ACTUATOR-FREE RESILIENT PASSENGER BOARDING BRIDGE CANOPY

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ABSTRACT
A passenger boarding bridge for use by passengers in an airport terminal for embarking to and disembarking from a parked aircraft is provided with a resilient canopy that conforms to the shape of the outside surface of a parked aircraft without the aid of any external driving assembly or linkages directly attached thereto. The resilient canopy is useful with a wide range of airplanes sizes and, in contrast to existing steel framed weather shielding bellows, the canopy is particularly suited to the rapidly changing curvature of smaller planes and significantly inexpensive to construct.

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BACKGROUND OF THE INVENTION

[0001] Field of the Invention

[0002] This invention relates to passenger boarding bridges for use by passengers in an airport terminal for embarking to and disembarking from a parked aircraft without exposing them to weather and ambient conditions. More specifically, this invention is directed to a resilient canopy for use in boarding bridges configured to conform to the shape of the outside surface of a parked aircraft without the aid of any external driving assembly directly attached thereto.

[0003] State of the Art

[0004] Passenger boarding bridges are systems commonly used in airports throughout the world to provide a passageway for passengers between an airport terminal and a parked aircraft. These bridges are usually adapted for servicing a wide range of aircraft, ranging in size from one-hundred-passenger airplanes (such as, for example, a DC-9 or MD-80) to large, wide-body, intercontinental aircraft (such as, for example, the Boeing 747 or 777, DC-10, MD-11, and Airbus 340). FIG. 1 illustrates the main components of a prior art boarding bridge shown in a retracted and elevated position.

[0005] Normally a passenger boarding bridge is connected to the airport terminal at its inboard end by a rotunda pivotally mounted on top of a sustaining column. Connected to the rotunda are a first tunnel and a set of telescoping tunnels, wherein the first tunnel is free to rotate vertically and allows the telescoping tunnel sections to move up or down in order to align the boarding bridge with the aircraft passenger door. The up and down motion or elevation adjustment of a passenger boarding bridge may be provided by an elevating structure composed of a set of telescoping members driven by several means, which may include a set of motors driving ball screw actuators to provide the desired adjustment.

[0006] A bubble section is located at the outermost end of the tunnel, including a cab, a weather shielding bellows, which is the part of the bridge that makes the most contact with the airplane, and a bumper. The cab, which serves as the outermost entrance or exit to the bridge, rotates on the bubble section in order to allow the correct positioning of the bridge with respect to the parked aircraft. Wheels, which are installed in the elevating structures and typically driven by electric motors, provide the means to move the bridge close to the airplane during boarding and away from it once the airplane is boarded and ready to depart. The foremost or leading element of the cab is the bumper, which will be positioned right up to and sometimes against or in contact with the aircraft being serviced.

[0007] The weather shielding bellows is an expensive and complex steel frame supported above a floor section that includes the bumper. Weather shielding bellows are expensive items in a passenger boarding bridge because the driving mechanism used to deploy and retract them during operation has to be configured to sense the load applied to the airplane when the bellows are deployed and to adjust deployment in order to avoid unwanted forces applied by the deployed bellows to the parked aircraft. Such is the case when the bellows are first deployed and properly adjusted to unload an arriving aircraft, but later it becomes overstretched, applying unwanted forces to the aircraft, once the empty airplane rises against the bellows as the total weight of the passengers is removed.

[0008] Another problem with existing passenger boarding bridges is their inability to service small commuter aircraft, particularly because these steel frame bellows do not conform well to the rapidly changing curvature of smaller planes. Thus, the inherent problem of weather shielding bellows, i.e., high cost, high maintenance, and improper fitting to smaller planes, remains unsolved to date.

BRIEF SUMMARY OF THE INVENTION

[0009] The present invention is directed to a passenger boarding bridge for use by passengers in an airport terminal for embarking to and disembarking from a parked aircraft. The bridge cab is provided with a resilient canopy that conforms to the outside surface shape of a parked aircraft without the aid of any external driving assembly directly attached thereto. The resilient canopy invention is useful with a wide range of airplanes sizes. In contrast to the existing steel framed weather shielding bellows of the prior art, the resilient canopy is also suited to the rapidly changing curvature of the outside surface of smaller planes and significantly inexpensive to construct.

[0010] The resilient canopy may be made as an integral structure or in the form of interconnected horizontal and vertical sections attached to the cab of a passenger boarding bridge. These sections may have resilient foam structural members wrapped with foam sections attached thereto, defining the overall desired shape of the resilient canopy. A plurality of covers of different materials may be provided to give additional structural strength as well as protection against external weather conditions. A plurality of pairs of buttons connected by a cord passing through the different layers of covers and foam sections may be used in the vertical sections of the canopy to control the amount of structural collapse experienced when the canopy is in contact with a parked aircraft. Additionally, vinyl straps discreetly wrapped around resilient foam structural members may be used to provide additional strength and to maintain the overall shape of the horizontal and vertical sections of the canopy when contacting the parked aircraft.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0011] In the drawings, which illustrate what is currently considered to be the best mode for carrying out the invention:

[0012] FIG. 1 illustrates a side elevation view of a prior art passenger boarding bridge;

[0013] FIG. 2 is an isometric view of the cab section of a passenger boarding bridge with the resilient canopy invention installed thereon;

[0014] FIG. 3 is a side view of a resilient foam core structure of a vertical section of the canopy invention;

[0015] FIG. 4 is side view of a vertical section of the resilient canopy invention, including the resilient core structure (dashed lines) wrapped by a plurality of foam sections;
FIG. 5 illustrates three separate foam sections used in FIG. 4 to wrap the resilient foam core structure;

FIG. 6 is a view perpendicular to the plane of FIG. 4 taken along line A-A;

FIG. 7 is a view perpendicular to the plane of FIG. 4 taken along line B-B;

FIG. 8 is a view perpendicular to the plane of FIG. 4 taken along line A-A of a vertical section of the resilient canopy invention, including the different covers and buttons and nylon cord;

FIG. 9 illustrates an isometric view of a wear pad for a vertical section of the resilient canopy in an installed configuration;

FIG. 10 illustrates a side view of a vertical section of the resilient canopy;

FIG. 11 illustrates a bottom view of a vertical section of the resilient canopy;

FIG. 12 illustrates a front (FIG. 12A) and back (FIG. 12B) isometric views of a horizontal section of the resilient canopy;

FIG. 13 illustrates a sectional view along lines C-C of FIG. 12A of a horizontal section of the resilient canopy;

FIG. 14 illustrates an isometric view of a resilient foam member with a plurality of vinyl straps; and

FIG. 15 illustrates a sectional view of a horizontal section of the resilient canopy when placed against the surface of a parked aircraft.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 2 is an isometric projection of the cab section 32 of a passenger boarding bridge with a resilient canopy of the invention installed thereon. In the mode of the invention illustrated in FIG. 2 the resilient canopy is made of three interconnected sections: two vertical sections 40 and 44 and one horizontal top section 42 secured to the cab and the vertical sections and extending there between. The horizontal top section 42 may have flaps 46 for firmly connecting it to the two vertical sections 40 and 44. In one of the preferred ways to connect the horizontal top section to the vertical sections hook-and-loop fasteners are used, but other connecting methods well known by those of ordinary skill in the applicable art may also be used, including, but not limited to, for example, gluing and sewing. The details of the construction of both vertical and horizontal sections of the resilient canopy invention are illustrated in FIGS. 3 through 15.

FIG. 3 illustrates a resilient foam core structure 52 which may be utilized in the construction of a vertical section 44 of the resilient canopy. This resilient foam core structure has a main element 54 shaped so as to fit to the canopy support 36 shown in FIG. 2. This resilient foam core structure is preferably made of a polyurethane foam material, model HR70280 manufactured by Future Foam Inc., of Salt Lake City, Utah, having a density of 2.8 lbs/ft³, no fillers, a 70 lbs/50 in² indentation force deflection at 25% deflection, and a minimum tensile strength of 10 psi. Further, although the main element 54 is illustrated in FIG. 3 as an integral piece, it may also be fabricated by connecting a plurality of smaller resilient foam pieces. Connected to the main element 54 is a plurality of secondary elements 56 located at pre-selected locations along the main element 54.

FIG. 4 illustrates the resilient foam core structure 52 of FIG. 3 wrapped by a plurality of foam sections 58, 58', and 58". These foam sections are supported by and securely attached to the resilient foam core structure 52. Dashed lines represent locations of the main element 54 and secondary elements 56 of the foam core structure 52. As indicated by dashed lines in FIG. 4, the locations of the plurality of secondary members 56 along the main member 54 are selected so as to assure that the seams or joints 59 between two adjacent foam sections will be located over each secondary member in order to provide extra support to the seams or joints. FIG. 5 illustrates flat patterns for the lower (58"), the middle (58'), and the upper (58") foam sections used in FIG. 4 to wrap the resilient foam core structure 52. These patterns are prepared taking into account any additional material, such as for example, additional material for a hem or a seam. The sections illustrated in FIG. 5 are examples of flat patterns used on vertical section 44. Slightly different flat patterns may be used, but have not been illustrated, for the other vertical section 40, depending on whether or not slight design variations exist between the two vertical sections, as illustrated, by way of example, in the embodiment illustrated in FIG. 2 because of the bay 38 for the installation of a prior art auto-level unit on the side of vertical section 40.

FIGS. 6 and 7 illustrate views perpendicular to the plane of FIG. 4 and along sections A-A and B-B thereof, respectively. A sectional view taken at the location of one of the secondary members 56 is shown in FIG. 6, illustrating how the foam section 58 wraps around the main member 54 and secondary member 56, creating only a small empty space 59 between the secondary member 56 and the foam section 58 and forming the round tip or leading edge 62. A sectional view taken at a location where there is no secondary member as shown in FIG. 7 illustrates a larger empty space 61 defined by the main member 54 and the foam section 58, also forming a round tip or leading edge 62. Although the resilient canopy invention is useful with any airplane size, the exemplary embodiment of the vertical sections presented herein assures that they will maintain their shape when not in use, and, at the same time, will be substantially conforming to even the rapidly changing body curvature of smaller planes. These foam sections are preferably made of a polyurethane foam material, model CC45150 manufactured by Future Foam Inc., of Salt Lake City, Utah, having a density of 1.5 lbs/ft³, no fillers, a 48 lbs/50 in² indentation force deflection at 25% deflection, and a minimum tensile strength of 10 psi.

Several layers of different covering materials may be used in the manufacture of the vertical section 44. FIG. 8 illustrates a view perpendicular to the plane of FIG. 4 along the sectional line A-A thereof after the installation of the different layers of covering materials. A first layer of vinyl material 68 may be used to partially or entirely cover the external surface of the foam sections 58 covering the main and secondary members 54 and 56 of the resilient foam core structure 52. All seams and edges in the first layer of vinyl material 68 may be sealed water tight and one of the preferred vinyl fabrics may be an 18-ounce vinyl coated polyester as per NFPA 701 regulations. Hook-and-loop
fasteners may be used to connect the first layer of vinyl material 68 to the foam sections 58 besides any other method known to those skilled in the applicable arts.

[0032] In addition, another layer of a fabric 70 may be used to partially or entirely cover the external surface of this first layer of vinyl material 68. Hook-and-loop fasteners may also be used to connect the layer of fabric 70 to the first layer of vinyl material 68, although other fastening methods known to those skilled in the applicable arts may also be used. The layer of fabric 70 may be made of a fire retardant material and may be used only to cover the external surface of the first layer of vinyl material 68 exposed to the inside of the boarding bridge.

[0033] Besides the previously discussed layers, a wear pad 66 may also be used as shown in FIG. 8 to cover the areas of the vertical sections in contact with the aircraft when the boarding bridge is in use. FIG. 9 illustrates an isometric view of the wear pad 66 for the vertical structure 40 in an installed configuration. A plurality of hooks 82 and loops 84 of hook-and-loop fasteners are used in the wear pad 66 to connect to a plurality of corresponding and opposing loops 84 and hooks 82 placed on the first layer of vinyl material 68 (not illustrated in FIG. 9).

[0034] Additionally, a plurality of pairs of buttons 71 (only one pair is illustrated in FIG. 8) is placed on each side of the vertical section 44 and connected to each other by way of a cord 75. As illustrated, the cord 75 passes through the layers of vinyl cover 68, additional layer of fabric 70, the plurality of foam sections 58, and the secondary member 56 and is configured to control and minimize the amount of collapse when the vertical section 44 comes in contact with a parked aircraft. FIG. 8 illustrates the buttons placed at a position where a secondary member 56 is located. They may however also be placed on other locations in the vertical section 44, as for example, in the location of the sectional view illustrated in FIG. 7. FIG. 10 shows an outside view 86 of the vertical structure 40, illustrating the positions of three upholstery buttons 71. FIG. 10 also illustrates the use of a plurality of hook-and-loop fasteners (illustrated as a plurality of pieces of fabric of small hooks 82 and a plurality of pieces of fabric of small loops 84) for the purpose of connecting the several layers of materials 68, 70, and 66 to the vertical section 40 as well as interconnecting it to the horizontal section 42 and connecting it to the cab 32. Although hook-and-loop fasteners have been illustrated, it is understood that other fasteners known to those of ordinary skill in the art would also be appropriate. Additionally, vertical sections 44 and 40 and top horizontal section 42 may be reinforced with additional foam as needed to minimizing collapsing.

[0035] Another inventive feature of the present invention is shown in the bottom view of an exemplary vertical section 44 in FIG. 11, wherein a plurality of holes 92 at the bottom of the vertical section 44 is shown for the purpose of venting and draining the interior thereof.

[0036] As illustrated in FIG. 2, the vertical sections 40 and 44 are not necessarily identical to each other. Modifications to each vertical section can be specified in order to accommodate variations in bridge design and equipment installation. For example, FIG. 2 shows that the bottom part of the vertical section 42 on the right (viewed from the bridge operator position facing the airplane) may be designed slightly different from the vertical section 44 on the left so as to accommodate the installation of an auto-level unit in the auto-level bay 38 using methods well known to one of ordinary skill in the art. Nevertheless, besides slight geometrical variations to accommodate modifications in bridge design and equipment installation, the construction of vertical section 40 is similar to that of vertical section 44 as illustrated in FIGS. 3-13. That is, vertical section 40 also has a resilient foam core structure 52 with a main element 54 shaped so as to fit to the canopy support 50 (FIG. 2) and a plurality of secondary elements 56, a plurality of foam sections 58, 58', and 58" covering the resilient foam core structure 52, several layers of different fabric materials covering the foam sections 58, including a first layer of vinyl material 68, a layer of a fire retardant fabric 70, and a wear pad 66, a plurality of pairs of buttons 71, and a plurality of holes 92 at the bottom of the vertical section 40 for the purpose of venting and draining the interior thereof.

[0037] FIGS. 12-14 illustrate the details in the construction of the horizontal top section 42, which is connected to the canopy at the top canopy support 34 (FIG. 2) and to the vertical sections 40 and 44 and extends there between (FIG. 2). FIG. 12A illustrates an isometric view of the inside (as viewed by an observer inside the boarding bridge) of the horizontal top section 42 of the resilient canopy invention and FIG. 14B illustrates an outside isometric view of the same section. As illustrated by several elements 82 and 84, a plurality of hook-and-loop fasteners are used to fasten the horizontal top section 42 to the vertical sections 40 and 44 as well as to the top canopy support 34. Flaps 46 with a plurality of pieces of fabric of small loops 84 are used on both extremities of the horizontal top section 42 to firmly connect it to a corresponding plurality of pieces of fabric of small hooks 82 in both the vertical sections 40 and 44. The connected canopy is shown in FIG. 2. Similar to the vertical sections 40 and 44, a plurality of holes 92 are placed at the lower extremities of the horizontal top section 42 for the purpose of venting and draining the interior thereof. A wear pad 66 (FIG. 12B) may also be used to cover the areas of the top horizontal section 42 in contact with the aircraft when the boarding bridge is in use. A plurality of hooks 82 and loops 84 of hook-and-loop fasteners are used in the wear pad 66 to connect to a plurality of corresponding and opposing loops 84 and hooks 82 placed on the horizontal top section 42 (not illustrated in FIG. 12B).

[0038] As also illustrated in FIG. 12B, a water diverter 78 may be constructed in the outside part of an external cover of the horizontal top section 42 to divert water in order to minimize water dripping on the passengers whenever the external surface of the boarding bridge gets wet. One of the preferred methods of making the water diverter 78 comprises rapping a round foam core with vinyl fabric with enough excess material as to create superimposing tabs to be folded and stiched to an external layer of the horizontal top section 42. This round foam core for the water diverter 78 is preferably a closed-cell polyethylene foam manufactured by Industrial Thermo Polymers Limited, of Buffalo, N.Y., having a 0.5 in diameter, a density of 2.0 lbs/ft^3, a compression deflection of 4 psi at 25%, and a minimum tensile strength of 50 psi.

[0039] The details of the internal construction of the horizontal top section 42 are illustrated in FIG. 13. FIG. 13 is a view of the horizontal top section 42 taken along section
line C-C of FIG. 12B. The horizontal top section has two resilient foam members 74 and 76 providing the structural support thereto. Resilient foam members 74 and 76 may be made of the same resilient foam as the material used for the resilient foam core structure 52 of the vertical sections of the resilient canopy. One of the purposes of the resilient foam members 74 and 76 is to provide structural support and to minimize the amount of collapsing of the horizontal top section 42 when the resilient canopy is placed against a parked aircraft.

[0040] As shown in FIG. 13, besides the resilient members 74 and 76, the construction of the top horizontal section 42 is similar to that of vertical sections 40 and 44, including one or a plurality of foam sections 58 used to wrap the resilient foam members 74 and 76, creating empty spaces 77 and 79 there between and the round tip or leading edge 62 of the foam section 58. (Question for inventor: is the same foam used here as in the vertical sections? Otherwise, please provide details about the different foam used). The foam section 58 is supported by and firmly attached to both resilient foam members 74 and 76. A first layer of vinyl material 68 may be used to partially or entirely cover the external surface of the foam sections 58. Another layer of a fire retardant fabric 70 may be used to partially or entirely cover the external surface of this first layer of vinyl material 68. A wear pad 66 may also be used to cover the areas of the top horizontal section 42 in contact with the aircraft when the boarding bridge is in use.

[0041] In a preferred embodiment of the horizontal top section 42 of the resilient canopy, a plurality of vinyl support bands or straps 80 placed tightly around the resilient foam members 74 and 76 may be used as illustrated in FIG. 14 (only resilient foam member 76 is illustrated in FIG. 14) in order to provide additional structural integrity.

[0042] In operation, the assembled resilient canopy as shown in FIG. 2 is brought against the parked aircraft upon docking of the boarding bridge to the plane. FIG. 15 illustrated the cross sectional view of a vertical section of the canopy placed against the surface 91 of a parked aircraft. For simplicity the fire retardant fabric 70 and wear pad 66 are not included in FIG. 15. As shown in FIG. 15, the empty region 61 is deformed in order to provide a seal between the leading edge 62 of the vertical section and the surface 91 of the airplane. The buttons 71 and nylon cord 75 minimize the amount of collapse locally experienced by the canopy. As the curvature of the airplane changes locally, the amount of collapse or deformation is controlled by both the flexibility of the empty region 61 and the structural control provided by the buttons 71 and nylon cord 75. In the horizontal top section 42, minimum buckling is experienced between the foam members 74 and 76 in the area of empty space 77 (FIG. 13) while the leading edge 62 also deforms similarly to the deformation illustrated in FIG. 15 for the vertical sections, scaling the horizontal top section 42 against the surface of the airplane. Because the structural design of both the vertical and horizontal sections the resilient canopy conforms to the body of small airplanes as well as it does to the body of large ones.

[0043] Although a few typical embodiments and details have been explained herein above with the intention of illustrating several best modes of the present invention, it will be clear to those persons of ordinary skill in the applicable arts that several changes and variations in the resilient canopy apparatuses and systems disclosed herein may be implemented within the scope of the present invention to be used in passenger boarding bridges. The scope of the invention is then appropriately determined by the claims appended below, particularly pointing out and distinctly claiming the subject matter that the applicant regards as his invention.

What is claimed is:

1. A passenger boarding bridge for allowing access to passengers in an airport terminal to and from a parked aircraft comprising:
   a tunnel section;
   a cab section having a first vertical end, a second vertical end, a top horizontal end, and a bottom horizontal end, said cab section connected to said tunnel section; and
   a resilient canopy connected to said cab section configured to conform to a shape of an outside surface of said parked aircraft solely by the docking motion of said cab section toward and away from said parked aircraft and the action of gravitational forces acting on said resilient canopy.

2. The passenger boarding bridge of claim 1, wherein said resilient canopy further comprises:
   a first vertical section connected to said first vertical end of said cab section and configured to conform to the shape of the outside surface of said parked aircraft;
   a second vertical section connected to said second vertical end of said cab section and configured to conform to the shape of the outside surface of said parked aircraft; and
   a horizontal top section connected to said top end of said cab section and to said first and second vertical sections and extending there between and configured to conform to the shape of the outside surface of said parked aircraft.

3. The passenger boarding bridge of claim 2, wherein said first and second vertical sections further comprise:
   a resilient foam core structure having a main member and a plurality of secondary members securely attached and extending from said main member, said resilient foam core structure generally defining the shape of said first and second vertical sections; and
   a plurality of foam sections wrapped around said resilient foam core structure and supported by and securely attached to said main member and said plurality of secondary members.

4. The passenger boarding bridge of claim 3, wherein said first and second vertical sections further comprise a vinyl cover over the external surface of said plurality of foam sections.

5. The passenger boarding bridge of claim 4, wherein said first and second vertical sections further comprise a layer of fire retardant fabric securely attached to said vinyl cover and covering only the surface of said vinyl cover exposed to the inside of said cab section.

6. The passenger boarding bridge of claim 5, wherein said first and second vertical sections further comprise a vinyl wear pad attached to the leading edges of said first and second vertical sections configured to contact said parked aircraft.
7. The passenger boarding bridge of claim 5 further comprising a plurality of pairs of buttons each of said pairs connected by a cord passing through said vinyl cover, said layer of fire retardant fabric, and said plurality of foam sections, each of said pair of buttons and said cord positioned and configured to control and minimize the amount of collapse when said first and second vertical sections come in contact with said parked aircraft.

8. The passenger boarding bridge of claim 2, wherein said horizontal top section further comprises:

- at least two resilient foam elements; and
- a foam section wrapped around said at least two resilient foam elements and supported by and securely attached to said at least two resilient foam elements.

9. The passenger boarding bridge of claim 8, wherein said horizontal top section further comprises a vinyl cover over the external surface of said foam section.

10. The passenger boarding bridge of claim 9, wherein said horizontal top section further comprises a layer of fire retardant fabric securely attached to said vinyl cover and covering only the surface of said vinyl cover exposed to the inside of said cap section.

11. The passenger boarding bridge of claim 10, wherein said horizontal top section further comprises a vinyl wear pad attached to the leading edge of said horizontal top section configured to contact said parked aircraft.

12. The passenger boarding bridge of claim 11, wherein an external surface of said horizontal top section further comprises at least one water diverter configured to minimize water dripping on said passengers whenever said external surface of said horizontal top section gets wet.

13. The passenger boarding bridge of claim 12, wherein said first and second vertical sections further comprise:

- a resilient foam core structure having a main member and a plurality of secondary members securely attached to and extending from said main member, said resilient foam core structure generally defining the shape of said first and second vertical sections; and
- a plurality of foam sections wrapped around said resilient foam core structure and supported by and securely attached to said main member and said plurality of secondary members.

14. The passenger boarding bridge of claim 13, wherein said first and second vertical sections further comprise a vinyl cover over the external surface of said plurality of foam sections.

15. The passenger boarding bridge of claim 14, wherein said first and second vertical sections further comprise a layer of fire retardant fabric securely attached to said vinyl cover and covering only the surface of said vinyl cover exposed to the inside of said cap section.

16. The passenger boarding bridge of claim 15, wherein said first and second vertical sections further comprise a vinyl wear pad attached to the leading edges of said first and second vertical sections configured to contact said parked aircraft.

17. The passenger boarding bridge of claim 16 further comprising a plurality of pairs of buttons each of said pairs connected by a cord passing through said vinyl cover, said layer of fire retardant fabric, and said plurality of foam sections, each of said pair of buttons and said cord positioned and configured to control and minimize the amount of collapse when said first and second vertical sections come in contact with said parked aircraft.

18. The passenger boarding bridge of claim 17 further comprising at least one hole at the bottom of each said first and second vertical sections, said at least one hole configured to vent and drain the interior of said first and second vertical sections.

19. The passenger boarding bridge of claim 18 further comprising at least one hole at each lower extremity of said top horizontal section, said at least one hole configured to vent and drain the interior of said top horizontal section.

20. A boarding bridge for facilitating passage between an airport terminal and a parked aircraft, said boarding bridge comprising:

- a passageway having a first end; and
- a canopy, secured to said first end of said passageway, said canopy comprising:
  - two upright fabric wall panels, spacedly positioned from one another, each of said fabric wall panels defining a first interior and a vertical leading edge,
  - a plurality of resilient foam blocks positioned within said first interior of each of said fabric wall panels,
  - a fabric cross member, secured to said wall panels and extending there between, said fabric cross member defining a second interior and a horizontal leading edge; and
  - at least one resilient foam element positioned within said second interior of said fabric cross member.

21. The boarding bridge of claim 20, wherein said plurality of resilient foam blocks further comprise a resilient foam core structure having a main member and a plurality of secondary members extending from said main member, said resilient foam core structure generally defining the shape of said two upright fabric wall panels.

22. The boarding bridge of claim 21, wherein each of said two upright fabric wall panels further comprises a vinyl cover over the external surface of said fabric wall panels.

23. The boarding bridge of claim 22, wherein each of said two upright fabric wall panels further comprises a layer of fire retardant fabric securely attached to said vinyl cover and covering only the surface of said vinyl cover exposed to the interior of said boarding bridge.

24. The boarding bridge of claim 23, wherein each of said two upright fabric wall panels further comprises a vinyl wear pad attached to the leading edge of each of said two upright fabric wall panels configured to contact said parked aircraft.

25. The boarding bridge of claim 23 further comprising a plurality of pairs of buttons, each button from each said pair of buttons connected by a cord passing through said vinyl cover, said layer of fire retardant fabric, and said fabric wall panels, each of said pair of buttons and said cord positioned and configured to control and minimize the amount of collapse when each of said two upright fabric wall panels comes in contact with said parked aircraft.

26. The boarding bridge of claim 21, wherein said fabric cross member further comprises a vinyl cover over the external surface of said fabric cross member.

27. The boarding bridge of claim 26, wherein said fabric cross member further comprises a layer of fire retardant
fabric securely attached to said vinyl cover and covering only the surface of said vinyl cover exposed to the interior of said boarding bridge.

28. The boarding bridge of claim 27, wherein said fabric cross member further comprises a vinyl wear pad attached to and configured to protect said leading edge of said fabric cross member when in contact with said parked aircraft.

29. The boarding bridge of claim 28, wherein an external surface of said fabric cross member further comprises at least one water diverter configured to minimize water dripping on said passengers whenever said external surface of said fabric cross member gets wet.

30. The boarding bridge of claim 29, wherein said plurality of resilient foam blocks further comprise a resilient foam core structure having a main member and a plurality of secondary members extending from said main member.

31. The boarding bridge of claim 30, wherein each of said two upright fabric wall panels further comprises a vinyl cover over the external surface of said fabric wall panels.

32. The boarding bridge of claim 31, wherein each of said two upright fabric wall panels further comprises a layer of fire retardant fabric securely attached to said vinyl cover and covering only the surface of said vinyl cover exposed to the interior of said boarding bridge.

33. The boarding bridge of claim 32, wherein each of said two upright fabric wall panels further comprises a vinyl wear pad attached to the leading edge thereof.

34. The boarding bridge of claim 33 further comprising a plurality of pairs of buttons, each button from each said pair of buttons connected by a cord passing through said vinyl cover, said layer of fire retardant fabric, and said fabric wall panels, each of said pair of buttons and said cord positioned and configured to control and minimize the amount of collapse when each of said two upright fabric wall panels comes in contact with said parked aircraft.

35. The boarding bridge of claim 34 wherein said resilient foam member further comprises vinyl straps tightly and discretely wrapped around said resilient foam member and configured to maintain the overall shape of said fabric cross member when contacting said parked aircraft.