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(54) Light-framed luggage

(57) A piece of luggage (100) including a plurality of sides (101, 102, 103, 104, 105, 106) defining an enclosed space, the enclosed space being divided into at least a first compartment (120), a second compartment (130), and a third compartment (140), the first compartment being at least partially defined by a first panel (121), the second compartment being at least partially defined by a second panel that encompasses at least a portion of the second compartment, the third compartment being at least partially defined by fabric (148), the first and second compartments sharing a first common substantially planar structure, and the second and third compartments may share a second common substantially planar structure.

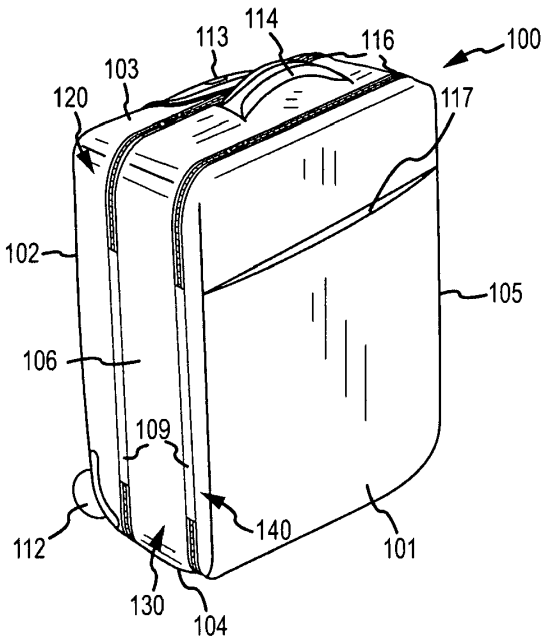

FIG.1a

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Description

FIELD OF INVENTION

[0001] The field of invention generally relates to luggage.

BACKGROUND

[0002] Luggage cases are often used for transferring personal or other items, sometimes very heavy items, from one place to another. During that process, many luggage cases are subjected to harsh conditions, such as handling by taxi drivers, handling by automatic machinery at an airport, a user dropping the luggage case, and so forth. As such, some luggage cases are designed to support a heavy load and protect the load contained in the case from damage arising from how the luggage is handled or mishandled. This support and protection may, however, increase the weight of the luggage case due to the added frame or other structure.

SUMMARY OF THE INVENTION

[0003] One embodiment of a piece of luggage may include a plurality of sides defining an enclosed space. The enclosed space may be divided into at least a first compartment, a second compartment, and a third compartment. The first compartment may be at least partially defined by a first panel. The second compartment may be at least partially defined by a second panel that encompasses at least a portion of the second compartment. The third compartment may be at least partially defined by fabric. The first and second compartments may share a first common substantially planar structure, and the second and third compartments may share a second common substantially planar structure.

[0004] Another embodiment of a piece of luggage may include a central substantially rigid panel that extends around a perimeter of the luggage and that defines at least a portion of a first compartment. Fabric may be operatively associated with the substantially rigid panel and define at least a portion of a second compartment. Fabric may also be operatively associated with the substantially rigid panel and define at least a portion of a third compartment. The third compartment may further be at least partially defined by a rigid panel.

[0005] An embodiment of a method of manufacturing a luggage case may include the acts of forming a portion of a first compartment with a first panel. Also the method may include forming a portion of a second compartment with a second panel that encompasses at least a portion of the second compartment. Also the method may include forming a portion of a third compartment with fabric. Also the method may include defining the first, second and third compartments such that the first and second compartments share a first common substantially planar structure, and the second and third compartments share a second common substantially planar structure.

[0006] A first aspect of the invention provides luggage, comprising:

a plurality of sides defining an enclosed space, the enclosed space divided into at least a first compartment, a second compartment, and a third compartment;
the first compartment at least partially defined by a first panel;
the second compartment at least partially defined by a second panel that encompasses at least a portion of the second compartment;
the third compartment at least partially defined by fabric; and
the first and second compartments share a first common substantially planar structure, and the second and third compartments share a second common substantially planar structure.

[0007] The plurality of sides may comprise at least six sides.

[0008] The first panel may comprise a high-density polypropylene board.

[0009] The third compartment may be at least partially defined by piping.

[0010] The luggage may further comprise a fixed handle positioned along the second compartment and a telescoping handle positioned in the first compartment.

[0011] The luggage may further comprise two fixed-axle wheels joined to at least one of the plurality of sides.

[0012] The luggage may further comprise four spinner-wheels joined to at least one of the plurality of sides.

[0013] The second panel may comprise polypropylene.

[0014] The second panel may be formed into a honeycomb structure. One of the plurality of sides defines a planar surface may include a length and a width, and the honeycomb structure may be either oriented to be perpendicular to the planar surface, parallel to the length of the planar surface, or parallel to the width of the planar surface.

[0015] The second panel may be extruded.

[0016] The second panel may extend around a perimeter of the luggage.

[0017] The first common substantially planar structure may comprise a first interior liner that at least partially defines the first compartment and the second compartment, and the second common substantially planar structure may comprise a second interior liner that at least partially defines the second compartment and the third compartment.

[0018] The second compartment may be positioned between the first and third compartments.

[0019] The first compartment may be a rear compartment, the second compartment may be a middle compartment, and the third compartment may be a front compartment.

[0020] A further aspect of the invention provides a method of manufacturing a luggage case, the method comprising the acts of:

forming a portion of a first compartment with a first panel;
forming a portion of a second compartment with a second panel that encompasses at least a portion of the second compartment;
forming a portion of a third compartment with fabric; and
defining the first, second, and third compartments such that the first and second compartments share a first common substantially planar structure, and the second and third compartments share a second common substantially planar structure.

[0021] The first panel may comprise a high-density polypropylene board.
[0022] The third compartment may be at least partially defined by piping.
[0023] The method may further comprise joining a fixed handle to the second compartment and a telescoping handle to the first compartment.
[0024] The method may further comprise joining two fixed-axle wheels to the first compartment.
[0025] The method may further comprise joining a first set of two spinner wheels to the first compartment and a second set of two spinner wheels to the second compartment.
[0026] The second panel may comprise polypropylene.
[0027] The second panel may be formed into a honeycomb structure.
[0028] The second panel may be extruded.
[0029] The second panel may extend around a perimeter of the luggage.
[0030] The first common substantially planar structure may comprise a first interior liner that at least partially defines the first compartment and the second compartment, and the second common substantially planar structure may comprise a second interior liner that at least partially defines the second compartment and the third compartment.
[0031] The second compartment may be positioned between the first and third compartments.
[0032] The first compartment may be a rear compartment, the second compartment may be a middle compartment, and the third compartment may be a front compartment.
[0033] A further aspect of the invention provides luggage, comprising:

a central substantially rigid panel that extends around a perimeter of the luggage and that defines at least a portion of a first compartment;
fabric operatively associated with the substantially rigid panel and defining at least a portion of a second compartment;
fabric operatively associated with the substantially rigid panel and defining at least a portion of a third compartment; and
the third compartment is further at least partially defined by a rigid panel.

[0034] The substantially rigid panel may be a polypropylene element formed into an extruded structure.
[0035] The substantially rigid panel may be formed into a honeycomb structure.
[0036] The rigid panel may comprise high-density polypropylene.
[0037] A further aspect of the invention comprises a piece of luggage including a plurality of sides defining an enclosed space. The enclosed space may be divided into at least a first compartment, a second compartment, and a third compartment. The first compartment may be at least partially defined by a first panel. The second compartment may be at least partially defined by a second panel that encompasses at least a portion of the second compartment. The third compartment may be at least partially defined by fabric. The first and second compartments may share a first common substantially planar structure, and the second and third compartments may share a second common substantially planar structure.
[0038] The present invention may be carried out in various ways and a preferred embodiment of luggage in accordance with the invention and modification thereof will now be described by way of example with reference to the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0039]

Figs. 1 a and 1 b show front perspective views of an embodiment of a light-framed luggage.

Fig. 2 shows a generalized exploded perspective view of some of the structural components of the luggage shown in Figs. 1a and 1b.

Fig. 3 shows another perspective view of the structural components shown in Fig. 2, showing one version of a middle compartment frame.

Fig. 4 shows another perspective view of the structure components shown in Fig. 2, showing a second version of a middle compartment frame.

Fig. 4a shows a cross section of the middle compartment frame of Fig. 4, viewed along line 4a-4a in Fig. 4.

Fig. 5 shows another perspective view of the structural components shown in Fig. 2, showing a third version of a middle compartment frame.

Fig 5a shows a cross section of the middle compartment frame of Fig. 5, viewed along line 5a-5a in Fig. 5.

Figs. 6a and 6b show partial cross-section views of the luggage shown in Figs. 1 a and 1 b, viewed along line A-A in Fig. 1b.

Fig. 7 shows a perspective view of an embodiment of the luggage shown in Fig. 1 with four spinner-wheels.

DETAILED DESCRIPTION

[0040] Described herein is luggage with a lightweight middle compartment frame. The luggage may include at least three main compartments - rear, middle, and front, or first, second, and third. Each main compartment may further be divided into sub-compartments. The luggage may further include at least one zipper or other sealing mechanism. Each zipper or other sealing mechanism may provide access to at least one of the main compartments. The rear compartment may be at least partially defined by a rigid or semi-rigid panel, the middle compartment may be defined by a lightweight frame, and the front compartment may be defined by a flexible fabric. The luggage may also include other features such as a telescoping handle for a user to tow the luggage (which may be positioned within the rear compartment), two or more wheels for the luggage to be rolled on (which may be positioned on the lower portion of the luggage), a front pocket (which may be positioned on the front compartment), a rear pocket (which may be positioned on the rear compartment), an insert or tag for identification, and so forth. The luggage may also include a side handle and/or a top handle to facilitate carrying or lifting the luggage. The side and/or top handles may be positioned on the side portion and/or upper portion of the luggage.

[0041] Fig. 1 a shows a front perspective view of a luggage 100 with a lightweight middle compartment frame, and Fig. 1b shows a front perspective view of the luggage 100 in Fig. 1 a from a different angle. With reference to Figs. 1 a and 1 b, the luggage 100 may include a front side 101, a rear side 102, an upper side 103, a lower side 104, a right side 105, and a left side 106 that define an enclosed space. The enclosed space may be divided into one or more main compartments. In some embodiments, the space may be divided into three main compartments - rear 120, middle 130, and front 140, or first 120, second 130, and third 140.

[0042] The front side 101 and portions of the upper 103, lower 104, right 105, and left sides 106 of the luggage 100 may define at least a portion of the front compartment 140. Portions of the upper 103, lower 104, right 105, and left 106 sides of the luggage may define at least a portion of the middle compartment 130. The rear side 102, and portions of the upper 103, lower 104, right 105, and left 106 sides of the luggage may define at least a portion of the rear compartment 120. The front compartment 140 may be referred to as a lid, and the rear compartment 120 may be referred to as a base; this terminology may particularly refer to the luggage 100 when it is oriented such that the rear compartment 120 is placed on a support [1]surface such as the ground. The front 140, middle 130, and rear 120 compartments may be joined together by one or more hinges 109 that allow the main compartments 120, 130, 140 to be selectively pivoted relative to each other to different configurations while remaining joined via the hinge(s) 109. For example, the front compartment 140 of the luggage shown in Figs. 1a and 1b may be pivoted such that some of the abutting edges along the common substantially planar structure of the front 140 and middle 130 compartments are separated, and such pivoting may allow a user to access the enclosed space. Similarly, the middle 130 and rear 120 compartments of the luggage 100 shown in Figs. 1 a and 1 b may be pivoted such that some of the abutting edges along the common substantially planar structure of the middle 130 and rear 120 compartments are separated, and such pivoting may also allow a user to access the enclosed space.

[0043] The luggage 100 may further include one or more wheels 112 joined to the luggage 100. The wheels 112 may be fixed-axle wheels (as shown in Figs. 1 a and 1 b), or spinner wheels (as shown in Fig. 6 and discussed below). In some embodiments, one or more foots or other supports (not visible in Figs. 1 a and 1 b) may be joined to the luggage 100 to facilitate positioning and maintaining the luggage 100 in an upright position, similar to the position for the luggage 100 shown in Figs. 1 a and 1 b.

[0044] The luggage 100 may further include one or more handles. At least one of the handles may be a telescoping handle 113 that may be selectively moved between a retracted position and one or more extended positions. In an extended position, the telescoping handle 113 may be used to facilitate using the wheels 112 to push or pull the luggage 100 along a support surface. In Figs. 1a and 1b, the telescoping handle 113 is shown positioned within the rear compartment 120. As explained in more detail below, the rear compartment 120 of the luggage of Figs. 1 a and 1 b may be structured with a rigid or semi-rigid panel. Positioning a telescoping handle 113 within a main compartment 120 framed with a panel may provide sufficient support to guide a luggage case 100 with wheels 112 using the telescoping handle 113.

[0045] The luggage 100 may further include one or more fixed handles 114, 115. In Figs. 1 a and 1 b, two fixed handles 114, 115 are shown: one joined to the upper side 103 of the luggage 100, and one joined to the right side 105 of the luggage 100. The fixed handles 114, 115 may be use to lift or carry the luggage 100. Of course, more or less than two fixed handles could be joined to the luggage, and the handles 114, 115 could be joined to any of the front 140, middle 130, or rear 120 compartments of the luggage. In Figs. 1a and 1b, the handles

114, 115 are joined to the middle compartment 130. As explained in more detail below, the middle compartment 130 of the luggage 100 of Figs. 1a and 1b may be framed with a substantially rigid yet lightweight honeycomb structure. Positioning fixed handles 114, 115 on the middle compartment 130 may provide sufficient support to lift or carry the luggage 100 by the one or more fixed handle (s) 114, 115.

[0046] The luggage 100 may further include one or more zippers 116 that provide access to the enclosed space. In Figs. 1a and 1b, a first zipper 116 may be positioned along some of the abutting edges along the common substantially planar structure of the front 140 and middle 130 compartments, and a second zipper 116 may be positioned along some of the abutting edges along the common substantially planar structure of the middle 130 and rear 120 compartments. Each zipper 116 may include a zipper track, one or more zipper sliders, and one or more zipper tabs joined to the one or more zipper sliders.

[0047] Fig. 2 shows a generalized exploded view of some of the structural components of the luggage 100 shown in Figs. 1 a and 1 b. Specifically, Fig. 2 shows a first panel 121 and piping 122, 123 that together define a frame for the rear compartment 120, a second panel 131 that defines a frame for the middle compartment 130, and piping 141, 142 that defines a frame for the front compartment 140. For the sake of clarity, Fig. 2 does not show any fabric, handles, wheels, or other features of the luggage.

[0048] With reference to Figs. 1a, 1b, and 2, the rear or first main compartment 120 may be at least partially defined by the rear side 102, and portions of the upper 103, lower 104, right 105, and left 106 sides of the luggage 100, as described above. The general structure of the rear compartment 120 may be at least partially defined by a first panel 121, as shown in Fig. 2. The first panel 121 may be formed from a rigid or semi-rigid material, such as a high-density polypropylene (HDPP) board, or the like. Specifically, the first panel 121 may be formed into a "C" or "U" shape so that a portion of the first panel 121 defines at least a portion of the rear side 102 of the luggage 100, a portion of the upper side 103 of the luggage 100, and a portion of the lower side 104 of the luggage 100. Alternatively, the first panel 121 may be formed into an "L" shape so that a portion of the first panel 121 defines at least a portion of the rear side 102 of the luggage 100, and a portion of the lower side 104 of the luggage 100. Alternatively, the structure of the rear compartment 120 may be defined by a plurality of panels; for example, one panel corresponding to the rear side of the luggage, and two smaller panels corresponding with a portion of the upper side and a portion of the lower side of the luggage. Fabric 128, such as nylon, may cover at least a portion of the outer-facing side of the first panel 121 to define a portion of the rear compartment 120, and a liner may cover the inner facing side of the first panel 121. Additionally, fabric, such as nylon, may be positioned along portions of the right and left sides of the luggage (as well as the upper side of the luggage in embodiments where the first panel is "L" shaped) to further define at least a portion of the rear compartment 120. Alternatively, panels, or panel inserts, may define at least a portion of the right and left sides of the rear compartment. This fabric and/or panels/inserts may also be coupled to the first panel and the fabric covering the outer-facing side of the first panel 121. In some embodiments, a continuous piece of fabric 128 may cover the outer right, upper, left, and lower sides of the rear compartment 120, while a separate piece of fabric covers the outer rear side 102 of the rear compartment 120. In other embodiments, two or more pieces of fabric may be used.

[0049] In addition, piping 122, 123 may extend along the at least some of the perimeter edges of the rear compartment 120, as shown in Fig. 2. The piping 122, 123 may be made of steel. Fabric 124, such as nylon, may be wrapped around the piping 122, 123. Such fabric may enclose the piping 122, 123 and provide an interface for the piping 122, 123 to be coupled to the other luggage components; for example, for the piping 122 to be coupled to the first panel 121 and its associated outer-facing fabric covering 128, as well as to the inner lining or fabric 125 and the zipper 116 track. The fabric 124 enclosing the piping 122 may also be coupled to the fabric and/or panel inserts along the right and left sides of the rear compartment 120. As shown in Fig. 2, two "L"-shaped sections of piping 123 may provide support to (1) the right, rear corner of the luggage 100 and the right, lower portion of the rear compartment 120, and (2) the left, rear corner of the luggage 100 and the left, lower portion of the rear compartment 120. In some embodiments, and as shown in Fig. 2, an "O"-shaped or rectangle/square-with-rounded-corners-shaped section of piping 122 may provide support to the upper 103, right 105, lower 104, and left 106 sides of the portion of the rear compartment 120 closest to the middle compartment 130. The fabric 128 and the first panel 121 in conjunction with an inner lining or fabric 125, and the piping 122, 123, may collectively define a first enclosed space or first/rear main compartment 120. The inner fabric or lining 125 that partially defines the first enclosed space or first/rear main compartment 120 may be joined to the first panel 121 and its outer-facing fabric 128 by piping 122, as shown in Fig. 6a. Alternatively the inner fabric or lining 125 may be joined to a second panel 131 (described below) and zipper 116, which zipper may then be joined to the fabric 124 enclosing the piping 122, as shown in Fig. 6b. Any of the liners or lining may include a zipper to allow access to the space that the liner encloses. Within the first enclosed space, the first/rear main compartment 120 may include zippers, organizers, or other dividers and sub-compartments.

[0050] A zipper 116 may be provided along at least some of the edges of the rear compartment 120 along the substantially planar structure in common with the middle compartment 130 (specifically, the zipper 116 may

extend from an upper portion of the left side 106 of the luggage 100, to the upper side 103 of the luggage 100, to the right side 105 of the luggage 100, to the lower side 104 of the luggage 100, and to a lower portion of the left side 106 of the luggage 100), and a hinge device 109 may be provided for the portion of the left side 106 of the luggage 100 that may not have a zipper. The hinge device 109 may be fabric, such as nylon, may be approximately as wide as the zipper track. The hinge device 109 may join the fabric 128 defining at least a portion of the rear compartment 120 to the fabric 136 and/or frame 131 defining at least a portion of the middle compartment 130. The hinge device 109 may also be provided on the right side 105 of the luggage 100, with the zipper 116 being appropriately positioned. Additionally, a telescoping handle 113 may be joined to the panel 121 defining the rear compartment, and a set of fixed-axle wheels 112 or spinner wheels 112 may be joined to the panel 121 defining the rear compartment 120 on the lower portion of the luggage 100. Figs. 1 a and 1 b show two fixed-axle wheels 112 positioned on the lower portion of the luggage 100. Alternatively, and as described below with reference to Fig. 6, the luggage 100 may include four spinner-wheels 112. A zipper, hinge, telescoping handle, and wheels are not shown in Fig. 2, but are all shown in Figs. 1 a and 1 b. Furthermore, the outer-facing side of the rear compartment 120 may include a rear pocket and/or an identification device on the rear side 102 of the luggage 100.

[0051] Still with reference to Figs. 1a, 1b, and 2, the middle or second main compartment 130 may be at least partially defined by portions of the upper 103, lower 104, right 105, and left sides 106 of the luggage 100. A lightweight frame or second panel 131, as shown in Fig. 2, may define at least a portion of the middle compartment 130. Specifically, the lightweight frame or second panel 131 may be formed into an "O" or a rectangle/square-with-rounded-corners shape so that the second panel 131 forms at least portions of the upper 103, lower 104, right 105 and left 106 sides of the luggage 100. The second panel 131 may be one panel folded into an "O" shape or the like, and there may be a pin or other structure(s) that joins the second panel 131 to itself so that it keeps its shape. Alternatively, the middle compartment 130 may be at least partially defined by a plurality of panels; for example, one panel corresponding to each of the upper 103, lower 104, right 105 and left sides 106 of the luggage 100. The panel 131 or panels may be polypropylene formed into a lightweight yet supporting structure. For example, the second panel 131 (or panels) may be a hollow, extruded structure, which extruded structure may be formed in the shape of a honeycomb, as shown in Figs. 3 through 5 (discussed below). Alternatively, the extruded structure may be in the shape of squares or any other shape. Also, the second panel 131 or panels may be formed from two pieces of plastic joined together by sidewalls, with hollow channels [1]extending along the length of the sidewalls. Also, the second panel 131 may be a single layer of material, such as polypropylene, that has been formed with certain cut-outs, such as honeycomb or circular cut-outs. Fabric 136, such as nylon, may cover the outer-facing side of the second panel 131, and a liner may cover the inner-facing side of the panel 131. In some embodiments, the outer fabric 136 may be a continuous piece of fabric. Also within the enclosed space, the middle compartment 130 may include zippers, organizers, or other dividers and sub-compartments. In some embodiments, particularly as shown in Fig. 6b, an inner liner 125 may be connected to the second panel 131, and may at least partially define the rear compartment 120 (as described above) and the middle compartment 130.

[0052] In some but not all embodiments, the structure of the middle compartment 130 may also be defined by piping (not shown in Fig. 2). The piping may be made of steel. Fabric, such as nylon, may be wrapped around the piping. Such fabric may enclose the piping and provide an interface for the piping to be coupled to the other luggage components, for example, for the piping to be coupled to the second panel 131 and its associated outer-facing fabric covering 136, as well as the inner lining or fabric and zipper track. An "O"-shaped or rectangle/square-with-rounded-corners-shaped sections of piping may provide support to the upper, right, lower, and left sides of the portion of the middle compartment 130 closest to the rear compartment 120. Also, an "O"-shaped or square-with-rounded-corners-shaped sections of piping may provide support to the upper 103, right 105, lower 104, and left 106 sides of the portion of the middle compartment 130 closest to the front compartment 140. Either, both, or neither of these piping configurations may define at least a portion of the middle compartment 130.

[0053] The fabric 136 and the second panel 131 in conjunction with one or two portions of inner lining or fabric 125,145 (and possible one or more sections of piping) may collectively define a second enclosed space or second/middle main compartment 130. The one or two portions of inner lining or fabric 125, 145 may be joined to the piping 122 and first panel 121 of the rear compartment 120, the piping 141 and fabric 148 of the front compartment 140, or to the fabric 136 and/or second panel 131 of the middle compartment 130. Within the second enclosed space, the second/middle main compartment 130 may include zippers, organizers, or other dividers and sub-compartments.

[0054] A zipper 116 may be provided on at least some of the edges of the side of the middle compartment 130 that shares a common substantially planar structure with the rear compartment 120 (this zipper 116 may be the same as discussed above in relation to the rear compartment 120). A zipper 116 may also be provided on at least some of the edges of the side of the middle compartment 130 that shares a common substantially planar structure with the front compartment 140. Specifically, each of these zippers 116 may extend from an upper portion of the left side 106 of the luggage 100, to the upper side 103 of the luggage 100, to the right side 105 of the lug-

gage 100, to the lower side 104 of the luggage 100, and to a lower portion of the left side 106 of the luggage 100. Alternatively, one or both of the zippers 116 may extend from an upper portion of the right side 105 of the luggage 100, to the upper side 103 of the luggage 100, to the left side 106 of the luggage 100, to the lower side 104 of the luggage 100, and to a lower portion of the right side 105 of the luggage 100. As discussed previously, a hinge device 109 may be provided for the portion of the left side 106 of the middle compartment 130 that may not have a zipper. The hinge device 109 may be fabric, such as nylon, and may be approximately as wide as the zipper track. The hinge device 109 may join the fabric 136 and/or frame 131 defining at least a portion of the middle compartment 130 to the fabric 128 defining at least a portion of the rear compartment 120, as described above. In addition to the hinge 109 that couples the middle compartment 130 with the rear compartment 120, a second hinge device 109 may couple the middle compartment 130 to the front compartment 140, such second hinge device 109 being otherwise similar to the first hinge device 109. Fig. 1 a shows a luggage case 100 with two hinges 109: one for coupling the rear 120 and middle 130 compartments, and one for coupling the middle 130 and front compartments 140. The two hinge devices 109 may both be positioned on the right side 105 of the luggage 100, may both be, positioned on the left side 106 of the luggage 100, or one may be positioned on the left 106 while the other may be positioned on the right side 105 of the luggage 100. Additionally, one or more fixed handles 114, 115 may be joined to the middle compartment 130. As described above, the one or more fixed handles 114, 115 may be joined to the middle compartment 130 along the right 105/left side 106 and/or the upper side 103 of middle compartment 130 of the luggage 100.

[0055] Fig. 3, also an exploded view of some of the structural components of the luggage 100 shown in Figs. 1 a and 1 b, illustrates one example of how the second panel 131 may be constructed. In Fig. 3 the second panel 131 may be a lightweight frame made of polypropylene and formed as an extruded structure, such as honeycomb with the honeycomb cells oriented perpendicular to a planar surface of one of the sides of the luggage case 100.

[0056] Fig. 4, also an exploded view of some of the structural components of the luggage 100 shown in Figs. 1 a and 1b, illustrates a second example of how the second panel 131 may be constructed. In Fig. 4 the second panel 131 may be made of polypropylene and formed as an extruded structure, such as honeycomb with the honeycomb cells oriented parallel to a length of the planar surface of one of the sides of the luggage case 100. Fig. 4a shows a cross section of the second panel 131 of Fig. 4, viewed along line 4a-4a in Fig. 4.

[0057] Fig. 5, also an exploded view of some of the structural components of the luggage 100 shown in Figs. 1 a and 1 b, illustrates a third example of how the second panel 131 may be constructed. In Fig. 5 the second panel 131 may be made of polypropylene and formed as an extruded structure, such as honeycomb with the honeycomb cells oriented parallel to a width of the planar surface of one of the sides of the luggage case 100. Fig. 5a shows a cross section of the second panel 131 of Fig. 5, viewed along line 5a-5a in Fig. 5. Of course, as explained above, the second panel 131 may be formed of polypropylene (or any substantially rigid yet lightweight material) extruded in any shape, such as squares, and the like.

[0058] Referring back to Figs. 1a, 1b, and 2, the front or third main compartment 140 may be at least partially defined by the front side 101, and portions of the upper 103, lower 104, right 105, and left sides 106 of the luggage 100, as described above. The general structure of the front compartment 140 may be at least partially defined by piping 141, 142, as shown in Fig. 2, and/or may be at least partially defined only by flexible fabric 148, such as nylon. In some embodiments, the fabric 148 may be a continuous sheet of fabric. In embodiments where the front compartment 140 is at least partially defined by piping 141, 142, at least a portion of the piping 142 may be made of a soft, flexible material. Fabric 143, such as nylon, may be wrapped around the piping 141, 142. Such fabric may enclose the piping 141, 142 and provide an interface for the piping to be coupled to the other luggage components. As shown in Fig. 2, two "L"-shaped sections of piping 142 may provide support to (1) the right, front corner of the luggage 100 and the right, lower portion of the front compartment 140, and (2) the left, front corner of the luggage 100 and the left, lower portion of the front compartment 140. In some embodiments, and as shown in Fig. 2, a portion of piping 141 may be made of steel and formed into an "O"-shaped or rectangle/square-with-rounded-corners-shaped. This portion of piping 141 may provide support to the upper 103, right 105, lower 104, and left 106 sides of the portion of the front compartment 140 closest to the middle compartment 130. The portion of piping 141 may similarly be wrapped with a fabric 143, such as nylon, to provide an interface. Either, both, or neither of these portions of piping 141, 142 may be used to at least partially define the front compartment 140.

[0059] Fabric 148, such as nylon, may be positioned along the front side 101 of the luggage 100, as well as along portions of the right 105, left 106, upper 103, and lower 104 sides of the luggage 100 to further at least partially define the front compartment 140. In embodiments where the front compartment 140 is at least partially defined by piping 141, 142, this frontside fabric 148 may be coupled to the fabric 143 enclosing the piping 142 along the side and lower portions of the front compartment 140, and may be coupled to the zipper track between the front 140 and middle 130 compartments. In some embodiments, the fabric 148 at least partially defining the front compartment 140 may be a continuous sheet of fabric (as shown in Figs 1 a and 1 b), or it may comprise a first sheet to define the front side 101 of the luggage, and smaller strips of fabric sewn to the first sheet, with the smaller strips defining portions of the right

105, left 106, upper 103, and lower 104 sides of the luggage.

[0060] The fabric 148 and piping 141, 142, in conjunction with a portion of inner lining or fabric 145 may collectively define a third enclosed space or third/front main compartment 140. The inner lining or fabric 145 may include a zipper to allow access to the enclosed space. Within the third enclosed space, the third/front main compartment 140 may include zippers, organizers, or other dividers and sub-compartments.

[0061] A zipper 116 may be provided on at least some of the edges of the side of the front compartment 140 that shares a common substantially planar structure with the middle compartment 130 (this zipper may be the same as discussed above in relation to the middle compartment). As discussed previously, a hinge 109 device may be provided for the portion of the left 106 (or right) 105 side of the front compartment 140 that may not have a zipper. The hinge device 109 may be fabric, such as nylon, may be approximately as wide as the zipper track, and may serve to couple the middle compartment 130 to the front compartment 140, as described above. Additionally, the outer-facing side of the front compartment 140 may include a front pocket 117, which may sealed by a zipper, Velcro, or any other manner.

[0062] Fig. 6a shows a partial cross-section view of the luggage 100 shown in Figs. 1a and 1b, viewed along line A-A in Fig. 1 b. As described above, the luggage 100 may be divided into three main compartments: rear 120, middle 130, and front 140, or first 120, second 130, and third 140. As shown in Fig. 6a, the rear or first compartment 120 may be defined by a first panel 121, fabric 128 covering the outer-facing side of the first panel 121, piping 122 enclosed by fabric 124, and an inner liner 125. Fig. 6a does not show any material lining the inner-side of the first panel, but such material may be positioned along the inner-side of the first panel 121 if desired. These components together define a first enclosed space 120. As also shown in Fig. 6a, the middle or second compartment 130 may be defined by a second panel 131, fabric 136 covering the outer-facing side of the second panel 131, a liner 125 joined to the piping 122 and first panel 121 of the rear compartment 120, and a liner joined 145 to the piping 141 and fabric 148 of the front compartment 140. Fig. 6a does not show any material lining the inner-side of the second panel 131, but such material may be positioned along the inner-side of the second panel 131 if desired. These components together define a second enclosed space 130. The front or third compartment 140 may be defined by a front, flexible piece of fabric 148, piping 141 enclosed by fabric 143, and an inner lining 145. These components together define a third enclosed space 140. The front compartment 140 and rear compartments 120 may be reinforced by "L" shaped piping 123, 142, as described above (not shown in Fig. 6a). Fig. 6a also shows two zippers 116 that couple the front 140 and middle 130 compartments, and the middle 130 and rear 120 compartments. The various components of the three compartments may be joined by any suitable connection method, including, but not limited to, by sewing, bonding, adhering, snapping, zipping, and so on. In Fig. 6a, various components are shown as being stitched 126, 127, 146, 147 together. Note that the components shown in Fig. 6a may not be to scale.

[0063] In some embodiments, the two inner linings 125, 145 that at least partially define the middle compartment 130 may be joined to either the first panel 121 of the rear compartment 120, the second panel 131 of the middle compartment 130, or the fabric 148 and piping 141 of the front compartment 140. In some embodiments, there may be three or four inner liners; for example, one inner liner joined to the piping and first panel 121 of the rear compartment 120, one or two inner liner(s) joined to the fabric 136 on the outer-facing side of the second panel 131 of the middle compartment 131, and one inner liner joined to the piping 141 and fabric 148 of the front compartment. Thus, different embodiments may have numerous different configurations of inner liners, each of which may include a zipper to allow access to one or more of the enclosed spaces. Depending on the configuration of inner liners, the front 140, middle 130, and rear 120 compartments may be defined differently.

[0064] As one example of an alternative embodiment, of which there are many, Fig. 6b also shows a different partial cross-section view of the luggage 100 shown in Figs. 1 a and 1 b, viewed along line A-A in Fig. 1 b. As above, the luggage 100 may be divided into three main compartments: rear 120, middle 130, and front 140, or first 120, second 130, and third 140. As shown in Fig. 6b, the rear or first compartment 120 may be defined by a first panel 121, fabric 128 covering the outer-facing side of the first panel 121, piping 122 enclosed by fabric 124, a zipper 116, and an inner lining 125 joined to fabric 136 associated with a second panel 131. Fig. 6b does not show any material lining the inner-side of the first panel 131, but such material may be positioned along the inner-side of the first panel 131 if desired. These components together define a first enclosed space 120. As also shown in Fig. 6b, the middle or second compartment 130 may be defined by a second panel 131, fabric 136 covering the outer-facing side of the second panel 131, a liner 125 joined to the fabric covering the second panel 131, and a liner 145 joined to the piping 141 and fabric 148 of the front or third compartment 140. Fig. 6b does not show any material lining the inner-side of the second panel 131, but such material may be positioned along the inner-side of the second panel 131 if desired. These components together define a second enclosed space 130. The front or third compartment 140 may be defined by a front, flexible piece of fabric 148, piping 141 enclosed by fabric 143, and an inner lining 145 joined to the fabric 148 enclosing the piping 141. These components together define a third enclosed space 140. The front compartment 140 and rear compartments 120 may be reinforced by "L" shaped piping 123, 142, as described above. As above, the various components of the three compart-

ments may be joined by any suitable connection method, including, but not limited to, by sewing, bonding, adhering, snapping, zipping, and so on. Note that the components shown in Fig. 6b may not be to scale.

[0065] Referring to Figs. 1a, 1b, and 2, a piece of luggage 100 may include a central substantially rigid panel 131 that extends around a perimeter of the luggage 100 and that defines at least a portion of a first compartment 130. Fabric 148 may be operatively associated with the substantially rigid panel 131 and define at least a portion of a second compartment 140. Fabric 128 may also be operatively associated with the substantially rigid panel 131 and define at least a portion of a third compartment 120. The third compartment 120 may further be at least partially defined by a rigid panel 121.

[0066] Referring now to Fig. 7, a spinner-wheel embodiment of the luggage case 700 described above is shown, with four spinner-wheels 712. In four-spinner-wheel embodiments, two spinner-wheels 712 may be position along the rear compartment 720, and two spinner-wheels 712 may be positioned along the middle compartment 730. The wheels 712 may be on the lower 706, or right 705 or left 706 sides of these respective main compartments.

[0067] A variety of embodiments and variations of structures and methods are disclosed herein. Where appropriate, common reference numbers and words were used for common structural and method features. However, unique reference numbers and words were sometimes used for similar or the same structural or method elements for descriptive purposes. As such, the use of common or different reference numbers or words for similar or the same structural or method elements is not intended to imply a similarity or difference beyond that described herein.

[0068] References to "front," "middle," "rear," "back," "upper," "lower," "top," "bottom," "side," as well as any other relative positional or directional descriptor are given by way of example to aid the reader's understanding of the particular embodiment(s) described. They should not be [1]read to be requirements or limitations, particularly as to the position, orientation, or use of the invention unless specifically set forth in the claims. Connection references (e.g. attached, coupled, connected, joined, and the like) are to be construed broadly and may include intermediate members between a connection of elements and relative movement between elements. As such, connection references do not necessarily infer that two elements are directly connected and in fixed relation to each other, unless specifically set forth in the claims. In some instances, components are described with reference to "ends" having a particular characteristic or being connected with another part. Those skilled in the art will recognize that the disclosed embodiments are not limited to components which terminate immediately beyond their points of connection with other parts.

[0069] The apparatus and associated method in accordance with the present invention has been described with reference to particular embodiments thereof. Therefore, the above description is by way of illustration and not by way of limitation. Accordingly, it is intended that all such alterations, variations, and modifications of the embodiments are within the scope of the present invention as defined by the appended claims. In methodologies directly or indirectly set forth herein, various steps and operations are described in one possible order of operation, but those skilled in the art will recognize that steps and operations may be rearranged, replaced, or eliminated without necessarily departing from the spirit and scope of the disclosed embodiments.

Claims

1. Luggage, comprising:

a plurality of sides defining an enclosed space, the enclosed space divided into at least a first compartment, a second compartment, and a third compartment;
the first compartment at least partially defined by a first panel;
the second compartment at least partially defined by a second panel that encompasses at least a portion of the second compartment;
the third compartment at least partially defined by fabric; and
the first and second compartments share a first common substantially planar structure, and the second and third compartments share a second common substantially planar structure.

2. The luggage of claim 1, wherein: (a) the plurality of sides comprises at least six sides; and/or (b) the first panel comprises a high-density polypropylene board; and/or (c) the third compartment is at least partially defined by piping; and/or (d) further comprising a fixed handle positioned along the second compartment and a telescoping handle positioned in the first compartment.

3. The luggage of any of the preceding claims, further comprising (a) two fixed-axle wheels joined to at least one of the plurality of sides; or (b) four spinner-wheels joined to at least one of the plurality of sides.

4. The luggage of any of the preceding claims, wherein the second panel comprises polypropylene; optionally wherein the second panel is formed into a honeycomb structure; and optionally wherein one of the plurality of sides defines a planar surface including a length and a width, and the honeycomb structure is either oriented to be perpendicular to the planar surface, parallel to the length of the planar surface, or parallel to the width of the planar surface.

5. The luggage of any of the preceding claims, wherein: (a) the second panel is extruded; and/or (b) the second panel extends around a perimeter of the luggage; and/or (c) the first common substantially planar structure comprises a first interior liner that at least partially defines the first compartment and the second compartment, and the second common substantially planar structure comprises a second interior liner that at least partially defines the second compartment and the third compartment; and/or (d) the second [1]compartment is positioned between the first and third compartments; and/or (e) the first compartment is a rear compartment, the second compartment is a middle compartment, and the third compartment is a front compartment.

7. A method of manufacturing a luggage case, the method comprising the acts of:

forming a portion of a first compartment with a first panel;
forming a portion of a second compartment with a second panel that encompasses at least a portion of the second compartment;
forming a portion of a third compartment with fabric; and
defining the first, second, and third compartments such that the first and second compartments share a first common substantially planar structure, and the second and third compartments share a second common substantially planar structure.

8. The method of claim 7, wherein: (a) the first panel comprises a high-density polypropylene board; and/or (b) the third compartment is at least partially defined by piping; and/or (c) further comprising joining a fixed handle to the second compartment and a telescoping handle to the first compartment; and/or (d) further comprising joining two fixed-axle wheels to the first compartment, or further comprising joining a first set of two spinner wheels to the first compartment and a second set of two spinner wheels to the second compartment; and/or (e) wherein the second panel comprises polypropylene, optionally wherein the second panel is formed into a honeycomb structure.

9. The method of any of claims 7 to 8, wherein the second panel is extruded.

10. The method of any of claims 7 to 9, wherein the second panel extends around a perimeter of the luggage.

11. The method of any of claims 7 to 10, wherein the first common substantially planar structure comprises a first interior liner that at least partially defines the first compartment and the second compartment, and the second common substantially planar structure comprises a second interior liner that at least partially defines the second compartment and the third compartment.

12. The method of any of claims 7 to 11, wherein the second compartment is positioned between the first and third compartments.

13. The method of any of claims 7 to 12, wherein the first compartment is a rear compartment, the second compartment is a middle compartment, and the third compartment is a front compartment.

14. Luggage, comprising:

a central substantially rigid panel that extends around a perimeter of the luggage and that defines at least a portion of a first compartment;
fabric operatively associated with the substantially rigid panel and defining at least a portion of a second compartment;
fabric operatively associated with the substantially rigid panel and defining at least a portion of a third compartment; and
the third compartment is further at least partially defined by a rigid panel.

15. The luggage of claim 14, wherein: (a) the substantially rigid panel is a polypropylene element formed into an extruded structure; and/or (b) the substantially rigid panel is formed into a honeycomb structure and/or (c) wherein the rigid panel comprises high-density polypropylene.

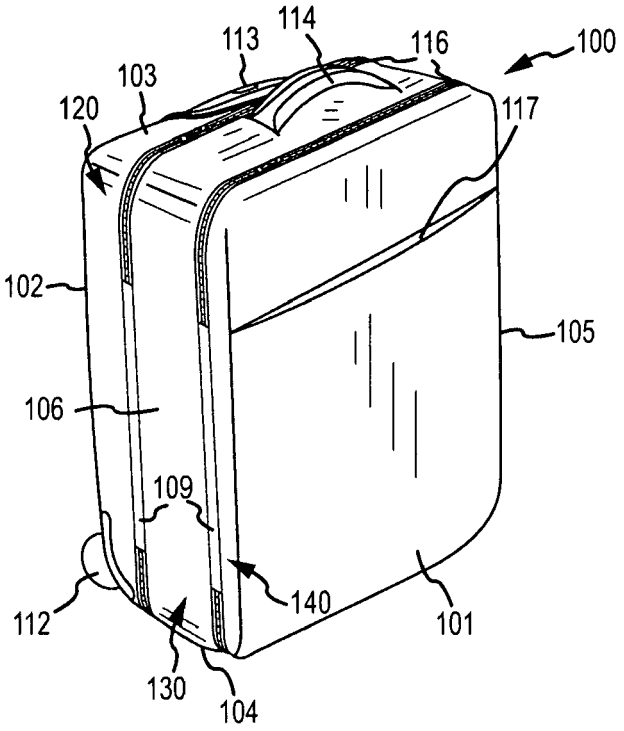
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FIG.1a

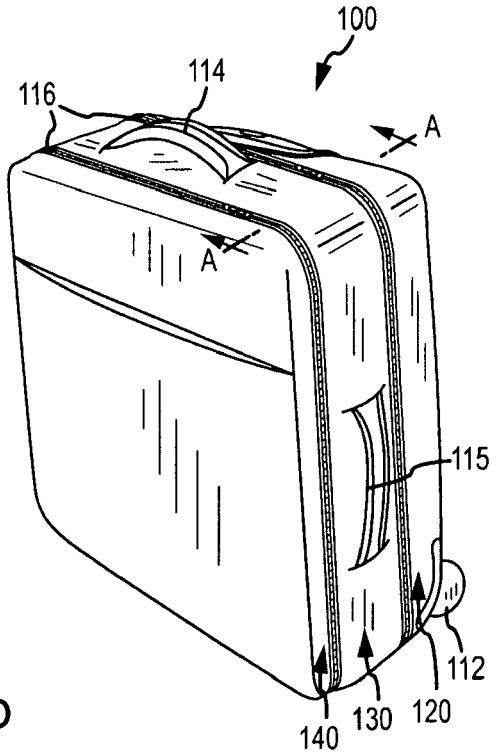
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FIG.1b

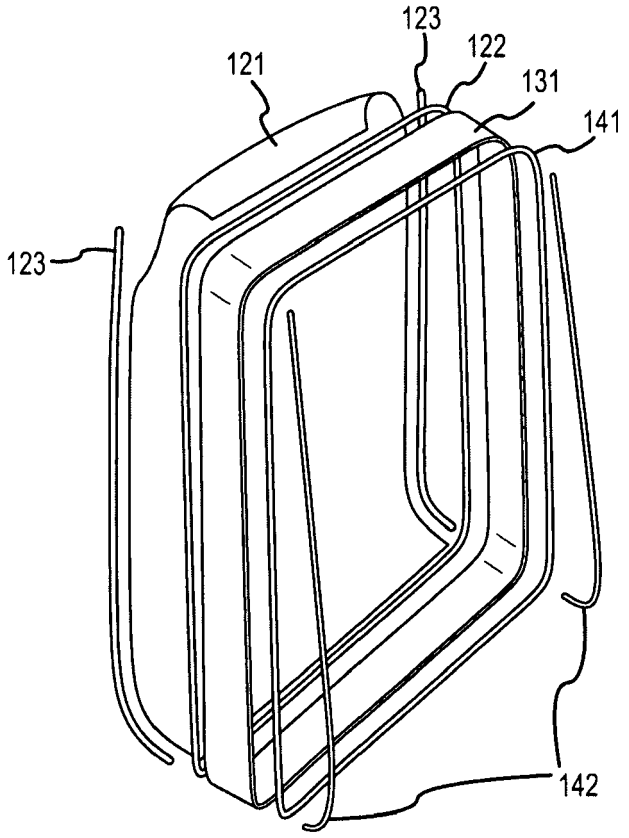

FIG.2

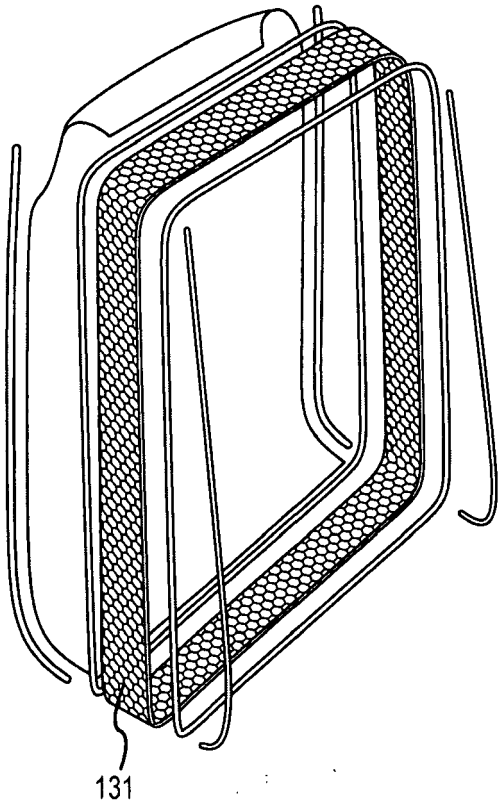

FIG.3

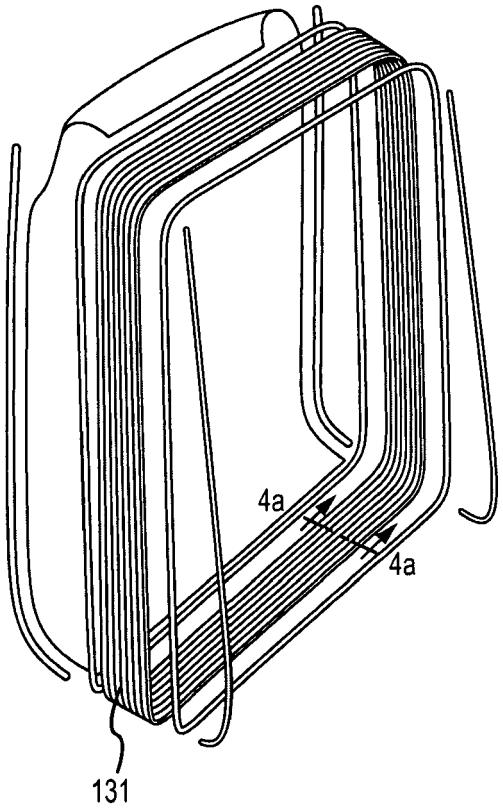

FIG.4

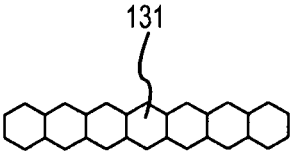

FIG.4a

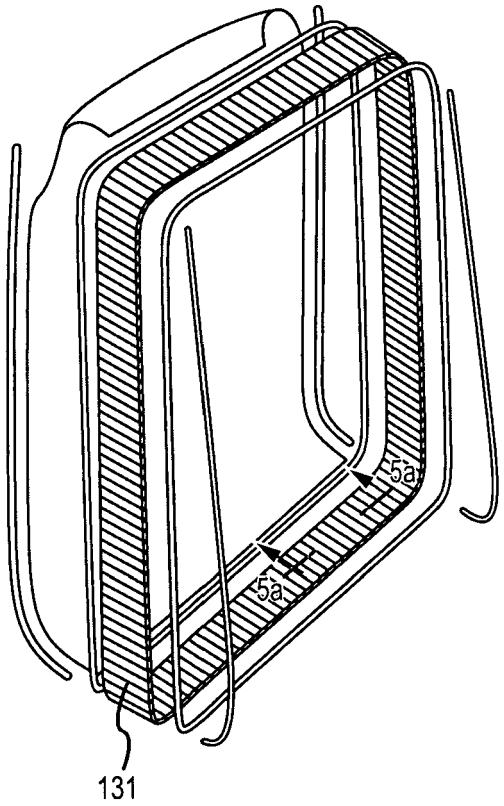

FIG.5

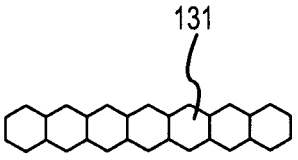

FIG.5a

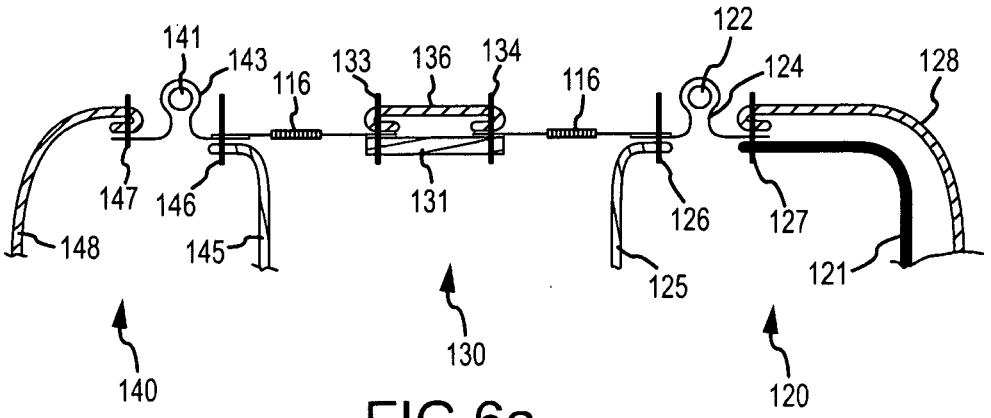
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FIG.6a

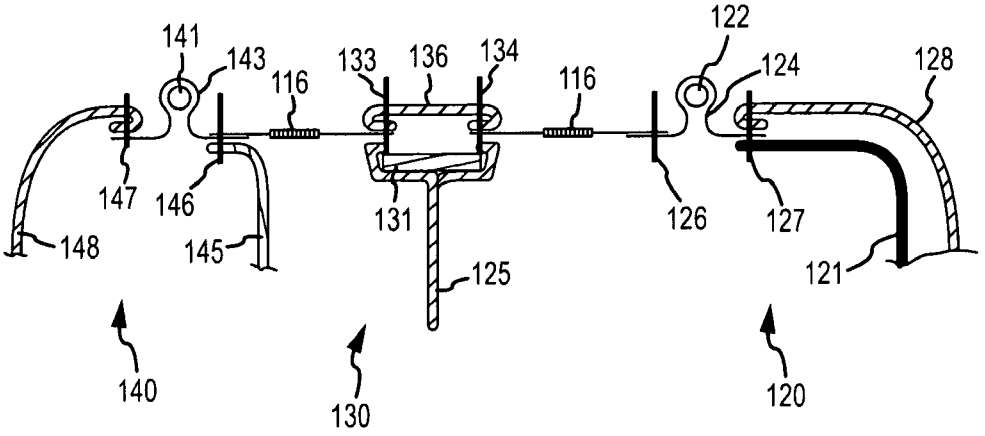
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FIG.6b

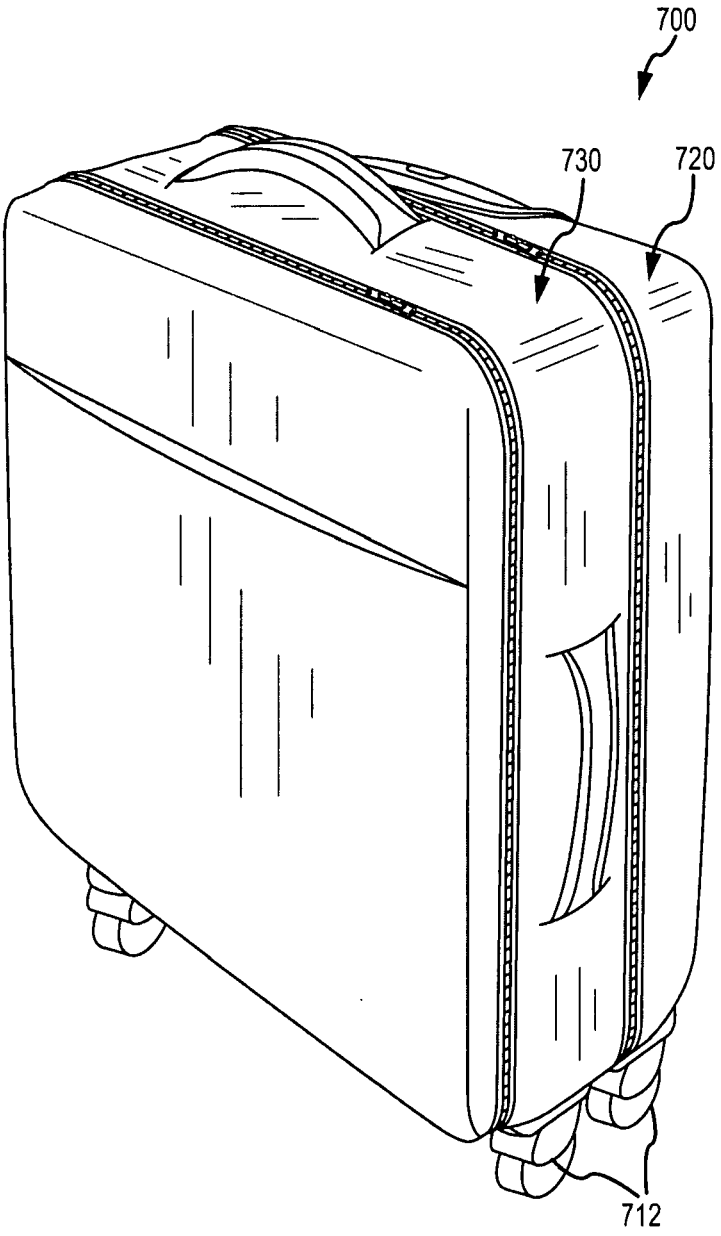

FIG.7