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

(11) **EP 4 303 144 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
10.01.2024 Bulletin 2024/02

(21) Application number: **23182711.4**

(22) Date of filing: **30.06.2023**

(51) International Patent Classification (IPC):
B65D 6/14 *(2006.01)* ***B65D 6/18*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B65D 9/14; B65D 9/30

(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 ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **08.07.2022 FI 20224084**

(71) Applicant: **Jaloa Oy**
84100 Ylivieska (FI)

(72) Inventor: **Ojala, Arto**
85560 Nivala (FI)

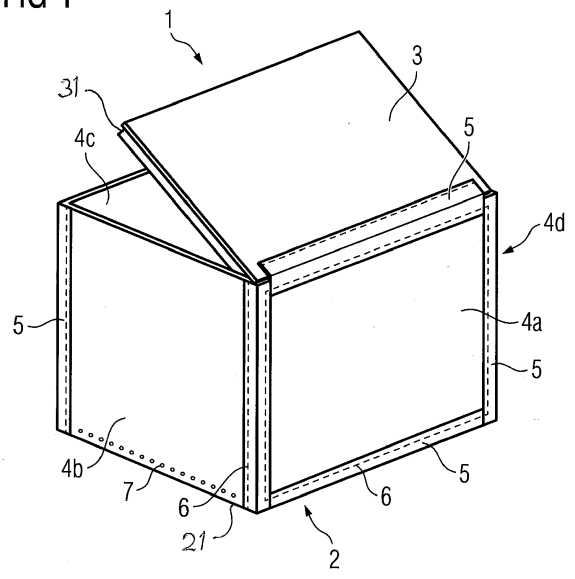
(74) Representative: **Genip Oy**
Heikinkatu 7
48100 Kotka (FI)

(54) **PACKING BOX MADE OF NATURAL FIBRE BOARD**

(57) A packing box (1) made of natural fibre board, which is flat when folded closed and can be formed into the shape of a rectangular prism when folded open, and which packing box comprises an opposite base (2) and lid (3) as well as four walls (4, 4a, 4b, 4c, 4d) which have the same dimensions in pairs regarding opposite walls (4a, 4b, 4c, 4d),

- the walls (4, 4a, 4b, 4c, 4d) are connected to each other by means of a flexible fabric strip (5) and rivets (6) by riveting in such a way that a rectangle can be formed of the walls (4, 4a, 4b, 4c, 4d),
- the base (2) is connected by means of a flexible fabric strip (5) and rivets (6) by riveting from one edge to the edge of the first wall (4a),
- the lid (3) is connected by means of a flexible fabric strip (5) and rivets (6) by riveting from one edge to the opposite edge of the same first wall (4a) to which the base (2) is connected,
- compared to the walls, the base (2) and lid (3) comprise a structure with twice the thickness so that the outer dimensions of the outer layer of the base (2) and the lid (3) correspond to the outer dimensions of a finished packing box (1) and the dimensions of the inner layer correspond to the inner dimensions of the packing box (1), in which case a lip (21, 31) is formed on the inner edge of the base (2) and the lid (3) for the wall (4).

FIG 1



EP 4 303 144 A1

Description

FIELD OF THE INVENTION

[0001] The invention relates to a packing box made of natural fibre board, which is flat when folded closed and can be formed into the shape of a rectangular prism when folded open, and which packing box comprises an opposite base and lid as well as four walls which have the same dimensions in pairs regarding opposite walls.

BACKGROUND OF THE INVENTION

[0002] A huge range of different box-shaped packages is used for packing and storing different goods. The object of this invention are medium-sized packing boxes with a volume of approximately 10-50 litres, even up to 500 or 1000 litres. Currently, the object of interest are particularly packages in which the package blank itself can be delivered to the packer in its folded form, that is, folded closed, and the package blank is folded open before use into its actual rectangular prism form for packing goods. When the package blanks are folded closed, they can easily be stacked on top of each other, for example, in bundles on a pallet, making it easy to deliver and store them for their actual use. A further object of interest are packing boxes with a rectangular prism shape, which can be stacked on top of each other when packed.

[0003] A typical example of folded package blanks are box blanks made from cardboard/corrugated cardboard by punching and scoring, which the user folds open into the shape of a box before use. The outer shape of the package blank and possible tabs and openings are made by punching, that is, compression cutting. At the same time, scoring is made at the bending points so that the cardboard will fold as desired, for example, at the point between the base and the side wall. The air volume that creates the thickness of the board in scoring is compressed with a non-cutting blade, whereupon an easily foldable bending line is formed at the said point. Thus, due to the flexibility of corrugated cardboard, bending lines and tabs and other similar form-locking points, which lock the package into its planned shape, are easy to make.

[0004] Up to a point, corrugated cardboard is a practical material for packing, but limitations are encountered as the mass of the packaged product increases and the conditions become more humid. Corrugated cardboard loses its strength very easily when it gets wet; getting wet even slightly, for example, in the rain, is critically harmful in terms of the strength and appearance of the package.

[0005] When considering material options that are next best to corrugated cardboard in strength and stiffness as well as bending stiffness, buckling strength, puncture strength and moisture resistance, various natural fibre boards, such as plywood, wood fibre boards, OSB boards and other compressed fibre boards are suitable and also cost-effective materials. The problem with these, on the other hand, is their fragility when they are bent. The said materials are not in themselves such that they could be used to form the connected faces of the packing box, that is, the walls, lid and base, from the same board by punching and scoring, as can be done with corrugated cardboard. Consequently, in such packages are typically used metal corner supports, by means of which the corners are made rigid. The problem with this solution is that the openability of the package blank is lost when the edges are made rigid. In this case, therefore, for packing are transported either fully assembled boxes, which are completely empty, or the user/packer must join together metal corner rails and separate wall/base parts when assembling the box. A third option would be to make the side walls in the shape of a cone, in which case the boxes could be stacked inside one another, but this is not an interesting option in terms of the present invention due to reduced load capacity and the delivery logistics of the packages.

[0006] From the prior art are known, among others, US 1084140 and US 1142084, which disclose collapsible veneer boxes. However, these have a relatively complex structure, and thus it would be practical and advantageous to provide an easier-to-use and simpler solution than the one disclosed in the said publications.

OBJECT OF THE INVENTION

[0007] An object of the invention is to provide a solution which has the logistic convenience, that is, deliverability, of a corrugated cardboard box as closed-folded package blanks, which the user can easily and quickly finish into a box with a rectangular prism shape, as well as the strength properties of a natural fibre board in terms of bending stiffness, buckling strength, puncture strength and moisture resistance. A further object is to provide an environmentally friendly product which consists mainly of natural and naturally decomposing materials, or which can be burned as energy waste without significant pollutant emissions. Of natural fibre boards, plywood in particular would be attractive at present in terms of its properties, availability and price, and thus the aim is to provide a solution that would be adaptable to the use of plywood, especially spruce plywood.

SUMMARY OF THE INVENTION

[0008] The objects of the invention are mainly achieved in the manner described in greater detail in independent claim 1. Other additional characteristics specific to the invention appear from the accompanying claims and the following description of the embodiments shown in the Figures.

[0009] One embodiment of the invention is a packing box made of natural fibre board, which is flat when folded closed and can be formed into the shape of a rectangular prism when folded open, and which packing box comprises an opposite base and lid as well as four walls which

have the same dimensions in pairs regarding opposite walls,

- the walls are connected to each other by means of a flexible fabric strip and rivets by riveting in such a way that a rectangle can be formed of the walls,
- the base is connected by means of a flexible fabric strip and rivets by riveting from one edge to the edge of the first wall,
- the lid is connected by means of a flexible fabric strip and rivets by riveting from one edge to the opposite edge of the same first wall to which the base is connected,
- compared to the walls, the base and lid comprise a structure with twice the thickness so that the outer dimensions of the outer layer of the base and the lid correspond to the outer dimensions of a finished packing box and the dimensions of the inner layer correspond to the inner dimensions of the packing box, whereupon on the inner edge of the base and the lid is formed a lip for the wall.

By means of the structure presented above can be achieved a package blank that is easily transportable in flat closed-folded form for the packer to use and that can easily be formed with the help of conventional tools into a packing box, which is simple in structure, strong and rigid. The structure is specially adapted to take into account that the material of the packing box is natural fibre board, including plywood, wood fibre boards, OSB boards and other compressed fibre boards.

[0010] According to one embodiment of the invention, when the four walls have different dimensions with respect to the adjacent walls, the lid and the base are connected to one of the long walls of the said walls. This feature makes possible particularly advantageous foldability of the package blank as the walls and base as well as the lid of the packing box are placed evenly against each other.

[0011] The walls and base as well as the lid of the packing box are connected to each other by means of a fabric strip. The fabric strip is preferably natural fibre strip, the strength and thickness of which form an almost equally strong structure with the walls. The fabric strip may be, for example, jute fabric or cotton with a basis weight of 250-500 g/m2, preferably 430 g/m2, with a width of 40-80 mm, in which case the strength and thickness form an almost equally strong structure with the walls made of 6 mm spruce plywood. For some fabric strips, such as jute fabric, the preferred basis weight may be 300-1000 g/m2. The fabric strip is attached to the walls, lid and base by riveting, in which case the attachment by riveting is most preferably done by using U-shaped rivets, staples or large-headed nails. The said examples can easily be attached by machine work, there are, for example, numerous pneumatic tools suitable for the purpose. When done in this way, the riveting ensures that the fabric strip is well pressed against the wall, lid or base, and does not tear easily.

LIST OF DRAWINGS

[0012] The invention and its operation are described in the following with reference to the accompanying schematic drawings, wherein

Figure 1 shows schematically an embodiment of the packing box according to the invention with the base and lid open,

Figure 2 shows schematically an embodiment of the lip of the lid or base of the packing box according to the invention,

Figure 3 shows schematically an embodiment of the packing box according to the invention when assembled, and

Figure 4 shows schematically an embodiment of the packing box according to the invention in its closed-folded form.

DETAILED DESCRIPTION OF THE INVENTION

[0013] Figure 1 shows schematically an embodiment of the packing box 1 made of natural fibre board according to the invention, which is flat when folded closed and can be formed into the shape of a rectangular prism when folded open, and which packing box comprises an opposite base 2 and lid 3 as well as four walls 4, 4a, 4b, 4c, 4d, which have the same dimensions in pairs regarding opposite walls 4a, 4b, 4c, 4d,

- the walls 4, 4a, 4b, 4c, 4d are connected to each other by means of a flexible fabric strip 5 and rivets 6 by riveting in such a way that a rectangle can be formed of the walls,
- the base 2 is connected by means of a flexible fabric strip 5 and rivets 6 by riveting from one edge to the edge of the first wall 4a,
- the lid 3 is connected by means of a flexible fabric strip 5 and rivets 6 by riveting from one edge to the opposite edge of the same first wall 4a to which the base 2 is connected,
- compared to the walls, the base 2 and lid 3 comprise a structure with twice the thickness so that the outer dimensions of the outer layer of the base 2 and the lid 3 correspond to the outer dimensions of a finished packing box 1 and the dimensions of the inner layer correspond to the inner dimensions of the packing box 1, in which case a lip 21, 31 is formed on the inner edge of the base 2 and the lid 3 for the wall 4, 4a, 4b, 4c, 4d.

[0014] In its folded form, the packing box 1 blank is flat, in the blank the lid 3 and base 2 are on top of each other, next the walls 4 are in pairs, the short 4b, 4d and the long 4a, 4c wall in the same layer. To put the packing box 1 in the open-folded working order, the walls 4 are lifted

up, whereupon the edges of the wall 4 form a tunnel-like structure. After this, the base 2 is turned into place so that the lips 21 in the base (as can be seen in Figure 2) fall into place with respect to the walls 4. The mutual position of the walls 4, 4a,4b, 4c, 4d in relation to each other then forms into a rectangle when the lip 21 guides the walls 4, 4a, 4b, 4c, 4d into the correct position. If the edges of the walls 4, 4a, 4b, 4c, 4d are in the correct position in the lip 21, the cross-section of the packing box 1 cannot even be other than a rectangle. When the base 2 has been set in place guided by the lips 21, the base 2 is then fixed by riveting by means of long rivets 7 or nails which pass through the walls 4, 4a, 4b, 4c, 4d. Riveting through the walls 4, 4a, 4b, 4c, 4d is a more advantageous alternative than riveting through the base 2. In this case the rivets 7 will be positioned transversely to the load direction (the direction opening the base) in which case a rivet 7 would have to become cut in two or the wall 4, 4a, 4b, 4c, 4d would have to tear from the lower edge. If the riveting was done through the base 2 to the wall 4, only the longitudinal tensile strength of the riveted joints would hold the base 2 in place. For use, the packing box 1 is turned over, with the newly attached base 2 facing down. The packing box 1 can be used for the planned purpose as intended, after which the lid 3 can be positioned in place and fastened as desired either making it easy for the user to open or more difficult to open.

[0015] Figure 2 shows schematically an embodiment of the lip on the lid or base of the packing box according to the invention. As can be seen, the base 2 and the lid 3 have a structure twice as thick as that of the walls so that the outer dimensions of the outer layer of the base 2 and the lid 3 correspond to the outer dimensions of the finished packing box 1 and the dimensions of the inner layer correspond to the inner dimensions of the packing box 1, whereupon a lip 21, 31 is formed on the inner edge of the base 2 and the lid 3 for the wall 4, 4a, 4b, 4c, 4d. The lip can be provided, for example, by joining together two boards of the same thickness whose outer dimensions are slightly different compared to each other as described above, or alternatively by using thicker plywood on the base and the lid, on the edge of which is machined with a milling machine or other machine tool the lip that provides the said function.

[0016] Figure 3 shows schematically an embodiment of the packing box according to the invention when assembled. In practice, the end result is thus a packing box whose outer edges between the walls 4 are covered by a fabric strip 6. Only for the base and lid, the fabric strip is only needed for forming a so-called hinge, but for aesthetic reasons the remaining edges of the packing box can also be sealed by using the fabric strip (not shown in Figure 3).

[0017] Figure 4 shows how, according to one embodiment of the invention, when the four walls have different dimensions with respect to the adjacent walls, the lid and the base are connected to one of the longer walls of the said walls. With this feature, the closed-folded flat packing box becomes low in a compact manner. The connected walls form a layer comprised of two adjacent walls, on top of which is folded a layer comprised of the next two walls. When the base and lid are attached to the long sides, the base and lid conveniently overlap when flat. In terms of manufacturing, it is advantageous to install, that is, rivet the fabric strip to the walls as well as to the base and lid when they are in closed-folded flat form because the mutual mobility of the parts is then ensured and the fabric strip does not become too tight, which could potentially hinder assembly.

[0018] It should be noted that only some of the most preferred embodiments of the invention have been disclosed in the foregoing. It is, therefore, obvious that the invention is not limited to the embodiments described above but can be applied in many ways within the scope defined by the accompanying claims. The features presented in connection with the different embodiments can also be used within the scope of the basic idea of the invention in connection with other embodiments and/or the features disclosed can be combined into different entities if so desired and the technical possibilities for this exist.

[0019] Reference numbers shown in the Figures

1	packing box
2	base
21	lip
3	lid
31	lip
4	wall
4a	side wall
4b	side wall
4c	front wall
4d	back wall
5	fabric strip
6	rivet
7	rivet (long)

Claims

1. A packing box (1) made of natural fibre board, which is flat when folded closed and can be formed into the shape of a rectangular prism when folded open, and which packing box comprises an opposite base (2) and lid (3) as well as four walls (4, 4a, 4b, 4c, 4d) which have the same dimensions in pairs regarding opposite walls (4a, 4b, 4c, 4d), **characterised in that**

   - the walls (4, 4a, 4b, 4c, 4d) are connected to each other by means of a flexible fabric strip (5) and rivets (6) by riveting in such a way that a rectangle can be formed of the walls (4, 4a, 4b, 4c, 4d),
   - the base (2) is connected by means of a flexible fabric strip (5) and rivets (6) by riveting from one

edge to the edge of the first wall (4a),
- the lid (3) is connected by means of a flexible fabric strip (5) and rivets (6) by riveting from one edge to the opposite edge of the same first wall (4a) to which the base (2) is connected,
- compared to the walls, the base (2) and lid (3) comprise a structure with twice the thickness so that the outer dimensions of the outer layer of the base (2) and the lid (3) correspond to the outer dimensions of a finished packing box (1) and the dimensions of the inner layer correspond to the inner dimensions of the packing box (1), in which case a lip (21, 31) is formed on the inner edge of the base (2) and the lid (3) for the wall (4, 4a, 4b, 4c, 4d).

2. A packing box (1) according to claim 1, **characterised in that** when the four walls (4) have different dimensions with respect to the adjacent walls (4a, 4b, 4c, 4d), the lid (3) and the base (2) are connected to one of the long walls (4a, 4c) of the said walls.

3. A packing box (1) according to claim 1 or 2, **characterised in that** the fabric strip (5) is natural fibre strip, the strength and thickness of which form an almost equally strong structure with the walls (4).

4. A packing box (1) according to any of the preceding claims, **characterised in that** the fabric strip (5) is preferably jute fabric or cotton with a basis weight of 250-500 g/m2, or 300-1000 g/m2, preferably 430 g/m2, with a width of 40-60 mm, or 50-80 mm, in which case the strength and thickness form an almost equally strong structure with the walls (4) made of 6 mm spruce plywood.

5. A packing box (1) according to any of the preceding claims, **characterised in that** the fabric strip (5) is attached to the walls (4), lid (3) and base (2) by riveting, in which case the attachment by riveting is done by using U-shaped rivets, staples or large-headed nails (6).

6. A packing box (1) according to any of the preceding claims, **characterised in that** the natural fibre board includes plywood, wood fibre boards, OSB boards and other compressed fibre boards.

FIG 1

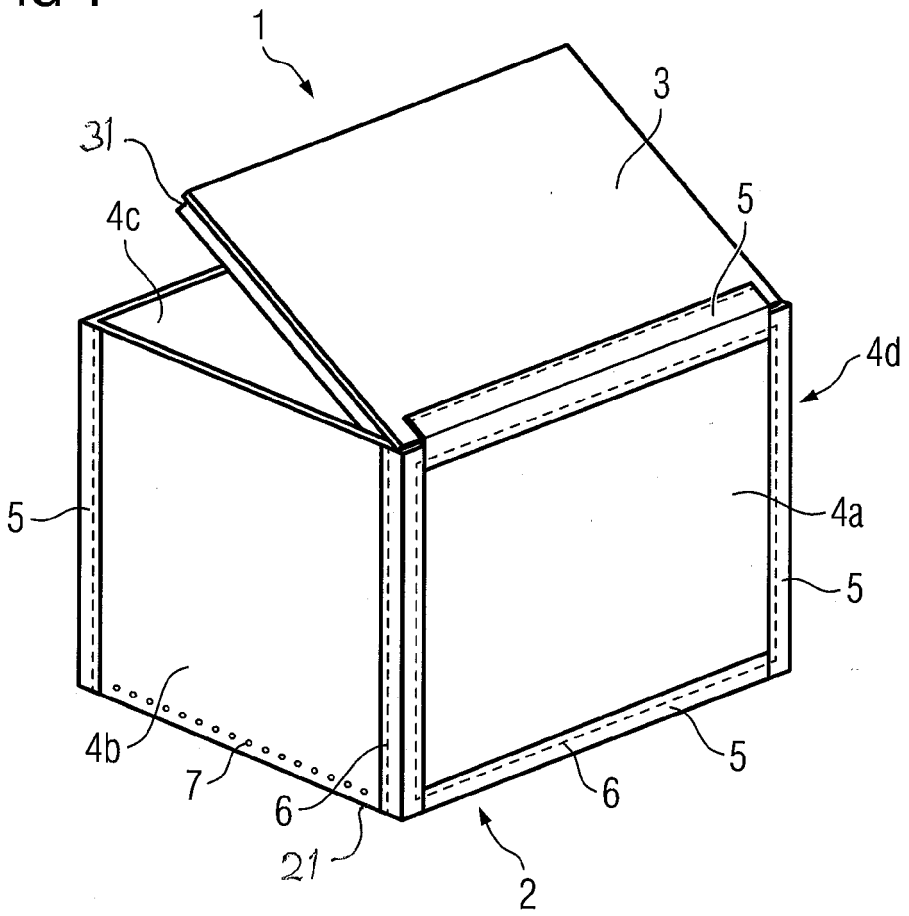


FIG 2

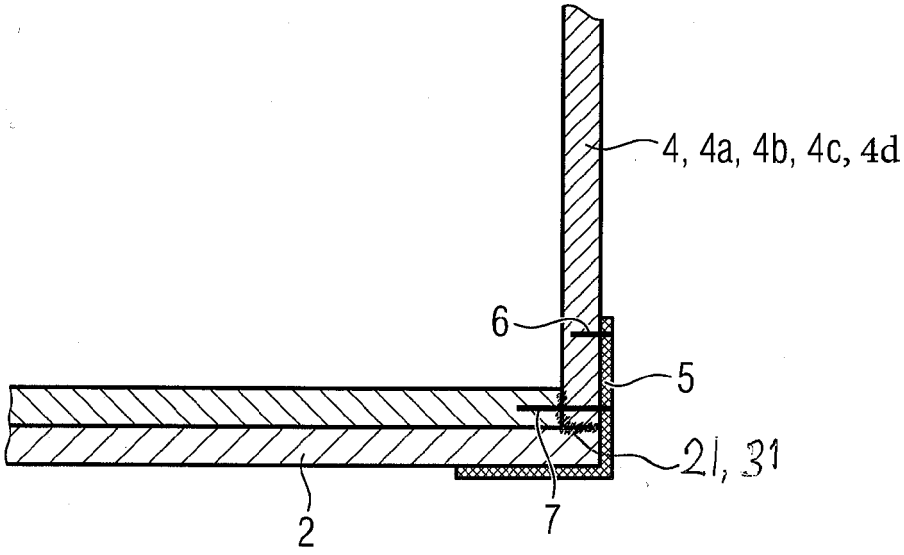


FIG 3

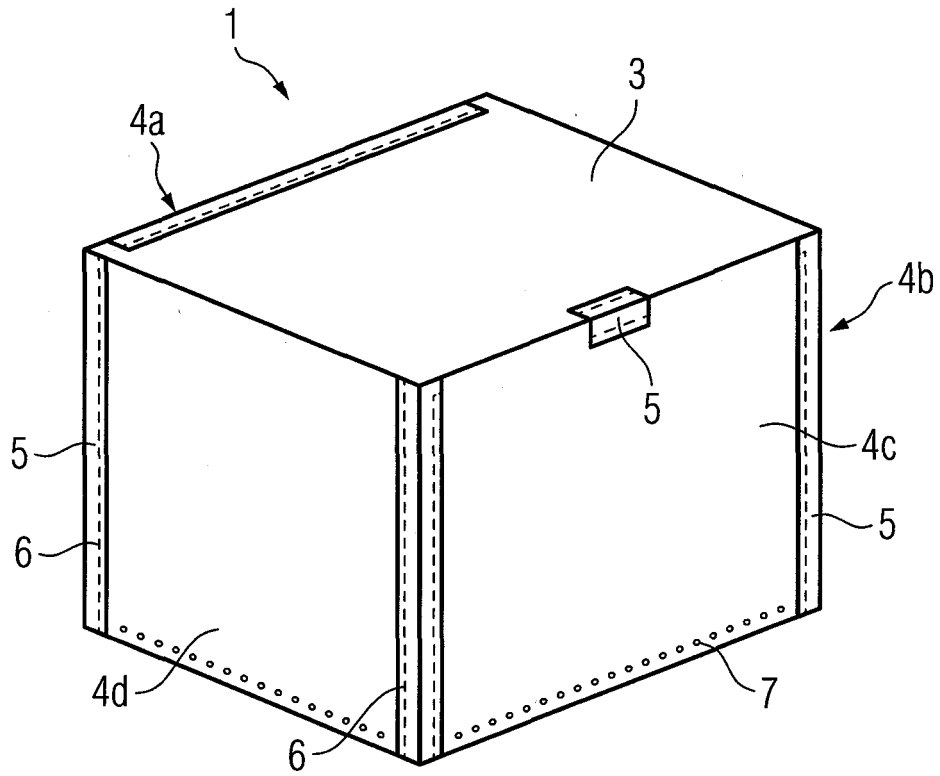
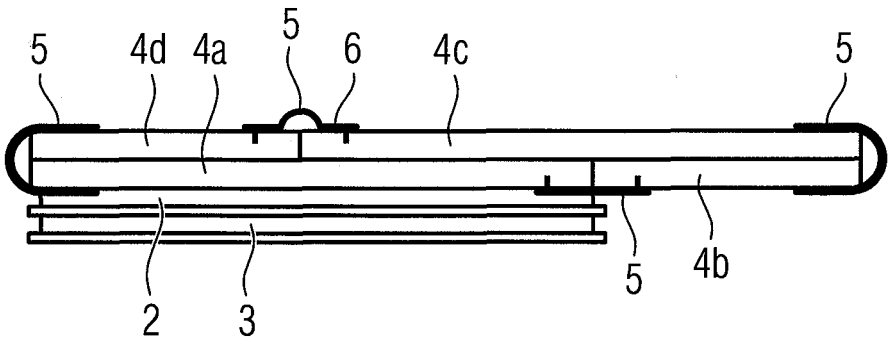


FIG 4



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 23 18 2711

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 4 793 507 A (DELPLANQUE ALAIN [FR]) 27 December 1988 (1988-12-27) * column 3, line 26 - column 6, line 2 * * figures 1-8 *	1-6	INV. B65D6/14 B65D6/18
X	DE 483 559 C (CHRISTIAN FRIES) 2 October 1929 (1929-10-02) * page 1, column 2, line 45 - page 2, column 2, line 35 * * figures 1-5 *	1-6	
A	US 3 446 384 A (BLACKMAN DENNIS G ET AL) 27 May 1969 (1969-05-27) * column 2, line 15 - column 3, line 35 * * figures 1-4 *	1,2,6	
A	FR 317 868 A (GUEIT [FR]) 30 September 1902 (1902-09-30) * page 1, column 1, line 1 - page 1, column 2, line 51 * * figures 1-3 *	3	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 November 2023	Piolat, Olivier

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 18 2711

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-11-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4793507 A	27-12-1988	AT E57152 T1	15-10-1990
		EP 0236652 A1	16-09-1987
		ES 2017934 B3	16-03-1991
		FR 2594797 A1	28-08-1987
		US 4793507 A	27-12-1988
DE 483559 C	02-10-1929	NONE	
US 3446384 A	27-05-1969	BE 703295 A	15-01-1968
		CH 481794 A	30-11-1969
		ES 345618 A1	16-11-1968
		GB 1182266 A	25-02-1970
		IL 28630 A	20-10-1971
		LU 54535 A1	27-11-1967
		NL 6713419 A	22-04-1968
		US 3446384 A	27-05-1969
FR 317868 A	30-09-1902	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 1084140 A **[0006]**
- US 1142084 A **[0006]**