(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 449 937 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
23.10.2024 Bulletin 2024/43

(21) Application number: **22905883.9**

(22) Date of filing: **21.07.2022**

(51) International Patent Classification (IPC):
A45C 7/00 *(2006.01)* ***A45C 5/14*** *(2006.01)*
A45C 5/02 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A45C 5/02; A45C 5/14; A45C 7/00

(86) International application number:
PCT/CN2022/106910

(87) International publication number:
WO 2023/109121 (22.06.2023 Gazette 2023/25)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **17.12.2021 CN 202123178649 U**

(71) Applicant: **Shanghai Conwood International Co., Ltd.**
Shanghai 200135 (CN)

(72) Inventors:
- **ZHENG, Xuefeng**
  Shanghai 200136 (CN)
- **LI, Yanting**
  Shanghai 200136 (CN)

(74) Representative: **Plasseraud IP**
104 Rue de Richelieu
CS92104
75080 Paris Cedex 02 (FR)

(54) COLLAPSIBLE SUITCASE

(57) The present invention relates to a foldable suitcase comprising: a front shell, a rear shell, a top shell, a bottom shell, side shells and sheet-shaped corner joints, wherein the front shell, the rear shell, the top shell, the bottom shell and the side shells make up a body of the suitcase, wherein the sheet-shaped corner joints are disposed respectively at upper left, upper right, lower left and lower right corners of the body and joined to the top shell, the bottom shell and the side shells by sutures, forming a folding module, wherein the folding module is joined to the front shell by a front zipper, and is joined to the rear shell by a rear joint tape and sutures,and wherein rear zipper teeth are attached to the rear joint tape by sutures.The present invention adopts a foldable structure consisting of both hard and soft components, which allows the suitcase to be transported at lower cost and stowed in a smaller space.

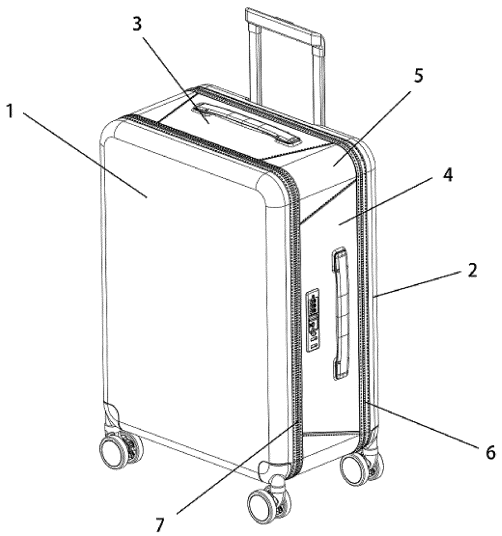

Fig. 1

EP 4 449 937 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a suitcase and, in particular, to a foldable suitcase.

BACKGROUND

[0002] Suitcases are used in our daily life for storing stuff and travel items and play an important role in users' long and short travels. However, conventional suitcases are associated with certain problems. In general, a suitcase with dimensions meeting on-board requirements (airlines permit boarding of luggage with a height not exceeding 55 cm, a width not exceeding 40 cm and a thickness not exceeding 20 cm, or with the sum of its length, width and height not exceeding 115 cm), whether hard or soft, would have a maximum load capacity and define a relatively rigid volume. Any object that is somewhat bulkier than the rigid volume could not be properly stowed in the suitcase. An excessive item forced into the suitcase may bulge or otherwise deform the suitcase, potentially causing damage to other contents in the suitcase, as well as to the suitcase itself. Moreover, the suitcase may fail to pass a luggage size check during pre-boarding security screening due to oversizing, necessitating additional time to go through consequently necessary procedures and wait for the suitcase by the conveyor belt after taking off the plane. Conventional suitcases lack diversity in function - except for being used to store clothes for transportation, they are usually left in home, vehicles or hotels. Therefore, they are limited in functionality and application. It is thus desirable to design a foldable structure consisting of both hard and soft components, which allows a suitcase to be transported at lower cost and stowed in a smaller space.

SUMMARY

[0003] It is an object of the present invention to propose a foldable suitcase, which can be transported at lower cost and stowed in a smaller space.

[0004] The above object is attained by the present invention which lies in a foldable suitcase comprised of a front shell, a rear shell, a top shell, a bottom shell, side shells and sheet-shaped corner joints. The front shell, the rear shell, the top shell, the bottom shell and the side shells make up a body of the suitcase. The sheet-shaped corner joints are disposed respectively at upper left, upper right, lower left and lower right corners of the body and joined to the top shell, the bottom shell and the side shells by sutures, forming a folding module. The folding module is joined to a front cover of the front shell by a front zipper, and is joined to a rear cover of the rear shell by a rear joint tape and sutures. Rear zipper teeth are attached to the rear joint tape by sutures.

[0005] Additionally, a top side of the top shell and the side shells are all trapezoidal. The sheet-shaped corner joints are also trapezoidal, when stretched. This enables satisfaction of the strength and foldability requirements.

[0006] Additionally, the shell components of the body are made of a sewable hard plastic material, which is ABS, PC or PP.

[0007] Additionally, the sheet-shaped corner joints and the rear joint tape are easily flexible soft fabric, which is any of nylon fabric, polyester fibers, ultrafine fibers and leather.

[0008] Additionally, the front zipper between the front shell and the folding module is a detachable zipper.

[0009] Additionally, the front shell engages the rear zipper teeth on the rear shell through zipper teeth on the front zipper, defining a folded configuration.

[0010] A foldable suitcase includes a front shell, a rear shell and a folding module in the form of a frame when in an unfolded configuration, wherein:

an edge of the folding module on one side thereof is joined to the rear shell via a flexible rear joint tape;

an edge of the folding module on its other side is provided across its entire length with a row of teeth, and the rear shell is provided on its exterior with rear zipper teeth across its entire length;

the front shell is provided thereon with a row of teeth across its entire length and a secondary row of teeth located externally to said row of teeth, wherein

either of the row of teeth and the secondary row of teeth on the front shell is configured for engagement with the row of teeth on the folding module, or during folding, either of the row of teeth and the secondary row of teeth on the front shell is configured for engagement with the rear zipper teeth.

[0011] Additionally, the secondary row of teeth projects towards the front shell with respect to the row of teeth on the front shell.

[0012] The present invention offers the benefits as follows:

It adopts a foldable structure consisting of both hard and soft components, which allows the suitcase to be transported at lower cost and stowed in a smaller space.

[0013] In order to store or transport goods in the suitcase, the front cover is removed, and the left and right side shells and the top and bottom shells are unfolded outwards to allow the suitcase to have an expanded overall volume capable of containing more goods therein.

[0014] In order to stow the suitcase, the front shell is removed, and the left and right side shells and the top and bottom shells are folded inwards into the inside of the rear shell. The front shell is then engaged with the rear zipper teeth using the detachable zipper, resulting in the folded configuration.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

Fig. 1 is a schematic perspective view of a foldable suitcase according to the present invention.

Fig. 2 is a side view of a foldable suitcase according to the present invention.

Fig. 3 is a schematic view of a folding module.

Fig. 4 is a schematic view after a front shell is removed.

Fig. 5 schematically illustrates a suitcase in a folded configuration.

Fig. 6 is a schematic partial view of a foldable suitcase according to one embodiment.

Fig. 7 is a schematic partial view of a foldable suitcase according to one embodiment, showing gathering of a front shell and a rear shell in a folded configuration.

Fig. 8 is a schematic partial view of a foldable suitcase according to another embodiment.

DETAILED DESCRIPTION

[0016] The present invention will be further described below with reference to the accompanying drawings and embodiments thereof.

[0017] As shown in Figs. 1 to 5, a foldable suitcase is comprised of a front shell 1, a rear shell 2, a top shell 3, a bottom shell 9, side shells 4 and sheet-shaped corner joints 5, which are joined together by sutures. The front shell 1, the rear shell 2, the top shell 3, the bottom shell 9 and the side shells 4 make up a body of the suitcase. The sheet-shaped corner joints 5 are disposed respectively at the upper left, upper right, lower left and lower right corners and joined to the top shell 3, the bottom shell 9 and the side shells 4 by sutures, forming a folding module. This folding module is joined to the front shell 1 by a front zipper 7, and is joined to the rear shell 2 by a rear joint tape 6 and sutures. Rear zipper teeth 8 are attached to the rear joint tape 6 by sutures.

[0018] Preferably, the shell components of the body are hard. They are made of a hard plastic material such as ABS, PC or PP, and are sewable.

[0019] Preferably, the sheet-shaped corner joints 5 and the rear joint tape 6 are soft fabrics made of soft materials such as nylon, polyester fibers, ultrafine fibers and leather, and are easily flexible.

[0020] Preferably, the front zipper 7 between the front shell 1 and the folding module is detachable, and the rear zipper teeth 8 are sewn to the rear joint tape 6. Zipper teeth on the front zipper 7 on the front shell 1 can engage the rear zipper teeth 8 to define a folded configuration.

[0021] Preferably, a top side of the top shell 3 and the side shells 4 are trapezoidal. Moreover, the sheet-shaped corner joints 5 are also trapezoidal, when stretched. This can ensure strength and enables foldability.

[0022] As shown in Fig. 4, the bottom shell 9 is joined at each of its left and right sides to one of the sheet-shaped corner joints 5, and the top shell 3 is also joined at each of its left and right sides to one of the sheet-shaped corner joints 5. One of the side shells 4 is joined to the two sheet-shaped corner joints 5 at the left side of the bottom shell 9 and the top shell 3, and the other side shell 4 is joined to the two sheet-shaped corner joints 5 at the right side of the bottom shell 9 and the top shell 3. The so-formed folding module appears like a roughly rectangular frame.

[0023] Longer bases of the trapezoidal sheet-shaped corner joints 5 are all located on the same side, i.e., joined to a single side of the front shell 1. This can facilitate inward folding of edges of the bottom shell 9, the top shell 3 and the side shells 4 along said side.

[0024] With combined reference to Fig. 6, the front zipper 7 includes two rows of teeth 70, which can interlock together. One of the rows of teeth 70 of the front zipper 7 is attached to a peripheral edge of the front shell 1 across its entire length. A peripheral edge of the folding module at its one side is joined to the rear joint tape 6, and the other row of teeth 70 of the front zipper 7 is attached to another peripheral edge of the folding module at its opposite side across its entire length. By means of the front zipper 7, the front shell 1 can be opened, closed and removed.

[0025] As shown in Figs. 4 to 5, a folding process may involve removing a front cover, folding the left and right side shells 4 inwards into the inside of the rear shell 2, and also folding the top shell 3 and the bottom shell 9 inwards into the inside of the rear shell 2. Alternatively, the top shell 3 and the bottom shell 9 may be first folded inwards into the inside of the rear shell 2, and the left and right side shells 4 may be then folded inwards into the inside of the rear shell 2. At last, the front cover is engaged with the rear zipper teeth 8 by the detachable zipper, resulting in the folded configuration. An unfolding process can be performed in a reverse order.

[0026] As shown in Fig. 7, the row of teeth 70 of the front zipper 7 that is attached to the front shell 1 can be engaged with the rear zipper teeth 8 to secure the front shell 1 to the rear shell 2, with the folding module being received inside the front shell 1 and the rear shell 2.

[0027] As shown in Fig. 8, in this embodiment, a secondary row of teeth 71 may be further provided on the front shell 1. It may be located externally with respect to the aforesaid row of teeth 70 of the front zipper 7 that is attached to the front shell 1. With this arrangement, there are two rows of teeth on the front shell 1, i.e., the aforementioned row of teeth 70 and the secondary row of teeth

71.

[0028] During folding, the secondary row of teeth 71 may be interlocked with the rear zipper teeth 8 to secure the front shell 1 to the rear shell 2.

[0029] The row of teeth 70 of the front shell 1 are provided with a slider 72, and the secondary row of teeth 71 are provided with another slider 72. The two sliders 72 can be manipulated separately, increasing convenience of use.

Claims

1. A foldable suitcase comprising: a front shell, a rear shell, a top shell, a bottom shell, side shells and sheet-shaped corner joints,

wherein the front shell, the rear shell, the top shell, the bottom shell and the side shells make up a body of the suitcase,
wherein the sheet-shaped corner joints are disposed respectively at upper left, upper right, lower left and lower right corners of the body and joined to the top shell, the bottom shell and the side shells by sutures, forming a folding module,
wherein the folding module is joined to a front cover of the front shell by a front zipper, and is joined to a rear cover of the rear shell by a rear joint tape and sutures,and
wherein rear zipper teeth are attached to the rear joint tape by sutures.

2. The foldable suitcase according to claim 1, wherein a top side of the top shell and the side shells are all trapezoidal,and
the sheet-shaped corner joints are also trapezoidal, when stretched, and enable satisfaction of the strength and foldability requirements.

3. The foldable suitcase according to claim 1, wherein the shell components of the body are made of a sewable hard material, which is ABS, PC or PP.

4. The foldable suitcase according to claim 1, wherein the sheet-shaped corner joints and the rear joint tape are easily flexible soft fabric, which is any of nylon fabric, polyester fibers, ultrafine fibers and leather.

5. The foldable suitcase according to claim 1, wherein the front zipper between the front shell and the folding module is a detachable zipper.

6. The foldable suitcase according to claim 5, wherein the front shell engages the rear zipper teeth on the rear shell through zipper teeth on the front zipper, defining a folded configuration.

7. A foldable suitcase with a front shell and a rear shell, further comprising: a folding module in the form of a frame when in an unfolded configuration, wherein:

an edge of the folding module on one side thereof is joined to the rear shell via a flexible rear joint tape;
an edge of the folding module on its other side is provided across its entire length with a row of teeth, and the rear shell is provided on its exterior with rear zipper teeth across its entire length;
the front shell is provided thereon with a row of teeth across its entire length and a secondary row of teeth located externally to said row of teeth, wherein
either of the row of teeth and the secondary row of teeth on the front shell is configured for engagement with the row of teeth on the folding module, or during folding, either of the row of teeth and the secondary row of teeth on the front shell is configured for engagement with the rear zipper teeth.

8. The foldable suitcase according to claim 7, wherein the row of teeth of the front shell are provided with a slider, and the secondary row of teeth are provided with another slider.

9. The foldable suitcase according to claim 7, wherein the folding module comprising:

a bottom shell, which is joined at each of its left and right sides to a sheet-shaped corner joint;
a top shell, which is also joined at each of its left and right sides to a sheet-shaped corner joint; and
a side shell joined to the two sheet-shaped corner joints at the left side of the bottom shell and the top shell, and another side shell joined to the two sheet-shaped corner joints at the right side of the bottom shell and the top shell; wherein
the sheet-shaped corner joints are easily flexible.

10. The foldable suitcase according to claim 9, wherein the sheet-shaped corner joints are trapezoidal, and longer bases of the trapezoidal sheet-shaped corner joints are all located on the same side, i.e., joined to a single side of the front shell.

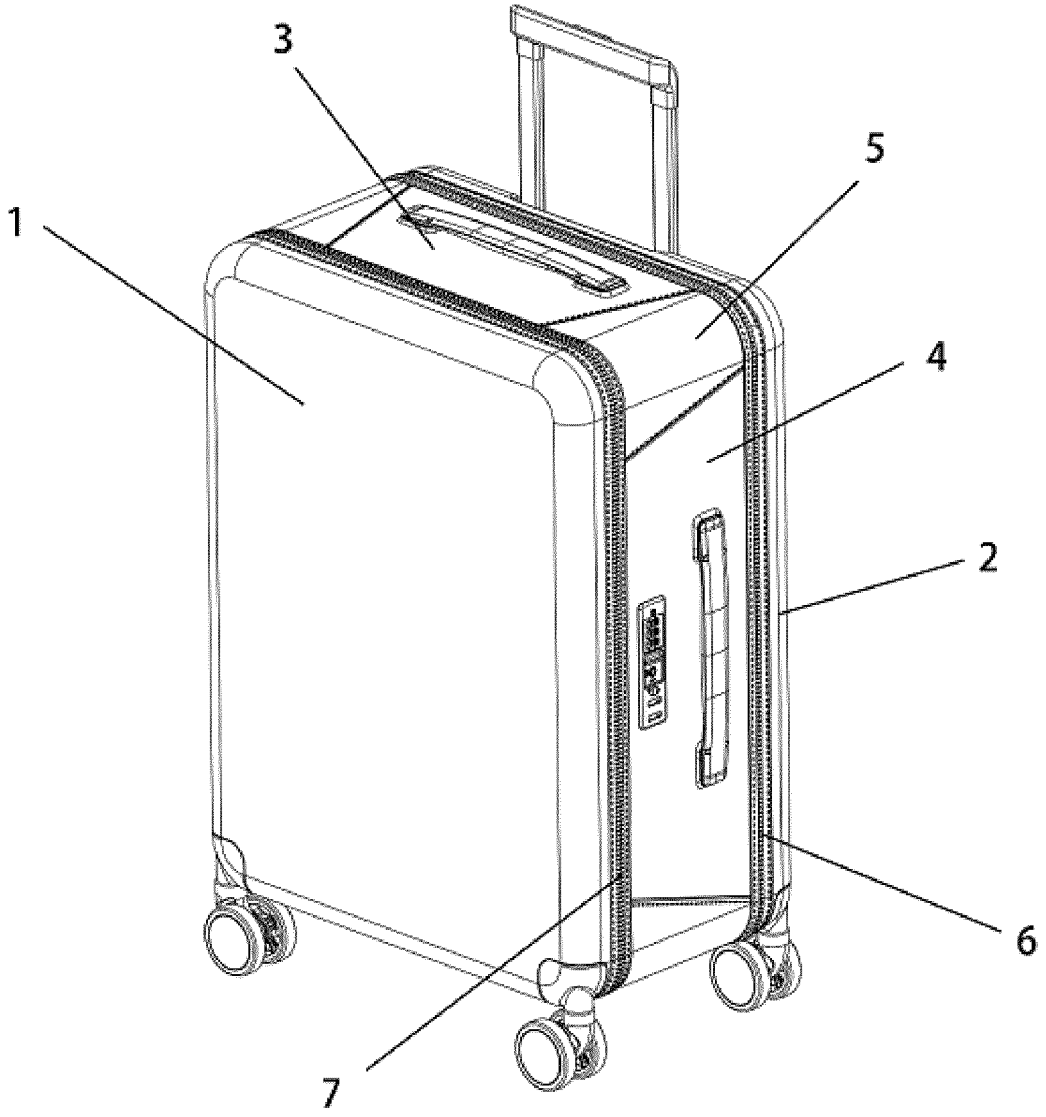

Fig. 1

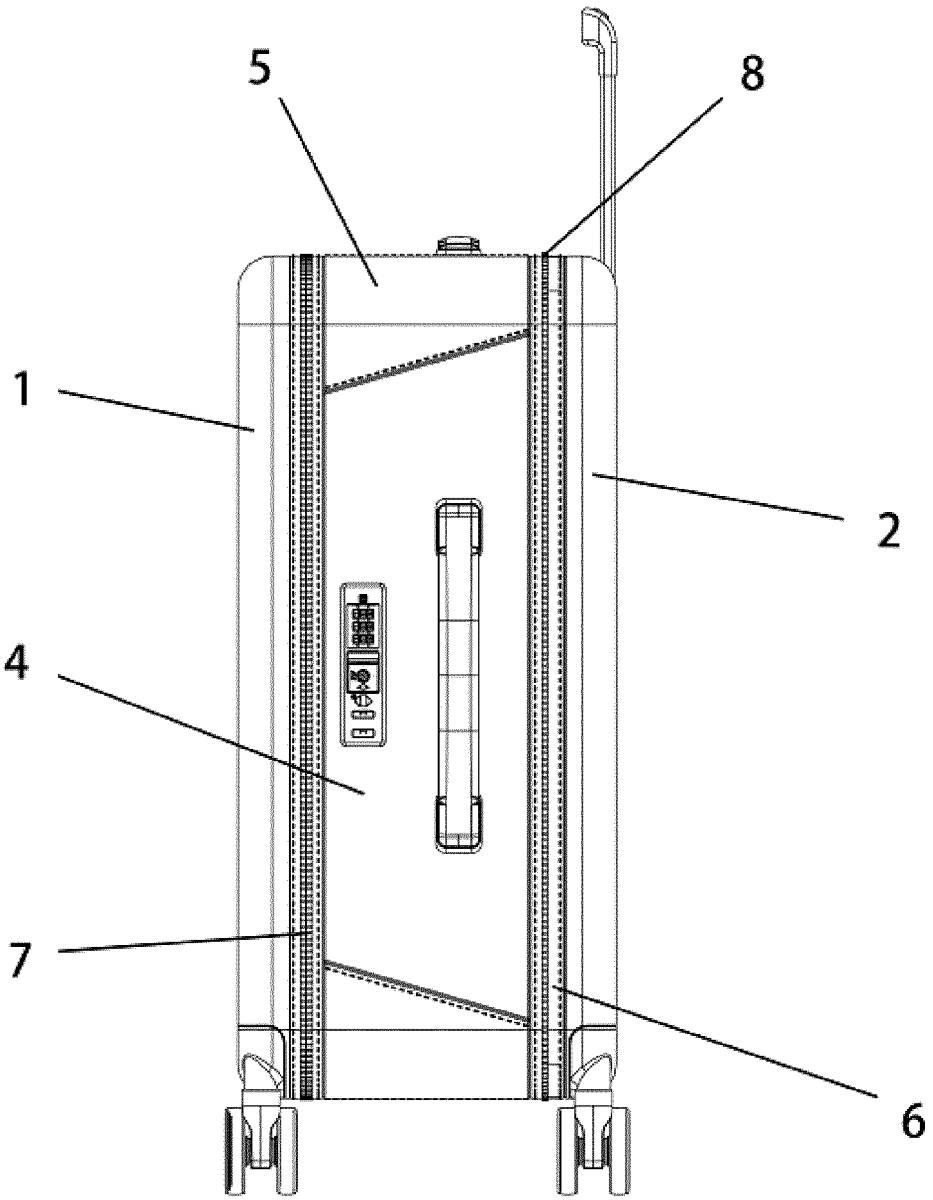

Fig. 2

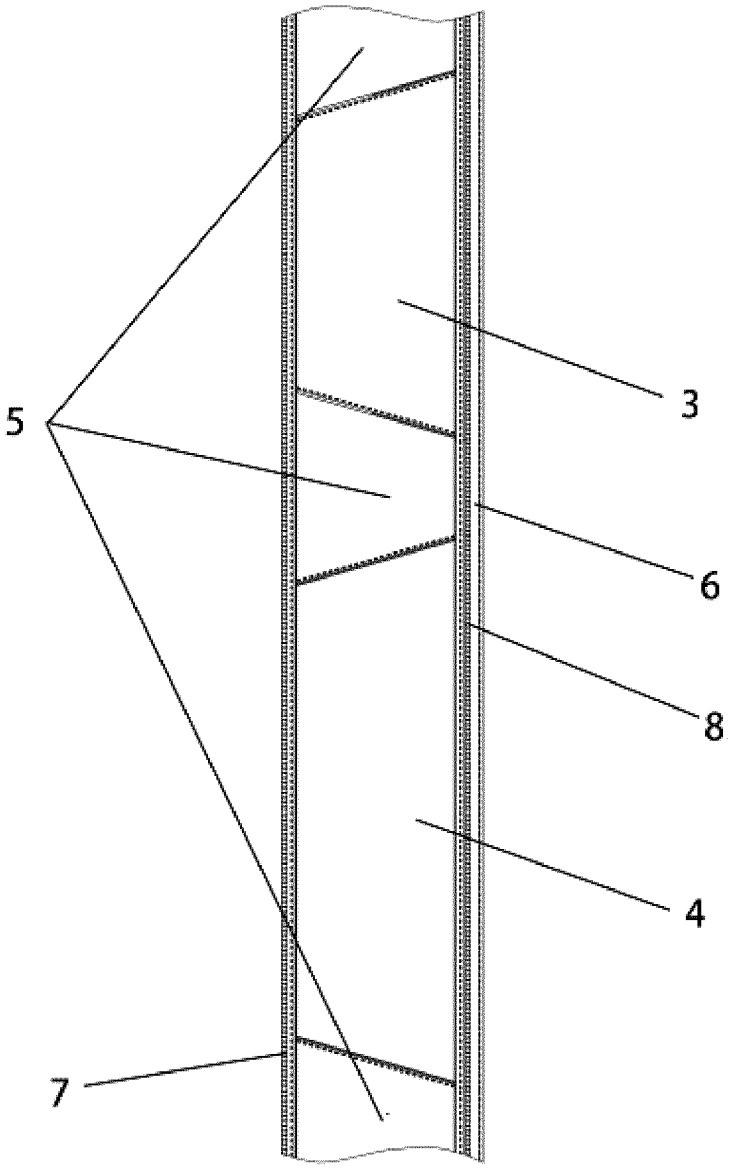

Fig. 3

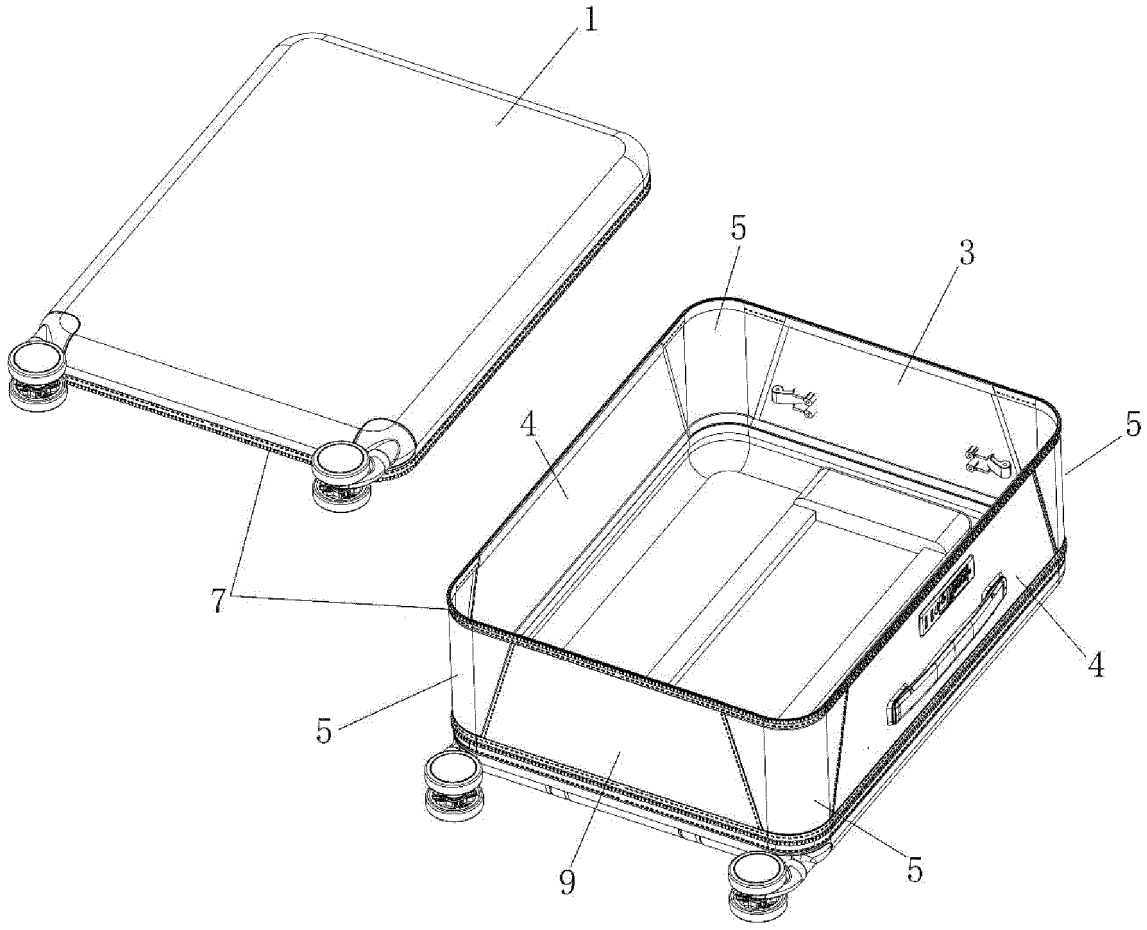

Fig. 4

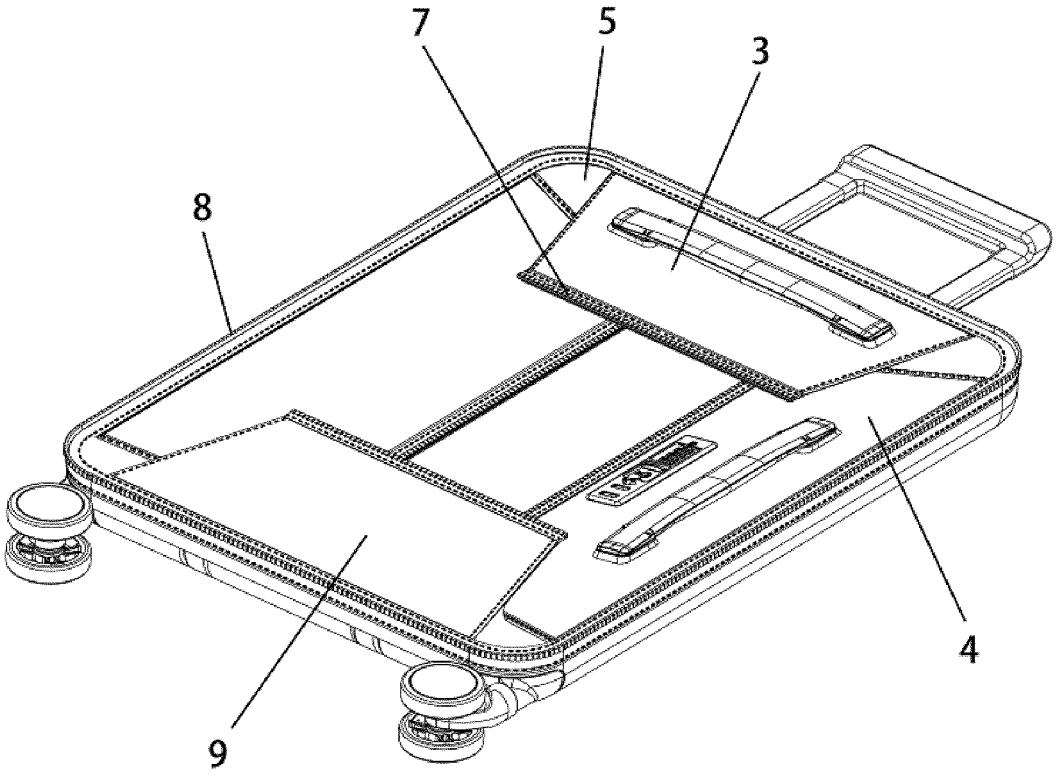

Fig. 5

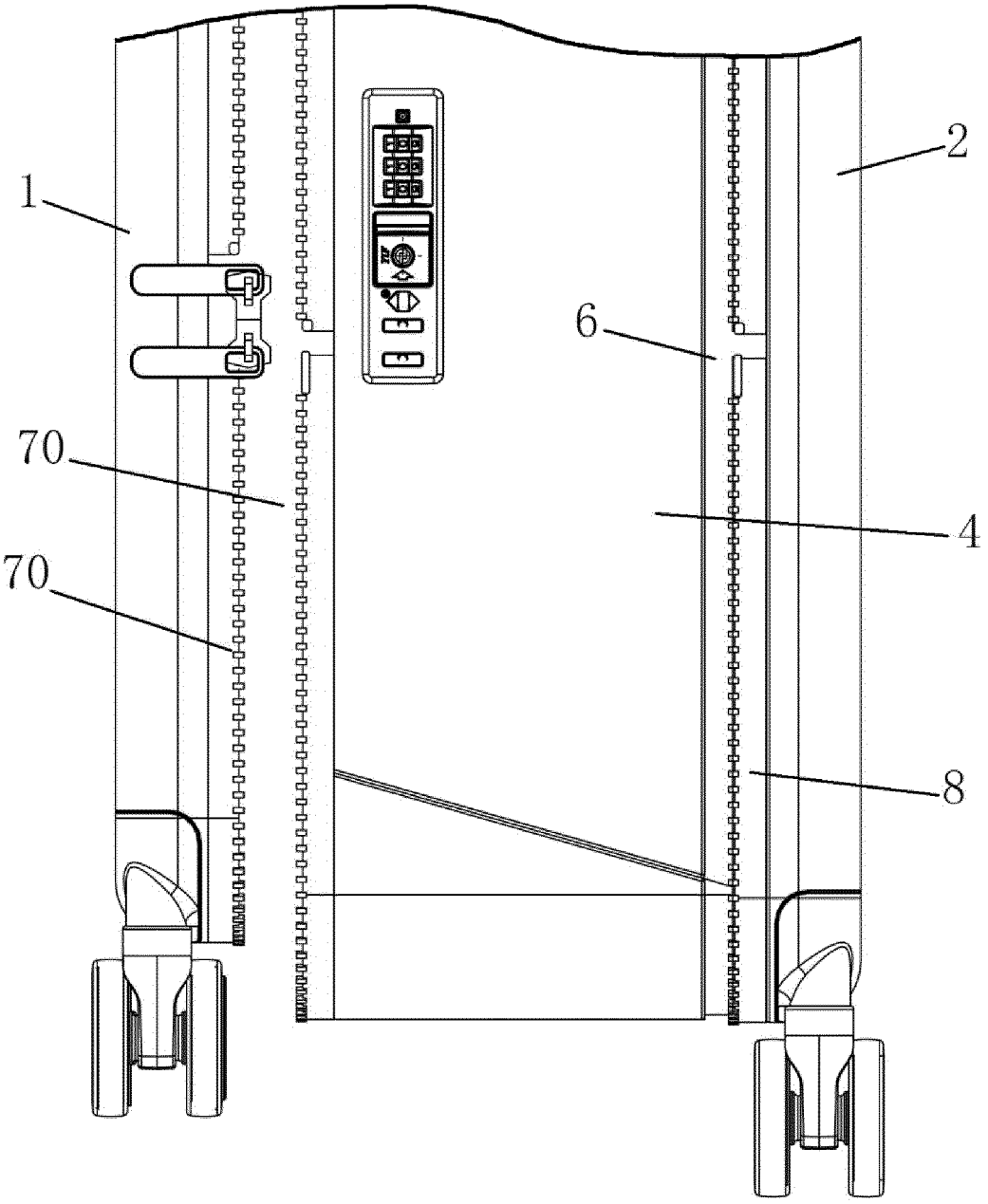

Fig. 6

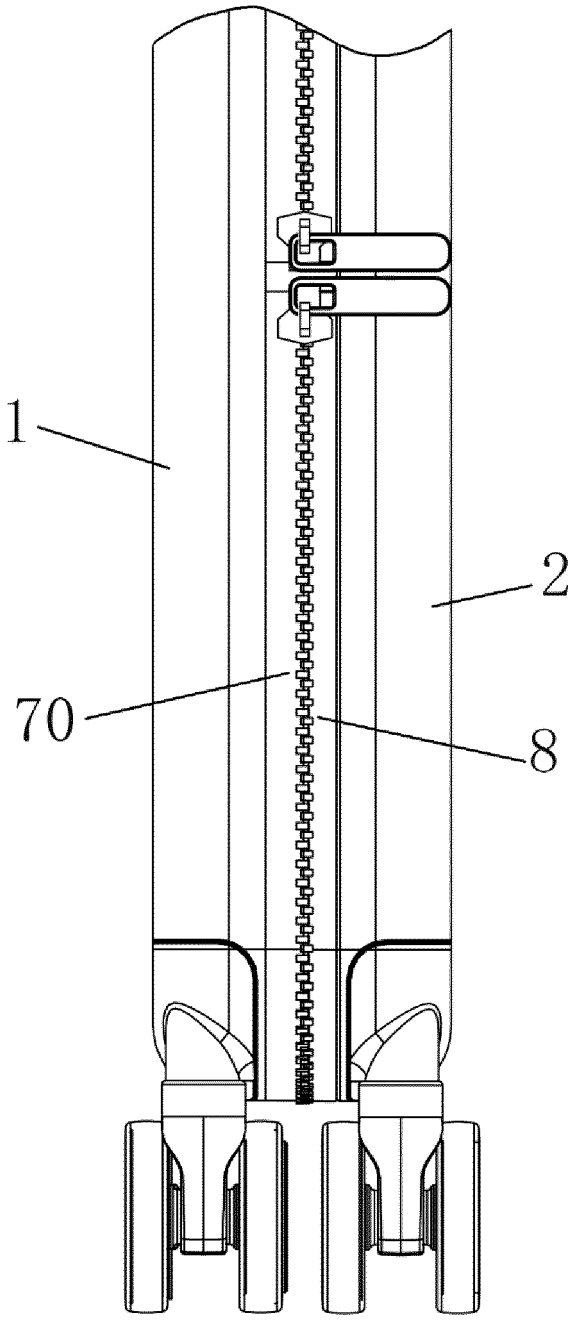

Fig. 7

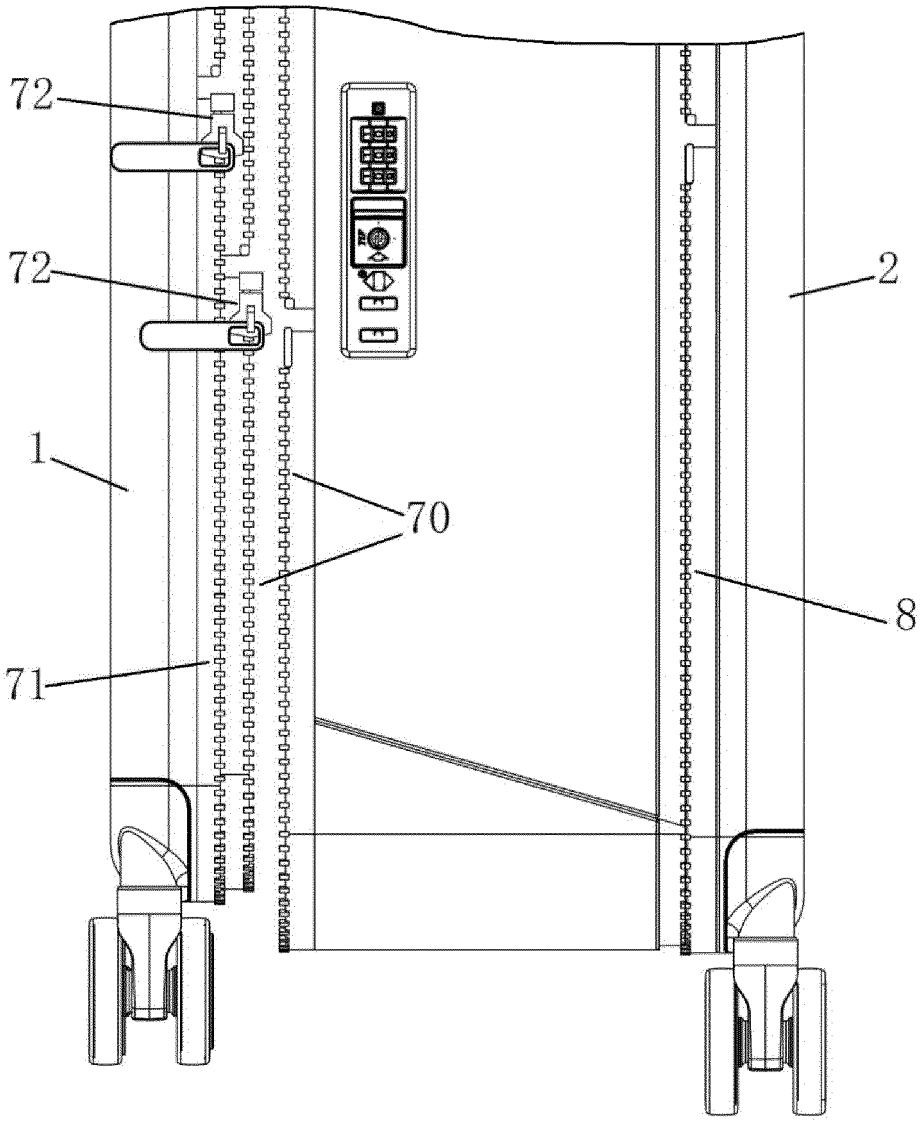

Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/106910

A. CLASSIFICATION OF SUBJECT MATTER

A45C 7/00(2006.01)i; A45C 5/14(2006.01)i; A45C 5/02(2006.01)i

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)

CNTXT, ENTXTC, ENTXT, CNKI: 折叠, 拉链, 可拆卸 foldable, zip, detachable

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 216453766 U (SHANGHAI HAY INTERNATIONAL TRADE LIMITED COMPANY) 10 May 2022 (2022-05-10) claims 1-10	1-10
X	CN 202222610 U (VOYLUX CO., LTD.) 23 May 2012 (2012-05-23) description, paragraphs [0062]-[0084], and figures 1-10	1-10
X	WO 2017064739 A1 (CARAMELLI CHIARA) 20 April 2017 (2017-04-20) description, page 4, line 2 to page 8, last line, and figures 1-14	1-10
A	CN 111053346 A (HARBIN INSTITUTE OF TECHNOLOGY) 24 April 2020 (2020-04-24) entire document	1-10
A	CN 209825475 U (WUYI UNIVERSITY) 24 December 2019 (2019-12-24) entire document	1-10
A	CN 213785815 U (ZHEJIANG LIANZHAN PRECISION HARDWARE ACCESSORIES CO., LTD.) 27 July 2021 (2021-07-27) entire document	1-10
A	CN 108124418 A (LI YAO) 05 June 2018 (2018-06-05) entire document	1-10

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 September 2022	**28 September 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/106910

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7175010 B1 (MINER MICHELLE YVETTE) 13 February 2007 (2007-02-13) entire document	1-10

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/106910

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 216453766 U	10 May 2022	None	
CN 202222610 U	23 May 2012	None	
WO 2017064739 A1	20 April 2017	IT UB20155228 A1	16 April 2017
		EP 3361901 A1	22 August 2018
CN 111053346 A	24 April 2020	None	
CN 209825475 U	24 December 2019	None	
CN 213785815 U	27 July 2021	None	
CN 108124418 A	05 June 2018	WO 2019126918 A1	04 July 2019
US 7175010 B1	13 February 2007	None	

Form PCT/ISA/210 (patent family annex) (January 2015)