



US 20240315412A1

(19) **United States**

(12) **Patent Application Publication**

Lindokken et al.

(10) **Pub. No.: US 2024/0315412 A1**

(43) **Pub. Date: Sep. 26, 2024**

(54) **EXPANDABLE ZIPPER ARRANGEMENT FOR LUGGAGE**

(52) **U.S. Cl.**

CPC *A45C 7/0027* (2013.01); *A45C 5/03* (2013.01); *A45C 5/14* (2013.01); *A45C 13/103* (2013.01); *A45C 13/36* (2013.01); *A45C 2005/037* (2013.01)

(71) Applicant: **Samsonite IP Holdings S.a r.l.**,
Luxembourg (LU)

(72) Inventors: **Lefie Lindokken**, Chicago, IL (US);
Amy Ward, Providence, RI (US);
Ulliyada Bopanna, Milton, MA (US)

(57) **ABSTRACT**

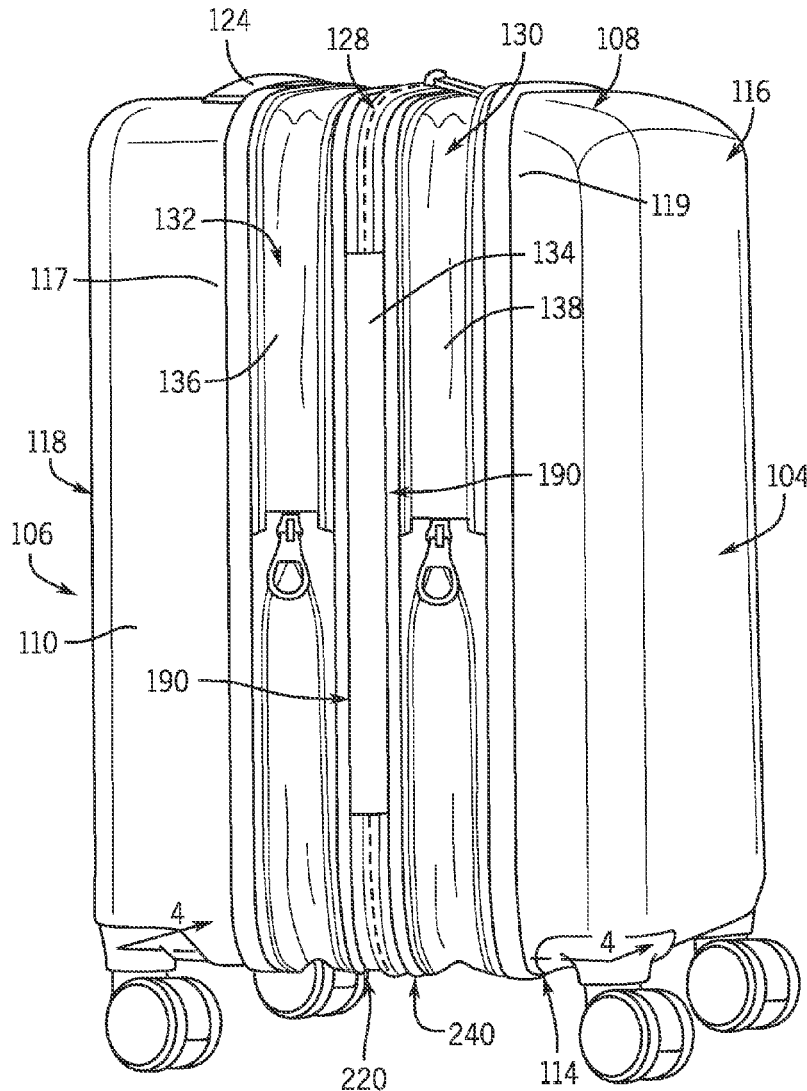
A luggage case (102) including a first shell (116, 118) and a second shell (116, 118) and an opening zip assembly (128) selectively joining the first and second shell (116, 118). A first expansion zip (130) is attached to a first shell (116) and a first side of the opening zip assembly (128). A second expansion zip (132) is attached to a second shell (118) and a second side of the opening zip assembly (128). A first reinforcing structure (190) is attached to and between the first expansion zip (130) and the first side of the opening zip assembly (128). A second reinforcing structure (190) is attached to and between the second expansion zip assembly (132) and the second side of the opening zip assembly (128).

(21) Appl. No.: **18/126,266**

(22) Filed: **Mar. 24, 2023**

Publication Classification

(51) **Int. Cl.**
A45C 7/00 (2006.01)
A45C 5/03 (2006.01)
A45C 5/14 (2006.01)
A45C 13/10 (2006.01)
A45C 13/36 (2006.01)



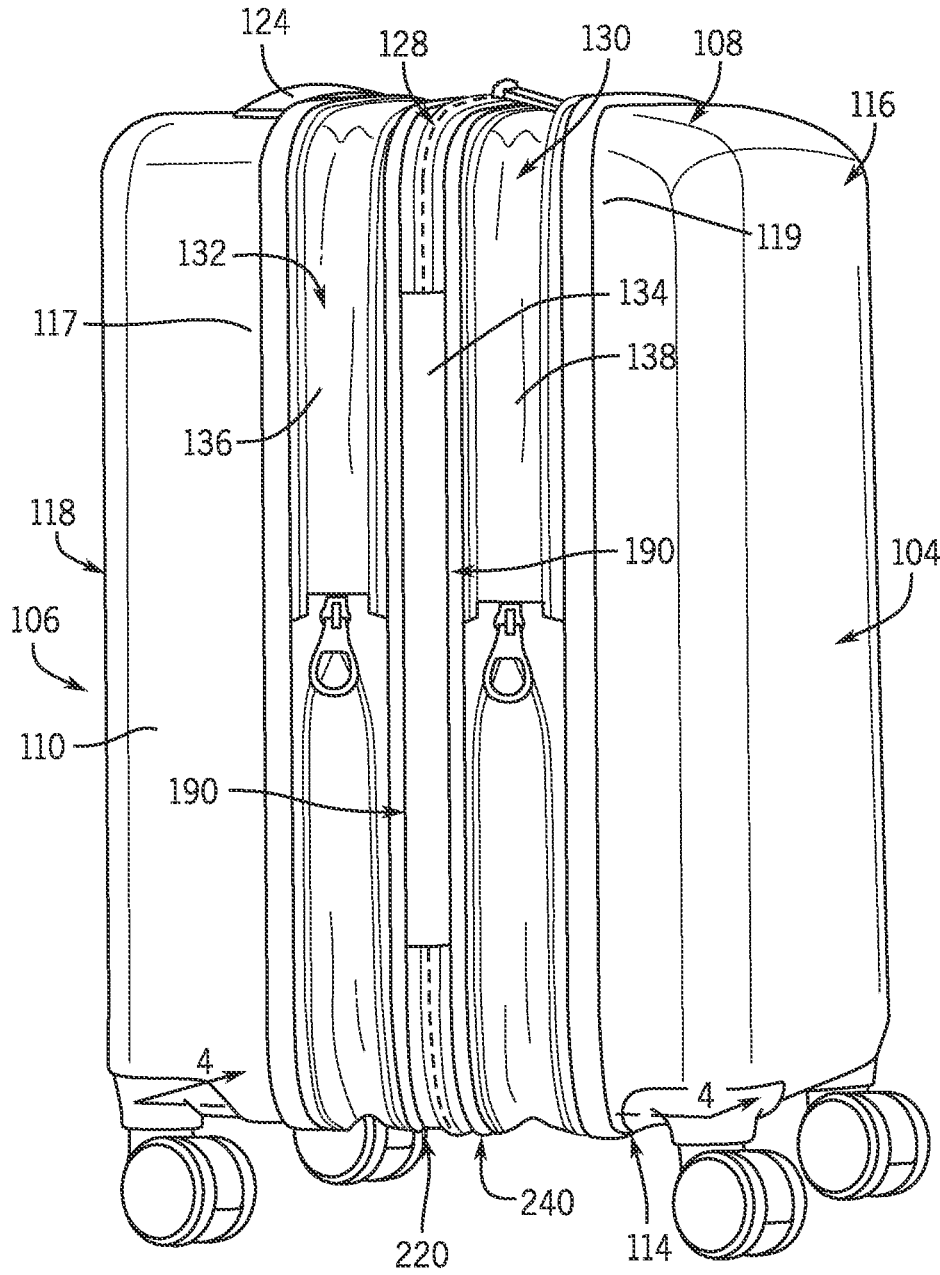


FIG. 1B

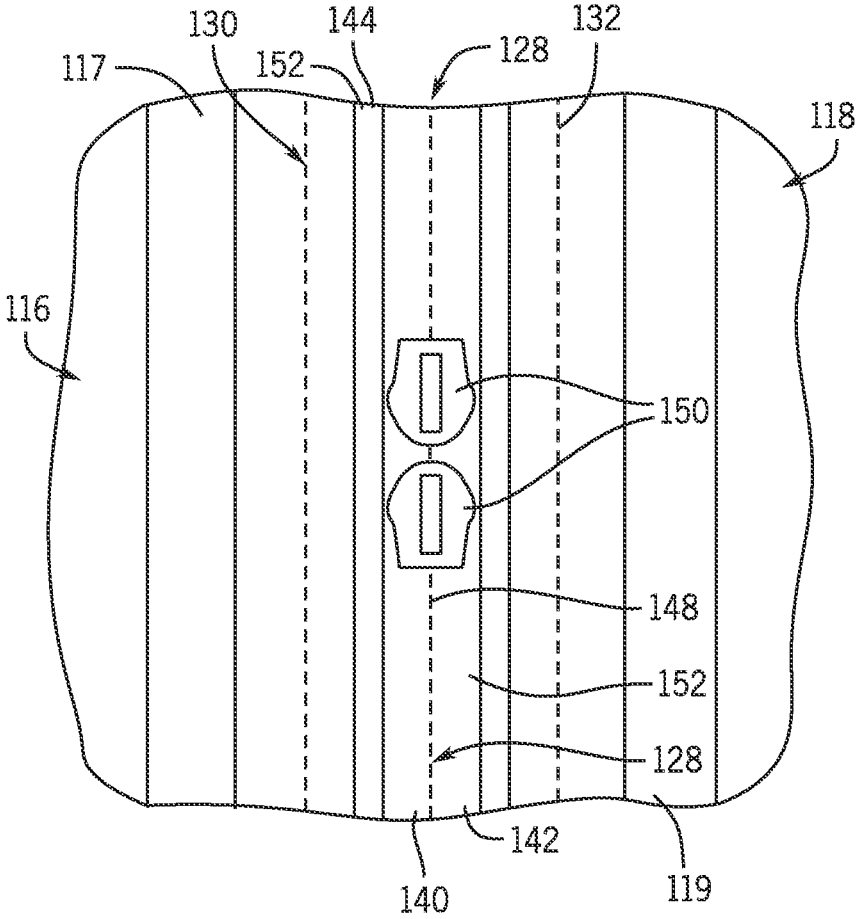


FIG. 2

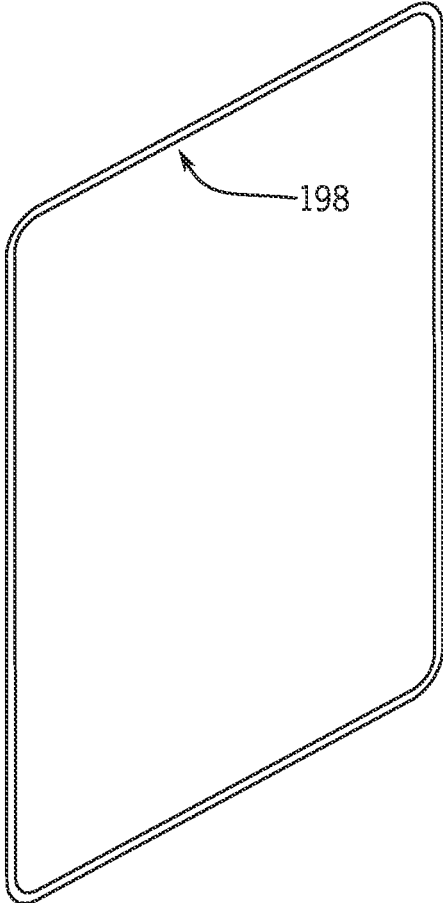


FIG. 5A

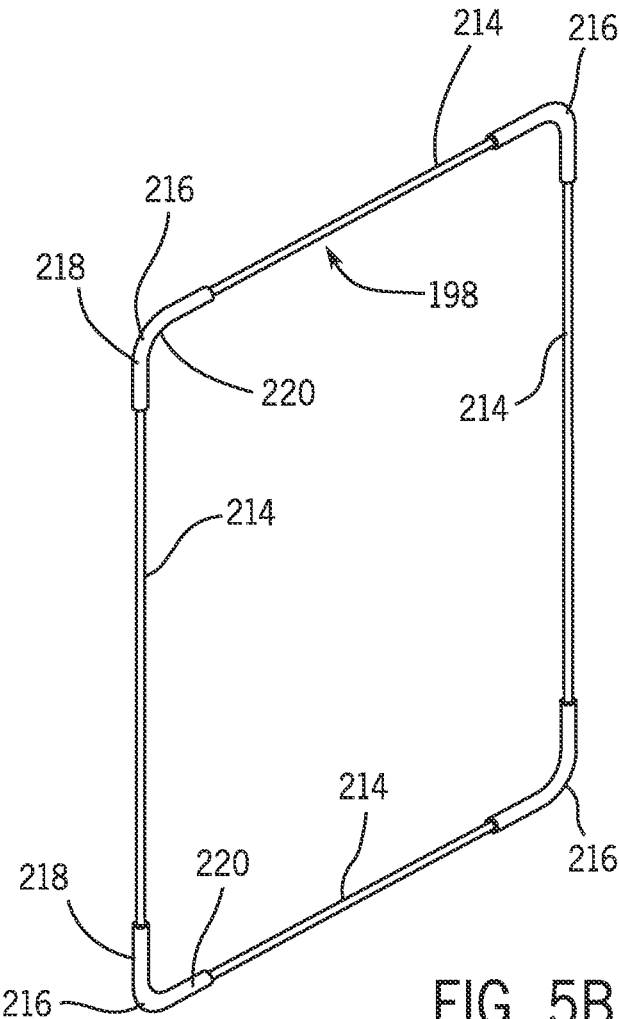


FIG. 5B

EXPANDABLE ZIPPER ARRANGEMENT FOR LUGGAGE

BACKGROUND

[0001] An important features of some luggage cases is the expandable zipper and expandability of the case. An expandable zipper allows a luggage case to be more functional since it can convert from a first unexpanded internal volume to a second expanded internal volume larger than the unexpanded internal volume. Expansion zippers are known to be adjacent to one side of an opening zip, and allow expansion of the luggage case on the respective side where the zipper is positioned. One issue with current expansion zippers is that many do not allow sufficient expansion of a luggage case to accommodate the user's articles, which requires the user to either acquire another luggage case or reduce the articles in order to fit into a typical expanded luggage case. Where existing luggage cases do allow significant expansion, they often require complicated, expensive, and/or heavy mechanisms to facilitate such expansion.

[0002] There is a need for an improved expansion zipper arrangement that is structurally simple, strong and inexpensive that allows a luggage case to expand sufficiently to accommodate a larger volume of user articles, while at the same time maintain structural integrity.

SUMMARY

[0003] A luggage case is disclosed. A luggage case may include a first shell having a first peripheral edge defining a first opening, and a second shell having a second peripheral edge defining a second opening, an opening zip assembly selectively joining the first and second peripheral edges of the first and second shells, a first expansion zip attached to the first peripheral edge and a first side of the opening zip assembly, a second expansion zip attached to the second peripheral edge and a second side of the opening zip assembly, a first reinforcing structure attached to and between the first expansion zip and the first side of the opening zip, and a second reinforcing structure attached to and between the second expansion zip and the first side of the opening zip.

[0004] Additionally, the first shell and the second shell may be made of hard sided material.

[0005] Additionally or alternatively, the first and second reinforcing structures are first and second elongated piping structures, each first and second piping structure including an elongated member.

[0006] Additionally or alternatively, either or both the first and second elongated members is made of wire, extruded plastic, or fiberglass.

[0007] Additionally or alternatively, the piping structure may include a cover layer forming a channel to receive the elongated member.

[0008] Additionally or alternatively, each of the first and second reinforcing structures extends along the respective first and second peripheral edge.

[0009] Additionally or alternatively, each of the first and second reinforcing structures extends along the respective first and second shell opening.

[0010] Additionally or alternatively, each of the first and second reinforcing structures extends along the respective first and second expansion zip.

[0011] Additionally or alternatively, the elongated member is a single piece formed in a loop.

[0012] Additionally or alternatively, the elongated member is a plurality of separate pieces attached together. Additionally, adjacent ends of each separate piece is secured together by a connector piece.

[0013] Additionally or alternatively, each expansion zip defines an unexpanded configuration and an expanded configuration, the expanded configuration having an expanded width defined by a gusset member, wherein in the expanded configuration each of the expansion zips has a greater width than the unexpanded configuration and spaces the connected first and second shells further apart. Additionally the expanded width of the respective gusset member of the first and second expansion zips are the same. Alternatively, the expanded width of the respective gusset member of the first and second expansion zips are different.

[0014] Additionally or alternatively, each expansion zip has a first and second opposing and engageable zip tapes and zip teeth, and wherein the respective gusset member is attached between the first and second zip tapes. Additionally, at least one gusset is attached below or underneath the first and second opposing zip tapes.

[0015] Additionally or alternatively, each of the respective gusset members is attached along one edge to the reinforcement structure. Additionally, each of the respective gusset members is attached along one edge to the opening zip member.

[0016] Additionally or alternatively, an opposite edge of each of the respective gusset members is coupled to the respective expansion zip or to the rim of the luggage case.

[0017] Additionally or alternatively, at least one hinge connects the first shell to the second shell to allow the shells to pivot along an opening edge with respect to each other when the opening zipper is open.

[0018] Additionally or alternatively, the first and/or second expansion zip have an expanded width between the expanded and non-expanded configuration of the first and second shells in the range including approximately 1 inch to approximately 4 inches.

[0019] Additionally or alternatively, a tow handle may be attached to one of the first or second shells. Additionally or alternatively a carry handle may attached to one of the first or second shells. Additionally or alternatively, at least one wheel assembly may be attached to one of the first or second shells at a lower corner region.

[0020] Additional embodiments and/or features are set forth in part in the description that follows, and will become apparent to those skilled in the art upon examination of the specification or may be learned by the practice of the disclosed subject matter. A further understanding of the nature and advantages of the present disclosure may be realized by reference to the remaining portions of the specification and the drawings, which forms a part of this disclosure. One of skill in the art will understand that each of the various aspects and features of the disclosure may advantageously be used separately in some instances, or in combination with other aspects and features of the disclosure in other instances.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] The description will be more fully understood with reference to the following figures in which components are not drawn to scale, which are presented as various examples

of the present disclosure and should not be construed as a complete recitation of the scope of the disclosure, characterized in that:

[0022] FIG. 1A shows a luggage case implementing an example of the invention in an unexpanded configuration;

[0023] FIG. 1B shows the luggage case of FIG. 1A in an expanded position;

[0024] FIG. 2 shows an enlarged area indicated by 1B-1B of FIG. 1A;

[0025] FIG. 3 is a cross-section view along line 3-3 of FIG. 2;

[0026] FIG. 4 is a cross-section view along line 4-4 of FIG. 2a; and

[0027] FIGS. 5A and B are examples of the elongated member of the reinforcing structure.

DETAILED DESCRIPTION

[0028] The improved expansion zipper arrangement described herein includes two expansion zip assemblies, one positioned adjacent opposite sides of a primary, or opening, zip assembly, with the opening zip assembly disposed or sandwiched therebetween, and which allow expansion of the luggage case by use of one or both of the expansion zipper assemblies. Each expansion zip assembly may include at least one reinforcing structure to support the expansion zip assembly when in both the expanded and unexpanded configurations. In the expanded position with one expansion zip assembly unzipped, each reinforcing structure may reduce the sag or deflection of the rim (and bottom panel) of the shell (e.g. closest to the support surface upon which the luggage case rests) to which it is most closely positioned. With both expansion zip assemblies expanded, each reinforcing structure acts to reduce the sag or deflection of the respective rim (and bottom panel) of the shell, and secondarily supports the other rim (and bottom panel) of the other shell.

[0029] The improved expansion zipper arrangement described herein may be suitable for use on many different types of luggage articles, including but not limited to hard-sided luggage cases, soft-sided luggage cases, hybrid luggage cases, duffel bags, brief cases, and other styles of luggage. The description of the improved expansion zipper arrangement is described herein with respect to a hard-sided luggage case having a first shell and a second shell 118 by way of example only, however the invention may be particularly suitable and beneficial for use on such hardside luggage.

[0030] FIG. 1A is an isometric view of a luggage article in a closed configuration according to some examples of the present disclosure. A luggage article 100 according to an embodiment of the present disclosure includes a luggage case 102 formed from a plurality of walls or panels defining an internal compartment and storage volume in which to carry a user's belongings. As shown, the luggage article 100 includes a front panel 104 opposing a rear panel 106, a top panel 108 opposing a bottom panel 110, and a left panel 112 opposing a right panel 114 that collectively define a pair of opposing shells 116, 118 and the outer structure of the luggage case 102. As shown, a plurality of wheel assemblies 120 may engage a support surface 121, and may be caster-type wheel assemblies, may be coupled to at least the bottom panel 110, such as at the lower corner regions 122.

[0031] The luggage article 100 may also include one or more carry handles 124, typically one on one side (for

example 114, not shown), and another (124) on the top panel 108 of the luggage article 100. The luggage article 100 may also include an extendable or telescopic tow handle 126 attached to at least one panel of the luggage case 102, such as to the rear panel 106.

[0032] With continued reference to FIG. 1A, the luggage case 102 in this example comprises a first shell 116 defining a first peripheral edge or rim 117 defining a first shell opening, and a second shell 118 having a second peripheral edge 119 defining a second shell opening. The respective first and second peripheral edges 117 and 119 of each shell being secured by an opening zip assembly 128. The opening zip assembly 128 allows opening of the luggage case such that the first 116 and second 118 shells pivot away from each other to allow access to the interior compartment of the luggage case 102. The opening zip assembly 128, such as for example a zipper structure, extending across at least the top panel 108, left panel 112, and bottom panel 110. The opening zip assembly 128 may continue along a portion of the right panel 114, and a hinge structure 134 may be formed, for example, on the right panel 114 such that the respective peripheral edge or rim 117, 119 of each of the two halves (shells 116, 118) of the luggage case 102 remain connected by the hinge 134 when the opening zip assembly 128 is unzipped and the shells 116, 118 rotate apart about the hinge 134 to access the interior volume of the luggage case 102. The shells 116, 118 may define an inner surface and an outer surface, and may be formed from materials used to construct hard-sided or rigid luggage cases, such as a plastic material, such as polypropylene, polyurethane, self-reinforced polypropylene, or other materials.

[0033] FIG. 1B shows the opening zip assembly 128 in the closed configuration, and the first expansion zip assembly 130 and the second expansion zip assembly 132 each in an expanded configuration. The first expansion zip assembly 130 is positioned between the opening zip assembly 128 and the first shell 116. In the expanded configuration, the first expansion zip assembly 130 effectively increases the internal volume of the first shell 116 by allowing the first 116 and second 118 shells to be spaced a further distance apart while remaining coupled together than when in the unexpanded configuration. The distance the first 116 and second 118 shells may be spaced apart in the expanded configuration may be defined by the effective expanded width of the first expansion gusset 136. The first expansion zip assembly 130 defines a first expansion zone on the luggage case 102. The second expansion zip assembly 132 is positioned between the opening zip assembly 128 and the second shell 118. In the expanded configuration, the second expansion zip assembly 130 effectively increases the internal volume of the second shell 118 by allowing the first 116 and second 118 shells to be spaced a further distance apart while remaining coupled together than when in the unexpanded configuration.

[0034] The distance the first 116 and second 118 shells may be spaced apart in the expanded configuration may be an amount defined by the effective width of the second expansion gusset 138. The second expansion zip assembly 132 defines a first expansion zone on the luggage case 102. The effective width of the first expansion gusset 136 and the second expansion gusset 138 may be the same, wherein each expansion zip assembly may increase the internal volume of the respective shell by the same amount. The effective widths of the first 136 and second 138 gussets may be

different from one another, and may thus increase the volume of the respective shell **116**, **118** by different amounts. The hinge **134** is shown extending along a length of the opening zip assembly **128**. The hinge **134** may be secured between the opening zip assembly **128** and each adjacent reinforcement assemblies as described below.

[0035] FIGS. **2** and **3** show an enlarged view of a portion of the example of an opening zip assembly **128** and adjacent expansion zip assemblies **130** and **132** as shown in FIG. **1A**. The opening zip assembly **128** may include a first **140** and second **142** opening zip members. The first **140** and second **142** opening zip members may have the same or similar structure, and are described herein using common reference numbers for common structure. Each of the first **140** and second **142** opening zip members may include an elongated zip tape **144** with closure members **146** extending along one opposing edge portion **148**. The closure members **146** may include zipper teeth or zipper coils, and the closure members may be hidden or exposed along the edge **148** of the zip tape **144**. The closure members **146** may be attached and separated by one or more zip sliders **150**. The other opposing edge portion **152** of each zip tape **144** may each be coupled with a respective expansion zip assembly **130**, **132**. The first expansion zip assembly **130** is on one side of and adjacent to the first opening zip member **140**, and the second expansion zip assembly **132** is on an opposite side of and adjacent to the second opening zip member **142**.

[0036] Referring to FIGS. **3** and **4**, the first expansion zip assembly **130** and the second expansion zip assembly **132** are shown in closed or unexpanded configurations (FIG. **3**) and in open or expanded configurations (FIG. **4**). In an expanded configuration (whether only one expansion zip is expanded or both expansion zips are expanded), each of the first and second expansion zip assemblies has a greater width than in the unexpanded configuration, which allows the connected first and second shells to be spaced further apart from one another. Each of the first **130** and second **132** expansion zip assemblies may have the same or similar structure. Each of the first **130** and second **132** expansion zip assemblies may include a first **156** and second **158** expansion zip member. Each of the first and second expansion zip members **156**, **158** may include an elongated zip tape **164** with closure members **166** extending along one opposing edge region **168**. The closure members **166** may include zipper teeth or zipper coils, and the closure members **166** may be hidden (for instance, attached along a lower edge of the zip tape) or exposed (for instance, attached along an upper edge of the zip tape), or both (for instance a double zipper), along the edge region of the zip tape **164**. The other edge region **170** of the zip tape **164** for the first expansion zip member **156** may be coupled to a rim **117**, **119** of the respective luggage shell **116**, **118**. The edge region **172** of the zip tape **164** for the second expansion zip member **158** may be coupled to the opening zip assembly **128**. In one example, the edge region **172** may be part of a multi-layer structure attached by stitching **184** to the opening zip assembly **128**.

[0037] Referring still to FIGS. **3** and **4**, the respective gusset member **136**, **138** of each expansion zip assembly **130**, **132** may have the same or similar structure and connections, and may be described herein with respect to one gusset member **136**, which may apply to the other gusset member **138** unless otherwise noted. The gusset member **136** may include opposing edge regions **178** and **180**. Edge

region **178** may be coupled between the first **156** and second **158** expansion zip members, and may collapse when the respective expansion zip assembly **130**, **132**, is in a closed or unextended configuration, and may expand up to a full effective width of the gusset member **136** when the respective expansion zip assembly **130**, **132** is in an opened or extended configuration. In one example, the gusset member **136** may be coupled to the edge region **170** of the zip tape **164** and the rim **117**, **119** of the respective shell **116**, **118** by a line of stitching **174**. Alternatively the gusset member **136** may be coupled to the edge region **170** of the zip tape **164** by a line of stitching **176**, with the zip tape **164** then attached to the rim **117**, **119** of the respective shell **116**, **118** by line of stitching **174**.

[0038] The opposite edge region **180** of the gusset member **136** of each expansion zip assembly **130**, **132** may be coupled to the edge region **172** of the respective expansion zip member **158**. As noted above, the edge region **172** of the zip tape **164** for the first and/or second expansion zip member **158** may be coupled to the opening zip assembly **128**. In one example, the edge region **172** of each expansion zip assembly **130**, **132** may be part of a multi-layer structure each attached by stitching along opposing sides of the opening zip assembly **128**.

[0039] Referring to FIG. **4**, in the fully expanded configuration, the fully expanded gusset member **136** of each expansion zip assembly **130**, **132** may be sized to allow an expansion **X** of approximately one inch for each expansion zip assembly **130**, **132**, an expansion of approximately 4 inches for each expansion zip assembly **130**, **132**, or an expansion amount therebetween. In one example the amount of expansion may be measured by the difference in spacing between the first peripheral edge **117** of the first shell **116** and the second peripheral edge **119** of the second shell **118** when in the unexpanded configuration and the expanded configuration. In this example when the expansion zip assemblies **130**, **132** is in the unexpanded configuration, the space between the first peripheral edge **117** and the second peripheral edge **119** may be between about 0.5 inches to about 2 inches. In another example the amount of expansion is measured by the difference is the spacing between the zipper teeth of the respective expansion zip assembly **130**, **132** between the unexpanded configuration and the expanded configuration. In this example, when each of the expansion zip assemblies **130**, **132** are in the unexpanded configuration, the space between the respective zipper teeth is minimal or close to zero inches because the zipper teeth are engaged. The full expansion width, in the examples provided, may be greater or less than these examples depending on the amount of expansion desired in the luggage case. The expansion of the each expansion zip assembly **130**, **132** may be the same as each other, or may be different from each other. In one example, where the amount of expansion is the same for each expansion zip assembly **130**, **132**, each of the gusset members **136** in each respective expansion zip assembly **130**, **132** may define the same expanded dimension, such as width. In an example where the amount of expansion is different for each expansion zip assembly **130**, **132**, each of the gusset members **136** in each respective expansion zip assembly **130**, **132** may define different expanded dimensions, such as different width dimensions. For example, the gusset member **136** of expansion zip assembly **130** may be 1 inch, and the gusset member **136** of expansion zip assembly **130** may be 4 inches. The

amount of expansion for each expansion zip assembly may be less than 1 inch, or may be more than 4 inches.

[0040] In one example, the volume of an unexpanded luggage case 102 may be increased by a first volume by opening the first expansion zip assembly 130 (the first expansion zone). The volume of the luggage case may be further increased by opening the second expansion zip assembly 132 (the second expansion zone). In one example, a carry-on luggage case has an unexpanded internal dimension of 19 inches long or tall×14 inches wide×10 inches deep, with each of the expansion zip assemblies creating an expansion of the depth dimension by 1.5 inches. The unexpanded volume is thus 2660 cubic inches. The unexpanded volume of the luggage case is increased by approximately 15% to 3059 cubic inches (the first expanded volume) by expanding the first expansion zip assembly 130, which increases the depth by 1.5 inches. Expanding or opening the second expansion zip assembly 132 incrementally increases the depth by an additional 1.5 inches increasing the total volume of the suitcase to 3458 cubic inches, which is an incremental volume of about 15% over the unexpanded volume, and a combined 30% increase over the unexpanded volume. The expansion of the second expansion zip assembly 132 is an incremental of the volume by about 13% over the first expanded volume. The reinforcing structure 190 as described herein aids the improvement of the expansion of a luggage case by reducing the sag or deflection of portions of the expanded luggage case when expanded.

[0041] Continuing with reference to FIGS. 1, 2, 3 and 4, each expansion zip assembly 130, 132 may also include a reinforcing structure 190 that is positioned between the expansion zip assembly 130, 132 and the opening zip assembly 128. The reinforcing structure 190 may extend along at least a part of the length of the opening zip assembly 128 and the respective expansion zip assembly. In another example, the reinforcing structure 190 may extend along the entirety of the length of the opening zip and the respective expansion zip assembly. In one example the reinforcing structure 190 may encircle the luggage case and form a loop. The loop may be a fully enclosed or partially enclosed, such as where the reinforcing structure 190 extends at least 75% of the periphery of the rim to which it is coupled. In one example, each reinforcing structure 190 may extend along and spaced away from a peripheral edge 117, 119 of one of the luggage shells 116, 118. The dimension or width of the space may be defined by the expansion zip assembly 128, and its expanded or unexpanded configuration, positioned between the reinforcing structure 190 and the adjacent peripheral edge 117, 119 of the respective luggage shell 116, 118. In one example the width or dimension of the space may range from approximately 0.5 inches to approximately 4 inches, or more or less.

[0042] The first reinforcing structure 190 may be positioned between the first expansion zip assembly 130 and the opening zip assembly 128, and a second reinforcing structure 190 may be positioned between the second expansion zip assembly 130 and the opening zip assembly 128.

[0043] Each reinforcing structure 190 may be defined by a piping structure 194. The piping structure 194 may include an elongated member 198 positioned within an interior channel 202 formed by a cover layer 206. The elongated member 198 may be relatively stiff but resiliently flexible. The elongated member 198 may be made of a relatively thin material, such as metal wire, (for example spring steel),

extruded plastic, or fiberglass. In some examples the elongated member 198 may have a circular cross section, oval cross section, rectilinear cross section, tear-dropped cross section, or variable-shaped cross section, along its length. The elongated member 198, where steel wire, may have a major cross sectional dimension of 2.4 to 3.2 mm, with 3.0 mm often used. The elongated member 198, where plastic or fiberglass, may have a major cross sectional dimension of 2.0 mm to 4.0 mm, with 3.5 mm being used. The major cross sectional diameter may be larger or smaller depending on the desired physical properties and the material used.

[0044] With reference to FIG. 5A, in one example the elongated member 198 inside the cover layer 206 may be a single piece of material, such as for example steel wire, formed into a loop. The single piece of material may be relatively flexible, such as for example to allow bending around a relatively large radius, such as that formed by a corner region 123 defined by the transition from a top panel 108 or bottom panel 110 of the luggage case 102 to a side panel 110, 112 of the luggage case 102 (see FIG. 1B).

[0045] Referring to FIG. 5B, in another example, the elongated member 198 inside the cover layer 206 may be made of more than one piece 214 attached together. In one such example, there may be four separate pieces 214, with the ends of adjacent separate pieces 214 being secured together by a connector piece 216. In a further example, each separate piece 214 is matched to be as long as a wall or panel forming the peripheral edge 217, 219 of a respective first 116 or second 118 luggage shell, and the connector piece 216 is a corner connector piece to attach the adjacent separate pieces 214 at a corner region 123 of the peripheral edge 117, 119. A corner region 123, as noted above with respect to FIGS. 1B and 5A, may be formed by the transition from a top panel 108 or bottom panel 110 of the luggage case 102 to a side panel 110, 112 of the luggage case 102 (see FIG. 1B). In one example, the corner connector piece 214 has a bent shape such that the separate pieces 214 engaging the corner piece 216 extend at an angle such that each separate piece 214 extends along a portion of a respective peripheral edge 117, 119 of the luggage case. The corner piece 216 may be bent in an “L” shape having an angle defined above between a first portion 218 and a second portion 220. One example of an angle is approximately 90 degrees. The first portion 218 and the second portion 220 may each define a sleeve forming a recess to receive an end of a separate piece 214 in order to couple the separate pieces 214 together. The ends of the separate pieces 214 may be attached to the corner pieces 214 by friction fit, adhesive, clamping, stitching or mechanical fastener.

[0046] The cover layer 206 may be made of a flexible material. The flexible material may be folded over onto itself to define the interior channel 202 that receives the elongated member 198. The overlapping ends of the cover layer 206, once folded over, may be sewn or otherwise fastened together. In some examples the overlapping ends may be sewn, stitched or fastened together with other layers, such a gusset member(s) 136, a hinge member(s) 134, a zipper tape(s) 164, or other layers. The channel 202 may be sized to closely receive and engage the elongated member 198 along its length. The cover layer 206 may frictionally secure the elongated member 198 in position inside the cover layer 206. The cover layer 206 may be made of the same material that forms the gusset member 236, and in some examples the cover layer 206 and the gusset 136 may be separate pieces

of material, and in other examples may be an integral, unitary piece of material. In other examples, the cover layer 206 may be an extruded material defining an interior channel 202 for receiving the elongated member 198, the extruded material defining a flange allowing it to be stitched together with other layers in the sandwich or lamina structure defined below.

[0047] Referring still to FIGS. 3 and 4, one edge portion 170 of the first expansion zip assembly 130 may be secured along the first rim 117 of the first shell 116. The second expansion zip assembly 132 may have the same or similar structure as described here for the first expansion zip 130. In one example, the zip tape 164 of the first expansion zip assembly 130 and one opposing edge portion 178 of the gusset member 136 form layers of a lamina or sandwich structure, and are secured to the rim 117 of the first shell 116 by stitching. Alternatively, a portion of the gusset 136 inside of the edge portion 178 may optionally be attached to the zip tape 164 along a line of stitching 176, and the edge portion 178 may or may not be secured to the rim 117 of the shell 116 with the edge portion 170 of the zip tape 164. An optional S-shaped edge guard or trim piece 175 may be included on the rim 117 of the first shell 116 and included in the lamina or sandwich structure stitched together to the rim 117 in order to provide protection and/or a finished appearance.

[0048] Continuing with FIGS. 3 and 4, the opposite edge portion 172 of the first expansion zip assembly 130 may be coupled with the first reinforcing structure 190 and be secured to an adjacent edge 152 of the opening zip assembly 128. In one example, the expansion zip tape 130, an opposing edge region 180 of the gusset member 136, the first reinforcing structure 190, and an edge region 152 of the first opening zip tape 128 are aligned together to form a lamina or sandwich structure and secured by stitching 184. In another example the opposing edge region 180 of the gusset member 136 may be secured to the expansion zip tape 164 separately and not collectively with the other layers. The lamina or sandwich structure may include other layers not defined herein, or shown in the figures.

[0049] In the example shown, the first reinforcing structure 190 may include edges 210 of the cover layer 206 overlapping and forming the internal channel 202 receiving the elongated member 198. The edges 210 of the cover layer 206 may define layers in the lamina or sandwich structure, in one example being attached together by stitching 184. As referenced above, in another example where the cover layer 206 of the piping 194 is formed by an extruded plastic material and defining an attachment flange, the flange may be included in the lamina or sandwich structure, and be secured by stitching (in place of the edges 210 of the cover layer 206) between the first expansion zip assembly 130 and the opening zip assembly 128. Referring to FIG. 4, each lamina of layers stitched together by stitch line 184 may be covered by a trim layer 244 to provide some protection, as well as a finished appearance.

[0050] As shown in dash in FIG. 4, the hinge 134, where present, may connect the first shell to the second shell to allow the shells to pivot along an opening edge with respect to each other when the opening zipper assembly 128 is opened. In another example, the hinge 134 may define opposing edge regions 212 that are each coupled to a respective opposing edge region of the opening zip assembly 128 and may extend over only the opening zip assembly. In

another example, each edge region 212 of the hinge 134 may be positioned between the opening zip assembly 128 and the reinforcing structure 190 as part of the lamina of layers and secured thereat by stitching, such as by stitching 184. The hinge 134 in this example may be made of a non-extensible or in another example an elastic material, and may extend over the opening zip assembly 128. The hinge 134 may not extend over the reinforcing structures 190 or the expansion zip assemblies 130 and 132. In this manner it does not interfere with the expansion function of either of the first or second expansion zip assemblies 130, 132. In another example, the hinge 134 may extend over the reinforcing structures 190 and respectively be coupled along either edge region 212 to the extension zip assemblies 130, 132, or respectively to the reinforcing structures 190. In another example, the edge regions 212 of the edge region may be attached directly or indirectly to the peripheral edges 117, 119 of the shells 116, 118 and extend over all or part of the opening zipper assembly and first 130 and second 132 expansion zipper assemblies.

[0051] Referring now to FIGS. 1A, 1B, 3, and 4, where in this example the luggage case 102 is shown sitting upright with the wheel assemblies 120 engaging the support surface 121. In this example the first reinforcing structure 190 may provide structural support Z to the first peripheral edge or rim 117, and/or a portion of the adjacent or nearby portion of the bottom panel 110, and/or the first expansion zip assembly 130, and/or the opening zipper assembly to reduce and/or limit the downward deflection Y of the some or all of these components towards the support surface 121 (see FIG. 1). The deflection of some or all of these components is due to the weight of the contents of the luggage case while in either the un-expanded or expanded configurations. Similarly, the second reinforcing structure 190 may provide structural support Z to the second peripheral edge or rim 119, and/or a portion of the adjacent or nearby portion of the bottom panel 110, and/or the second expansion zip assembly 132, and/or the opening zipper assembly 128 to reduce and/or limit the downward deflection Y of the some or all of these components towards the support surface 121 (see FIG. 1). The deflection of some or all of these components is due to the weight of the contents of the luggage case while in either the un-expanded or expanded configurations. The structural support is created by the extension of the reinforcing structure 190 around at least a portion of the peripheral edge or rim 117, 119 of each of the shells 116, 118. Where the reinforcing structure 190 is in the form of a loop (whether made of a single piece or multiple pieces connected together), and extends around the entirety along the peripheral edge 117, 119 of the respective luggage shell 116, 118, the strength of the piping 194 creates the structural support. The elongated member 198 may be the primary source of the supportive structure. The elongated member 198 is received within the cover 206 to form the piping 194, which is coupled to the opening zip assembly 128 on one side, and the respective expansion zip assembly 130, 132, on the other to connect the reinforcing structure 190 to the respective shell 116, 118.

[0052] In one example, the support provided to each peripheral rim 117, 119 and adjacent portion of the bottom panel 114 may be greater in the unexpanded position than in the expanded position. This may be because, as shown in FIG. 3, in the unexpanded position, the reinforcing structure 190 is more closely positioned near its respective peripheral

rim 117, 119 being separated only by the width of the respective closed expansion zip 130, 132. In the expanded position, such as in FIG. 4, where both the expansion zip assemblies 130, 132 are opened/expanded, the respective structure 190 may be further away from the respective peripheral edge 117, 119. In this expanded configuration, the reinforcing structure 190 still provides support to reduce or limit deflection of the peripheral edge or rim 117, 119 due to the load caused by the contents of the luggage case. The reinforcing structure 190 coupled with the first expansion zipper assembly 130 provides support primarily to the first rim 117 and bottom panel 110 of the first shell 116. It may also provide some supplemental support to the second rim 119 and bottom panel 114 of the second shell 118. Likewise, the reinforcing structure 190 coupled with the second expansion zipper assembly 132 provides support primarily to the second rim 119 and bottom panel 110 of the second shell 118. It may also provide some supplemental support to the first rim 117 and bottom panel 110 of the first shell 116. The reinforcing structures 190 each provide structural support at the respective opposing edges of the opening zipper assembly 128 (for example see arrows 220, 240) because of the structural stiffness of the piping 194, and in one example specifically because the elongated member 198 is relatively stiff. When the elongated member 198 is included in the cover 206, the piping 194 reduces the deflection of the rim 117, 119 and bottom panel 110 of the shell 116, 118 under the load of the contents of the luggage case 102. In an example where the reinforcing structure 190 is a piping 194 including an elongated member 198 received in a cover layer 206, and is formed in a loop attached along a respective edge of the opening zipper assembly 130, the structure may support the load of the luggage contents and significantly reduce the deflection of the peripheral edge or rim 117, 119 and bottom panel 110 of the shell 116, 118.

[0053] All relative and directional references (including: upper, lower, upward, downward, left, right, leftward, rightward, top, bottom, side, above, below, front, middle, back, vertical, horizontal, and so forth) are given by way of example to aid the reader's understanding of the particular examples described herein. They should not be read to be requirements or limitations, particularly as to the position, orientation, or use 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.

[0054] Those skilled in the art will appreciate that the presently disclosed examples teach by way of example and not by limitation. Therefore, the matter contained in the above description or shown in the accompanying drawings should be interpreted as illustrative and not in a limiting sense. The following claims are intended to cover all generic and specific features described herein, as well as all statements of the scope of the present method and system, which, as a matter of language, might be said to fall there between.

1. A luggage case comprising:

- a first shell having a first peripheral edge defining a first opening, and a second shell having a second peripheral edge defining a second opening;

- an opening zip assembly selectively joining the first and second peripheral edges of the first and second shells;
 - a first expansion zip attached to the first peripheral edge and a first side of the opening zip assembly;
 - a second expansion zip attached to the first peripheral edge and a second side of the opening zip assembly;
 - a first reinforcing structure attached to and between the first expansion zip and the first side of the opening zip; and
 - a second reinforcing structure attached to and between the second expansion zip and the first side of the opening zip.
- 2.** The luggage case as defined in claim 1, wherein the first shell and the second shell are made of hard sided material.
- 3.** The luggage case as defined in claim 2, wherein: the first and second reinforcing structures are first and second piping structures, each first and second piping structure including an elongated member.
- 4.** The luggage case as defined in claim 3, wherein either or both the elongated members is made of wire, extruded plastic, or fiberglass.
- 5.** The luggage case as defined in claim 3, wherein the piping structure includes a cover layer forming a channel to receive the elongated member.
- 6.** The luggage case as defined in claim 3, wherein each of the first and second reinforcing structures extends along the respective first and second peripheral edge.
- 7.** The luggage case as defined in claim 3, wherein each of the first and second reinforcing structures extends along the respective first and second shell opening.
- 8.** The luggage case as defined in claim 3, wherein each of the first and second reinforcing structures extends along the respective first and second expansion zip.
- 9.** The luggage case as defined in claim 3, wherein the elongated member is a single piece formed in a loop.
- 10.** The luggage case as defined in claim 3, wherein the elongated member is a plurality of separate pieces attached together.
- 11.** The luggage case as defined in claim 10, wherein adjacent ends of each separate piece is secured together by a connector piece.
- 12.** The luggage case as defined in claim 1, wherein: each expansion zip assembly defines an unexpanded configuration and an expanded configuration, the expanded configuration having an expanded width defined by a gusset member; wherein in the expanded configuration each of the expansion zip assemblies has a greater width than the unexpanded configuration and spaces the connected first and second shells further apart.
- 13.** The luggage case as defined in claim 12, wherein the expanded width of the respective gusset member of the first and second expansion zip assemblies are the same.
- 14.** The luggage case as defined in claim 12, wherein the expanded width of the respective gusset member of the first and second expansion zip assemblies are different.
- 15.** The luggage case as defined in claim 1, wherein: each expansion zip has a first and second opposing and engageable zip tapes and zip teeth, and wherein the respective gusset member is attached between the first and second zip tapes.
- 16.** The luggage case as defined in claim 15, wherein at least one gusset is attached below the first and second opposing zip tapes.

17. The luggage case as defined in claim **15**, wherein:
each of the respective gusset members is attached along
one edge to the reinforcement structure.

18. The luggage case as defined in claim **17**, wherein:
each of the respective gusset members is attached along
one edge to the opening zip assembly.

19. The luggage case as defined in claim **18**, wherein:
an opposite edge of each of the respective gusset members
is coupled to the respective expansion zip assembly or
to the rim of the luggage case.

20. The luggage case as defined in claim **1**, wherein:
at least one hinge connects the first shell to the second
shell to allow the shells to pivot along an opening edge
with respect to each other when the opening zip assem-
bly is open.

21. (canceled)

22. (canceled)

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