









FIG. 4

EXTENDIBLE BUILDING STRUCTURE

[0001] The invention to which this application relates is a building facility which can be moved between an in-use position and a storage position thereby allowing the movement of the same to the in-use position upon the occurrence of a particular event. The invention is particularly, although not necessarily exclusively, related to the provision of a building facility for use for medical purposes such as for example upon the occurrence of a major incident such as a contamination of numbers of people.

[0002] The occurrence of incidents which affect a plurality of people in terms of the requirements of, for example, medical treatment, are relatively rare. However, when they do occur, if large numbers of people are affected, the normal building facilities of, for example, hospitals can quickly become full, and the hospitals may not always have the required facilities immediately available within the buildings. This has previously been recognised such that, for example, if the incident involves the contamination of a number of persons with a hazardous substance, it is known to provide a decontamination unit as part of a vehicle and the vehicle can then be provided at the incident, or more preferably, at the hospital to which persons are being taken following the incident. However, contamination units provided as part of vehicles, are in themselves problematic in that it can be difficult to arrange for the vehicle to reach the required site, it can be difficult to position the vehicles at the required location and it is still possible for a person who has been decontaminated in the decontamination unit, to then leave that unit and once again become contaminated prior to entering the hospital for further treatment. Furthermore, the time taken to position and then prepare the decontamination unit can be important time lost in the effective treatment of patients.

[0003] The aim of the present invention is to provide a building structure which can be selectively positioned between a storage location when not in use and an in-use position for use.

[0004] In one aspect of the invention, there is provided a building structure, said building structure having at least a first opening to allow entry into the interior of the structure, said structure formed by a frame, and sheet material which forms the side walls and roof of the structure and wherein said structure is selectively movable between erected and collapsed conditions to allow the building structure to be moved between an in-use position where the same is erected and a storage position when the structure is at least partially collapsed.

[0005] In one embodiment, the frame includes a plurality of members, at least some of which are mutually engaged to be pivotable thereby allowing, by the respective pivoting movement of the frame members, the movement of the frame between the erected and collapsed condition. The sheet material is attached at various locations to the frame to thereby cause the sheet material to follow the movement of the frame.

[0006] In one embodiment, the opening or openings into the interior of the building structure, allow the entry and exit of persons to and from the same.

[0007] Preferably, the openings which face externally of the building structure, can themselves be enclosed by security shutters thereby providing additional security for the building structure when the same is not in use.

[0008] In one embodiment, the building structure includes at least one opening which allows access into a further building, thereby providing a path for the flow of movement for persons so that persons can enter the structure and pass through the structure into a further building and therefore do not have to re-enter the external environment between the building structure and the said further building.

[0009] In one embodiment, the building structure is attached at one face thereof, to the further building and therefore forms part thereof. In one embodiment, when the building structure is in a collapsed condition, the same protrudes from the said further building wall but to less of an extent than when the structure is extended to the in-use position. Alternatively, the said building structure, in the storage position, lies within a cavity in said further building and only extends from the further building when it is moved to the in-use position.

[0010] Typically, the building structure includes one or a series of facilities provided within the same for use when the building structure is in an in-use position. In one embodiment, the said facilities can be mounted within the building structure once the same has been moved to the in-use position but more preferably, the said facilities are housed within the building structure at all times. In one embodiment the facilities can move with the structure between the storage and in-use positions so that the same are available for use almost immediately upon movement of the building structure to the in-use position.

[0011] In one embodiment, the facilities which are provided are those which are required for decontamination of persons and the building structure is provided to allow the treatment of persons who can "self present". These persons may be those who have been involved in an incident such as a crowd disaster or a terrorist incident, may have been injured and/or contaminated but are still able to walk and perhaps require treatment for shock or the like within the further building to which the building structure is connected. In the case of contamination the building structure can allow the decontamination of the person before they enter the further building for treatment.

[0012] In a further embodiment of the invention, the building structure is provided as a self contained unit which can be selectively positioned adjacent to a temporary building and this may be of particular use for example in the setting up of field hospitals in which the said building structure can be moved into position and extended to an in-use position as and when required.

[0013] In one embodiment at least the frame is formed by a series of cells which can be selectively inflated to allow movement of the structure to the in-use condition.

[0014] In a further aspect of the invention there is provided a structure which is selectively movable between an at least partially collapsed condition for storage and an extended, in-use position, said structure comprising sheet material and a frame, said structure movable between storage and in-use positions and wherein said structure is connected to a further building such that when in the in-use position the structure forms an additional area of the building through which persons pass prior to entering the further building.

[0015] In one embodiment, the structure includes a series of inflatable cells, said cells are spaced apart to form a frame with sheet material lying intermediate said respective cells so as to form an extended structure once the cells are inflated.

[0016] In one embodiment, a series of the cells are formed as arch structures and a further series of cells formed as relatively linear beams, said beams connected with and spaced between adjacent arches.

[0017] In one embodiment, the sheet material supported by said inflatable cells is attached to said cells so as to allow the sheet material to unfold and follow the movement of the cells as they are inflated.

[0018] In one embodiment, the inflation of the cells is created by connection with a pneumatic air supply, or other inflation means and it is preferred that the gas or air supply and the inflation means are of a type so as to allow rapid inflation and hence deployment of the structure to the extended in-use position.

[0019] It is envisaged that the structure will be of particular use in response to an emergency situation such as, for example, a need for decontamination of persons, said decontamination occurring as described in the Applicant's co-pending patent application.

[0020] Specific embodiments of the invention will now be described with reference to the accompanying drawings, wherein:—

[0021] FIG. 1 illustrates a building structure in accordance with one embodiment of the invention, in a collapsed storage position;

[0022] FIG. 2 illustrates the structure of FIG. 1 in an extended position;

[0023] FIG. 3 illustrates the structure of FIG. 2 with facilities provided; and

[0024] FIG. 4 illustrates a perspective view of a structure in an extended in-use condition in a further embodiment of the invention.

[0025] Referring now to the drawings, in FIGS. 2 and 3 the interiors of the same are shown for illustrative purposes but it should be appreciated that the interior of the building structure would not necessarily be viewable from the outside in normal use.

[0026] Referring to the drawings, the building structure comprises a roof 2, side walls 4, and in this case, a front end wall 6 and a rear wall which in this embodiment is formed by a further building 8 to which the said building structure of the invention is attached. The building structure includes a frame 10 which in this embodiment is formed from a series of members, said members interconnected, 11, to be pivotally movable along each side wall in a scissor-like arrangement and to allow the selective extension and retraction of the side walls.

[0027] In this embodiment, the pivotal movement allows the building structure to be moved between the storage condition, in which the same is held within a permanent "casing" 14 provided as part of the further building shown in FIG. 1, and the extended in-use condition shown in FIG. 3. This can be achieved by the exertion of manual force in the direction indicated by arrow 12 or alternatively, powered movement means can be connected to cause the movement to the in-use condition and also, in the reverse, to the storage condition.

[0028] If required, rollers or guides can be provided at the base of the side walls so as to allow the improved movement between the storage and in-use conditions as the rollers or guides move along the surface 16.

[0029] The frame supports, and is connected to, sheet material which follows the movement of the frame and thereby causes the formation of the side walls and roof. The sheet material can be of any suitable form to suit particular uses and

in one embodiment may form an effective sealed and controlled environment within the building structure.

[0030] The front wall 6 is provided with one or more openings 18 and these openings are in turn provided to lead from a general opening which can be selectively sealed off by the provision of a shutter 20 mounted above the general opening as shown in FIG. 1. The shutter is typically provided in the closed position, as shown in FIG. 1, when the building structure is in the storage condition in the casing 14 and thereby provides additional security. When the shutter is opened, the structure can be extended and entry can be gained into the interior of the building structure, so that the interior of the structure can be used. Furthermore, openings 22 are provided into the further building 8 at the rear wall, thereby allowing persons to pass through the building structure and into the said further building without having to re-enter the external environment.

[0031] There are typically also a range of facilities provided within the building structure and the use of these will now be described with reference to an example of a particular incident.

[0032] When an incident has occurred such as a major casualty causing incident, if the structure is provided at a hospital, the shutter 20 is raised and the structure frame and sheet material are moved in the direction of arrow 12 to the position shown in FIGS. 2 and 3. When in the in-use position the interior of the structure can be configured as required. In this case opening 18 leads to a male decontamination area and opening 18 leads to the female equivalent. In both areas the persons who present themselves at the respective openings pass into a de-robing area 26 and then into a showering area 28 and then into an area 30 in which further testing and clean clothing can be provided.

[0033] The persons can then pass from the building structure through the openings 22 into the main building for further treatment as required and without having to enter the external environment again.

[0034] The structure 102 in the second embodiment of FIG. 4 comprises a series of inflatable cells which form the frame of the structure and the cells can be split into two groups, a first group 104 of cells which, when inflated, take an arch form, and a series of inflatable cells 106 which, when inflated take the form of linear beams. The inflatable cells 106 are located with respect to the cells 104 so as to provide additional support and strength of the structure between the adjacent arch shaped cells 104. Sheet material 108 is suspended by the inflatable cells, when they are inflated, so as to form the walls of the structure in the extended in-use position and a floor material 110 can also be provided. Typically, the sheet material 108 is welded to the arches 104, beams 106 and the floor 110. It is also shown how at one end of the structure, there is provided an opening acting as an entrance to a door 112 of a further building, typically permanent structure 114 such that when the structure is in the extended in-use position, access can be gained between the temporary structure formed in accordance with the invention and the permanent structure 114.

[0035] There is therefore provided an inflatable structure 102 which is designed to rapidly extend from the wall 116 upon which it is mounted to create a series of enclosed chambers 118 which can be used for a variety of uses such as, for example, controlled access and decontamination facilities for casualties.

[0036] In the example shown, the inflation of the cells will have the effect of propelling the structure from its deflated mode in which the same is stored in a flat-packed form against the wall **116** of the permanent structure **114** typically inside a suitable protective cabinet (not shown).

[0037] The sheet material used to form the cells and the walls of the structure can be of any suitable material such as to be fire retardant, translucent or to have other characteristics as required.

[0038] The present invention therefore provides an effective manner of providing a temporary structure, particularly useful as emergency structures and allowing the effective treatment or pre-treatment of relatively large numbers of people quickly and efficiently without having to extend main buildings on a permanent basis for relatively rare events.

1. A building structure, said building structure having at least a first opening to allow entry into the interior of the structure, said structure formed by a frame, and sheet material which forms the side walls and roof of the structure and wherein said structure is selectively movable between erected and collapsed conditions to allow the building structure to be moved between an in-use position where the structure is erected and a storage position where the structure is at least partially collapsed.

2. A structure according to claim **1** wherein the frame includes a plurality of members, at least some of which are mutually engaged to be pivotable.

3. A structure according to claim **1** wherein the sheet material is attached at various locations to the frame to thereby cause the sheet material to follow the movement of the frame.

4. A structure according to claim **1** wherein the opening or openings into the interior of the building structure, allow the entry and exit of persons to and from the structure.

5. A structure according to claim **1** wherein openings which face externally of the building structure, can be closed by security shutters.

6. A structure according to claim **1** wherein the building structure includes at least one opening which allows access into a further building.

7. A structure according to claim **6** wherein persons can move from the structure into the further building without having to enter the external environment.

8. A structure according to claim **1** wherein the building structure is attached at one face thereof, to a further building.

9. A structure according to claim **8** wherein when the building structure is in a collapsed condition, the same protrudes from the said further building wall but to less an extent than when the structure is extended to the in-use position.

10. A structure according to claim **8** wherein the said building structure, in the storage position, lies within a cavity in

said further building and only extends from further building when moved to the in-use position.

11. A structure according to claim **1** wherein the building structure includes one or a series of facilities provided within the same for use when the building structure is in an in-use position.

12. A structure according to claim **11** wherein the said facilities move along with the building structure between the storage and in-use positions so that the same are available for use almost immediately upon movement of the building structure to the in-use position.

13. A structure according to claim **11** wherein the facilities are provided for decontamination of persons.

14. A structure according to claim **1** wherein the same is provided to allow the treatment of persons who are presented at the structure and who may then pass into the further building for medical treatment.

15. A structure according to claim **14** wherein the persons are decontaminated in the structure prior to entering the further building for treatment.

16. A structure according to claim **1** wherein the same is a self contained unit which can be selectively positioned adjacent to a further building.

17. A structure according to claim **1** wherein the frame is formed of a series of cells which are selectively inflatable.

18. A structure according to any claim **1** wherein the same is attached in a further building in the form of a hospital.

19. A structure which is selectively movable between an at least partially collapsed condition for storage and an extended, in-use position, said structure comprising sheet material and a frame, said structure movable between storage and in-use positions, and wherein said structure is erected to a further building such that when in the in-use position the structure forms an additional area of the building through which persons pass prior to entering the further building.

20. A structure according to claim **19** wherein the structure includes a series of inflatable cells spaced apart to form the frame with sheet material lying intermediate and respective cells so as to form an extended structure once the cells are inflated.

21. A structure according to claim **19** wherein a series of the cells are formed as arch structures and a further series of cells are formed as relatively linear beams, said beams connected with and spaced between adjacent arches.

22. A structure according to claim **19** wherein the sheet material is supported by said inflatable cells by being attached to said cells so as to allow the sheet material to unfold and follow the movement of the cells as they are inflated.

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