

AN EXPANDABLE TRANSPORTABLE ENCLOSURE

Background of the Invention

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This invention relates to an expandable transportable enclosure.

Description of the Prior Art

10 Reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that the prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

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Transportable enclosures are typically used in communication, medical or logistical applications where a facility is required in a remote location. Some of these enclosures or shelters are expandable to provide a larger useable volume. Accordingly, shelters containing preconfigured electronic systems (e.g., command, control and communications (C3) systems),
20 or for use in providing mobile field hospitals (i.e., medical treatment centers) are known in the art.

Known expandable shelters are generally self-contained boxes with rigid flooring structures that nest within a central or main section of the shelter. This design results in the floors of the
25 expandable boxes not being on the same level, creating steps within the shelter during its deployment. The uneven flooring within the shelter not only poses tripping hazard, but it also makes the movement of furniture, stores, stationery and equipment difficult. Another consequence of the known shelter designs is that the expandable sections cannot be made to be

the substantially the same volume of the central section of the shelter system. This results in non-optimal use of interior space within the expandable shelter.

5 Furthermore, the prior art box nesting design of the expandable sections prevents the permanent mounting of equipment on the floor of the central section of the Expandable Shelter during transport. Consequently, equipment designated for installation on the floor of the central section of such an expandable shelter must be stored elsewhere within the central section of the shelter and then redeployed to the floor of the central station after the expandable section(s) have been moved to the required deployment positions. This requires
10 movement of typically sensitive equipment within the shelter after deployment in the field, which is highly undesirable in demanding applications such as mobile C3 applications and mobile field hospital applications.

Summary of the Present Invention

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According to an aspect of the invention, there is provided an expandable transportable enclosure having:

a central portion forming a box-like structure with a floor linked to a roof via sides;

at least one framework displaceable between a transport position, in which the
20 framework is inside the central portion, and a deployed position, in which the framework protrudes from the side of the central portion, said framework including:

a main panel and two side portions slidably arranged in relation to the central portion by means of a telescoping track, the main panel lying flush with the side of the central portion when in the transport position; and

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a floor assembly having at least two floor panels able to be concertinaed to enlarge or reduce the floor when the framework is displaced between the deployed or transport positions, respectively, the floor panels supported level with the floor in the deployed position; and

a deployment mechanism configured to displace the framework between the deployed and transport positions.

5 Typically, the side of the central portion is hingedly connected to the roof so that the side encloses the framework inside the central portion when in the transport position, and the side hinges to form a roof over the framework when in the deployed position.

10 However, alternatively, the framework includes a roof assembly having at least two roof panels able to be concertinaed to enlarge or reduce the roof when the framework is displaced between the deployed or transport positions, respectively.

Typically, the side portions of the framework include bearings configured to facilitate deployment of the framework and to support said framework in the deployed position.

15 Typically, the telescoping track includes an outer C-shaped track fast to an underside of the floor, and an inner track lying inside the outer track, the inner track having a stop plate at an end thereof to prevent the inner track from sliding entirely out of the outer track.

Typically, the deployment mechanism includes:

20 an electric motor;
a drive shaft operatively driven by the electric motor;
a sprocket and chain arrangement driven by the drive shaft, the chain arrangement configured to engage the interlink plate so that the inner track is slidable in relation to the outer track upon actuation of the electric motor.

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Typically, the floor assembly panels include a hinge joint and form a rigid floor when deployed, thereby allowing the floor assembly to be supported at either end via hinges attached to the floor and the respective framework.

Typically, the enclosure includes supports for supporting the framework when in the deployed position.

Typically, the enclosure is fitted onto a truck.

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Brief Description of the Drawings

An example of the present invention will now be described with reference to the accompanying drawings, in which: -

10 Figure 1 shows a left-side perspective view of a vehicle with an expandable transportable enclosure in a transport position;

Figure 2 shows a right-side perspective view of a vehicle with an expandable transportable enclosure in a transport position;

15 Figure 3 shows a cross-sectional diagrammatic representation of the enclosure of Figures 1 and 2 in the transport position;

Figures 4 and 5 show a cross-sectional diagrammatic representation of the enclosure with a framework moving from the transport to a deployed position;

Figure 6 shows a cross-sectional diagrammatic representation of the enclosure with the framework in the deployed position;

20 Figure 7 shows a diagrammatic perspective view of the framework;

Figure 8 shows a diagrammatic perspective view of the framework between the transport and deployed positions;

Figure 9 shows a diagrammatic perspective view of the framework in the deployed position;

25 Figure 10 shows a closer perspective view of an example of a telescoping track and deployment mechanism of the enclosure;

Figure 11 shows a diagrammatic perspective view of a floor assembly of the framework in the transport position;

Figure 12 shows a front diagrammatic view of the floor assembly in the transport position;

Figure 13 shows front diagrammatic view of the floor assembly between the transport and deployed positions;

5 Figure 14 shows front diagrammatic view of the floor assembly in the deployed position;

Figure 15 shows a diagrammatic perspective view of the floor assembly in the deployed position;

10 Figure 16 shows a left-side perspective view of the vehicle with the framework in the deployed position;

Figure 17 shows a cross-sectional diagrammatic representation of a further example of an enclosure having two frameworks deployed from either side; and

Figure 18 shows a left-side perspective view of the vehicle having an enclosure with two frameworks deployed from either side.

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Detailed Description of Preferred Examples

With reference now to the accompanying drawings, Figures 1 and 2 show a vehicle 36, being a truck in this example, fitted with an example of an expandable transportable enclosure 10. The enclosure 10 is in the form of a box-like structure 14 having a central portion 12 with a floor (shown in Figure 3) linked to a roof 18 via sides 20. The enclosure 10 also includes at least one framework 22. In the current example, the enclosure 10 includes two frameworks 22.1 and 22.2 located on either side of the enclosure 10, as shown.

25 Each framework 22 is displaceable between a transport position, in which the framework 22 is inside the central portion 12 (shown in Figures 1 to 3), and a deployed position, in which the framework 22 protrudes from the side of the central portion 12 (shown in Figures 6, 17 and 18). It is to be appreciated that further examples may include a different number of frameworks, the implementation of which would be understood by the skilled person in light

of this description. However, for the sake of simplicity, the current dual-framework example will be described with reference to the accompanying drawings, where like reference numerals indicate like components of each respective framework.

5 Referring now to Figure 3, each framework 22 includes a main panel 24 and two side portions 26 slidably arranged on the floor 16 of the central portion 12 by means of a telescoping track 28 and bearings 40. It is to be appreciated that only a single side portion 26 of each framework 22.1 and 22.2 is visible. Side portion 26.1 of framework 22.1 includes a window or door aperture 27 through which side portion 26.2 of framework 22.2 is visible. The main panel 24
10 of each respective framework lies substantially flush with the side 20 of the central portion 12 when each framework 22 is in the transport position.

Each framework 22 also includes a floor assembly 30 having at least two floor panels 32, with the floor panels 32 able to be concertinaed to enlarge or reduce the floor 16 of the enclosure 10
15 when the framework 22 is displaced between the deployed or transport positions, respectively. The working hereof will be described in further detail below. The enclosure 10 also includes a deployment mechanism 34 configured to displace the respective frameworks 22 between the deployed and transport positions.

20 In Figure 3, the frameworks 22 are in the transport position lying inside the enclosure 10 with the main panels 24 lying flush with, and enclosed by, the sides 20 of the central portion 12. In the current example, the sides 20 of the central portion 12 are hingedly connected to the roof 18 so that the sides 20 enclose the frameworks 22 inside the central portion 12 when in the transport position. In addition, the floor panels 32 are in an upright position next to the main
25 panel 24 and does not take up space on the floor 16 of the central portion 12.

Referring now to Figures 4 and 5 of the drawings, there is shown the framework 22.1 being moved from the transport position to the deployed position. The side 20.1 hinges to form a roof over the framework 22.1,, whilst the floor panels 32.1 are shown to concertina as the

framework 22.1 moves from the transport position towards the deployed position. As shown, the side portions 26 of the framework 22.1 include the bearings 40 on the upper part of the side portions 26, and bearings (not shown) on a lower part of the side portions 26, which are configured to facilitate deployment of the frameworks 22 and to support the frameworks 22 during deployment, and in the deployed position. Further support can be provided by supports 62 when in the deployed position, as will be described in more detail below.

It will be appreciated that when the side 20 hinges to form the roof over the framework 22 in deployed position, the weight of the side 20 can secure the side 20 onto and seal the gaps between the main panel 24 and the side portions 26 of the framework 22, thereby eliminating the need to manually secure the side 20 for example using latches or any other mechanical locking devices.

It is to be appreciated that, in another example, the framework 22 may include a roof assembly (not shown) having at least two roof panels supported by a second telescoping track and able to be concertinaed to enlarge or reduce the roof when the framework is displaced between the deployed or transport positions, respectively. In such an example, the roof assembly would resemble the operation of the floor assembly 30, described above, which would not require the side 20 to hinge and form a roof for the framework 22.

In one example, the telescoping track 28 includes an outer C-shaped track fast to an underside of the floor 16 of the enclosure 10, and an inner track lying inside the outer track. As described in more detail with reference to Figure 7 to 10 below, the inner track 46 typically has a stop plate (not shown for clarity) at an end thereof to prevent the inner track 46 from sliding entirely out of the outer track 48.

In the current example, the deployment mechanism 34 includes an electric motor 42, a drive shaft 50 operatively driven by the electric motor 42, and a sprocket and chain arrangement 52 driven by the drive shaft 50, the chain arrangement 52 configured to engage the interlink plate

44 so that the inner track 46 is slidable in relation to the outer track 48 upon actuation of the electric motor 42.

Figure 6 shows the framework 22.1 in the deployed position. The floor panels 32.1 are
5 completely extended and supported by the framework 22.1, and the floor 16, as will be described in more detail below. The side 20.1 of the central portion 12 forms a roof for the framework 22.1. It is to be appreciated that the floor panels 32.1 are on the same level as the floor 16 of the central portion 12 when deployed, whilst not taking up space of the floor 16 of the central portion 12 when in the transport position. This allows the floor 16 to be used during
10 the transport position, e.g. equipment can be mounted thereto, or the like.

Figures 7 to 9 show a diagrammatic view of the framework 22.1 moving from the transport position to the deployed position. As can be seen, the main panel 24.1, along with the floor panels 32 of the floor assembly 30, are supported by the framework 22.1, which is in turn
15 supported by the side portions 26.1. Bearings 40.1 on the side portions 26.1 also interact with the sides and roof 18 of the central portion 12, with the lower bearing (not shown) interacting with the sides and floor 16, to thereby support the framework 22.1. In the current example, the telescoping track 28 includes the inner track 46 slidably received inside the outer track 48. The deployment mechanism 34 consisting of electric motor 42, along with the driveshaft 50 and
20 sprocket and chain arrangement 52, allows the framework 22.1 to be displaced between the transport and deployment positions.

It is to be appreciated that the configuration of the main panel 24, along with the floor assembly 30 and the position of the side portions 26 allows the framework 22 to be stored
25 inside the central portion 12 without requiring a lot of floor space. As such, the floor 16 of the central portion 12 can be used to store and/or mount equipment.

Figure 10 shows a closer view of the deployment mechanism 34. The chain and sprocket arrangement 52 includes a chain or similar link 54 driven by a suitable sprocket 56 via the

electric motor 42. The chain 54 is positioned inside the C-shaped portion of the tracks. The chain 54 engages with the interlink plate 44 of the inner track so that actuation of the motor 42, depending on a rotational direction of the motor 42, causes the framework 22.1 to move into the transport or storage positions. A stop plate is also used to ensure that the inner track
5 46 does not slide completely out of the outer track 48. Typically, the deployment mechanism 34 includes suitable electronic controls to facilitate the actuation thereof. For example, electronic switches and/or sensors may be used to monitor a position of the framework 22.1 and the relative positions of the track portions 46 and 48 to ensure that the motor 42 operates as required.

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Figure 11 to 15 show examples of the floor assembly 30 in different positions. In this example, the floor assembly 30 includes two panels 32 able to concertina, as shown. The floor assembly 30 typically includes hinge connections 60 via which the panels 32 are hingedly attached to the floor 16 of the central portion 12 and the main panel 24 of the respective framework 22.
15 The floor assembly 30 also includes a suitable hinge joint 58 to allow the panels 32 to lie flat when in the deployed position.

It is to be appreciated that the two panels 32 are designed at the ends near to the hinge joint 58, to form a rigid floor when deployed or fully unfolded, thereby allowing the floor assembly 30
20 to be supported solely via the hinges 60, without additional support being required.

Figure 16 shows the vehicle 36 with the framework 22.1 in the deployed position. The enclosure 10 typically includes suitable supports 62 to support the enclosure and/or the respective frameworks 22 when in the deployed position. Similarly, Figures 17 and 18 show
25 the enclosure 10 having both of the frameworks 22.1 and 22.2 in the deployed position. In this example, the supports 62 are housed within the main panels 24 and are able to be extended therefrom according to requirements. The supports 62 can be used to stabilise the frameworks 22 on uneven terrain, or the like.

It is to be appreciated that the enclosure is generally used along with a suitable vehicle, such as a truck 36. Accordingly, the enclosure 10 typically includes attachment means (not shown) for fastening the enclosure 10 to the vehicle 26.

- 5 The central portion 12 of the enclosure 10 is generally made of a steel construction and may include appropriate insulation. Similarly, the frameworks 22 may be made from an insulated sandwich construction, typically with aluminium fittings. It is to be appreciated that the above example includes three distinct modes of configuration, namely the transport position in which the frameworks 22 are completely nested within the central portion 12; a single side
10 deployment in which only one framework 22 is deployed, and a double side deployment in which both of the frameworks 22 are deployed, as shown in Figures 17 and 18.

The current arrangement provides for an easily-transportable enclosure able to be rapidly deployed where required. The enclosure provides for an even floor surface when in the
15 deployed position along with the ability to mount equipment to the floor of the central portion without requiring removal of such equipment during deployment.

Many modifications or variations will be apparent to those skilled in the art without departing from the scope of the present invention. All such variations and modifications should be
20 considered to fall within the spirit and scope of the invention broadly appearing and described in more detail herein.

It is to be appreciated that reference to "one example" or "an example" of the invention is not made in an exclusive sense. Accordingly, one example may exemplify certain aspects of the
25 invention, whilst other aspects are exemplified in a different example. These examples are intended to assist the skilled person in performing the invention and are not intended to limit the overall scope of the invention in any way unless the context clearly indicates otherwise.

Features that are common to the art are not explained in any detail as they are deemed to be easily understood by the skilled person. Similarly, throughout this specification, the term "comprising" and its grammatical equivalents shall be taken to have an inclusive meaning, unless the context of use clearly indicates otherwise.

- 12 -

CLAIMS

1. An expandable transportable enclosure having:
 - a central portion forming a box-like structure with a floor linked to a roof via sides;
 - 5 at least one framework displaceable between a transport position, in which the framework is inside the central portion, and a deployed position, in which the framework protrudes from the side of the central portion, said framework including:
 - a main panel and two side portions slidably arranged in relation to the
 - central portion, the main panel lying flush with the side of the central portion when
 - 10 in the transport position and wherein the side portions of the framework includes bearings configured to facilitate deployment of the framework and to support said framework in the deployed position; and
 - a floor assembly having at least two floor panels that concertina to enlarge
 - or reduce the floor as the framework is displaced between the deployed or transport
 - 15 positions, respectively, the floor panels supported level with the floor in the deployed position; and
 - a deployment mechanism configured including a telescoping track to displace the framework between the deployed and transport positions.
- 20 2. The enclosure of claim 1, wherein the side of the central portion is hingedly connected to the roof so that the side encloses the framework inside the central portion when in the transport position, and the side hinges to form a roof over the framework when in the deployed position.
- 25 3. The enclosure of claim 1, wherein the framework includes a roof assembly having at least two roof panels supported by a second telescoping track and able to be concertinaed to enlarge or reduce the roof when the framework is displaced between the deployed or transport positions, respectively.
- 30 4. The enclosure of any one of claims 1 to 3, wherein the telescoping track includes an outer C-shaped track fast to an underside of the floor, and an inner track lying

inside the outer track, the inner track having a stop plate at an end thereof to prevent the inner track from sliding entirely out of the outer track.

5. The enclosure of claims 4, wherein the deployment mechanism includes:
5 an electric motor;
a drive shaft operatively driven by the electric motor;
a sprocket and chain arrangement driven by the drive shaft, the chain arrangement
configured to engage an interlink plate so that the inner track is slidable in relation to the
outer track upon actuation of the electric motor.
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6. The enclosure of any one of claims 1 to 5, wherein the floor assembly panels
include a hinge joint and form a rigid floor when deployed, thereby allowing the floor
assembly to be supported at either end via hinges attached to the floor and the
respective framework.
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7. The enclosure of any one of claims 1 to 6, which includes supports for supporting
the framework when in the deployed position.
8. The enclosure of any one of claims 1 to 7, which is fitted onto a truck.

ABSTRACT

Provided is an expandable transportable enclosure having a central portion forming a box-like structure with a floor linked to a roof via sides. The enclosure also includes at least one framework displaceable between a transport position, in which the framework is inside the central portion, and a deployed position, in which the framework protrudes from the side of the central portion. The framework includes a main panel and two side portions slidably arranged in relation to the central portion by means of a telescoping track, the main panel lying flush with the side of the central portion when in the transport position, as well as a floor assembly having at least two floor panels able to be concertinaed to enlarge or reduce the floor when the framework is displaced between the deployed or transport positions, respectively, the floor panels supported level with the floor in the deployed position. The enclosure further includes a deployment mechanism configured to displace the framework between the deployed and transport positions.

[figure recommended to accompany abstract: Figure 5]