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(54) **Expandable trolley**

(57) The present invention relates to an expandable trolley comprising an interfaced pair of preferably rigid semi-bodies, between which a perimeter band of soft material is mounted and closed by a corresponding perimeter zipper; it being provided that said trolley is provided on the outside of said soft intermediate band with a basically perimeter second zipper, the toothed sides of which are mounted on the interfaced borders of said semi-bodies.

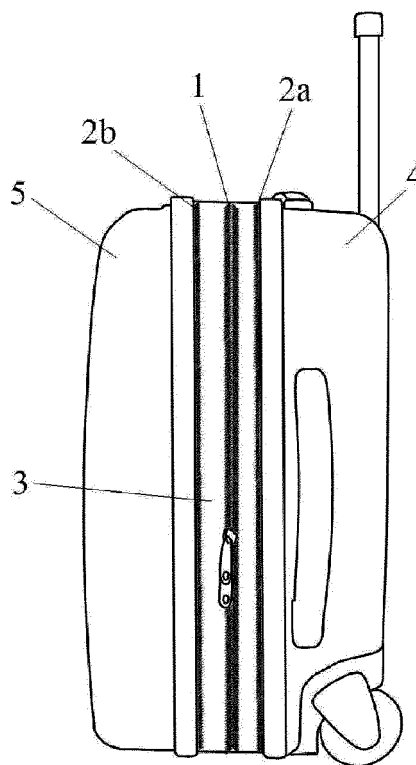


Fig. 2B

Description

[0001] The present patent application relates to an expandable trolley of new conception.

[0002] A large use is currently made of suitcases known as "trolleys" and provided with a vertical structure and a pair of ground rolling wheels, as well as an extendible handle.

[0003] In spite of their large diffusion, this type of suitcases is increasingly impaired by the need to reduce their volume.

[0004] This problem is felt both at domestic level, when it is necessary to store the trolley when it is not used, and at operating level, when the suitcase must be stored in the luggage compartment of an airplane, in the trunk of a vehicle or on a baggage rack of a train.

[0005] It must be noted that trolleys adapted to meet such a specific requirement have been available for some time, being provided with a bellows-like expandable structure.

[0006] Because of such a characteristic, the trolley can be maintained in compact position (at minimum expansion level) when it is not used and is stored in a cabinet or on a shelf, and also when it is used to contain an amount of objects that can be conveniently held in its minimum volume configuration.

[0007] On the contrary, when the amount of objects that must be contained in the trolley is higher than its minimum capacity, such an expandable trolley can be easily brought to the expanded position, in view of a bellows-like expansion that corresponds to its maximum internal capacity.

[0008] Till now a traditional expandable trolley is formed of two rigid semi-bodies that are mutually interfaced and joined by a perimeter band of a soft material, normally fabric.

[0009] The intermediate perimeter band is the bellows-like element that allows for bringing said semi-bodies farther or closer in order to respectively increase or reduce the internal volume of the trolley.

[0010] For a better understanding of the structure of an expandable trolley of the prior art, reference is made to the enclosed photograph, wherein:

- Figure 1A is a view of said trolley in compact position;
- Figure 1B is a view of said trolley in expanded position;

[0011] Such an expandable trolley (T1) of this type is currently provided with two zippers (10, 20).

[0012] The first zipper (10) is applied on the edges of the perimeter opening obtained on said soft perimeter band (30) and is situated in the vicinity of the border of the first (40) of said two rigid semi-bodies.

[0013] Said zipper (10) must be used to alternatively open and close the trolley (T1) in order to introduce or collect items.

[0014] The second zipper (20), which basically affects

the entire perimeter of the trolley (T1), is used to bring the two semi-bodies (40, 50) closer or farther.

[0015] In fact, said zipper (20) must be closed to bring the trolley (T1) in compact position, in such a condition that the soft intermediate band (30) is completely compacted between the two semi-bodies (40, 50), as shown in Fig. 1A.

[0016] Instead, the same zipper (20) must be opened to extend the soft intermediate band (30) in such manner to separate the two semi-bodies (40, 50) and bring the trolley (T1) into the expanded position that corresponds to the maximum internal volume, as shown in Fig. 1B.

[0017] Fig. 1B also shows that the second zipper (20) is mounted in such manner that one of its toothed sides (20a) is sewn in immediately adjacent position to said first zipper (10) and the other toothed side (20b) is sewn in the vicinity of the border of the second (50) of said semi-bodies.

[0018] According to the prior art, the two zippers (10, 20) are in parallel position, the first zipper (10) being positioned towards the first rigid semi-body (40) and the second zipper (20) being positioned towards the second rigid semi-body (50).

[0019] In spite of the very large use of such a technology, it must be noted that the same is impaired by a serious drawback related with the use of said two zippers (10, 20) in parallel position.

[0020] Such a condition, in fact, considerably reduces the possibility of compacting the trolley (T1), regardless of the actual deformation capability of said soft intermediate band (30).

[0021] As it can be easily understood, the compression of said soft band (30), and most of all the operation used to move closer the two semi-bodies (40, 50) are considerably impaired by the fact that the two parallel zippers (10, 20) come in mutual contact, being positioned between the interfaced borders of the two rigid semi-bodies (40, 50), as shown in Fig. 1A.

[0022] In view of the above, the two semi-bodies (40, 50) are adapted to remain separated by a distance that corresponds to the total width of the two parallel zippers (10, 20).

[0023] A careful study of the prior art has resulted in devising the trolley of the invention, which is adapted to overcome the aforesaid limitation of the prior art and, more precisely, give the trolley a considerably higher compacting capability (and, consequently, a volume reduction) than traditional models.

[0024] Such a higher compacting capability is especially advantageous for smaller trolleys (known as "boardcases") that are taken on board planes as hand luggage.

[0025] As part of their cost reduction policy, airline companies progressively tend to reduce the size of trolleys that can be carried on board.

[0026] For instance, some low cost companies only allow carrying on board cases with depth not higher than 20 cm.

[0027] An additional purpose of the present invention is to make the expandable trolley of the invention less vulnerable to burglary than traditional trolleys, when it is in compact position.

[0028] In such a situation, in fact, a potential theft would be forced to tamper two zippers and not only one, as in a trolley of the prior art.

[0029] The aforesaid two purposes are achieved by giving the trolley of the invention a basically general traditional structure, and changing the mounting position of said two zippers.

[0030] In particular, in the trolley of the invention, the two zippers are no longer arranged in side-by-side position, but one above the other or, better said one zipper (the one applied on the soft intermediate band) in more internal position and the other zipper (the one that allows for expanding the two rigid semi-bodies) in more external position.

[0031] Such a solution is obtained by applying the two toothed sides of the second zipper (the one that allows for expanding and compacting the trolley) in the proximity of the borders of the two rigid semi-bodies in interfaced position.

[0032] The two toothed sides of the second zipper are situated at the two lateral ends of said soft band in intermediate position between the two semi-bodies.

[0033] So, when the two semi-bodies are brought one against the other and the soft intermediate band is "compressed" between them, the result is that the second zipper surrounds said soft band from the outside.

[0034] It can be otherwise said that the two zippers are in a basically superimposed position, wherein the zipper of the soft intermediate band is situated in internal position, and the zipper that directly connects the two semi-bodies is situated in external position.

[0035] Because of said superimposition of the two zippers, the two semi-bodies can be brought closer, given the fact that their mutual translation is hindered only by the second zipper and no longer by the presence of two parallel zippers, as in the prior art.

[0036] For explanatory reasons, the description of the invention continues with reference to attached drawings, which only have an illustrative, not limiting value, wherein:

- Fig. 2A is a side view of the new expandable trolley in compact position;
- Fig. 3A is the same as Fig. 2A, except for it shows the same trolley from the opposite side;
- Fig. 2B is a side view of the new expandable trolley in expanded position;
- Fig. 3B is the same as Fig. 2B, except for it shows the same trolley from the opposite side.

[0037] Referring to said figures, the new trolley of the invention (T) is normally provided with an interfaced pair of rigid semi-bodies (4, 5), between which an intermediate band (3) of soft material is mounted to connect the

semi-bodies (4, 5).

[0038] Also the new trolley is provided with two basically perimeter zippers (1, 2).

[0039] The first of said zippers (1) is applied on the edges of the central perimeter opening of said intermediate band (3); in other words, said first zipper (1) is used to open and close the trolley (T), at least until it is maintained in expanded position, as shown in Figs. 2B and 3B.

[0040] The second zipper (2) is used to stabilize the two semi-bodies (4, 5) in maximum approaching position, further to compression of said soft intermediate band (3), as shown in Figs. 2A and 3A.

[0041] For this reason, the two toothed sides (2a, 2b) of said second zipper (20) are sewn on the sides of said soft intermediate band (3).

[0042] More precisely, one toothed side (2a) of said second zipper (2) is sewn on the perimeter edge of the first rigid semi-body (4), whereas the other toothed side (2b) is sewn on the perimeter edge of the second rigid semi-body (5), as expressly shown in Figs. 2B and 3B.

[0043] In view of the above, when the second zipper (2) is closed for the entire perimeter of said trolley (T), said second zipper (2) is superimposed from the outside to said first zipper (1), in such manner to conceal it completely together with the corresponding soft intermediate band (3).

[0044] However, the most important point is that by superimposing the two zippers (1, 2) only the second zipper (2) in external position is positioned - with thickness - between the two semi-bodies (4, 5) when the semi-bodies (4,5) are compacted as shown in Figs. 2A and 3A.

[0045] As mentioned earlier, this allows for minimizing the depth of the trolley (T) during maximum compression.

[0046] Finally, it must be noted that during the compression of the trolley (1), when it is necessary to minimize any intermediate volume, it might be necessary to leave said first zipper mounted on the soft intermediate band (1) in open position.

[0047] Such a decision, in fact, would not have any contraindications, since the closing of trolley (T), or better said, the connection of the two semi-bodies (4, 5) would be anyhow guaranteed by the closing of said second zipper (2).

[0048] Finally, it must be noted that although the trolley (1) of the invention is formed of two rigid semi-bodies, the present inventive idea may be also applied in case of a trolley formed of two soft semi-bodies (made of leather, fabric or the like) or by one rigid semi-body and one soft semi-bod.

Claims

1. An expandable trolley comprising an interfaced pair of semi-bodies (4, 5) between which an intermediate perimeter band (3) made of compactable soft material is mounted, and also provided with a first zipper (1) applied on the edges of its perimeter opening;

trolley being **characterized in that** it is provided with a basically perimeter second zipper (2), mounted on the outside of said soft intermediate band (3), the toothed sides (2a, 2b) of which are respectively mounted on the perimeter border of the first semi-body (4) and on the perimeter border of the second semi-body (5). 5

2. The trolley of claim 1, **characterized in that** said two semi-bodies (4, 5) have a rigid structure. 10
3. The trolley of claim 1, **characterized in that** said two semi-bodies (4, 5) have a soft structure.
4. The trolley of claim 1, **characterized in that** the first (4) of said semi-bodies has a rigid structure and the second (5) of said semi-bodies has a soft structure. 15
5. The trolley of claim 1, **characterized in that** the first (4) of said semi-bodies has a soft structure and the second (5) of said semi-bodies has a rigid structure. 20

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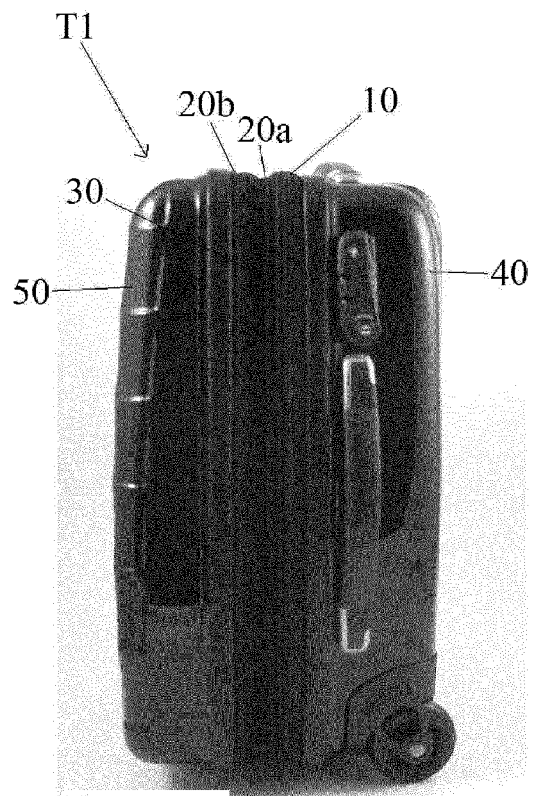


Fig. 1B

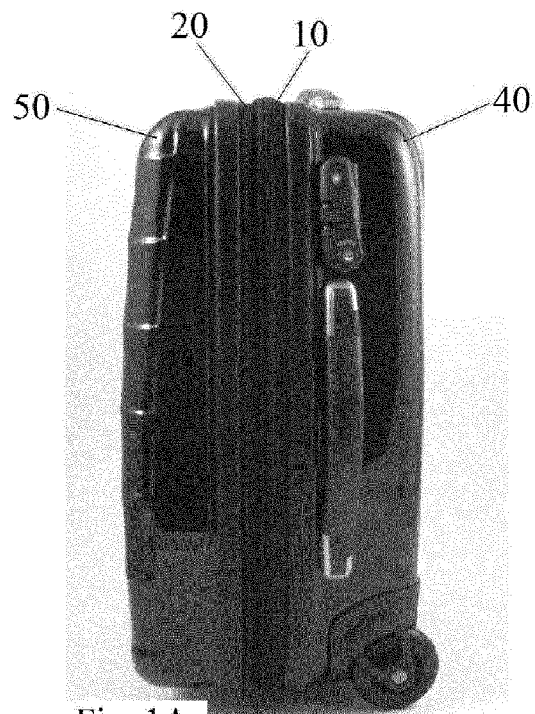


Fig. 1A

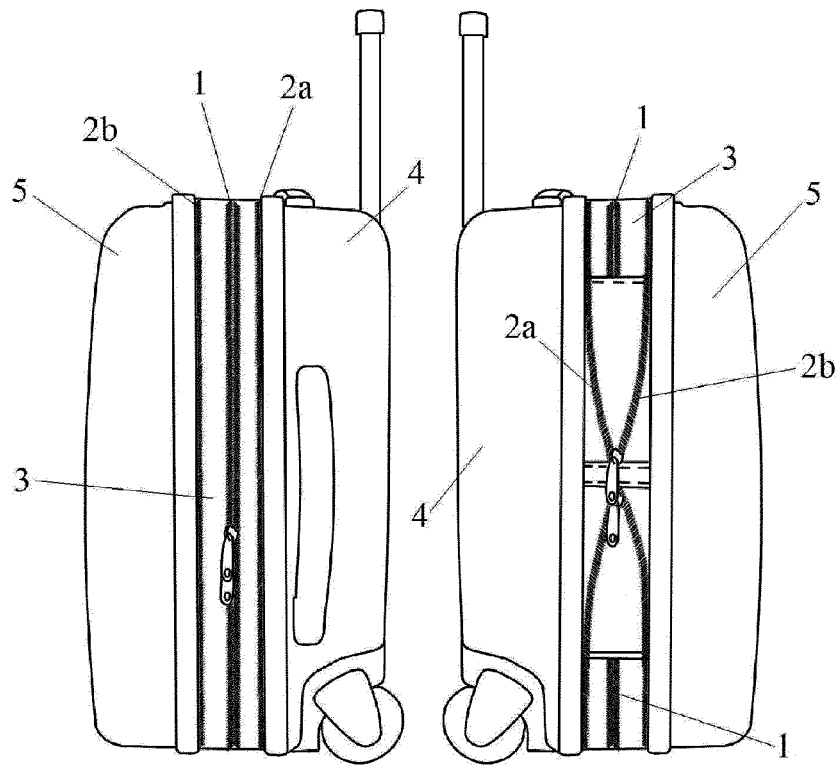


Fig. 2B

Fig. 3B

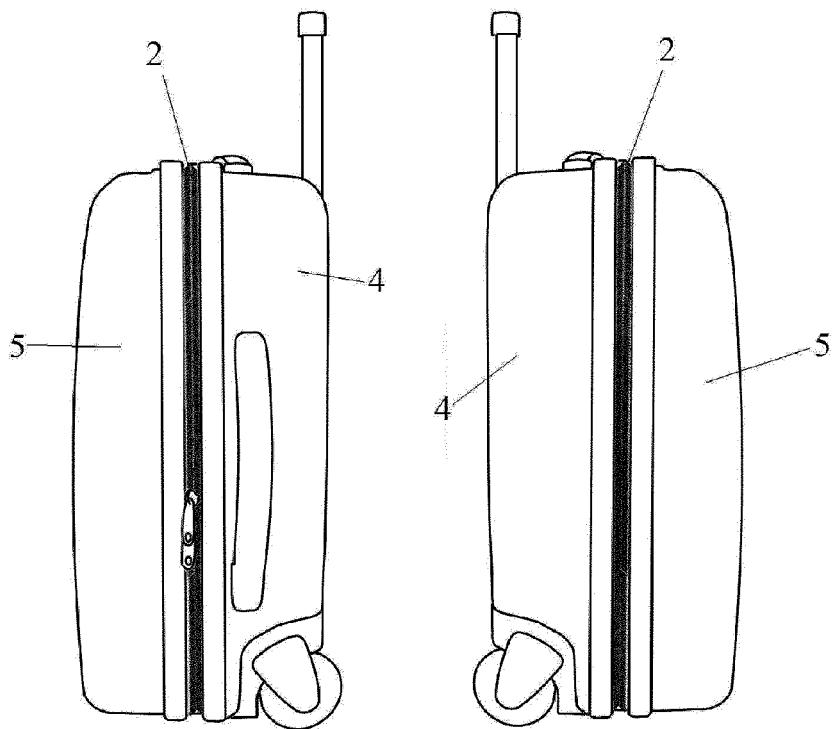


Fig. 2A

Fig. 3A



EUROPEAN SEARCH REPORT

Application Number
EP 12 17 0717

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 010 988 A (BROWN LAUREN [US]) 30 April 1991 (1991-04-30) * column 3, lines 4-59; figures 6,7 * -----	1-5	INV. A45C13/10 A45C7/00 A45C5/14
X	US 6 183 133 B1 (ROEGNER DEANNA [US]) 6 February 2001 (2001-02-06) * column 6, line 27 - column 7, line 58; figures 17,18 * -----	1-5	
			TECHNICAL FIELDS SEARCHED (IPC)
			A45C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 November 2012	Examiner Ionescu, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 17 0717

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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09-11-2012

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5010988	A	30-04-1991	NONE	

US 6183133	B1	06-02-2001	NONE	
