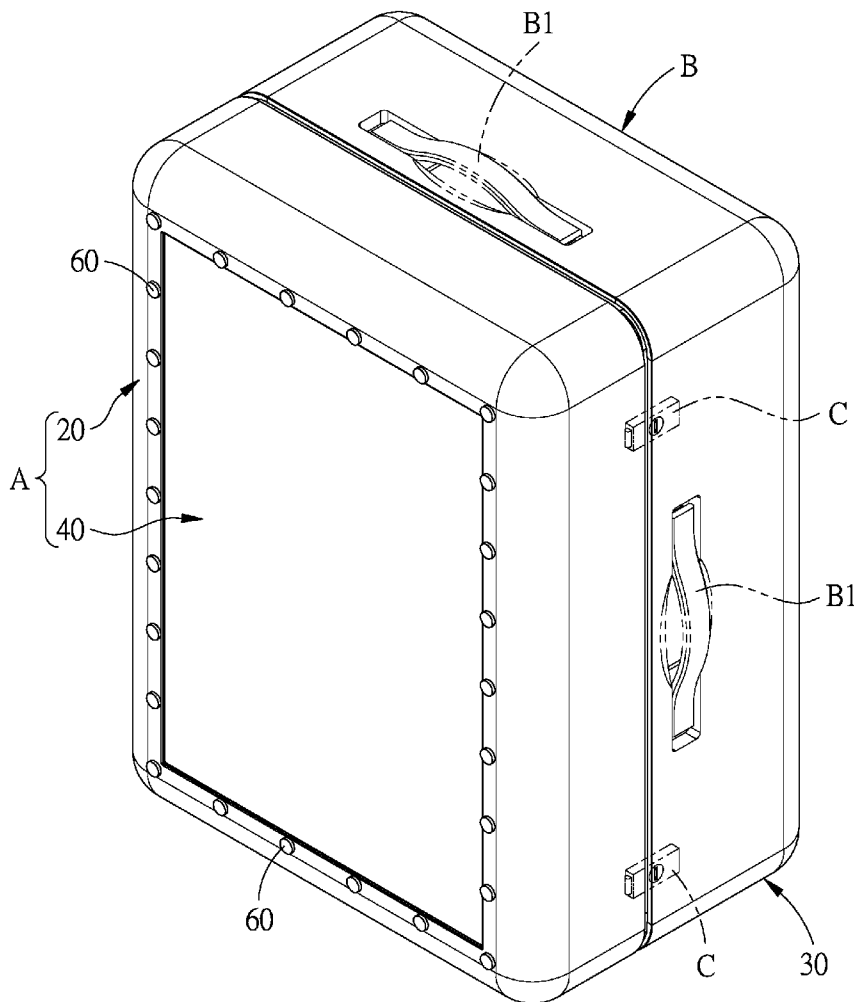


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A luggage case structure is provided with two aluminum alloy frames which extend in depth to the bottom of the two shells to form the four lateral surfaces of the two shells, which solves the problem of structure strength difference between the bottom of the shells of the convention luggage case and the lateral boards. Besides, the carbon fiber is formed into two-dimensional flat boards instead of a three-dimensional structure, which not only makes manufacturing easier, but also enhances the structural strength while reducing weight.



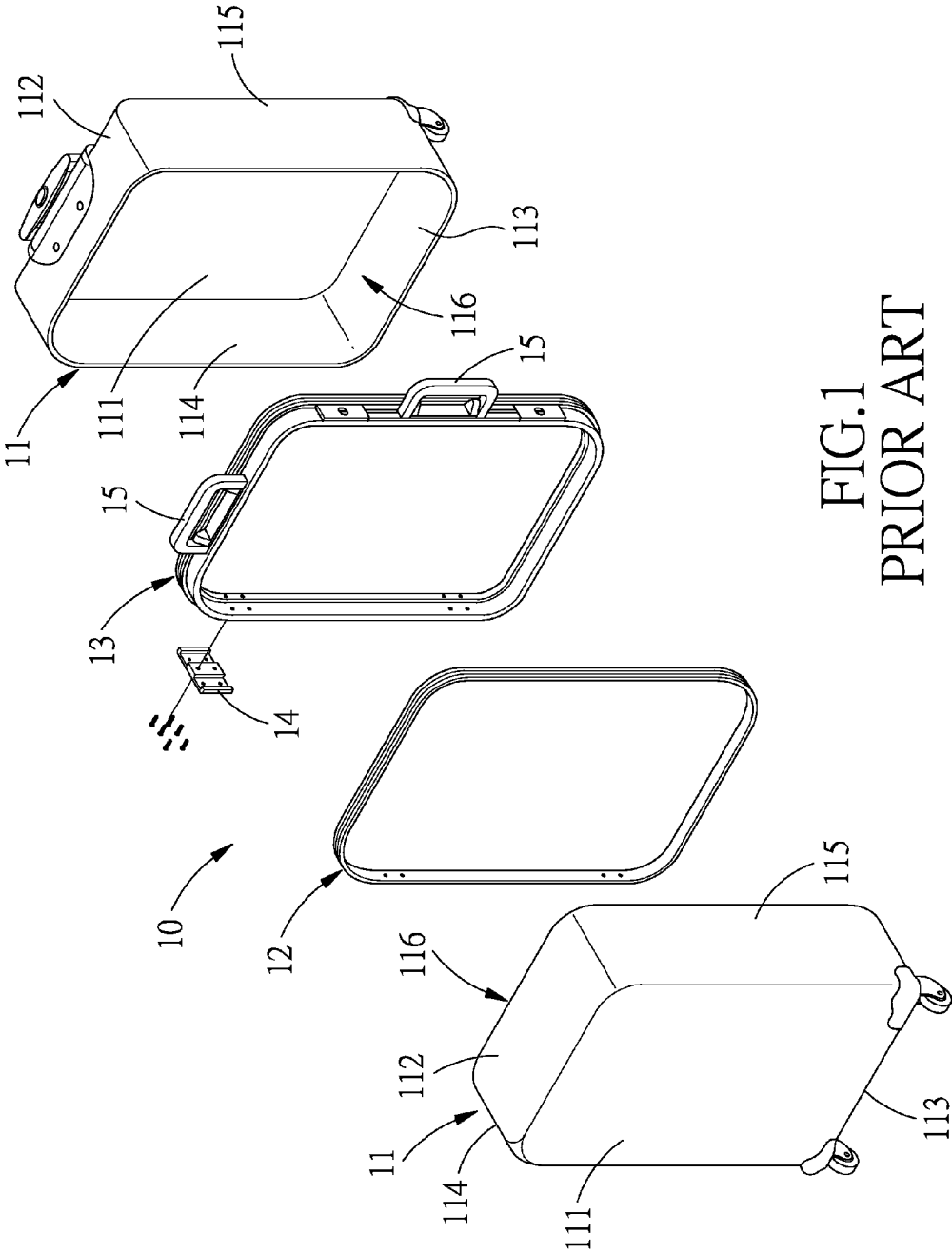


FIG.1
PRIOR ART

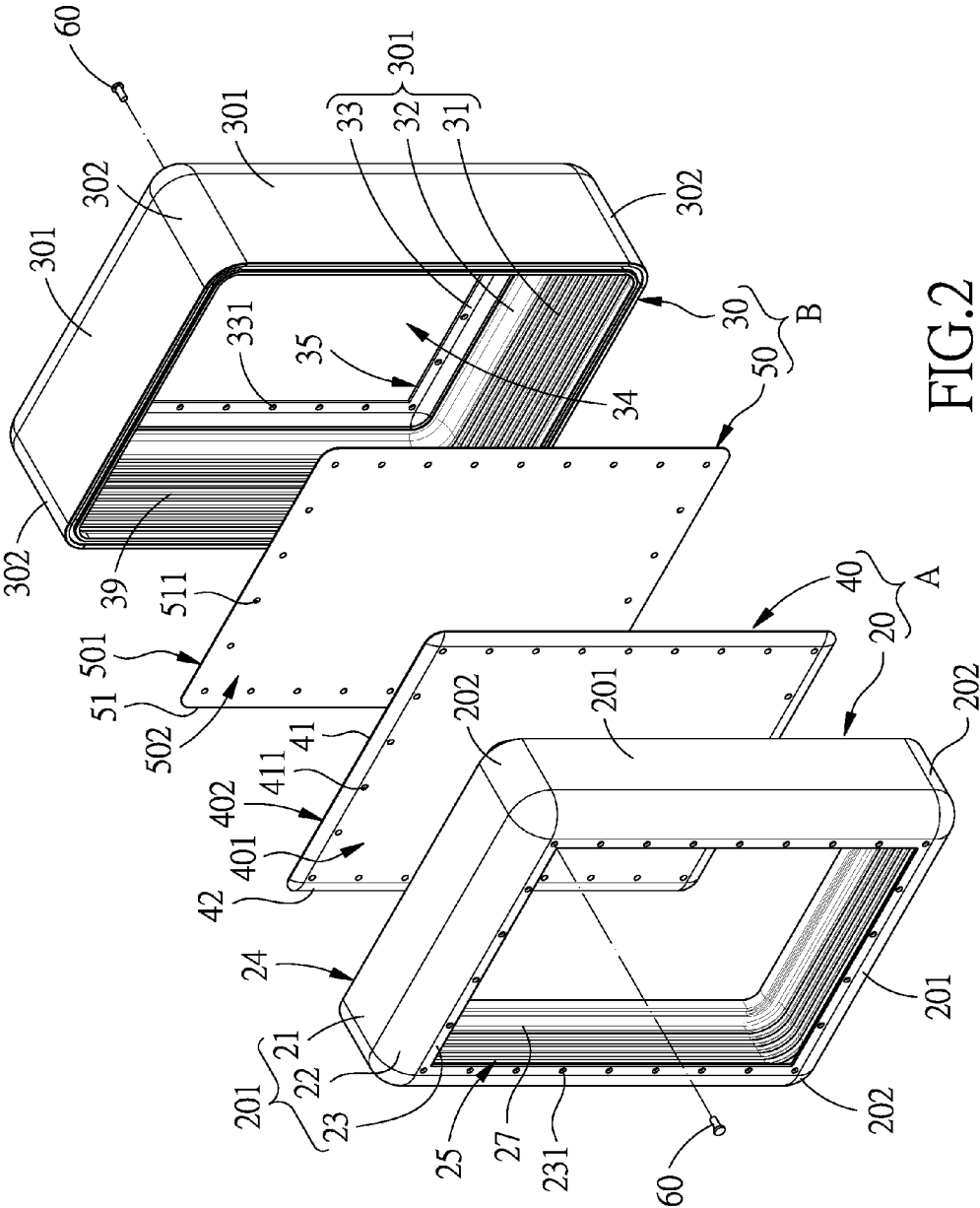


FIG. 2

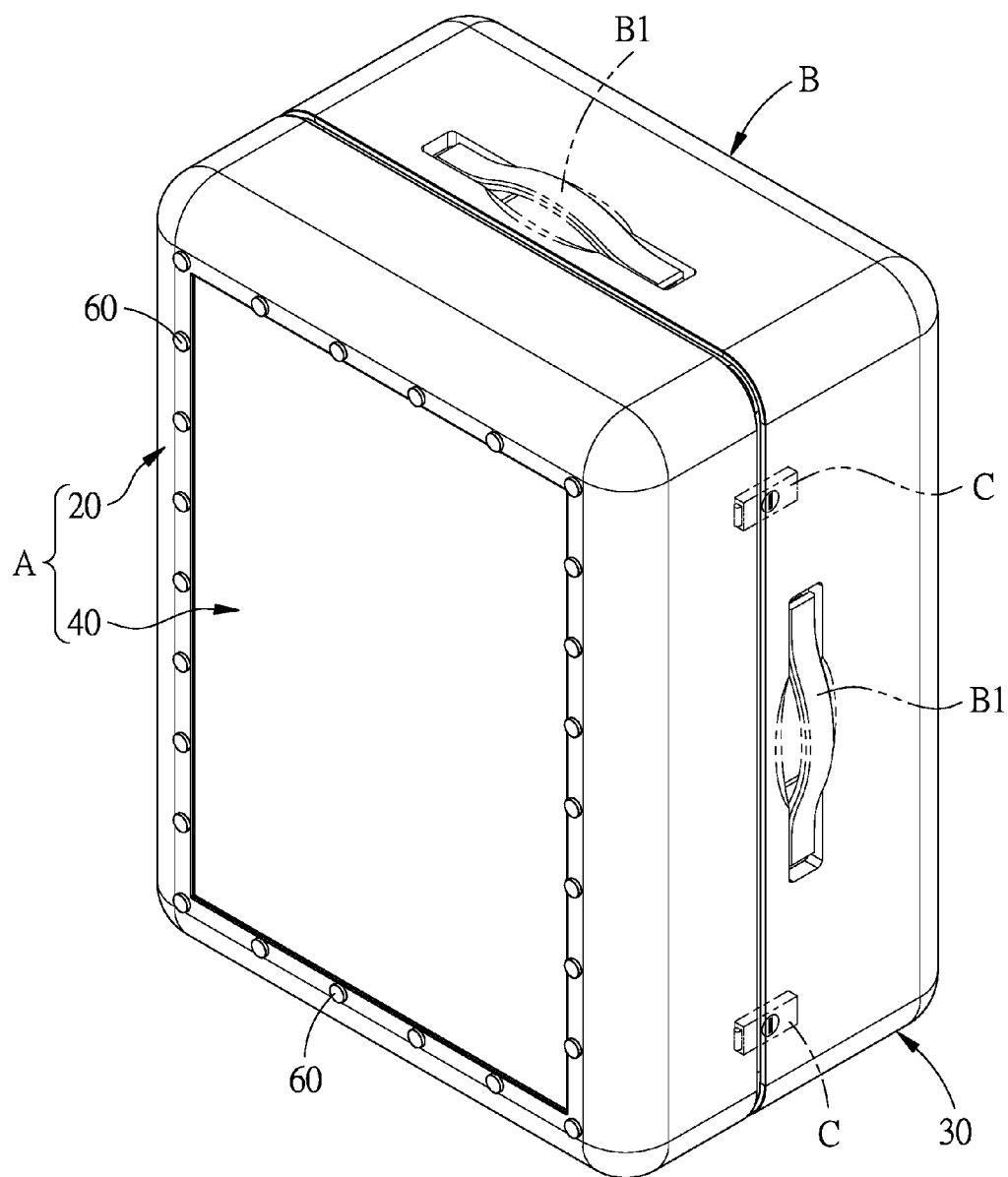


FIG.3

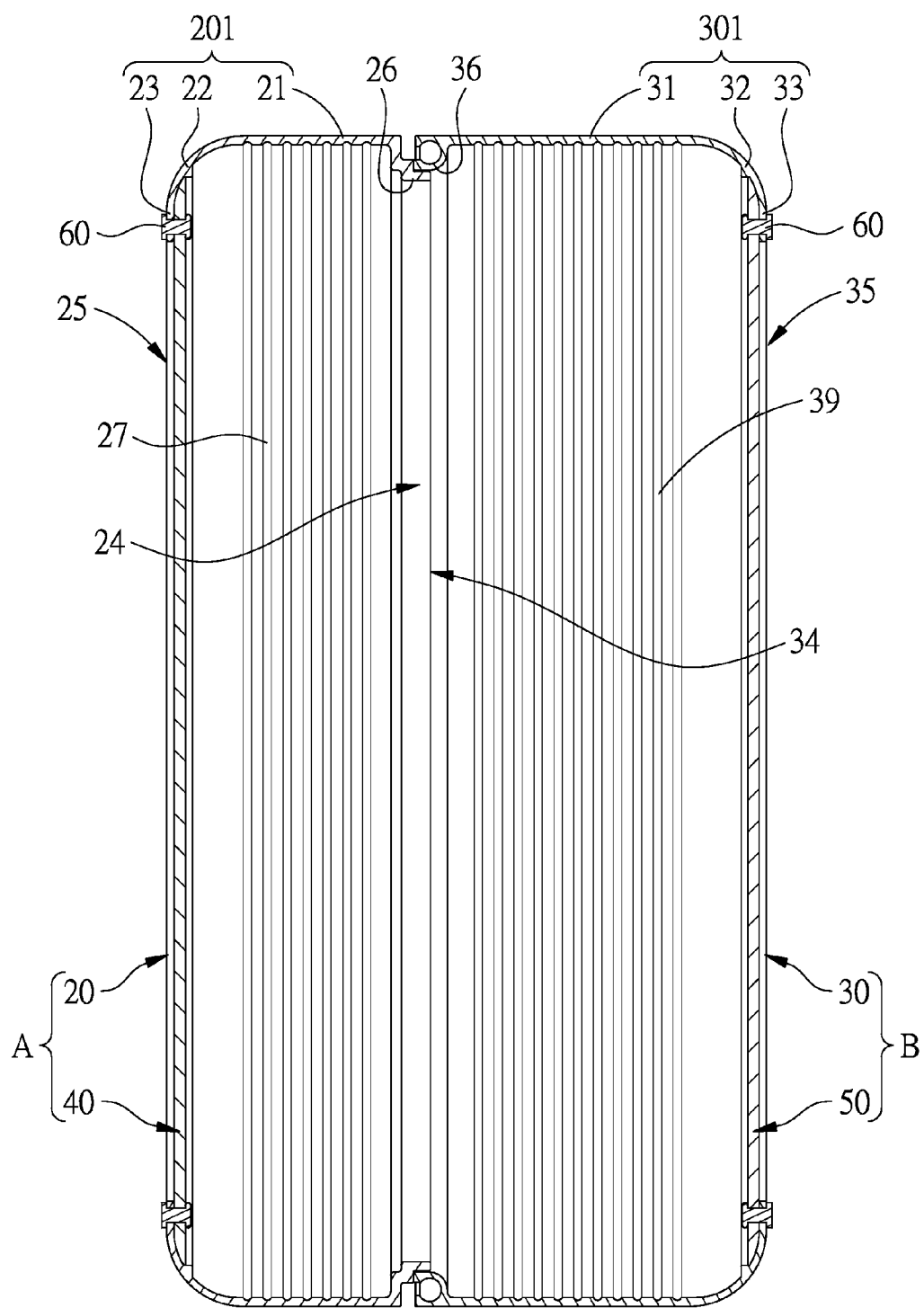


FIG.4

FIG. 5

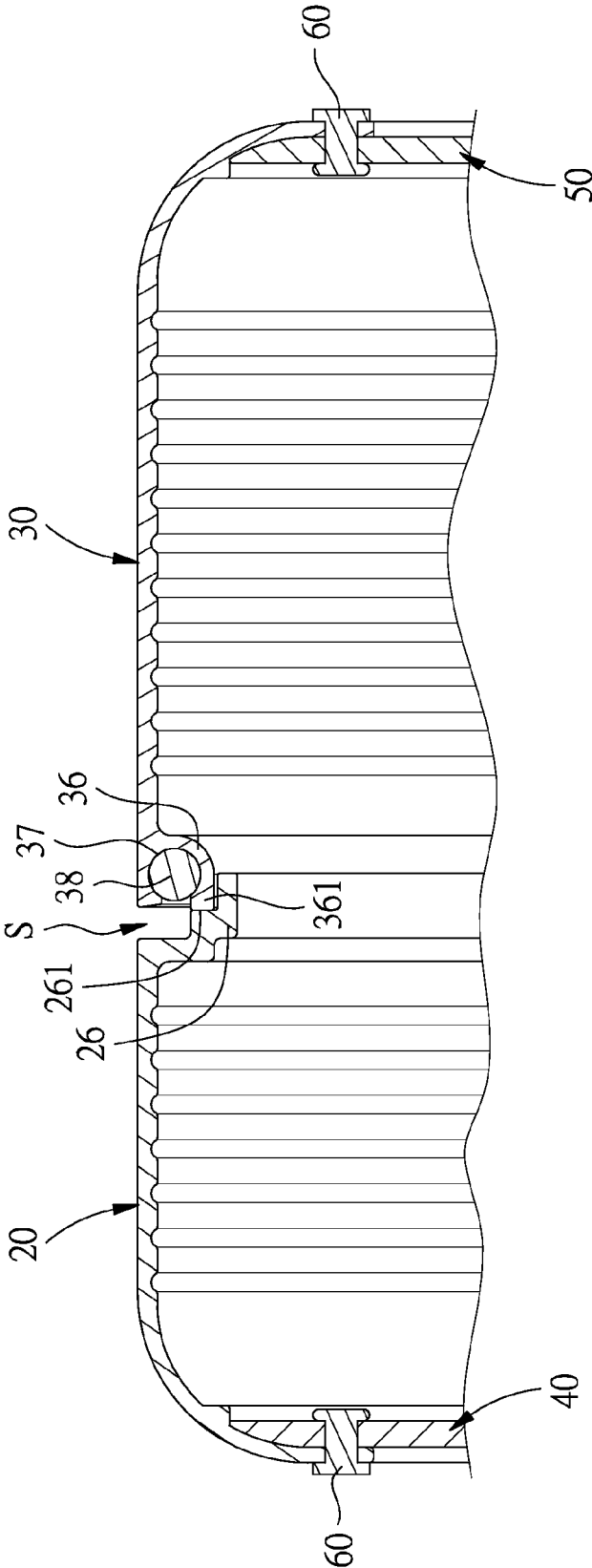


FIG.6

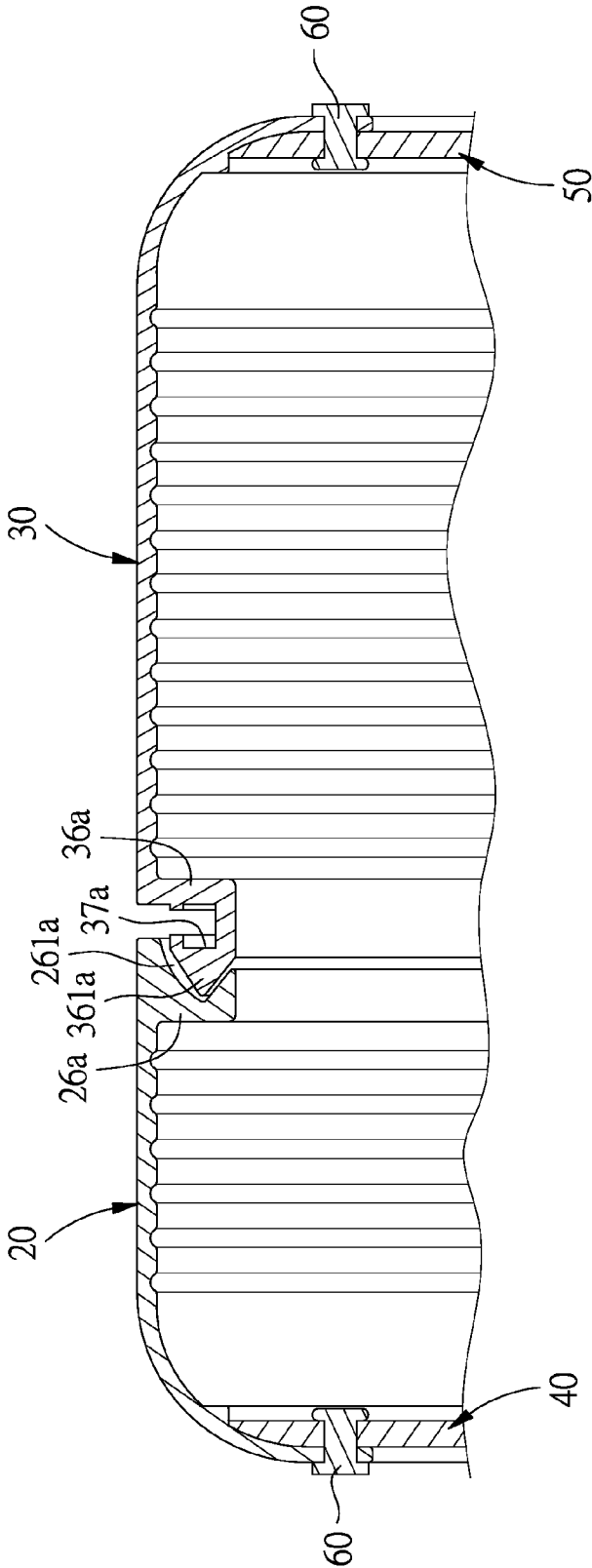


FIG.7

LUGGAGE CASE STRUCTURE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a case, and more particularly to a luggage case structure.

[0003] 2. Description of the Prior Art

[0004] The existing luggage cases are generally divided into soft cases and hard cases. Hard cases have better ability to resist deformation and therefore win more market share. In order to reduce the weight of the hard case, as shown in FIG. 1, a carbon fiber luggage case 10 was developed and comprises two opposite hard shells 11 which are formed by hot vacuum molding of carbon fibers. Each of the shells 11 includes a bottom 111 and four lateral boards 112, 113, 114, 115 which are integrally formed around the bottom 111 to define a chamber 116. The two shells 11 are connected to each other by a first frame 12, a second frame 13 and hinges 14 to form the luggage case 10.

[0005] The first frame 12 is relatively narrow and disposed around the periphery of the chamber 116 of the front shell 11 of the luggage case 10, and the second frame 13 is relatively wider in cross section than the first frame 12 and has one side disposed around the peripheral edge of the chamber 116 of the rear shell 11 and has another side connected to the first frame 12. On the outer surface of the second frame 13 are disposed two handles 15.

[0006] It is to be noted that carbon fiber product is made by solidifying carbon fibers with resin. Carbon fiber might be light weight but has directionality. Therefore, carbon product has relatively high tensile strength but is susceptible to crack, and the carbon fiber product is particularly weak at the folding portion. Hence, the structural strength of the luggage case 10 is weak at the folding portion where the four lateral boards 112, 113, 114, 115 are connected to the bottom 111, and at the corners of the chamber 116. The corners of the chamber 116 can be strengthened by the first and second frames 12, 13 which are made of metal. However, the structural strength of the shells 11 will become nonuniform. Once the lateral boards are subjected to an impact force, the stress is likely to be transmitted to the folding portion of the shells 11, causing damage to the luggage case.

[0007] The present invention has arisen to mitigate and/or obviate the afore-described disadvantages.

SUMMARY OF THE INVENTION

[0008] The primary objective of the present invention is to provide a luggage case structure, wherein the aluminum alloy frames extends in depth to the bottom of the two shells to form the four lateral surfaces of the two shells, which solves the problem of structure strength difference between the bottom of the shells of the convention luggage case and the lateral boards. Besides, the carbon fiber is formed into two-dimensional flat boards instead of a three-dimensional structure, which not only makes manufacturing easier, but also enhances the structural strength while reducing weight.

[0009] To achieve the above objective, a luggage case structure is formed by two shells, and each of the shells comprises: a frame made of aluminum alloy and including four lateral surfaces connected to one another by four round angles, each of the lateral surfaces including a flat portion, an arc-shaped portion extending from the flat portion, and a flat flange extending from the arc-shaped portion, the four flat portions

being connected to one another by the four round angles to define a chamber, and the four flat flanges being connected by the four round angles to define an opening, so that the chamber and the opening are located at two sides of the first frame; a board made of carbon fibers and including a peripheral edge disposed in the frame to abut against the flat flanges; and a plurality of fasteners inserted through the flat flanges and a periphery edge of the board to fix the board to the frame.

[0010] Preferably, the board includes an outer surface and an opposite inner surface, the peripheral edge of the board is provided with an arc-shaped protruding surface which is formed to fit the shape of the arc-shaped portion of the board and located on the outer surface, the outer surface of the board comes into contact with the flat flange of the frame, and the arc-shaped portion of the frame is abutted against the arc-shaped protruding surface of the board.

[0011] Preferably, the first frame shrinks around the opening to form a connecting portion, and around the connecting portion is an annular groove; the second frame is provided an annular flange around an inner edge of the opening, and the annular flange includes a terminal edge; the first and second shells are clamped against each other, in such a manner that the terminal edge of the annular flange of the second frame is disposed in the annular groove of the connecting portion of the first frame.

[0012] The inner edge of the opening of the second frame and the annular flange define an annular engaging groove for insertion of a waterproof rubber piece.

[0013] Preferably, the flat flange of the frame and the peripheral edge of the board are provided a plurality of holes for insertion of the fasteners.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is an exploded view of a conventional luggage case;

[0015] FIG. 2 is an exploded view of a luggage case structure in accordance with a preferred embodiment of the present invention;

[0016] FIG. 3 is an assembly view of the luggage case structure in accordance with the preferred embodiment of the present invention;

[0017] FIG. 4 is a cross sectional view of the luggage case structure in accordance with the preferred embodiment of the present invention;

[0018] FIG. 5 is an enlarged view of a part of FIG. 4;

[0019] FIG. 6 is an enlarged view showing that the second shell of the luggage case of the present invention is provided with a waterproof rubber; and

[0020] FIG. 7 shows a luggage case structure in accordance with another preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] The present invention will be clearer from the following description when viewed together with the accompanying drawings, which show, for purpose of illustrations only, the preferred embodiment in accordance with the present invention.

[0022] Referring to FIGS. 2-6, a luggage case structure in accordance with a preferred embodiment of the present invention comprises two shells, namely, a first shell A and a second shell B. The first shell A includes a first frame 20 and a first board 40 which are connected to each other by a

plurality of fasteners 60. The second shell B includes a second frame 30 and a second board 50 which are connected to each other by a plurality of fasteners 60. The means for connecting the first frame 20 and the first board 40 or the second frame 30 and the second board 50 is not limited to the fasteners 60, and can also be gluing, or the combination of the two, in order to improve the connection strength between the frame and the board. Or, the connecting means as mentioned in the “description of the prior art” can also be used to enhance the connection between the frame and the board.

[0023] The first frame 20 is made of aluminum alloy and includes four lateral surfaces 201 which are connected to one another by four round angles 202. Each of the lateral surfaces 201 includes a flat portion 21, an arc-shaped portion 22 extending from the flat portion 21, and a flat flange 23 extending from the arc-shaped portion 22. The four flat portions 21 are connected to one another by the four round angles 202 to define a chamber 24, and the four flat flanges 23 are connected by the four round angles 202 to define an opening 25, so that the chamber 24 and the opening 25 are located at two sides of the first frame 20. In this embodiment, as shown in FIGS. 4 and 5, the first frame 20 shrinks around the opening 25 to form a connecting portion 26, and around the connecting portion 26 is an annular groove 261. On the flat flange 23 of the first frame 20 is provided a plurality of holes 231 for insertion of the fasteners 60.

[0024] The second frame 30 is made of aluminum alloy and includes four lateral surfaces 301 connected to one another by four round angles 302. Each of the lateral surfaces 301 includes a flat portion 31, an arc-shaped portion 32 extending from the flat portion 31, and a flat flange 33 extending from the arc-shaped portion 32. The four flat portions 31 of the four lateral surfaces 301 are connected by the four round angles 302 to define a chamber 34, and the flat flanges 33 are connected by the four round angles 302 to define an opening 35, so that the chamber 34 and the opening 35 are located at two sides of the second frame 30. In this embodiment, as shown in FIGS. 4 and 5, the second frame 30 is provided an annular flange 36 around the inner edge of the opening 35, and the annular flange 36 includes a terminal edge 361. The flat flange 33 of the second frame 30 is provided with a plurality of holes 331 for insertion of the fasteners 60.

[0025] The first board 40 is made of carbon fibers and includes a peripheral edge 41 disposed in the first frame 20 to abut against the flat flanges 23. The peripheral edge 41 is provided with a plurality of holes 411 aligned with the holes 231 of the first frame 20 for insertion of the fasteners 60, so as to fix the first board 40 to the first frame 20. In this embodiment, as shown in FIG. 5, the first board 40 includes an outer surface 401 and an opposite inner surface 402. The peripheral edge 41 of the first board 40 is provided with an arc-shaped protruding surface 42 which is formed to fit the shape of the arc-shaped portion 22 of the first board 40 and located on the outer surface 401. The outer surface 401 of the first board 40 comes into contact with the flat flange 23 of the first frame 20, and the arc-shaped portion 22 of the first frame 20 is abutted against the arc-shaped protruding surface 42 of the first board 40.

[0026] The second board 50 is made of carbon fibers and includes a peripheral edge 51 disposed in the second frame 30 to abut against the flat flanges 23. The peripheral edge 51 is provided with a plurality of holes 511 aligned with the holes 331 of the second frame 30 for insertion of the fasteners 60, so as to fix the second board 50 to the second frame 30. In this

embodiment, as shown in FIG. 5, the second board 50 includes an outer surface 501 and an opposite inner surface 502. The peripheral edge 51 of the second board 50 is provided with an arc-shaped protruding surface 52 which is formed to fit the shape of the arc-shaped portion 32 of the second board 50 and located on the outer surface 501. The outer surface 501 of the second board 50 comes into contact with the flat flange 33 of the second frame 30, and the arc-shaped portion 32 of the second frame 30 is abutted against the arc-shaped protruding surface 52 of the second board 50.

[0027] The first and second shells A and B are clamped against each other, in such a manner that the terminal edge 361 of the annular flange 36 of the second frame 30 is disposed in the annular groove 261 of the connecting portion 26 of the first frame 20. In this embodiment, as shown in FIG. 5, the outer surface of the connecting portion 26 is a stepped structure, and the terminal edge 361 of the annular flange 36 extends out of the peripheral edge of the opening 35, so that the first and second frames 20, 30 are clamped against each other, leaving a clearance S between the peripheral edge of the opening 35 of the second frame 30 and the connecting portion 26 of the first frame 20.

[0028] The first and second shells A and B can be connected by any possible means, in addition to the abovementioned method.

[0029] Referring then to FIG. 7, which shows another embodiment of method to connect the first and second shells A and B, wherein the first frame 20 includes a connecting portion 26a protrudes out of the inner edge of the opening 25, and around the outer edge of the connecting portion 26a is formed an annular groove 261a. An annular flange 36a is disposed around and protrudes out of the peripheral edge of the opening 35 of the second frame 30, and the terminal edge of the annular flange 36a is formed with a pointed portion 361a and chamfered to form an annular engaging groove 37a. The annular groove 261a of the first frame 20 is formed to fit the shape of the pointed portion 361a. When the first and second shells A and B are clamped against each other, the pointed portion 361a of the annular flange 36a of the second frame 30 is disposed in the annular groove 261a of the first frame 20. In this embodiment, as shown in FIG. 7, the annular engaging groove 37a of the second frame 30 is aligned to the clearance S between the peripheral edge of the opening 35 of the second frame 30 and the connecting portion 26 of the first frame 20. As shown in FIG. 3 again, between the first and second shells A and B can be disposed a lock C to lock the two shells A and B after they are closed to each other.

[0030] The aluminum alloy first and second frames 20, 30 extends in depth to the bottom of the two shells A and B to form the four lateral surfaces of the two shells A and B, which solves the problem of structure strength difference between the bottom of the shells of the convention luggage case and the lateral boards. Besides, the carbon fiber is formed into two-dimensional flat boards 40, 50 instead of a three-dimensional structure, which not only makes manufacturing easier, but also enhances the structural strength while reducing weight.

[0031] Referring then to FIG. 3 again, the second shell B of the present invention is more suitable for use as a rear shell of the luggage case, and at the top and lower sides of the second shell B are provided two handles B 1. The first and second shells A and B of the luggage case of the present invention are

not limited to the abovementioned designs, and can also be provided with other equipments, such as retractable rod or rollers.

[0032] Referring then to FIGS. 5 and 6, the inner edge of the opening 35 of the second frame 30 and the annular flange 36 can define an annular engaging groove 37 for insertion of a waterproof rubber piece 38 to improve the waterproof performance of the luggage case. On the inner side of the lateral surfaces 201,301 of the first and second frames 20, 30 are formed a plurality of annular grooves 27, 39 to improve the structural strength of the luggage case. The inner surface of the frames of the luggage case of the present invention can also be flat.

[0033] While we have shown and described various embodiments in accordance with the present invention, it is clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

What is claimed is:

1. A luggage case structure being formed by two shells, and each of the shells comprising:

a frame made of aluminum alloy and including four lateral surfaces connected to one another by four round angles, each of the lateral surfaces including a flat portion, an arc-shaped portion extending from the flat portion, and a flat flange extending from the arc-shaped portion, the four flat portions being connected to one another by the four round angles to define a chamber, and the four flat flanges being connected by the four round angles to define an opening, so that the chamber and the opening are located at two sides of the first frame;

a board made of carbon fibers and including a peripheral edge disposed in the frame to abut against the flat flanges; and

a plurality of fasteners inserted through the flat flanges and a periphery edge of the board to fix the board to the frame.

2. The luggage case structure as claimed in claim 1, wherein the board includes an outer surface and an opposite inner surface, the peripheral edge of the board is provided with an arc-shaped protruding surface which is formed to fit the shape of the arc-shaped portion of the board and located on the outer surface, the outer surface of the board comes into contact with the flat flange of the frame, and the arc-shaped portion of the frame is abutted against the arc-shaped protruding surface of the board.

3. The luggage case structure as claimed in claim 1, wherein the two shells are a first shell and a second shell, the frame and the board which constitute the first shell are referred to a first frame and a first board, and the frame and the board which constitute the second shell are a second frame and a second board;

the first frame shrinks around the opening to form a connecting portion, and around the connecting portion is an annular groove;

the second frame is provided an annular flange around an inner edge of the opening, and the annular flange includes a terminal edge;

the first and second shells are clamped against each other, in such a manner that the terminal edge of the annular flange of the second frame is disposed in the annular groove of the connecting portion of the first frame.

4. The luggage case structure as claimed in claim 3, wherein the inner edge of the opening of the second frame and the annular flange define an annular engaging groove for insertion of a waterproof rubber piece.

5. The luggage case structure as claimed in claim 1, wherein the flat flange of the frame and the peripheral edge of the board are provided a plurality of holes for insertion of the fasteners.

6. The luggage case structure as claimed in claim 1, wherein a plurality of annular grooves is formed on an inner side of the lateral surfaces of the frame.

7. The luggage case structure as claimed in claim 1, wherein the two shells are a first shell and a second shell, the frame and the board which constitute the first shell are referred to a first frame and a first board, and the frame and the board which constitute the second shell are a second frame and a second board;

the first frame includes a connecting portion around an inner edge of the opening, and around an outer edge of the connecting portion is formed an annular groove;

an annular flange is disposed around and protrudes out of the peripheral edge of the opening of the second frame, and the terminal edge of the annular flange is formed with a pointed portion and chamfered to form an annular engaging groove;

when the first and second shells are clamped against each other, the pointed portion of the annular flange of the second frame is disposed in the annular groove of the first frame.

* * * * *