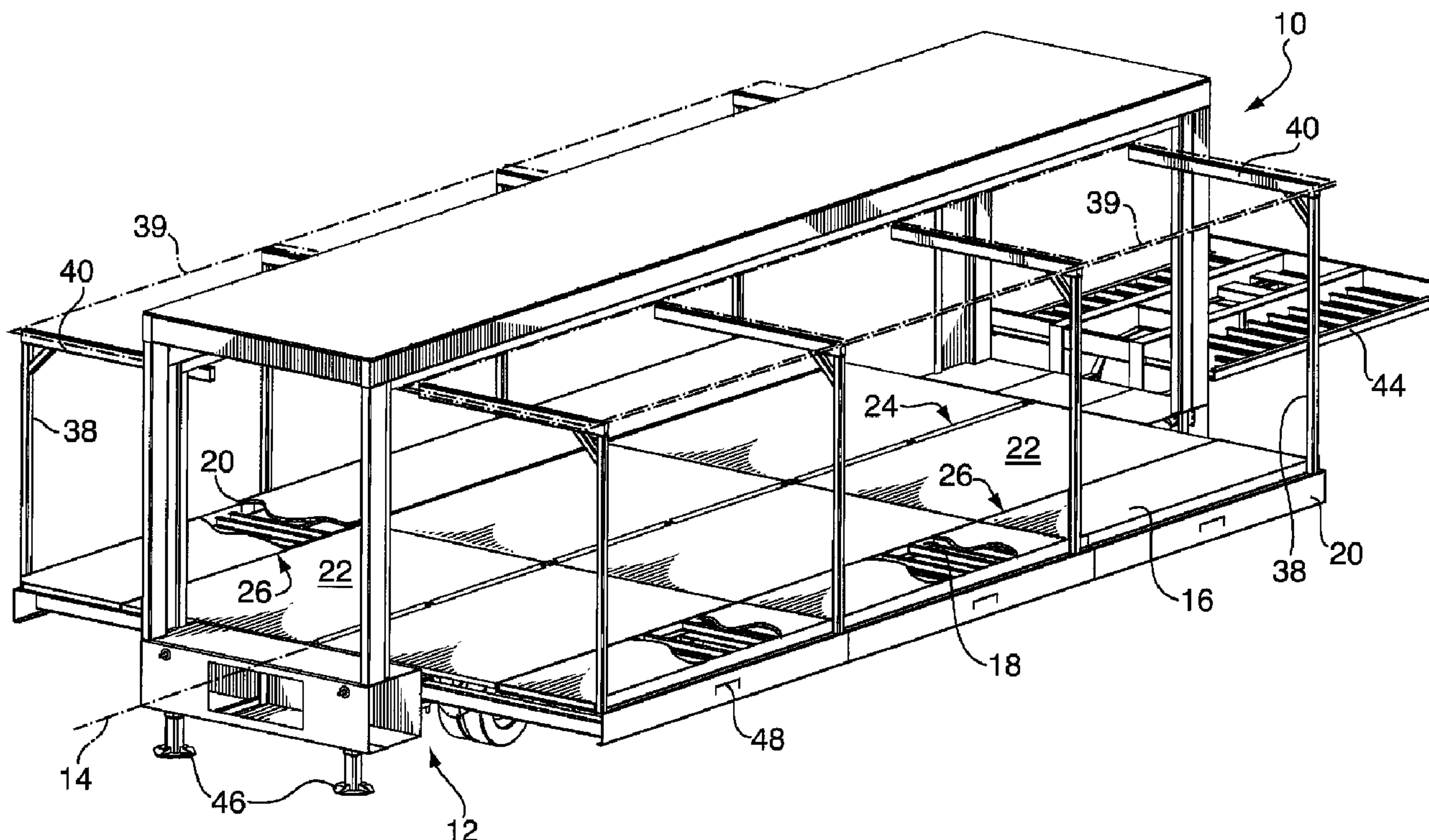




(22) Date de dépôt/Filing Date: 2006/01/23  
(41) Mise à la disp. pub./Open to Public Insp.: 2006/07/09

(51) Cl.Int./Int.Cl. *B60P 3/34* (2006.01),  
*B60P 3/39* (2006.01), *B62D 63/06* (2006.01)  
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(54) Titre : REMORQUE EXTENSIBLE  
(54) Title: EXPANDABLE TRAILER



(57) Abrégé/Abstract:

An expandable trailer comprising a chassis, at least one pair of extendable supports, at least one pair of horizontal floor sections and at least one pair of floor elements. Each support is extendable laterally outwardly to a respective side of a central longitudinal axis of the chassis. The horizontal floor sections of each pair of horizontal floor sections are spaced apart laterally and each have an outer rail which is coupled to a corresponding one of the supports. The floor elements are pivotally coupled to each other and to the floor sections. Upon extension of the extendable supports from a retracted position to an open, extended position, the

**(57) Abrégé(suite)/Abstract(continued):**

horizontal floor sections move laterally outwardly to extend from the chassis and the floor elements move from an upright vertical arrangement to an arrangement where the floor elements lie in horizontal alignment with the floor sections.

**ABSTRACT**

An expandable trailer comprising a chassis, at least one pair of extendable supports, at least one pair of horizontal floor sections and at least one pair of floor elements. Each support is extendable laterally outwardly to a respective side of a central longitudinal axis of the chassis. The horizontal floor sections of each pair of horizontal floor sections are spaced apart laterally and each have an outer rail which is coupled to a corresponding one of the supports. The floor elements are pivotally coupled to each other and to the floor sections. Upon extension of the extendable supports from a retracted position to an open, extended position, the horizontal floor sections move laterally outwardly to extend from the chassis and the floor elements move from an upright vertical arrangement to an arrangement where the floor elements lie in horizontal alignment with the floor sections.

- 1 -

**TITLE OF THE INVENTION**

EXPANDABLE TRAILER

**FIELD OF THE INVENTION**

The present invention relates to expandable trailers.

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**BACKGROUND OF THE INVENTION**

Expandable trailers are often used as house trailers where it is useful be able to collapse a trailer into a more easily transportable form. Quite often, in order to have a structurally stable expandable portion of the trailer, the trailer interior must receive the expandable portion when in the collapsed or retracted position. This can be quite inconvenient as the expandable portion may obstruct the trailer interior and make it difficult to position furniture and the like. Examples of such trailers are disclosed in U.S. patent No. 5,280,985 (Morris) and U.S. patent No. 5,237,782 (Cooper).

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This problem has been addressed in part by U.S. patent No 2,901,282 (Meaker) which discloses a telescopically collapsible house trailer in which the trailer interior is left completely unobstructed. The expandable portion comprises foldable floor elements which are folded up into parallel retracted position at one side of the trailer when it is being transported. When the trailer is expanded, these floor elements fold out to form the expanded portion. Although the trailer interior is not obstructed by the expandable portion, this trailer construction does have a number of drawbacks. The expandable portion cannot support any furniture or the like during transport as the floor elements must be folded up into the retracted position. In addition, as only one side of the trailer supports the expandable portion, balance may also be a concern when the trailer is expanded, particularly when containing heavy loads.

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- 2 -

Thus, there exists a need for an expandable trailer with increased stability and improved supports so that the expanded portion of the trailer remains level. Preferably, such an expandable trailer would be able to store furniture and the like in the expandable portion when the trailer is in a retracted position.

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### **SUMMARY OF THE INVENTION**

In accordance with an aspect of the invention there is provided an expandable trailer comprising a chassis having a central longitudinal axis, at least one pair of extendable supports, at least one pair of horizontal rectangular floor sections and at least one pair of rectangular floor elements. Each extendable support of the pair of extendable supports is extendable laterally outwardly to a respective opposite side of the central longitudinal axis of the chassis. Each horizontal floor section of the pair is spaced laterally with respect to the other floor section to either side of the central longitudinal axis of the chassis. Each floor section has an inner longitudinal edge and an outer rail, the outer rail being coupled to an outer end of a corresponding one of the extendable supports. Each floor element of the pair is pivotally coupled along a first longitudinal edge to the first longitudinal edge of the other floor element of the pair and pivotally coupled along a second longitudinal edge to a corresponding inner longitudinal edge of one of the horizontal floor sections. Upon extension of the extendable supports from a retracted position to an open, extended position, the horizontal floor sections move laterally outwardly to extend from the chassis and the floor elements move from an upright vertical arrangement to an arrangement where the floor elements lie in horizontal alignment with the floor sections.

In accordance with another aspect of the invention there is provided apparatus comprising a plurality of expandable trailers as described above and at least one coupling for connecting each one of the plurality of expandable trailers to adjacent expandable trailers.

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- 3 -

In accordance with yet another aspect of the invention, there is provided apparatus comprising a plurality of expandable trailers as described above, a plurality of levelling jacks for levelling the trailers when parked and at least one coupling for connecting each one of the plurality of expandable trailers to  
5 adjacent expandable trailers. The levelling jacks are adapted to horizontally align respective floor sections of adjacent expandable trailers.

With this construction of expandable trailer, because the floor sections remain horizontally aligned during the transition from the retracted position  
10 where the floor elements are in an upright vertical arrangement to the open position where the floor elements lie in horizontal alignment with the floor sections, objects such as furniture and the like may be stored thereon during transport. Furthermore, as the trailer expands outwardly to each side of the chassis, the entire structure remains balanced. The construction of this  
15 expandable trailer also ensures that the expanded portions remain level.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

These and other advantages of the invention will become apparent upon reading the following detailed description and upon referring to the drawings in  
20 which:

FIGURE 1 is a perspective view from the side and rear of an embodiment of an expandable trailer in a retracted position in accordance with the invention;

FIGURE 2 is a similar perspective view from the side and rear of an embodiment of an expandable trailer in an open, extended position in  
25 accordance with the invention;

FIGURE 3 is a partial perspective view of an extendable support of the expandable trailer of Figures 1 and 2 in retracted position;

- 4 -

FIGURE 4 is a side view of the extendable support of Figure 3 in open, extended position;

FIGURE 5 is a side view of the extendable support of Figure 3 in retracted position;

5 FIGURE 6 is a rear elevation view of the expandable trailer of Figures 1 and 2 in open, extended position; and

FIGURE 7 is a rear elevation view of the expandable trailer of Figures 1 and 2 in retracted position.

10 While the invention will be described in conjunction with the illustrated embodiments, it will be understood that it is not intended to limit the invention to such embodiments. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

15 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Figure 1 illustrates an expandable trailer 10 in a retracted position and Figure 2 illustrates the expandable trailer 10 in an open position. The expandable trailer 10 illustrated in Figures 1 and 2 comprises a chassis 12  
20 having a central longitudinal axis 14 and at least one pair of extendable supports (not shown). The extendable supports are each extendable laterally outwardly to respective sides of the central longitudinal axis 14 of the chassis. The extendable supports will be described in more detail with reference to Figures 3, 4 and 5 later in this document.

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The extendable supports support at least one pair of rectangular floor sections 16. Each floor section 16 of the pair is spaced laterally with respect to the other floor section 16 of the pair to either side of the central longitudinal axis 14 of the chassis 12. Each of the floor sections 16 has an inner longitudinal

- 5 -

edge 18 and an outer rail 20, the outer rail 20 being coupled to an outer end of a corresponding one of the at least one pair of extendable supports.

5 The floor sections 16 may each comprise a planar member supported by a frame having a plurality of lateral support bars, as shown in the cut-away portions of Figures 1 and 2. This frame does not have to be in direct contact with the extendable supports.

10 At least two rectangular floor elements 22 are pivotally coupled together along respective first longitudinal edges (indicated generally by reference number 24). Each floor element 22 is pivotally coupled at a second longitudinal edge (indicated generally by reference number 26) to a corresponding inner longitudinal edge 18 of one of the at least two floor sections. Like the floor sections 16, the floor elements 22 may each comprise a planar member  
15 supported by a frame having a plurality of support bars (not shown).

Upon extension of the extendable supports from a retracted position to an open, extended position, the horizontal floor sections 16 move laterally outwardly to extend from the chassis 12 and the floor elements 22 move from a  
20 retracted position where the floor elements 22 are in an upright vertical arrangement (as in Figure 1) to an open, extended position where the floor elements lie in horizontal alignment with the floor sections (as in Figure 2).

When in the open position, there may be a small clearance  
25 (approximately  $\frac{3}{4}$ " ) between the second longitudinal edge 26 of each floor element 22 and the inner longitudinal edge 18 of the corresponding horizontal floor section 16. Likewise, when in the open position, there may be a small clearance (approximately  $\frac{3}{4}$ " ) between the first longitudinal edges 24 of the floor elements 22. In the open position, each of the floor elements 22 may be  
30 supported on a lip extending from the corresponding floor section 16 (not shown).

- 6 -

Preferably, as can be seen in Figures 1 and 7, the floor elements 22 extend upwardly from a lateral center of the chassis (in line with longitudinal axis 14) when in the retracted position. It should be understood, however, that the floor elements 22 may extend upwardly from any suitable part of the  
5 chassis 12.

Referring now to Figures 3, 4 and 5, each of the extendable supports 28 comprises an inner member 30 and an outer member 32. The outer member 32 has an inner opening that extends along the length of the outer member 32 for  
10 receiving the inner member 30. The inner member 30 lies substantially within the outer member 32 when in the retracted position (as shown in Figures 3 and 5) and extends telescopically from the outer member 32 when in the extended position (as shown in Figure 4).

15 Each of the extendable supports 28 further comprises a first roller 34 fastened to a first end of the inner member 30, a diameter of the first roller 34 being slightly smaller than the width of the outer member 32. The first roller 34 rolls along a bottom surface of the inner opening as the inner member 30 is driven out of the outer member 32.

20

Each of the extendable supports further comprises a second roller 36 fastened to the outer member 32 at an end distal to the first end of the inner member 30 when the extendable support 28 is in retracted position. The second roller 36 is fastened so that a portion of the roller lies within the inner  
25 opening of the outer member 32 and a bottom surface of the inner member 30 is supported as it is driven out of the outer member 32 to the extended position. The portion of the second roller 36 that lies within the inner opening can be increased and decreased.

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The inner member 30 may be tubular and generally square in cross-section. Likewise, the outer member 32 may be generally square in cross-section.

- 7 -

At least one actuator is associated with the extendable supports 28 to move them from retracted position to an extended position. The at least one actuator may accomplish this by exerting an outward lateral force on the outer  
5 rail 18 of each floor section.

The at least one actuator may be a motor-driven screw jack, although it should be understood that any suitable actuator may be used. The screw jack may drive a rod and piston assembly wherein the rod is coupled to one the  
10 outer rails 20 of the floor sections 16. This rod and piston assembly may extend parallel to the extendable supports 28. The screw jack may be coupled to a gear box and at least one electric motor. A number of screw jacks may be used and driven by the same gear box and motor combination.

15 It should be understood that any suitable type of extendable support may be used and the invention is not limited to the type of extendable support shown in Figures 3, 4 and 5.

At least two side walls may extend upwardly from outer edge portions of  
20 respective ones of the floor sections 16. These walls may be supported by the vertical supports 38 shown clearly in Figures 1 and 2. Alternatively, these side walls may be implemented without vertical supports 38. At least two roof sections 39 are attached to the upper edges of the at least two side walls. The roof sections 39 are shown in phantom in Figures 1 and 2 are supported by roof  
25 supports 40. Each of the side walls may comprises at least one removable panel (not shown) for the purposes of, for example, interchanging different types of panel (e.g. with window, without window).

When the extendable supports 28 are in the retracted position, the roof  
30 sections one side lies beneath the roof section of the other side of the trailer, as shown in the Figures. Preferably the chassis comprises a central static roof section 42 and the roof sections 39 both lie beneath the roof section 42 of the

- 8 -

chassis 12 when the extendable supports 28 are in the retracted position. The static roof portion 42 may supported by additional vertical supports 38 at each corner, as shown in the Figures. The side walls on opposite sides of the trailer may be different heights so that the first and second roof sections 39 may lie  
5 beneath the static roof portion 42 as shown in the Figures.

A platform 44 may extend from a back end of the chassis. The platform 44 may be pivotally mounted to fold up into a vertical arrangement when the trailer is in motion. This platform may be used for any suitable purpose, for  
10 example additional storage.

When the expandable trailer 10 is parked, a plurality of conventional levelling jacks 46 can be used to level the trailer 10.

15 According to another embodiment of the invention, a plurality of expandable trailers similar to the expandable trailer described previously may be connected together by a suitable coupling means 48. This connection may be facilitated by using respective levelling jacks to horizontally align respective floor sections of adjacent expandable trailers.

20

It is apparent that there has been provided in accordance with the invention an expandable trailer that fully satisfy the objects, aims and advantages set forth above. While the invention has been described in conjunction with illustrated embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such alternatives, modifications and variations as fall within the spirit and broad scope of the invention.

**WHAT IS CLAIMED IS:**

## 1. An expandable trailer comprising:

a chassis having a central longitudinal axis;

at least one pair of extendable supports, each extendable support of the pair extendable laterally outwardly to a respective opposite side of the central longitudinal axis of the chassis;

at least one pair of horizontal rectangular floor sections, each horizontal floor section of the pair spaced laterally with respect to the other floor section to either side of the central longitudinal axis of the chassis, each floor section having an inner longitudinal edge and an outer rail, the outer rail being coupled to an outer end of a corresponding one of the at least one pair of extendable supports; and

at least one pair of rectangular floor elements, each floor element of the pair being pivotally coupled along a first longitudinal edge to the first longitudinal edge of the other floor element and pivotally coupled along a second longitudinal edge to a corresponding inner longitudinal edge of one of the horizontal floor sections,

wherein upon extension of the extendable supports from a retracted position to an open, extended position, the horizontal floor sections move laterally outwardly to extend from the chassis and the floor elements move from an upright vertical arrangement to an arrangement where the floor elements lie in horizontal alignment with the floor sections.

2. An expandable trailer according to claim 1, wherein the floor elements extend upwardly from a lateral center of the chassis when in upright vertical arrangement.
3. An expandable trailer according to claim 1, wherein, when the floor elements are in horizontal alignment with the floor sections, there is a small clearance between the second longitudinal edge of each one of the pair of floor elements and the inner longitudinal edge of the corresponding one of the at least one pair of horizontal floor sections.

- 10 -

4. An expandable trailer according to claim 1, wherein, when the floor elements are in horizontal alignment with the floor sections, there is a small clearance between the first longitudinal edges of the at least one pair of floor elements.
5. An expandable trailer according to claim 1, wherein each of the extendable supports comprises an inner member and an outer member, the outer member having an inner opening that extends along the length of the outer member for receiving the inner member.
6. An expandable trailer according to claim 5, wherein the inner member lies substantially within the outer member when in the retracted position and extends from the outer member when in the open, extended position.
7. An expandable trailer according to claim 5, wherein each of the extendable supports further comprises a first roller fastened to a first end of the inner member, a diameter of the first roller being slightly smaller than the width of the outer member.
8. An expandable trailer according to claim 7, wherein the first roller is positioned to roll on a bottom surface of the inner opening as the extendable supports are extended.
9. An expandable trailer according to claim 1, wherein at least one actuator is associated with the extendable supports to move them from the retracted position to the open, extended position.
10. An expandable trailer according to claim 9, wherein the at least one actuator exerts an outward lateral force on the outer rail of each floor section.

- 11 -

11. An expandable trailer according to claim 9, wherein the actuator comprises a screw jack.
12. An expandable trailer according to claim 1, further comprising at least two side walls extending upwardly from outer edge portions of respective ones of the floor sections and at least two roof sections attached to the at least two side walls.
13. An expandable trailer according to claim 12, wherein each of the side walls comprises at least one removable panel.
14. An expandable trailer according to claim 12, wherein, when the extendable supports are in the retracted position, a first one of the at least two roof sections lies beneath a second one of the at least two roof sections.
15. An expandable trailer according to claim 1, wherein the chassis comprises a static roof section.
16. An expandable trailer according to claim 15, wherein a first roof section of the at least two roof sections lies beneath a second roof section of the at least two roof sections, the first and second roof sections lying beneath the static roof section of the chassis when the extendable supports are in the retracted position.
17. An expandable trailer according to claim 1, further comprising a platform extending from a back end of the chassis.
18. An expandable trailer according to claim 1, further comprising a plurality of levelling jacks for levelling the trailer when it is parked.

19. Apparatus comprising:

a plurality of expandable trailers according to any one of claims 1 to 18; and

at least one coupling means for connecting each one of the plurality of expandable trailers to adjacent expandable trailers.

20. Apparatus comprising

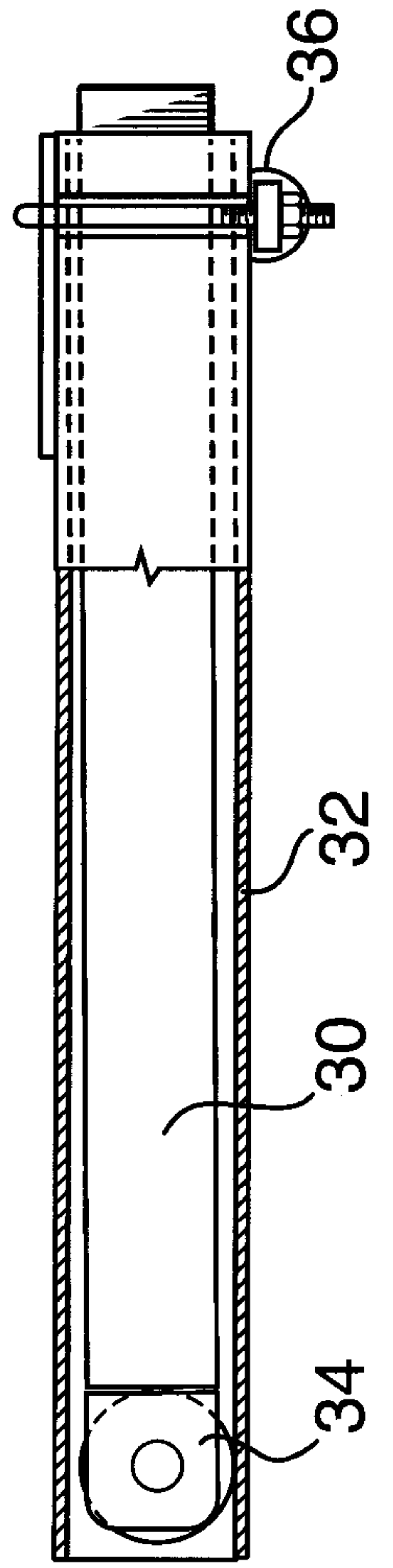
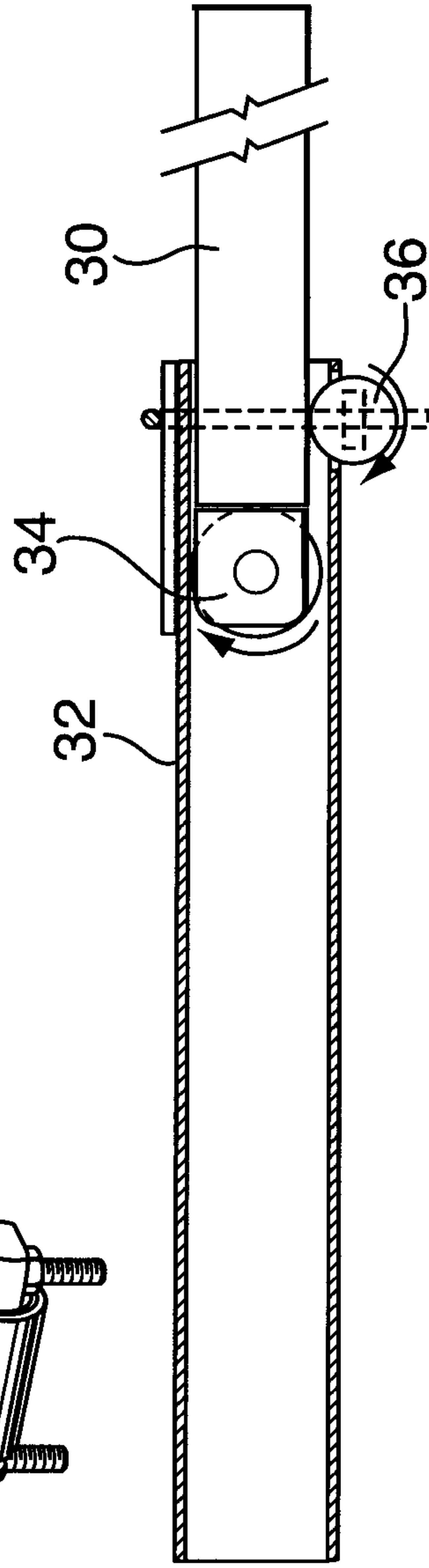
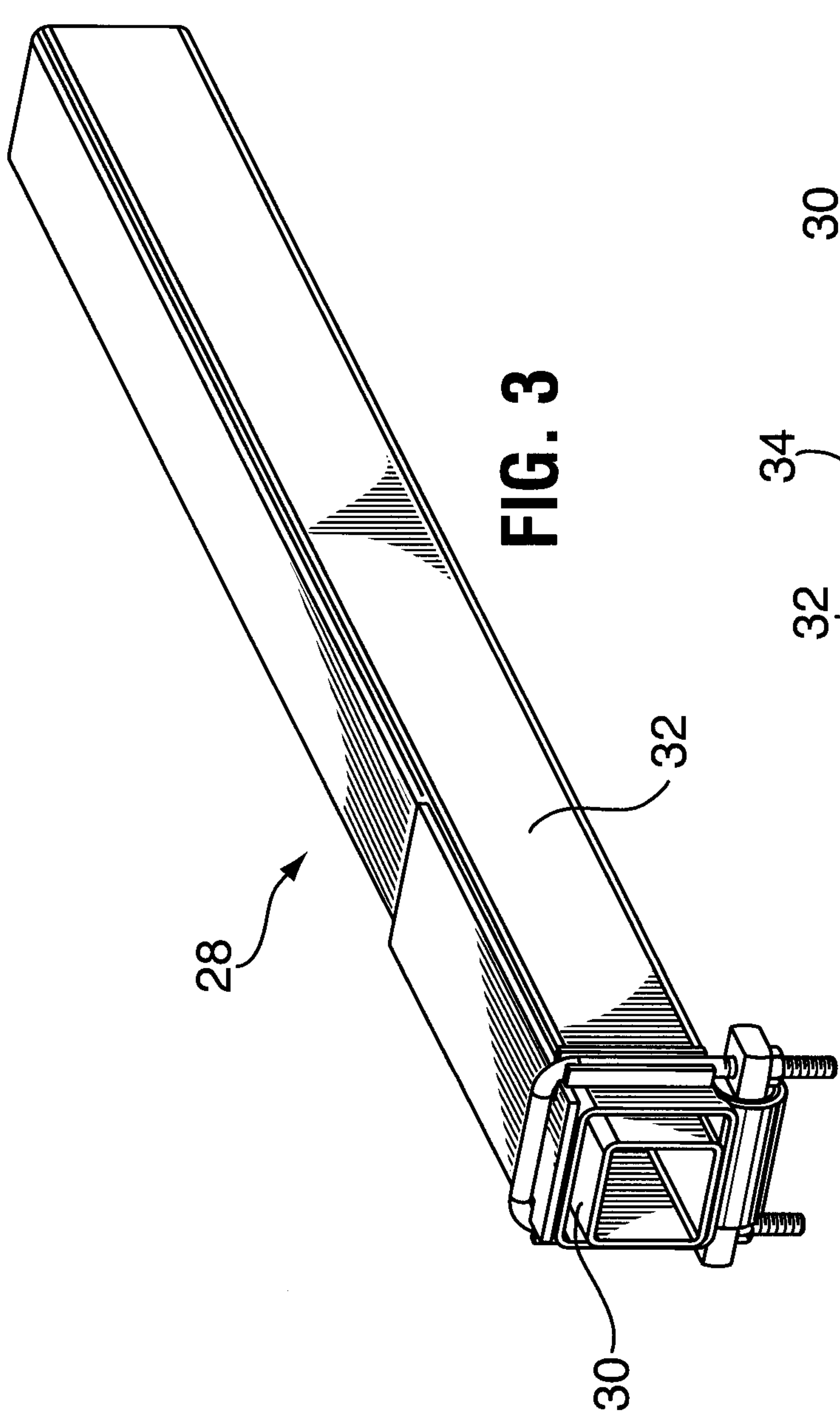
a plurality of expandable trailers according to claim 18; and

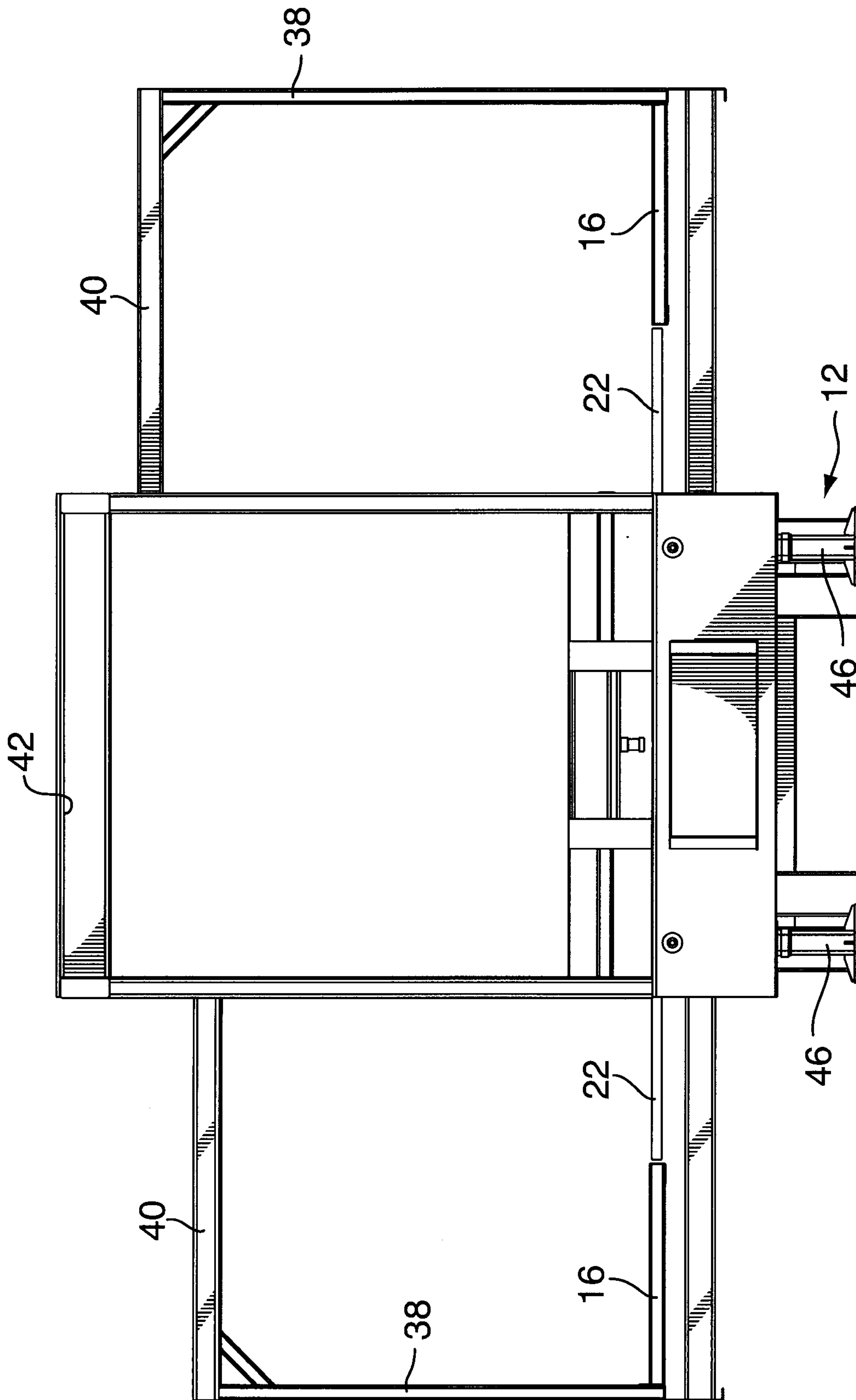
at least one coupling means for connecting each one of the plurality of expandable trailers to adjacent expandable trailers,

wherein respective levelling jacks of each of the plurality of expandable trailers are adapted to horizontally align respective floor sections of coupled adjacent expandable trailers.

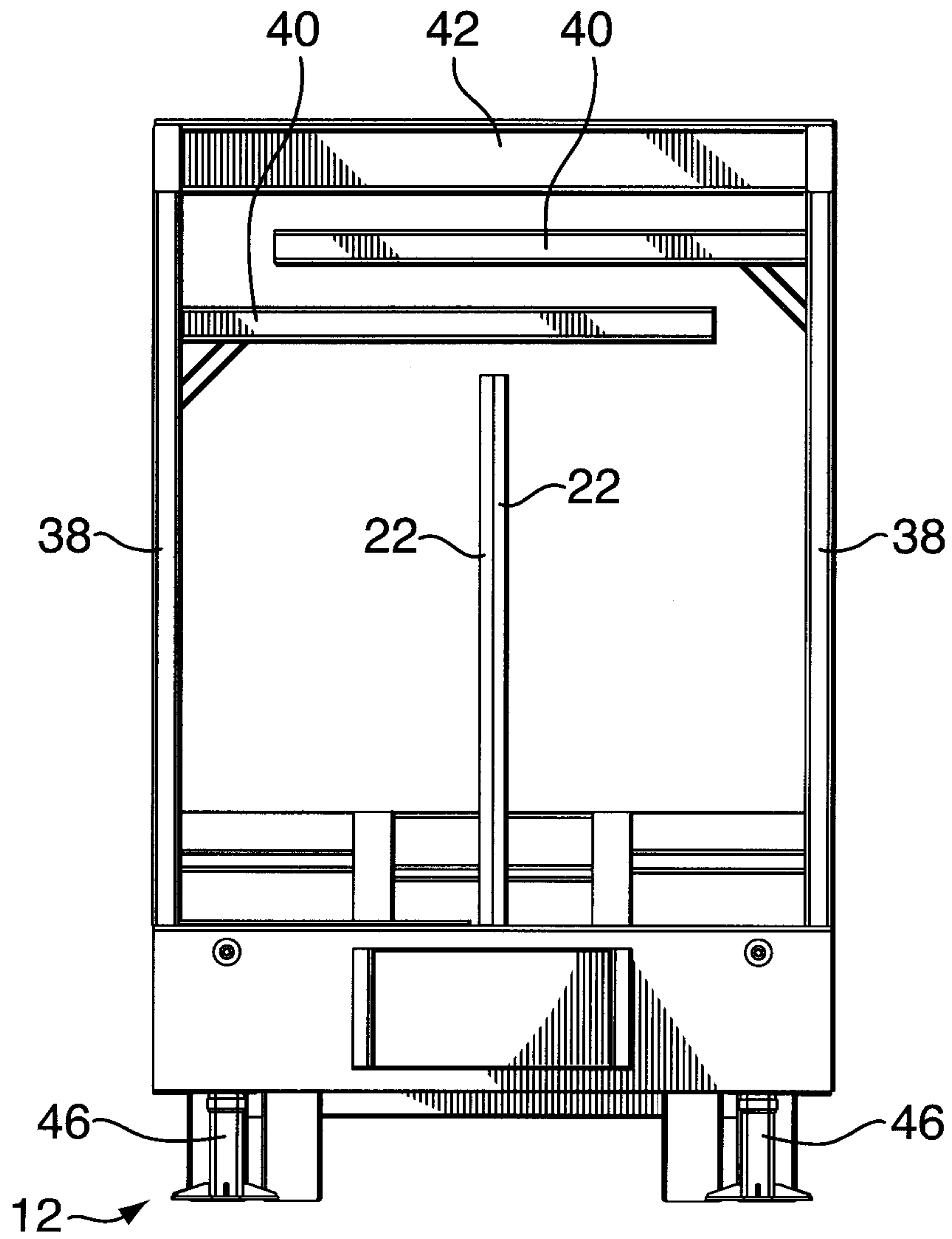








**FIG. 6**



**FIG. 7**

