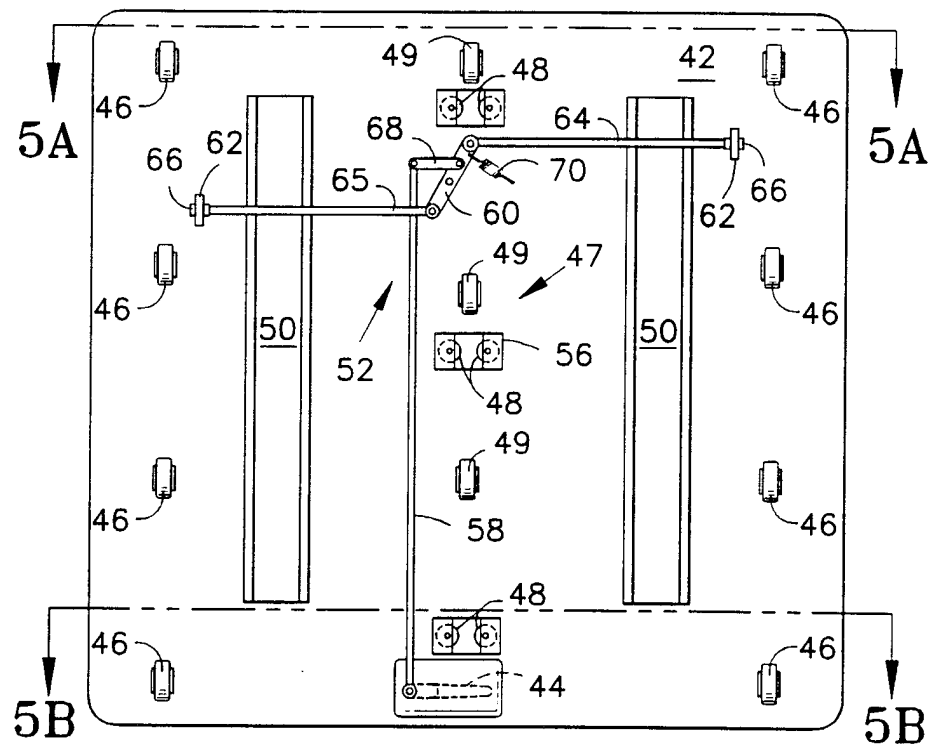


FIG.5A

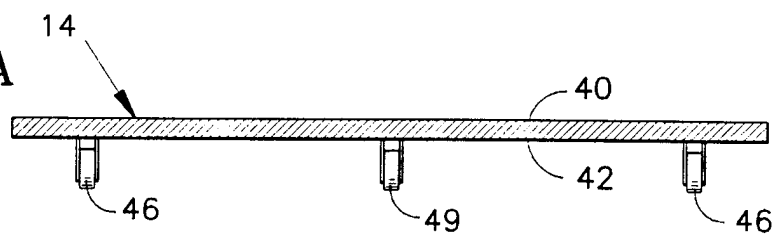
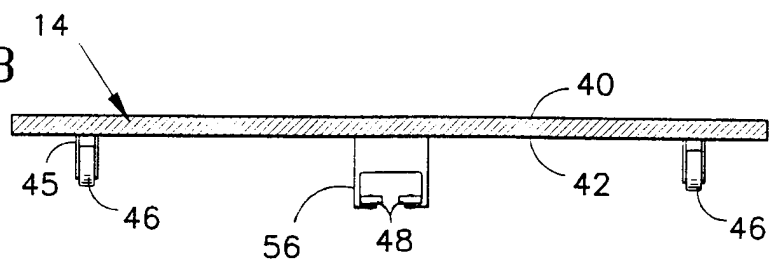


FIG. 5B



INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/05656

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B60R5/04 B60P1/00

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)

IPC 6 B60R B60P B60N

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 practical, 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 4 305 695 A (ZACHRICH WAYNE H) 15 December 1981 see column 3, line 42 - column 4, line 52; figures 1,3 ---	1-3,13
A	DE 296 08 955 U (JAEHNE JOHANNES) 26 September 1996 see page 6, paragraph 2 - page 9, last line; figures 1-8 ---	1-3,13
A	US 3 058 636 A (BILBEISI) 16 October 1962 see column 2, line 6 - line 55; figure 1 ---	1-3,13
A	US 3 338 620 A (CAUVIN) 29 August 1967 see column 1, line 53 - line 72; figures 1,2 ---	1-3,13
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Blurton, M

INTERNATIONAL SEARCH REPORT

Inter: 1al Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 824 158 A (PETERS RICHARD E ET AL) 25 April 1989 see abstract; figures 1-6 -----	1-3,13

INTERNATIONAL SEARCH REPORT

Information on patent family members

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