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(54) Title: MULTIPURPOSE FURNITURE ASSEMBLY

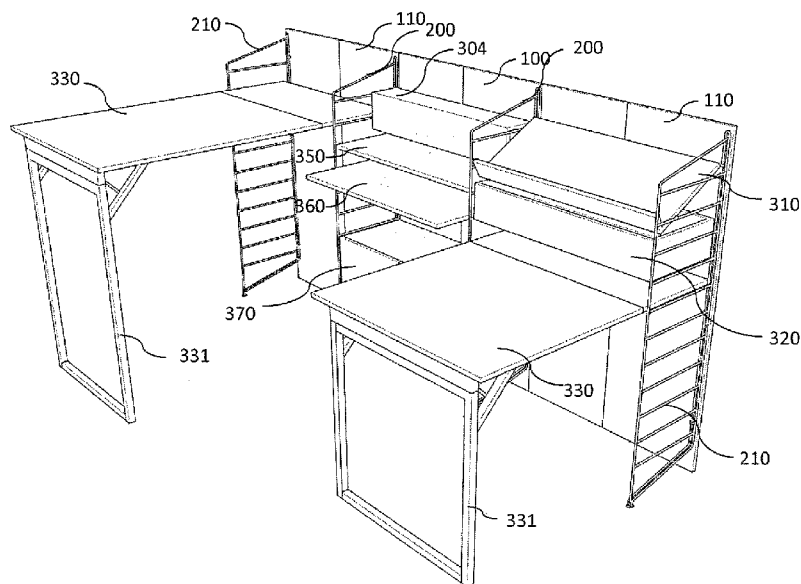


Fig. 1

(57) Abstract: A knock-down lay flat furniture kit having a basic unit comprising a generally rectangular back-board (100) and a pair of generally rectangular metal side members (200) comprising ladder-like frames hinged to the vertical edges of the back-board (100) so that they can be moved between a position in which they lie flat on the back-board (100) and a position in which they extend perpendicular to the back-board (100).



MULTIPURPOSE FURNITURE ASSEMBLY

FIELD OF INVENTION

- 5 The invention relates to a furniture. More particularly, the invention relates to a knock-down lay flat furniture kit being able to serve different purposes with different forms of further panels.

BACKGROUND OF THE INVENTION

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Furniture may be defined as a movable objects intended to support various human activities such as seating, eating, and sleeping. Besides, furniture is also used to hold objects at a convenient height for work or store things. Majority of the people are living in a smaller space in the current era, resulting in the needs for making every
15 piece of furniture pull double duty. In the quest to live smaller, the idea of 'multipurpose' goes a long way. When possessions perform more than one function, people may have need for fewer of them. In the modern homes, multipurpose furnishings save space, which allows the people to choose smaller, more efficient dwellings. Also known as modular furniture, multipurpose furnishings are able to
20 expand or shrink depending on needs, serve two purposes at once, or transform seamlessly from one function to another.

In one example as shown in the patent document US3556586A discloses a multifunctional article of furniture, especially child furniture, formed as a monolithic
25 hollow Walled molding of rigid plastic material operationally usable as an upright chair, a rocking chair, a desk and a table according to selective positioning of the article. However, the disclosed furniture has a limitation whereby the furniture is not foldable into a compact size for storage purpose.

In second example as shown in patent document US20080276839A1, a convertible furniture item is disclosed. The disclosed furniture item is convertible between a coffee table and a dining table with chairs, by simply rotating the furniture from a horizontal position to an upright standing position. However, the furniture has a difficult connection whereby it cannot to be detached easily into smaller pieces for transportation and storage purpose.

Meanwhile, a patent document BE1008843A3 discloses a folding piece of furniture which is able to transform its functions between a chair, stool, table or shelving. The furniture consist of hinges to allow the furniture to be folded in certain degree. However, the rigidity of the furniture is not guaranteed.

In a nut shell, it is necessary to provide an invention of multi-functional furniture which is foldable, dismountable into smaller pieces with a simple connection. Therefore, this invention provides such a furniture.

SUMMARY OF INVENTION

The main objective of the invention is to provide a knock-down lay flat furniture kit having a basic unit comprising a generally rectangular back-board and a pair of generally rectangular metal side members comprising ladder-like frames hingedly connected to the vertical edges of the back-board so that they can be moved between a position in which they lie flat on the back-board and a position in which they extend perpendicular to the back-board.

25

Preferably, the kit includes panels attached to the frame by clip members that fit closely on the rungs and side pieces of the side members.

Preferably, the kit includes further back panel with interlocking means for connecting

the back panels.

Preferably, the side members includes ladder-like members with both horizontal and inclined rungs.

5

Preferably, the back-board comprises a pair of hinged panels being able to fold symmetrically along the vertical axis.

Preferably, the further panel may comprises but not limit to drawer, shelf, cabinet,
10 foldable table and chair.

Alternately, the clip members comprises a 'U'-shaped hook with a flange extended from the hook.

15 Alternately, the side panels include a limit means next to the hinge, limiting the extension of the side panel to allow the kit to stand upright before attaching the further panels.

Alternately, the kit further includes earthquake prevention measures applied on the
20 clips members and the further panels.

One skilled in the art will readily appreciate that the invention is well adapted to carry out the objects and obtain the ends and advantages mentioned, as well as those inherent therein. The embodiments described herein are not intended as limitations on
25 the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

For the purpose of facilitating an understanding of the invention, there is illustrated in the accompanying drawing the preferred embodiments from an inspection of which
5 when considered in connection with the following description, the invention, its construction and operation and many of its advantages would be readily understood and appreciated.

- 10 **Figure 1** is a drawing illustrating the knock-down lay flat furniture kit.
- Figure 2** is a drawing illustrating the basic unit and extended unit of the furniture kit.
- 15 **Figure 3** is a drawing illustrating the shelving of the furniture kit.
- Figure 4** is a drawing illustrating the charging corner of the furniture kit.
- Figure 5** is a drawing illustrating the drawer assembly of the furniture kit.
- 20 **Figure 6** is a drawing illustrating the folding table assembly of the furniture kit.
- Figure 7** is a drawing illustrating the dismountable storage box assembly of the furniture kit.
- 25 **Figure 8** is a drawing illustrating the extension of wired frame of the furniture kit.
- Figure 9** is a drawing illustrating the hook for holding the wired frame.

Figure 10 is a drawing illustrating the first embodiment of the clip member.

Figure 11A is a drawing illustrating the second embodiment of the clip member.

5 **Figure 11B** is a drawing illustrating the attachment of the further panels to the second embodiment of the clip member.

Figure 12 is a drawing illustrating the roller of drawer assembly.

10 **Figure 12A** is a drawing illustrating the cross-sectional view of roller for drawer assembly.

Figure 13 is a drawing illustrating the base of the side member's leg.

DETAILED DESCRIPTION OF THE INVENTION

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The invention will now be described in greater detail, by way of example, with reference to the drawings.

Fig. 1 to Fig. 2 indicate the drawing of the knock down lay flat furniture kit together with its accessories. The furniture kit has a basic unit which comprises a generally rectangular back-board 100 and a pair of generally rectangular metal side members 200 formed by ladder-like frames hingedly connected to the vertical edges of the back-board 100 so that they can flip into two positions, one which the side members 200 are lied flat on the back-board 100 and the other which the side members 200 extend perpendicular to the back-board 100. The side members 200, 210 further include a means for limiting the extension of the side panel to allow the kit to stand upright before attaching the further panels. Preferably, the limiting means may be but not limit to an extra bar added at the ladder-like frame of the side members 200,210, a stopper or ridge added at the end of the back-board 100,110. The back-board 100

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comprises a pair of hinged panels capable of folding along the vertical axis in a corrugated way. The kit is also extendable horizontally by attaching another back-board 110 with single side member 210 to the main back-board 100 by interlocking means. Besides, the back-board 100 also includes a hook 222 for attaching a wired
5 frame 220 so that the wired frame 220 can be extended vertically from the back-board 100 as illustrated in **Fig. 3** and **Fig. 4**. The wired frame 220 also has an additional hook 221 to be clung on the back-board 100 for reinforcement.

The kit includes further panels attached to the side members 200 by clip members 400
10 that fit closely on the rungs and side pieces of the side members 200 whereby the side members 200 include ladder-like members with both horizontal and inclined rungs. The further panels of the kit can be in different forms, which includes but not limited to drawer 320, shelf, cabinet 370, foldable table 330 and chair. In a first example as shown in **Fig. 5**, where the further panels are in the form of drawer 320, the drawer
15 320 has two pairs of clips 400 with a different orientation mounted on the inner sides of the drawer 320, so that the drawer 320 is capable of sliding in a maximum allowance along the rungs. The change of clip orientation not only allow the drawer 320 to be attached to the rungs but also act as a grip channel to allow the slid-ability of the drawer 320.

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In second example as shown in **Fig. 6**, where the further panels are in the form of foldable table 330, the foldable table 330 includes a two-part form foldable table top attached with the clips on one side 332 and a folding leg 331 on the other side of the table top. The table 330 has an erected configuration and a compact configuration. In
25 the erected configuration, the table top is laid flat at a generally horizontal position and the leg is flipped outwardly to a generally vertical position to support the table top. In the compact configuration, a first section of the table top is swung downwardly to a position which is perpendicular to a second section 332 of the table top and the leg is flipped inwardly to a position parallel to the first section. The height of the table

is corresponded to the length of the folding leg 331 and different heights can serve different purposes. For instance, a taller table can serve as a bar table while a shorter foldable table 330 can serve as a working desk.

- 5 In a third example as shown in **Fig. 7** and **Fig. 8**, where the further panels are in a form of a shelf, the shelf is attachable to the side members 200 at any level via the clips 400. The shelf can be in the form of a flat panel (350,360) or an L-shaped panel (310,340) to serve different purposes. For instance, the flat panel (350,360) can be laid horizontally to form a display shelf; the L-shaped panel (310,340) can be placed
10 on top of the flat panel to form a concealed area; the L-shaped panel (310,340) can also attached to the side members 200 at a slanted angle where one end of the panel can be transformed into a ridge to hold an object on the panel at the slanted angle.

- In the fourth example as shown in **Fig. 9**, where the further panels are in the form of a
15 cabinet 370. The cabinet 370 has a bottom panel with two pairs of clips 400 at the sides, two side panels 373 with hinged door 371 and a top cover panel 372 being connected via dowel connection.

- A first embodiment of the clip members 400 as shown in **Fig.10** comprises a “U”-
20 shaped hook 402 for the attachment to the rungs, a flange 404 extended either from one of the top end of the ‘U’-shaped hook 402 or from the parabola base 401 of the ‘U’-shaped hook 402. The flange has a hole 403 at the centroid allowing any fastening medium such as bolts, lock nuts and screws.

- 25 A second embodiment of the clip members 400 as shown in **Fig 11A** & **Fig 11B** comprises a beam structure 405 where each free end has a ‘U’-shaped hook 402 for the attachment to the rungs of the side member’s frame. The beam structure also has a pair of protrusions 406 mate able with the recesses of the further panel 350.

A third embodiment of the clip members as shown in **Fig. 12**, each is in the form of a grooved wheel 321, in which the rungs are seated within the grooved section of the wheel. This embodiment can be applied on the further panel in the form of drawer 320 for a better sliding of the drawer with the reduced friction.

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In certain countries where earthquake occurs frequently, the furniture may incorporate features with earthquake prevention as shown in **Fig. 11** to **Fig. 13**. In one of the example where the clip members 400 can further comprise a support beam structure 405 connecting both side of the clip members with a securing means to prevent the detachment of the clips 400 from the rungs caused by external force. The beam also includes a pair of holding means 406 such as roller catch for holding the further panels 350. In another example, the safety measures may be applied on the grooved wheel 321 of the drawer 320 whereby a reinforce panel 322 is added next to the grooved wheel 321 to provide further support to the drawer 320. Furthermore, the legs of the side members 200 has a foot 201 which its size can be enlarged to enhance the stability of the furniture.

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CLAIMS

1. A knock-down lay flat furniture kit having a basic unit comprising a generally rectangular back-board (100) and a pair of generally rectangular metal side members
5 (200) comprising ladder-like frames hingedly connected to the vertical edges of the back-board (100) so that they can be moved between a position in which they lie flat on the back-board (100) and a position in which they extend perpendicular to the back-board (100).
- 10 2. A kit as claimed in claim 1, which includes further panels attached to the frame by clip members that fit closely on the rungs and side pieces of the side members (200).
3. A kit as claimed in claim 1 or 2, which includes further back-board (110) with interlocking means for connecting the back-boards (100,110).
- 15 4. A kit as claimed in anyone of claim 1 to 3, wherein the side members (200,210) includes ladder-like members with both horizontal and inclined rungs.
5. A kit as claimed according to anyone of claims 1 to 4, wherein the back-board
20 (100,110) comprises a pair of hinged panels being able to fold symmetrically along the vertical axis.
6. A kit as claimed in anyone of claims 1 to 5, wherein the further panel is drawer (320), shelf, cabinet (370), foldable table (330) and chair, or any combination thereof.
- 25 7. A kit as claimed in anyone of claims 1 to 6, wherein the clip members (400) comprises a 'U'-shaped hook with a flange extended from the hook.
8. A kit as claimed according to anyone of claims 1 to 7, wherein the side panels

include a means for limiting the extension of the side panel to allow the kit to stand upright before attaching the further panels.

9. A kit as claimed in anyone of claims 1 to 8, wherein the kit further includes
5 earthquake prevention measures applied on the clips members (400) and the further panels.

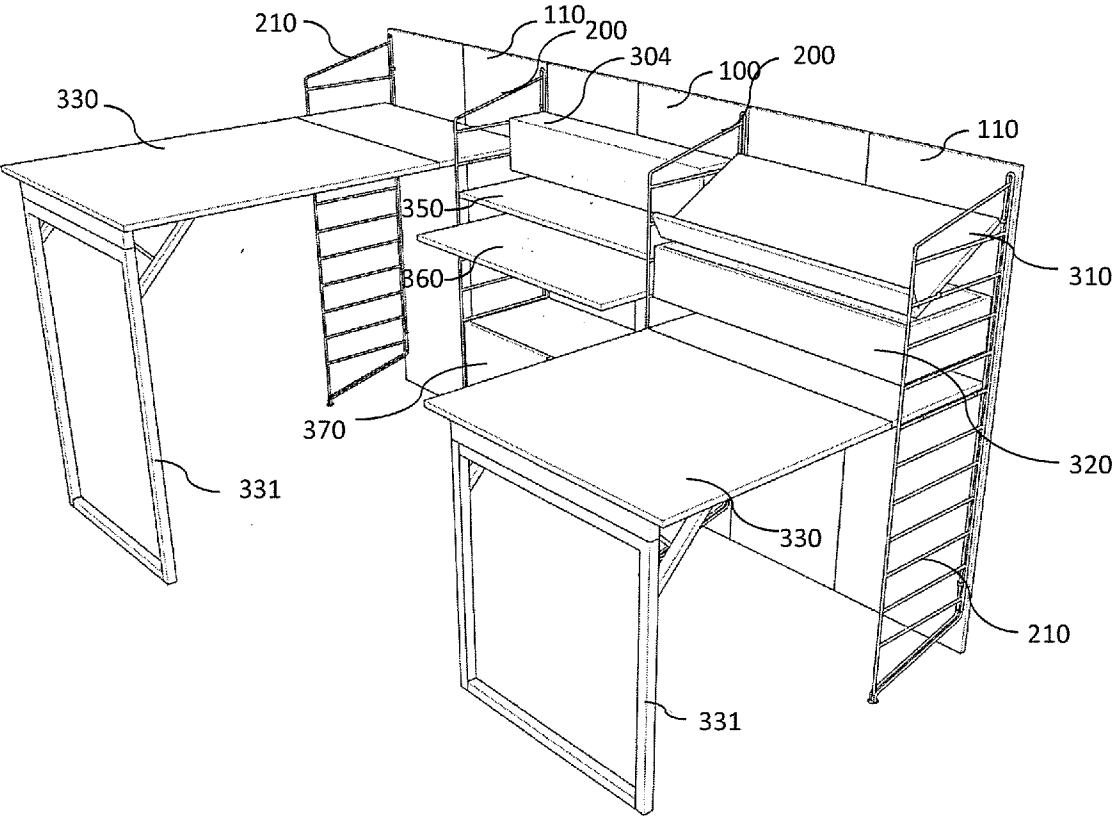


Fig. 1

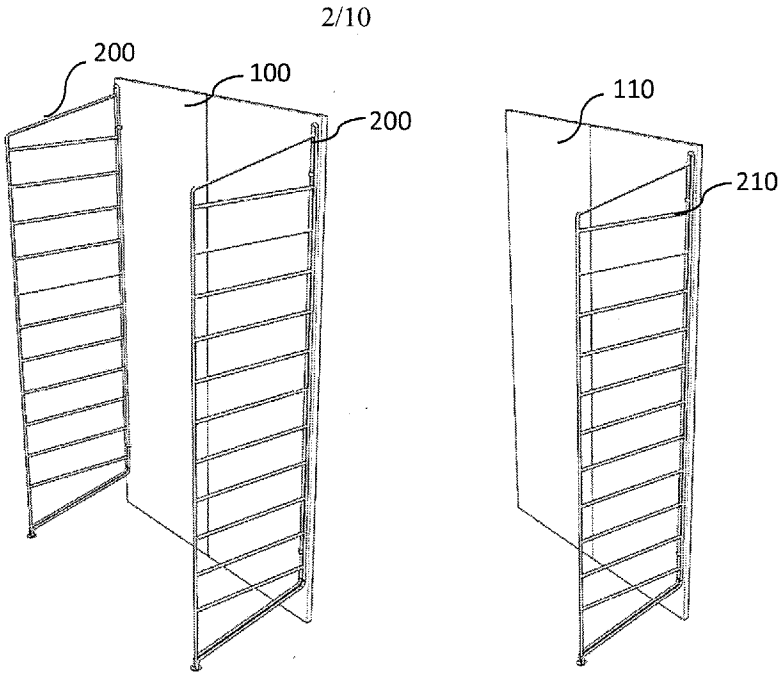


Fig. 2

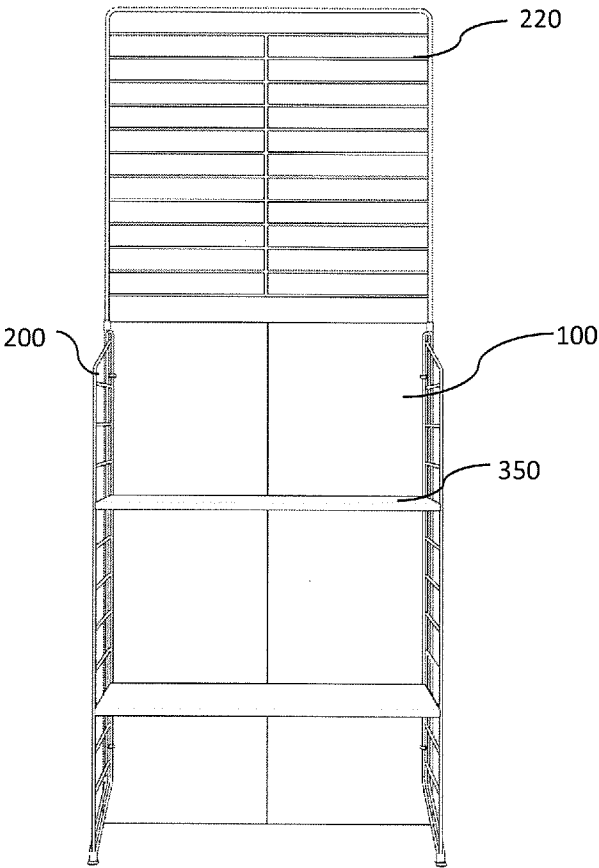


Fig 3

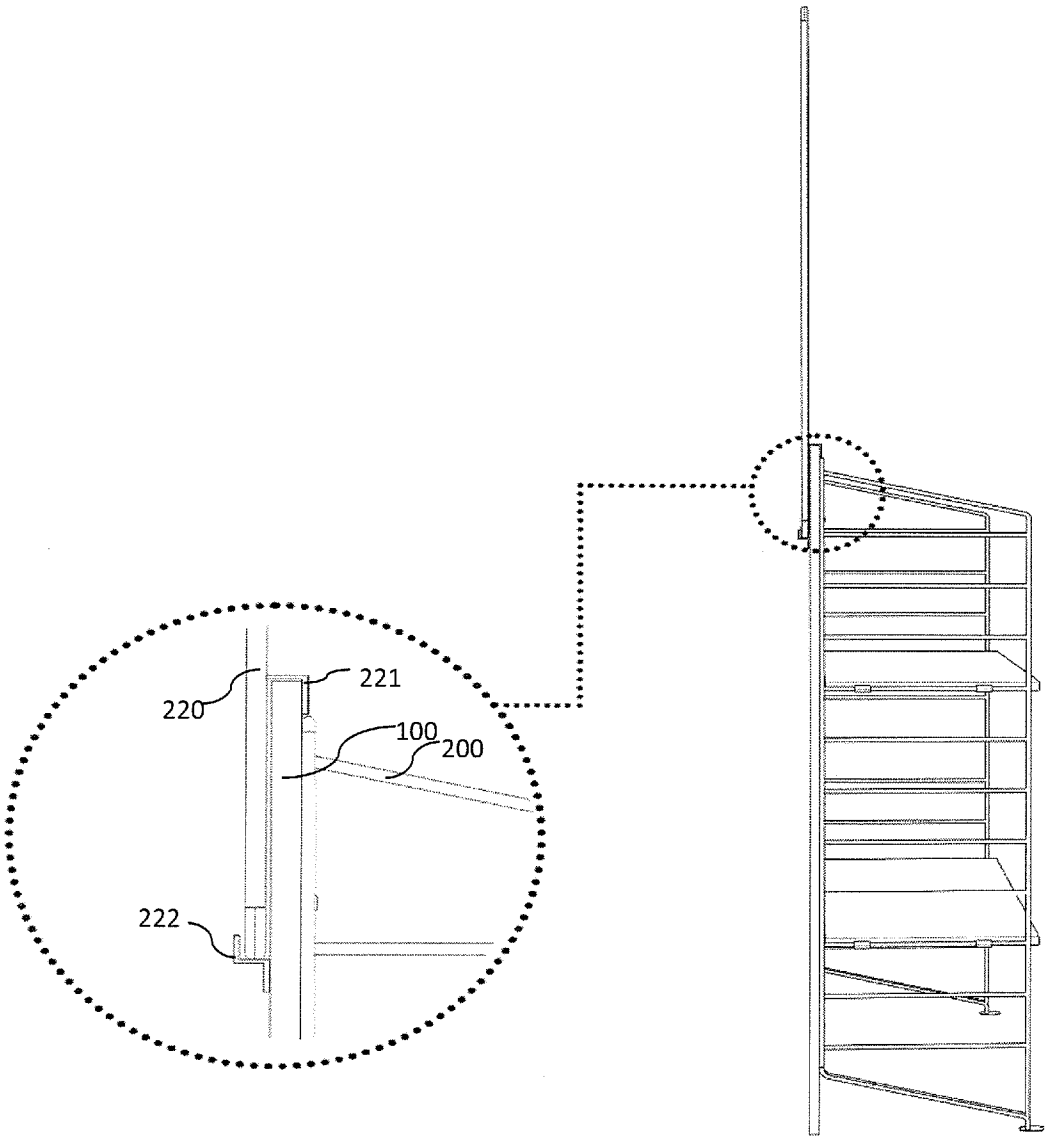


Fig 4

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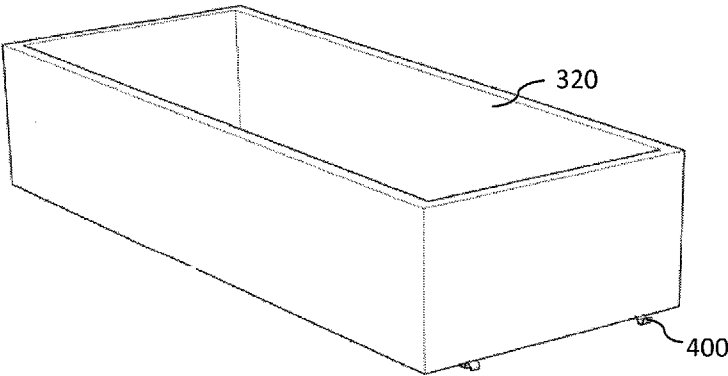


Fig 5

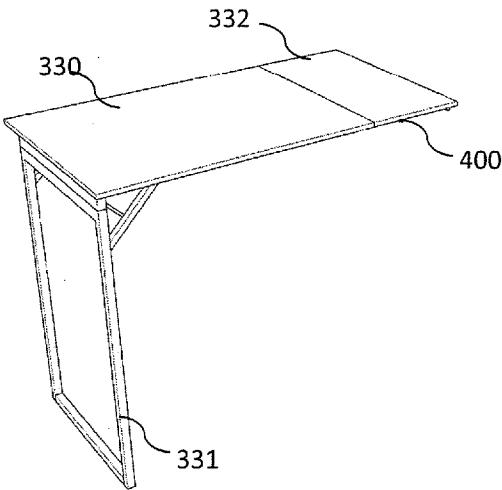


Fig 6

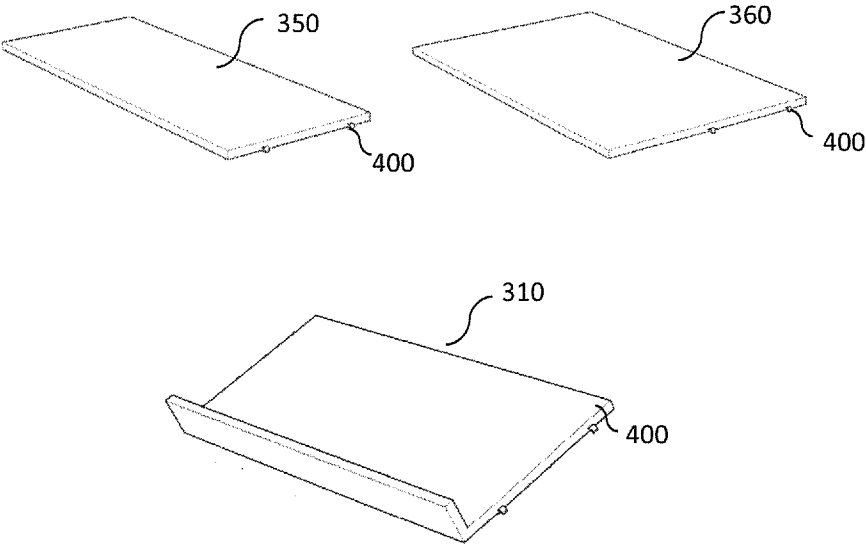


Fig 7

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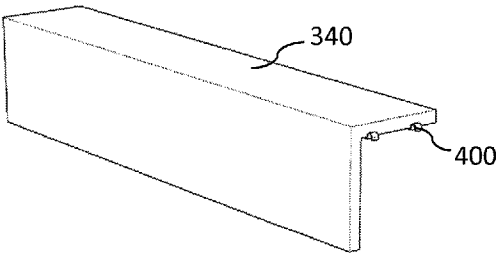


Fig 8

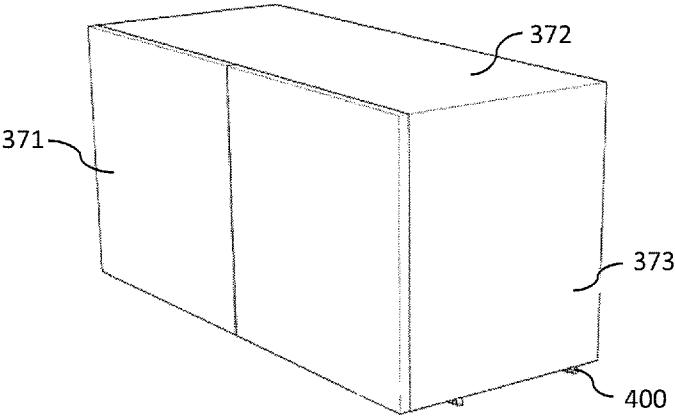


Fig 9

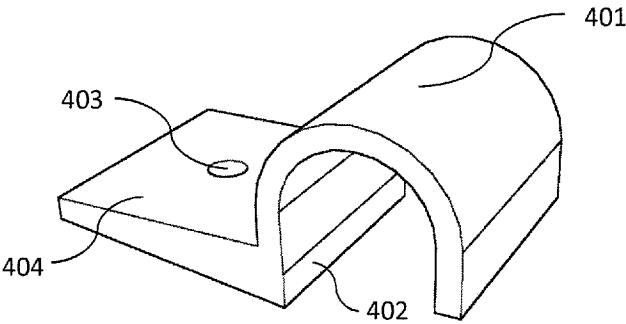


Fig 10

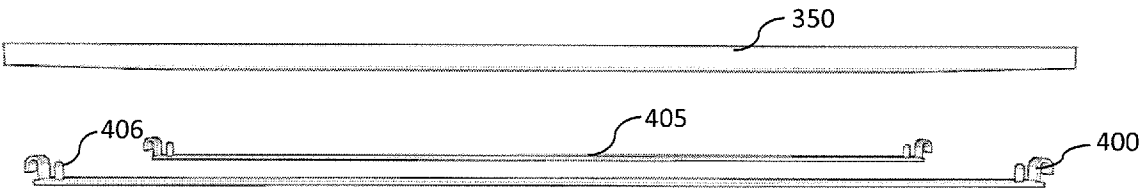


Fig. 11A

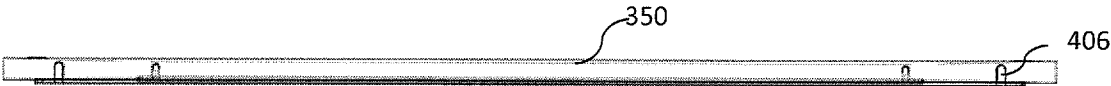


Fig 11B

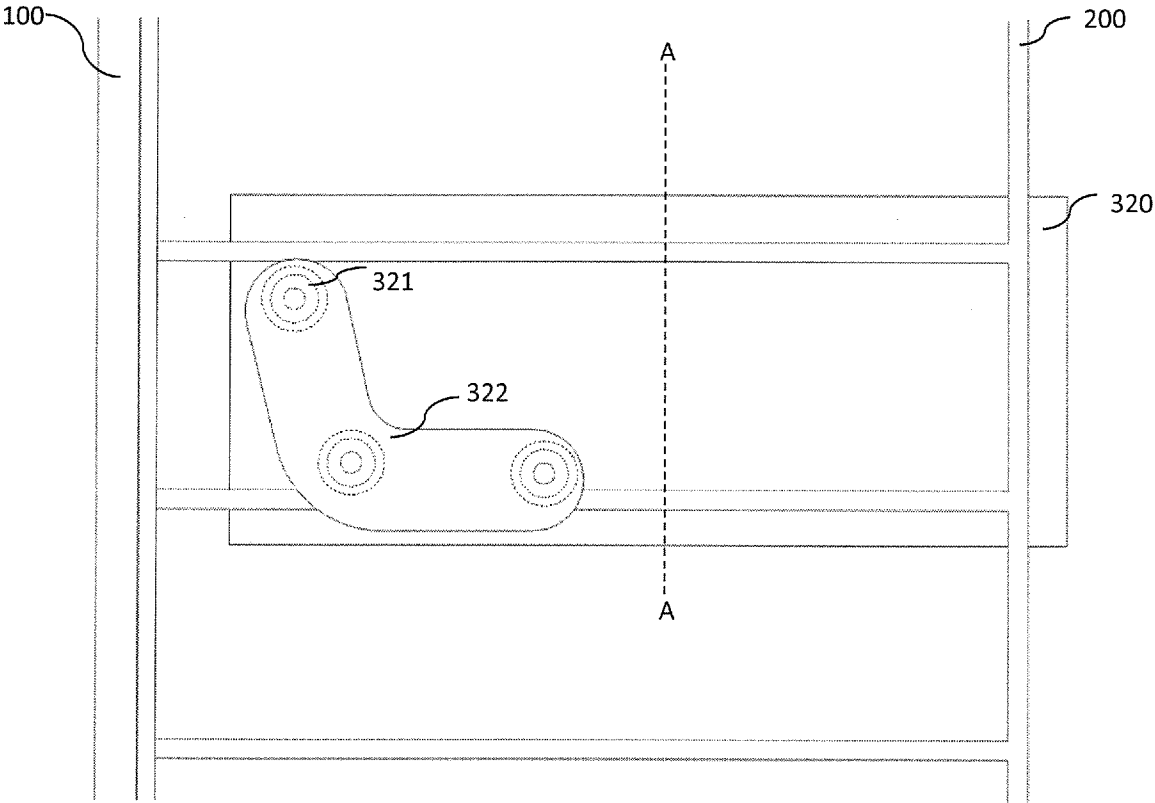


Fig 12

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A-A

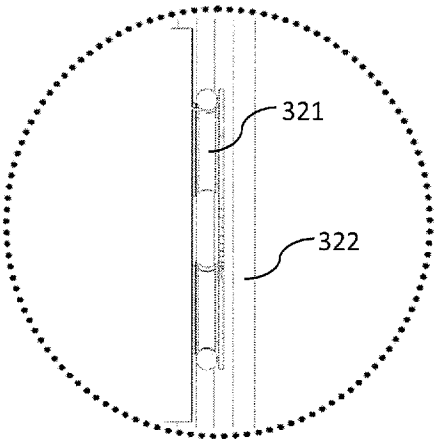


Fig 12A

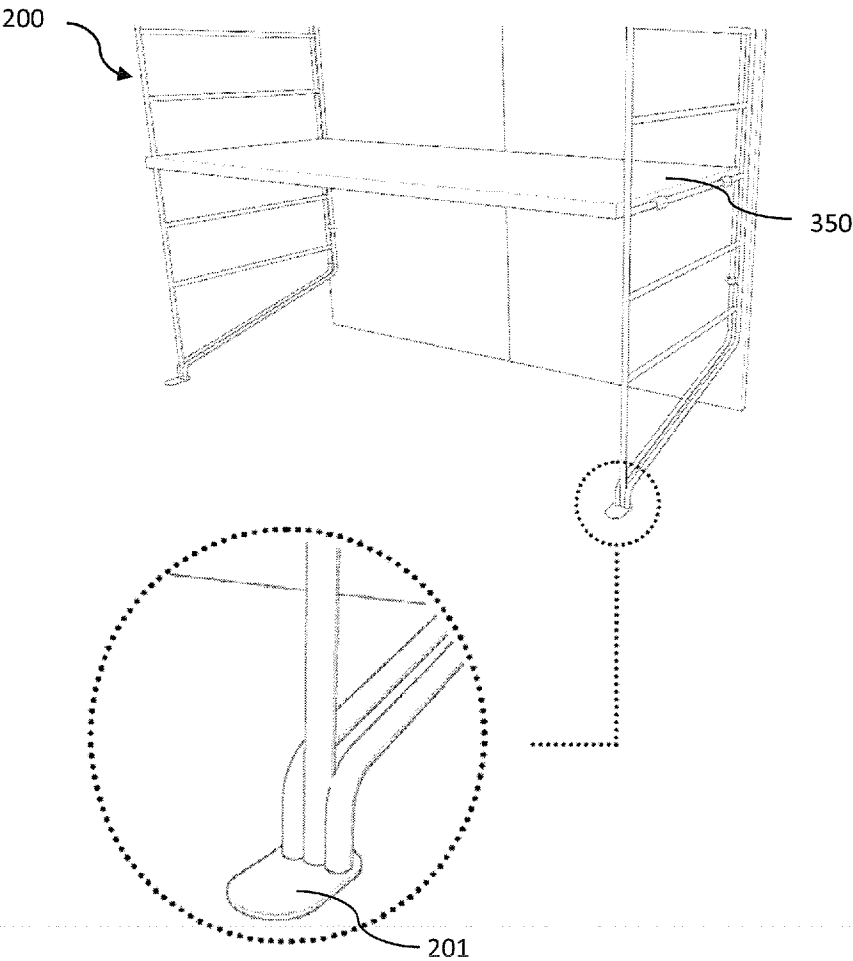


Fig 13

INTERNATIONAL SEARCH REPORT

 International application No.
PCT/MY2017/050016

A. CLASSIFICATION OF SUBJECT MATTER

A47B 3/00 (2006.01) A47B 43/00 (2006.01) A47B 57/12 (2006.01) A47B 57/36 (2006.01) A47B 85/00 (2006.01)
A47F 5/13 (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)

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)

Database: PATENW & IPC/CPC: A47B3/00, A47B43/00, A47B43/00, A47B46/005, A47B47/00, A47B57/12, A47B57/36, A47B83/00, A47B83/045, A47B85/00, A47F3/004, A47F5/0018, A47F5/0081, A47F5/13 & keywords: hinge, pivot, swing, side, edge, frame, lateral, knock down, lay flat, flat pack, collapsible, ladder, rung, back, board, panel and like terms.

Espacenet & IP Australia Internal Database: Applicant & inventor name search

Google Patents & keywords: furniture, flat pack, lay flat, sides, ladder, fold, hinged, rack, table, chair, seat, shelf and like terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	



Further documents are listed in the continuation of Box C



See patent family annex

* "A"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 15 June 2017		Date of mailing of the international search report 15 June 2017	
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustalia.gov.au		Authorised officer John Ho AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. 0262832329	

Box No. IV Text of the Abstract (Continuation of item 5 of the first sheet)

A knock-down lay flat furniture kit having a basic unit comprising a generally rectangular back-board (100) and a pair of generally rectangular metal side members (200) comprising ladder-like frames hingedly connected to the vertical edges of the back-board (100) so that they can be moved between a position in which they lie flat on the back-board (100) and a position in which they extend perpendicular to the back-board (100).

INTERNATIONAL SEARCH REPORT C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		International application No. PCT/MY2017/050016
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3091345 A (HOOSE et al.) 28 May 1963 Figures 1 -3, column 1 lines 9-12, column 2 line 28 - column 3 line 36.	1-9
X	US 3101148 A (BROWN) 20 August 1963 Figures 1-5, column 1 line 36 - column 4 line 8	1-9
X	US 4313544 A (ASHTON) 02 February 1982 Abstract, figure 1, column 3 line 46- column 5 line 20.	1-2, 4, 6-9
X	US 510427 A (HINE) 12 December 1893 Figures 1-7, page 1 lines 44-53	1-9
X	US 2014/0353271 A1 (AMERIWOOD INDUSTRIES INC.) 04 December 2014 Figures 1-17	1-2, 4-6, 8-9

INTERNATIONAL SEARCH REPORT Information on patent family members		International application No. PCT/MY2017/050016	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	Publication Date	Publication Number	Publication Date
US 3091345 A	28 May 1963	US 3091345 A	28 May 1963
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		TW 201505583 A	16 Feb 2015
		WO 2014194249 A2	04 Dec 2014
End of Annex			
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001. Form PCT/ISA/210 (Family Annex)(July 2009)			