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(54) **VARIABLE VOLUME SUITCASE**

(57) The invention relates to a suitcase that can double its volume, which has a rectangular prismatic body with a handle and wheels, with the particularity that its side walls, as well as the middle area of its bottom, have folding lines that allow the upper part of the suitcase body to be folded over the lower part of said body, so that said side walls are superimposed, being linked and unlinked

by means of zips or similar means, so that the suitcase maintains its floor dimensions at all times, but the height of the suitcase can vary in accordance with two assembly modes depending on the specific needs of each case, for example when it is to be carried in an aircraft cabin, where minimum bulk is crucial.

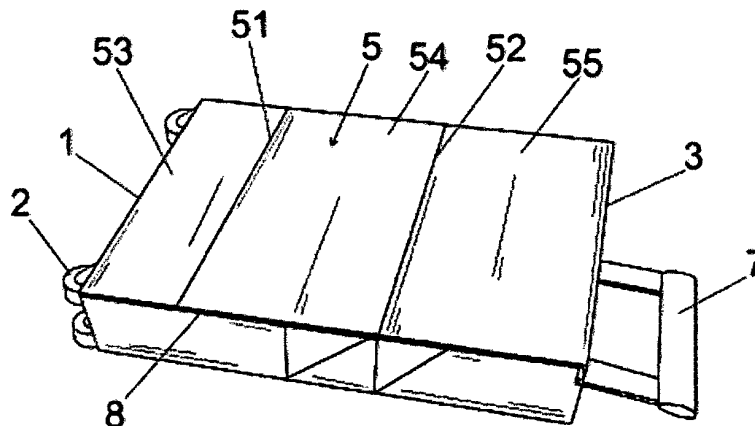


FIG. 1

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Description

TECHNICAL SPECIFICATIONS

[0001] The present invention relates to a travel suitcase which has the characteristic of offering the possibility of two different configurations of use, by means of which its load capacity can be sensibly varied, to the order of more than double/half.

[0002] The object of the invention is therefore to provide a suitcase which can occupy a limited space when a high load capacity is not required, for example, in accordance with the limitations established in aircraft cabins, but which, when a greater load capacity is required, can effectively double its volume and, as a result, its load capacity.

BACKGROUND OF THE INVENTION

[0003] In the field of practical application of the invention there are known innumerable types of suitcases, some of which have a structure which gives them a certain capacity to vary their volume.

[0004] In most cases they are suitcases whose capacity expansion is relatively low, in the order of 20 to 30%, as is the case of documents US 2014238801 or WO201306747.

[0005] Suitcases that allow a greater increase in their load capacity are known, such as the suitcase described in document US6575272, as well as other similar documents, although they are devices whose variable volume is achieved based on a telescopic structure in which the height and width of the suitcase remain unchanged, adjusting its thickness to the needs of each case, so that said width and height dimensions may be excessive and limiting when attempting to insert said suitcases in certain spaces, such as aircraft cabins.

[0006] This same technical problem arises in the document or US5819891A in which a suitcase with a telescopic structure is described, in which complex means are necessary to lock its telescopic structure in the position of maximum extension, which makes it an expensive suitcase, and subject to the same limitations previously mentioned.

[0007] Finally, it is worth mentioning other solutions of suitcases of variable volumetry, such as those described in patents US2018177271A1 and EP3412171A1, whose capacity to vary their volumetry is based on the flexible nature of the structure of the suitcase itself; that is, they are soft suitcases, in which their contents are not protected against the usual blows that suitcases are subjected to in airports and similar spaces, with the subsequent risks to their contents that this may cause.

EXPLANATION OF THE INVENTION

[0008] The variable volumetry suitcase that the invention proposes solves the above-mentioned problem in a

fully satisfactory manner, on the basis of a simple but effective solution, managing to reduce or increase its volume by more than half/double, according to a redistribution of the dimensions of the suitcase which makes it more compact, with an optimum three-dimensional distribution.

[0009] To this end, the suitcase in the invention is constituted from an essentially rectangular prismatic body which may have certain of its edges slightly rounded, in which is defined a lower rolling base, an upper base, two side walls and a front face and a rear bottom, also corresponding to the rear face with the classic telescopic handle.

[0010] Indeed, in accordance with the essence of the invention, the front face will be articulately linked to the lower rolling base through its lower edge, so that the other three free sides will be fixed to the side walls and upper base by means of a zipper, allowing for access to the suitcase in its maximum volume configuration, with the particularity that two transversal folding lines are established in said front face, the lower one at a distance according to the thickness of the suitcase, and the second one at exactly half of the remaining sections.

[0011] From these folding lines, and starting from the maximum volume configuration initially described, once the zipper or zippers of this front face are opened, it can then be folded over the bottom of the suitcase, so that the front face is coplanar with the rolling bottom in its first lower section, and its two upper sections are folded one over the other, remaining coplanar with the rear bottom.

[0012] On the other hand, the rear bottom will include two transversal folding lines in its middle zone, separated from each other by a magnitude according to the thickness of the suitcase, so that while of the three sections that define these two folding lines, the lower and the intermediate ones are fixed to the side walls and lower base, the upper section is detachable from the side walls and upper base through a zipper that adopts an inverted "U" trajectory.

[0013] Finally, the side walls will present in their middle zone two transversal folding lines spaced between them the thickness of the suitcase, between which a diagonal folding line is established, establishing a folding line parallel to this one in correspondence with the upper section that delimits the upper transversal folding line.

[0014] From this structure, and once the front side has been folded over the lower base and the lower section of the bottom of the case, the set formed by the upper and intermediate sections of the side faces and the bottom can be folded in the middle area of the case, lodging internally in it, leaving its walls coplanar, and linked together through additional zippers, brackets, Velcro or any other conventional means, in such a way that the upper usable section of the bottom becomes the front face of the suitcase in situations of minimum occupation, reducing it to more than half of its height and consequently more than half of its volumetric occupation, its new internal volume being hardly affected by the walls or sections

that become inoperative, due to the fact that all of them are arranged parallel to the walls, lower base or bottom.

[0015] The telescopic handle has three sections in order to offer three operating positions: the operative position, with maximum extension, and two other intermediate and retractable positions of the handle in accordance with the two heights that the case can adopt depending on its configuration.

BRIEF DESCRIPTION OF SKETCHES

[0016] In order to complement the description to be made below and with the purpose of helping to a better understanding of the characteristics of the invention, in accordance with a preferential example of practical realization thereof, a set of sketches attached as an integral part of said description, in which the following has been represented for, but not limited to, the following illustrative purposes:

Figure 1.- Shows a perspective view of a suitcase of variable volumetry made in accordance with the object of the present invention in its maximum volumetric capacity configuration.

Figure 2.- Shows a view similar to that of figure 1, but in which the front face appears folded over the base and bottom of the suitcase in a first phase of transformation of the suitcase in order to minimize its volumetric capacity.

Figure 3.- Shows a perspective view of the case of figure 2, according to a subsequent folding phase.

Figure 4.- Shows, finally, a perspective view of the suitcase of the previous figures in a final position of minimum volumetric occupation.

PREFERRED EMBODIMENT OF THE INVENTION

[0017] In view of the figures shown, it can be seen that the suitcase of the invention is based on the conventional structure of this type of suitcases in which a rectangular prismatic body is defined in which there is a lower base (1), preferably equipped with wheels (2) to facilitate its displacement, an upper base (3), two side walls (4), a front face (5) and a rear bottom (6), using the classic telescopic handle (7), either double, as in the figures, or simple.

[0018] According to figure 1, the front face (5) is articulately linked to the lower base (1) by means of its (1) lower edge, so that its other three free sides will be fixed to the side walls and upper base by means of a zipper (8).

[0019] Said front face includes two transversal folding lines (51) and (52), the lower one (51) at a distance according to the thickness of the suitcase, and the upper one (52) at the exact half of the remaining section, defining three rectangular sections (53), (54) and (55).

[0020] According to this configuration, and as shown in figure 2, once the zipper (8) is opened, the front face (5) can be folded over the bottom of the suitcase, the section (53) being coplanar and coincident with the lower base (1), and the section (55) folding over the section (54), being coplanar with the bottom (6) of the suitcase.

[0021] Said bottom (6) includes in its middle zone two transversal folding lines (61 and 62) separated from each other a magnitude according to the thickness of the suitcase, the lower and intermediate sections of said bottom (6) being immovably linked to the side walls (4) and lower base (1), while the upper section (63) is detachable from the side walls (4) and upper base (3) through a zipper (9) that adopts an inverted "U" trajectory.

[0022] On the other hand, and returning again to figure 2, the side walls (4) will present in their middle zone two transversal folding lines (41-42) with the thickness of the suitcase spaced between them, between which a diagonal folding line (43) is established and a folding line (44) is established parallel to this one in correspondence with the upper section that delimits the upper transversal folding line.

[0023] From this structure, and as shown in figure 3, once the front face (5) is folded over the lower base (1) and the lower section of the bottom (6) of the suitcase, the set formed by the upper and intermediate sections of the side faces and the bottom can be folded through the folding lines (41 to 44), the upper sections of the side walls (4) being placed internally to the frame formed by the lower sections of the said side walls and the lower base (1), on which the upper base (3) will be arranged in a coplanar fashion, so that the triangular folds that are defined internally could be stabilized by means of brackets, Velcro or similar elements, defining a diaphanous space inside the suitcase which in such configuration, shown in figures 3 and 4, has a volumetric occupancy of less than half that of the maximum volume configuration shown in figure 1.

[0024] On the other hand, the double wall formed by the lower base (1) and the upper base (3) as well as by the lower and upper sections of the sides (4) can be stabilized by means of additional zippers, hooks, Velcro or any other conventional fastening system.

[0025] Finally, it only remains to be pointed out that the telescopic handle (7), which will be exclusively linked to the lower section of the bottom (6), so as not to affect the folding maneuvers of the suitcase, will have at least three telescopic sections in order to be able to offer at least three operating positions, the operative one, of maximum extension, regardless of the configuration of the suitcase, and two other positions of handle concealment in accordance with the two heights that the suitcase can adopt depending on its configuration.

Claims

1. Suitcase of variable volumetric size, being of the type

consisting of an essentially prismatic rectangular body, which includes a lower base (1), preferably equipped with wheels (2), an upper base (3), two side walls (4), a front face (5) and a rear bottom (6), including the classic telescopic handle (7) for carrying, **characterized in that** the front face (5) is articulately linked to the lower base (1) through its lower edge, so that its other three free sides are linked and unlinked to the side walls and upper base by means of a zipper (8), with the particularity that said front face includes two transverse folding lines (51) and (52), the lower one (51) at a distance according to the thickness of the suitcase, and the upper one (52) at exactly half of the remaining section, the bottom (6) including in its middle zone two transversal folding lines (61 and 62) separated from each other at a distance according to the thickness of the suitcase, the lower and intermediate sections of said bottom (6) being immovably linked to the side walls (4) and lower base (1), while the upper section (63) is detachable from the side walls (4) and upper base (3) by means of a zipper (9) that uses an inverted "U" trajectory, with the particularity that the side walls (4) present in their middle zone two transversal folding lines (41-42) spaced between them according to the thickness of the suitcase, between which a diagonal folding line (43) is established parallel to which a second diagonal folding line (44) is established in correspondence with the upper section that delimits the upper transversal folding line, so that the front side (6) is foldable on the inside of the case body, while the upper middle structure of the case can be folded internally onto the lower middle structure, a configuration in which the upper section (63) becomes the means of access to the interior of the case in its minimum volumetric occupation configuration.

2. Variable volume suitcase, according to claim 1a, **characterized in that** it includes zippers or additional fixing means to stabilize the suitcase in a minimum volume occupancy arrangement.
3. Variable volume suitcase, according to claim 1a, **characterized by** the fact that the telescopic handle (7), which is exclusively linked to the lower section of the bottom (6), has at least three telescopic sections for adapting it to the two heights that the suitcase can adopt according to its configuration, as well as for maximum extension for manual transport of the suitcase.

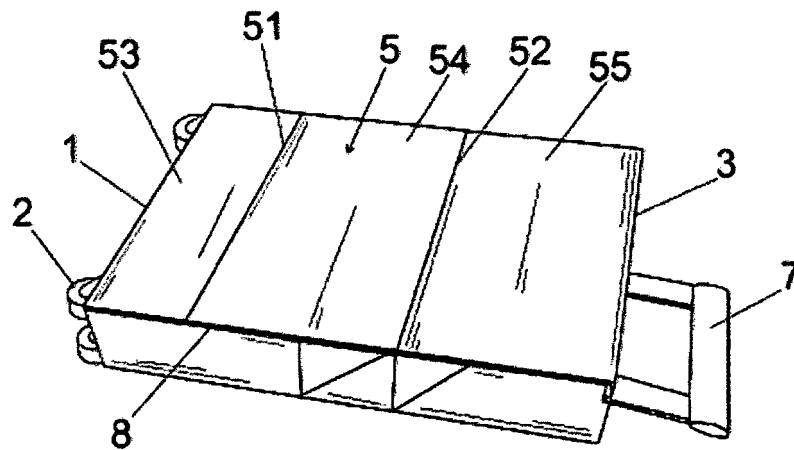


FIG. 1

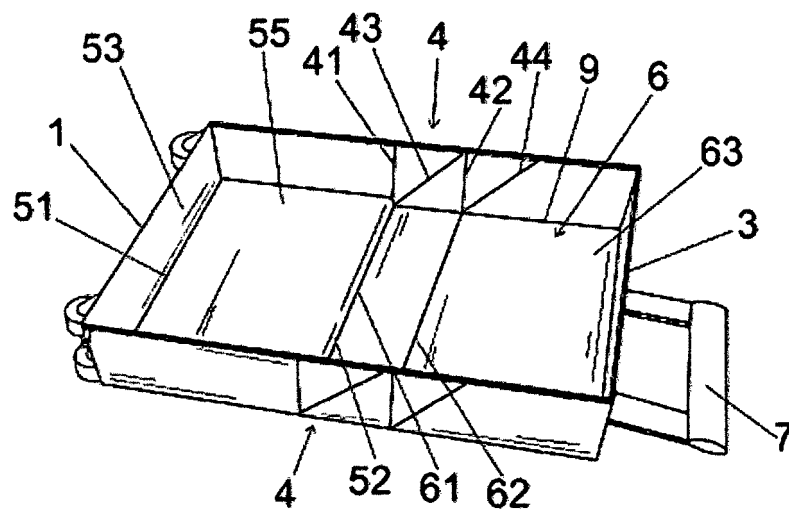


FIG. 2

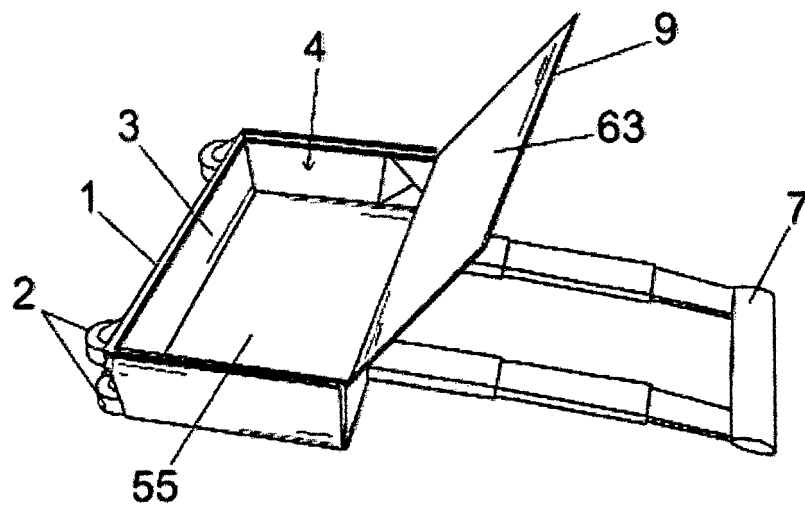


FIG. 3

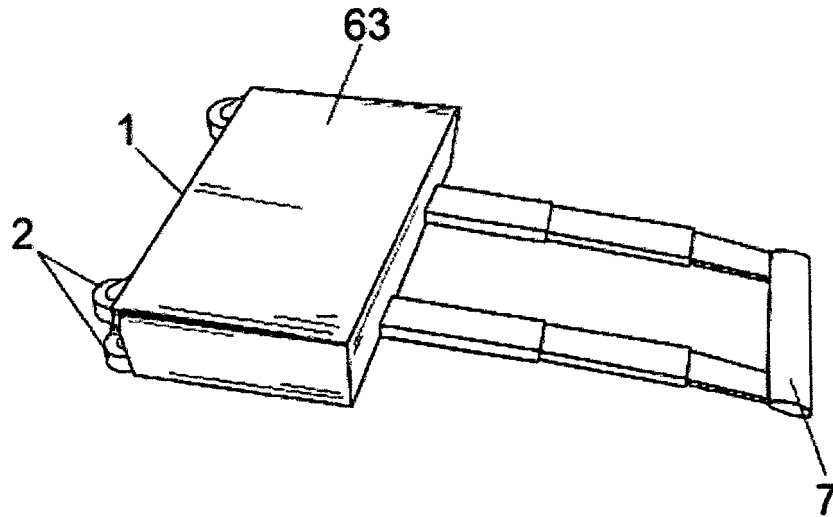


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2020/070084

A. CLASSIFICATION OF SUBJECT MATTER

A45C7/00 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A45C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES, WPI, INTERNET

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2015008272 A1 (ATLAS YITZCHAK ET AL.) 22/01/2015, figures	1-3
A	CN 105831930 A (NINGBO QIANTANG ORIGINALITY PRODUCTS TECH CO LTD) 10/08/2016, figures	1-3
A	TW M465055U U (HUANG WEI-YANG ET AL.) 11/11/2013, figures	1-3
A	CN 102578780 A (LISHUI VOCATIONAL & TECHNICAL COLLEGE) 18/07/2012, figures	1-3
A	CN 206576445U U (PEI ZHIXUAN) 24/10/2017, figures	1-3

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search
21/04/2020Date of mailing of the international search report
(24/04/2020)

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2020/070084

Information on patent family members

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----- CN206576445U U -----	----- 24.10.2017 -----	----- NONE -----	----- ----- -----

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REFERENCES CITED IN THE DESCRIPTION

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- WO 201306747 A [0004]
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