



(51) International Patent Classification:

A47B 1/06 (2006.01) A47C 4/02 (2006.01)
A47B 3/04 (2006.01) A63H 33/08 (2006.01)
A47B 85/04 (2006.01)

(21) International Application Number:

PCT/IB2019/055313

(22) International Filing Date:

24 June 2019 (24.06.2019)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2018 023 26 June 2018 (26.06.2018) LT

(71) Applicant: UAB ADOLESA [LT/LT]; Blindžių g. 24-4,
08110 Vilnius (LT).

(72) Inventor: ŽILIONIS, Mindaugas; Žygimantų g. 44,
Šventininkų k. Senųjų Trakų sen., 21156 Trakų raj. (LT).

(74) Agent: KIŠKIS, Vaclovas; Bebrų g. 20, Adomaiciai,
15234 Vilniaus raj. (LT).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,

HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP,
KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— as to the identity of the inventor (Rule 4.17(i))

Published:

— with international search report (Art. 21(3))

(54) Title: STRUCTURAL FURNITURE ELEMENT

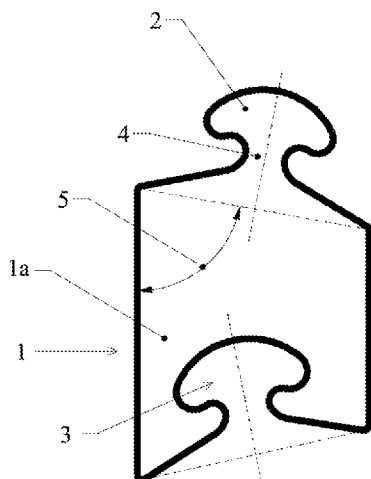


Fig. 3

(57) Abstract: The invention relates to the manufacture of furniture field and can be used as a universal construction element for assembled furniture, from which the user could assemble (and disassemble) the desired shape furniture. Structural furniture element is made as profiled bar (1) with equilateral trapezoidal (1a) or ring sector (1b) form profile in the lateral non-parallel walls of the rod along it length tongue (2) and groove (3) is formed, the profiles of tongue and groove match each other and can be rigidly connected to each other, for the assembly of the tongue and groove, the tongue has a neck (4). The element can be made of aluminum or plastic profiles by extrusion, and also can be made of aluminum or plastic profiles with visible parts covered with finishing materials.



STRUCTURAL FURNITURE ELEMENT

The invention relates to the manufacture of furniture field and can be used as a universal construction element for assembled furniture, from which the user could assemble (and disassemble) the desired shape furniture.

Recently, the furniture assembled from individual various shape and configuration pieces becomes increasingly popular. Furniture element sets allow the users to assemble the furniture themselves and, if necessary, change their configuration during exploitation.

The following technical solutions are known.

Patent US213214577 describes the piece of furniture having three positions: a storage position and two folded positions: a chair and a table.

There are known furniture element sets that consist of several configurations' elements. Furniture elements have notches (connecting grooves) that connect them (see patent WO2012034248).

There is a known structural element of furniture with the ends cut at 45° angle with tongue at one end and groove – on another. Thus, the elements can be connected using 90° or 180° angles (see patent US4099887).

The patent FR2558699 is also known, in which the furniture elements and furniture partitions are assembled using joint referred as “swallow-tail joint”.

Patent WO2010070605 is also known, according which the boards in the shape of furniture panels, and their assembling measures which are essentially made as profiled parts in the boards material, or the joining means are in the form of a tongue and groove.

All the provided technical furniture solutions have the following disadvantages:

You need to have a whole range of furniture items of various furniture configurations

Using furniture element sets only limited forms of furniture can be assembled.

The proposed structural furniture element is versatile, as using one furniture element set one can assemble wide variety furniture shapes and for different applications, and after a while they can be disassembled and reassembled for another shape or application.

The stated purpose is achieved as structural furniture element is a profiled bar with a profile of an equilateral trapezoid with rounded corners,

at the side walls of the bar, that are not parallel along the length the tongue and groove are formed, the profiles of tongue and groove match each other and can be rigidly connected to each other.

To join the tongue and groove, the tongue has a neck.

The bar profile can be a ring sector shape with rounded corners,

at the side walls of the bar, that are not parallel along the length the tongue and groove are formed, the profiles of tongue and groove match each other and can be rigidly connected to each other,

to join the tongue and groove, the tongue has a neck.

The corners of the cross-sectional profile of the trapezoidal bar are from 30.89° to 89.5° , preferably from 75° to 85° , and the angle profile angle of the ring sector is from 1° to 120° , preferably from 10° to 36° .

It is proposed that the forms of the tongue and groove profiles shall be made in the forms of a circle, a segment of a circle, an ellipse, an elliptical segment, a rectangle, a triangle, a parallelogram or a letter V. Rod and tongue profiles may be full or hollow, with two to twenty different shapes of chambers.

The element can be made of aluminum or plastic profiles by extrusion, and also can be made of aluminum or plastic profiles with visible parts covered with finishing materials. Finishing materials can be wood or plywood.

The proposed variant of furniture element, with the bar with the tongue and the groove is made of glued profile shaped plywood pieces, additionally reinforced by reinforcement flat rod.

The nature of the invention is explained in the drawings:

Fig. 1 – a general view of an equilateral trapezoidal bar;

Fig. 2 – a general view of a ring sector shape bar;

Fig. 3 – outer contour of the sectional profile of the equilateral trapezoidal bar;

Fig. 4 – outer contour of the sectional profile of ring sector bar;

Fig. 5a – transverse cross-section of equilateral trapezoidal bar with circle tongue and groove;

Fig. 5b – transverse cross-section of equilateral trapezoidal bar with rectangle tongue and groove;

Fig. 5c – transverse cross-section of equilateral trapezoidal bar with V-shaped tongue and groove;

Fig. 5d – transverse cross-section of ring sector bar with circle segment tongue and groove;

Fig. 5e – transverse cross-section of ring sector bar with a parallelepiped tongue and groove;

Fig. 6a – hollow bar sectional cut with two chambers;

Fig. 6b – hollow bar sectional cut with four chambers;

Fig. 6c – hollow bar sectional cut with six chambers;

Fig. 6d – hollow bar sectional cut with two chambers;

Fig. 7 – composite sectional cut of ring sector bar profile;

Fig. 8 – overall view of the ring sector bar made of plywood pieces;

Fig. 9 – illustration of bars interconnection.

These figures illustrate the use of the furniture element:

Fig. 10 – a protective wall assembled using bars;

Fig. 11 – a box or table support assembled using bars;

Fig. 12 – armchair assembled using bars;

Fig. 13 – loungers assembled using bars;

Fig. 14 – table assembled using bars.

Description of structural furniture element

The structural element of the furniture is made as a profiled bar 1, in which perpendicular to the plane of the edge along its entire length tongue 2 is formed and at the opposite edge perpendicular to the plane of the edge along its entire length groove 3 is made. Tongue 2 is connected to the edge of the bar through the neck 4.

The cross section of the bar 1 profile can be in the form of an equilateral trapezoidal shape 1a (Fig. 1) or a ring sector 1b (Fig. 2). Even angles of section 1a of the equilateral trapezoidal bar (Fig. 3) 5 may be from 30° to 89.5°, usually profiles are used with the angles 5 from 75° to 85°. Ring sector bar 1b profile section angle (Fig. 4) 6 may be from 1° to 120°, usually profiles with the angles 6 from 10° to 36° are used.

The tongue 2 may have a form of a circle 2a (Fig. 5a), a rectangle 2b (Fig. 5b), a V-shape 2c (Fig. 5c), a circle segment 2d (Fig. 5d), an ellipse, an ellipse segment, a triangle or a parallelogram 2e (Fig. 5e). The form 3 of the tongue in the bar 1 must correspond to the tongue form 2 and, when joining the single-type bars 1, they must smoothly join together.

The profiles of the bar 1 can be full (Fig. 5) or hollow (Fig. 6) having two to twenty different shape chambers. Fig. 6 shows profiles with two chambers (Fig. 6a), four chambers (Fig. 6b), six chambers (Fig. 6c) and twelve chambers (Fig. 6d).

The bars 1 may be made of a single material or composite material made of various materials. Fig. 7 shows a cross-section of rod 1, in which the bar frame 7 together with the tongue 2 and the groove 3 are a metal hollow profile and the outer finish 8 is made of wood.

Another example of a composite bar is shown in Fig. 8. It consists of many glued plywood pieces 9, with cut tongues and grooves. To ensure rigidity through the entire length of the bar 1, a groove is made in which the reinforcement 10 (flat rod) is fixed.

Bars 1 can be made of various materials—wood, plastic, metal. They can be produced by machining surfaces. The hollow profiles can be made by extrusion from plastic or aluminum. When producing furniture elements, the profiles are cut into bars of the desired length.

Assembling bars 1.

After entering tongue 2 of one bar 1 to the groove 3 of another bar 1, the bars 1 are pushed relative to one another until they coincide by their length. Relatively marked ends of rod 1 as 1.1 and 1.2.

Bars 1 can be assembled in two ways:

When the ends of the assembled bars 1 coincide at one end (1.1 and 1.1) and at the other end (1.2 and 1.2);

When the ends of the assembled bars 1 do not coincide – at one end (1.1 and 1.2) and at the other end (1.2 and 1.1).

While assembling bars 1 when the ends 1.1 and 1.2 do not coincide, a plane is formed. While assembling bars 1, when the ends 1.1 and 1.1 coincide, a curved surface is formed and its curvature radius depends on the trapezoidal angle (5) of the bar 1a profile or the the ring sector bar 1b angle 6. The curvature of the curved surfaces can be changed by changing the joint of the bars 1.1 and 1.2. Fig. 9 shows an example of forming flat and curved surfaces. The bars 1 are not mutually

reinforced after the assembly so they do not change their position relative to each other. Fixing can be done with the help of various hidden fixings.

Fig. 10-14 shows examples of furniture element usage. Vertical protective wall, Fig. 10, made using bars of two lengths. Boxes or table support made of single-length bars are shown in Figure 11. The armchair and lounger assembled using bars is shown in Fig. 12, 13. The armchair is made of single-length bars and the lounger is made of two-length bars. Fig. 14 shows a table made by assembling bars.

The proposed universal furniture element has the following features:

Can be made of different materials,

Have a wide range of dimensions,

No additional equipment or special tools are required for the assembly of the furniture

Can be used many times, the user can disassemble the existing furniture and assemble another piece of furniture,

Very compact and simple packing of elements, convenient transportation of elements.

The proposed piece of furniture can be used for furniture production, small architecture, small constructions as well as for toy production. It offers a wide range of possibilities for designers and architects to design unique products.

CLAIMS

1. A structural furniture element made as a profiled bar (1), **characterized** in that:
the section of the bar (1) profile has an equilateral trapezoidal shape (1a) with rounded corners,
in the lateral non-parallel walls of the rod along its length tongue (2) and groove (3) is formed,
the tongue (2) and groove (3) profiles correspond to each other and can be rigidly connected to
each other,
to assemble the tongue (2) and the groove (4), the tongue has a neck (4).
2. Element according to claim 1, **characterized** in that the angles (5) of the equilateral trapezoidal
profile of the bar (1a) are between 30° and 89.5° , preferably between 75° and 85° .
3. A structural furniture element made as a profiled bar (1), **characterized** in that:
the section of the bar (1) profile is in the form of a ring sector (1b) with rounded corners,
in the lateral non-parallel walls of the bar (1b), a tongue (2) and a groove (3) are formed along
its entire length,
the tongue (2) and groove (3) profiles correspond to each other and can be rigidly assembled,
to assemble the tongue (2) and the groove (4), the tongue (2) has a neck.
4. Element according to claim 3, **characterized** in that the angle (6) of the ring sector profile of
the bar (1b) is from 1° to 120° , preferably from 10° to 36° .
5. Element according to claims 1 and 3, **characterized** in that the shape of the tongue (2) and
groove (3) profiles form can be of a circle (2a), a segment of a circle (2d), an ellipse, an elliptical
segment, a rectangular (2b), a triangle, parallelogram (2e) or V-shaped (2c).
6. Element according to claims 1, 3, 5 **characterized** in that the bar (1) and the tongue (2) profiles
can be solid or hollow, having two to twenty different shaped chambers.
7. Element according to claims 1, 3, 5, 6, **characterized** in that it can be made from one material.
8. Element according to claims 1, 3, 5, 6, **characterized** in that it can be made from different
materials.
9. Element according to claims 1, 3, 5-7, **characterized** in that it can be made of aluminum or
plastic profiles produced by extrusion.

10. Element according to claims 1, 3, 5-8, **characterized** in that it can be made of aluminum or plastic profiles, the visible parts of which are covered with finishing materials.
11. Element according to claims 1, 3, 5-8, **characterized** in that it consists of a frame (7) having a tongue (2) and a groove (3) and the finishing (8) attached on both sides of the visible frame (7).
12. Element according to claims 10, 11, **characterized** in that wood can be used as a finishing material.
13. Element according to claims 10, 11, **characterized** in that plywood can be used as a finishing material.
14. Element according to claims 10, 11, **characterized** in that plastic can be used as a finishing material.
15. Element according to claims 1, 3, 5, 6, 8, **characterized** in that the bar (1) with the tongue (2) and the groove (3) is made of glued plywood pieces of rod (1) profile, further reinforced by reinforcement (10).

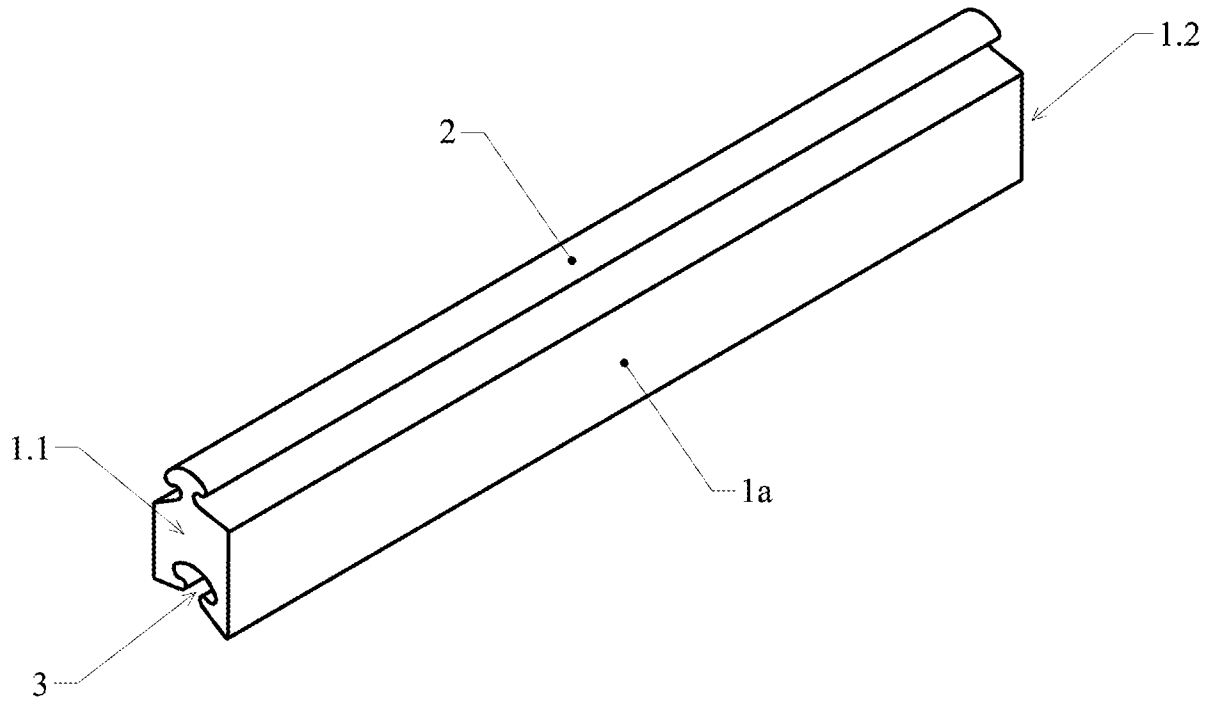


Fig. 1

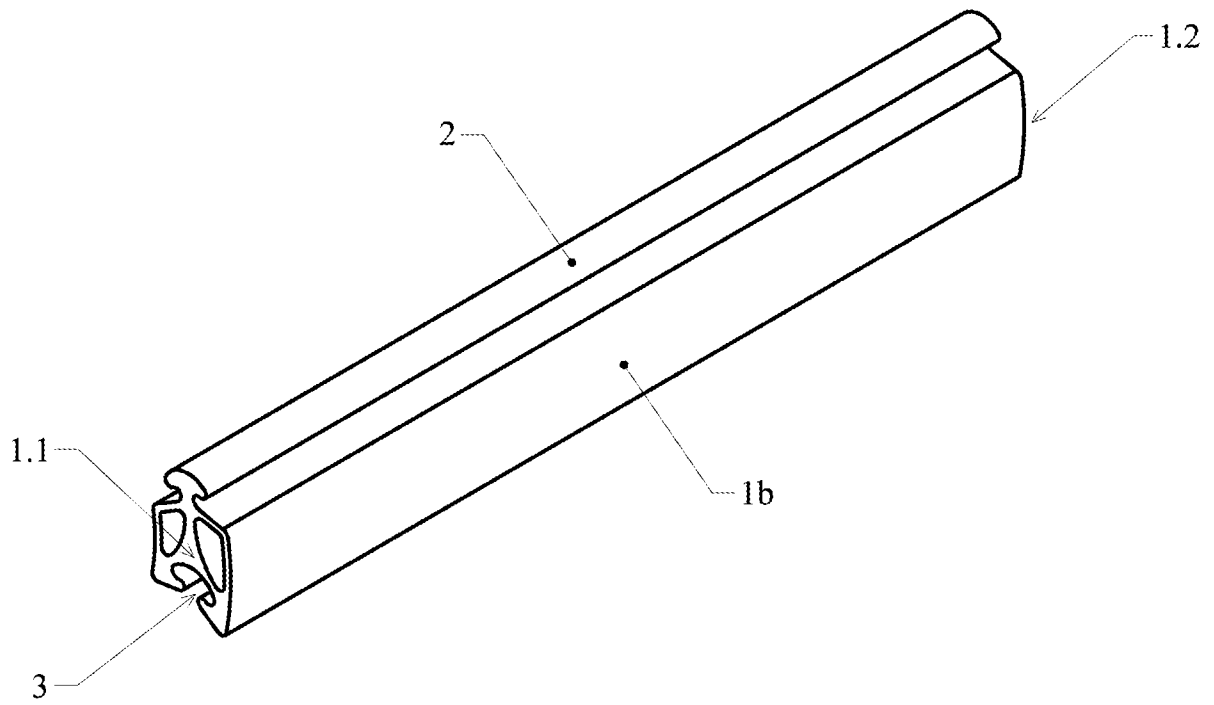


Fig. 2

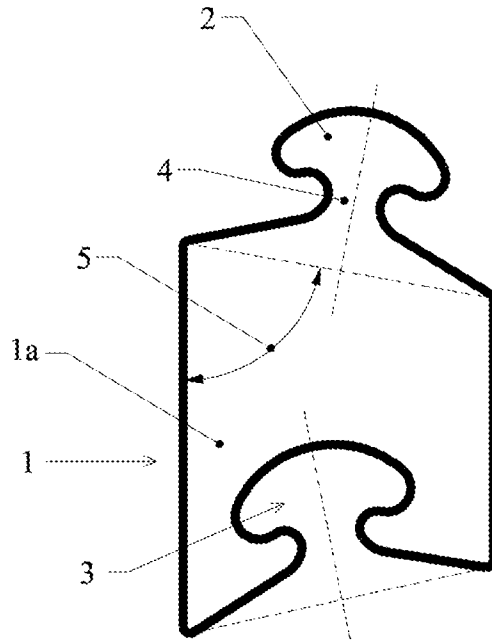


Fig. 3

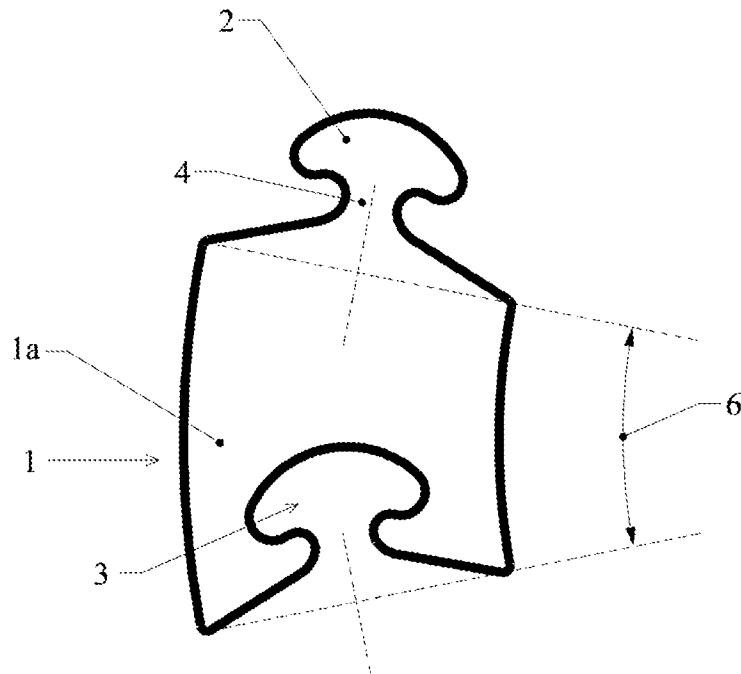


Fig. 4

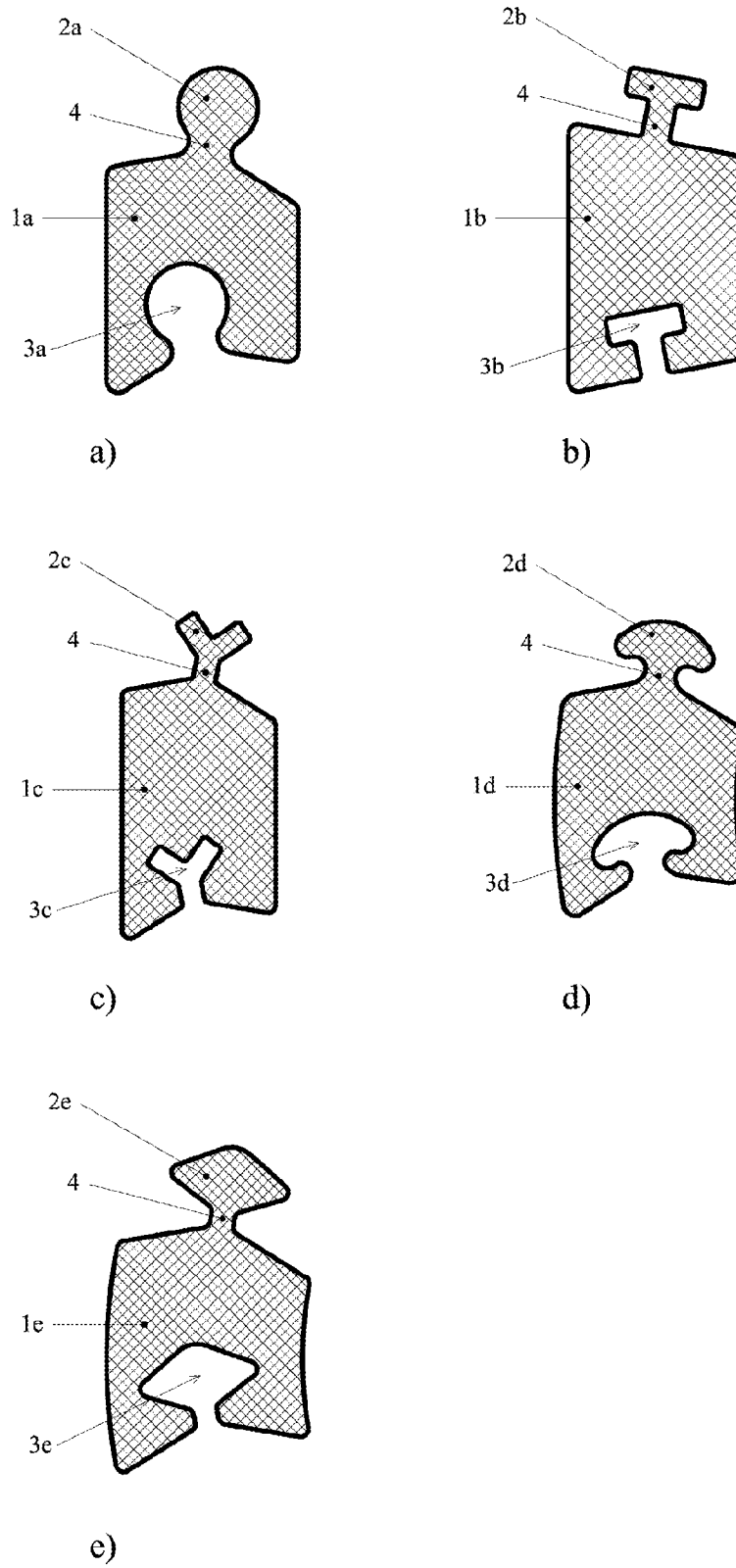


Fig. 5

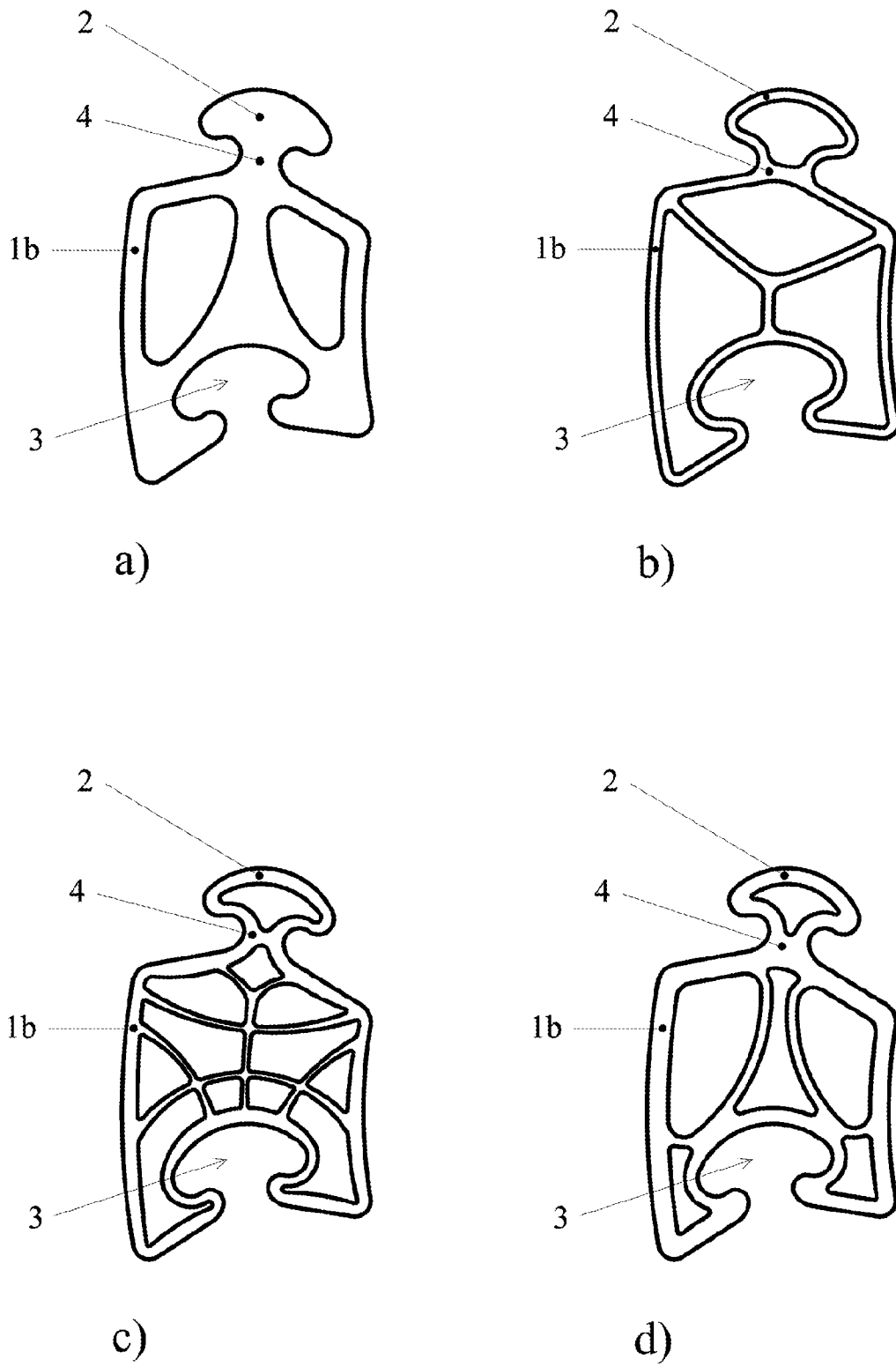


Fig. 6

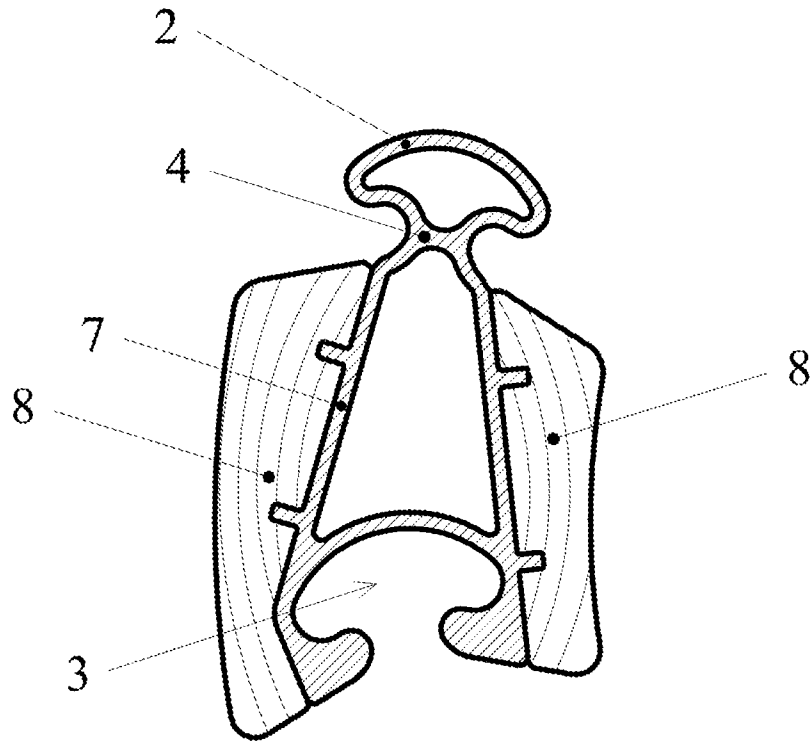


Fig. 7

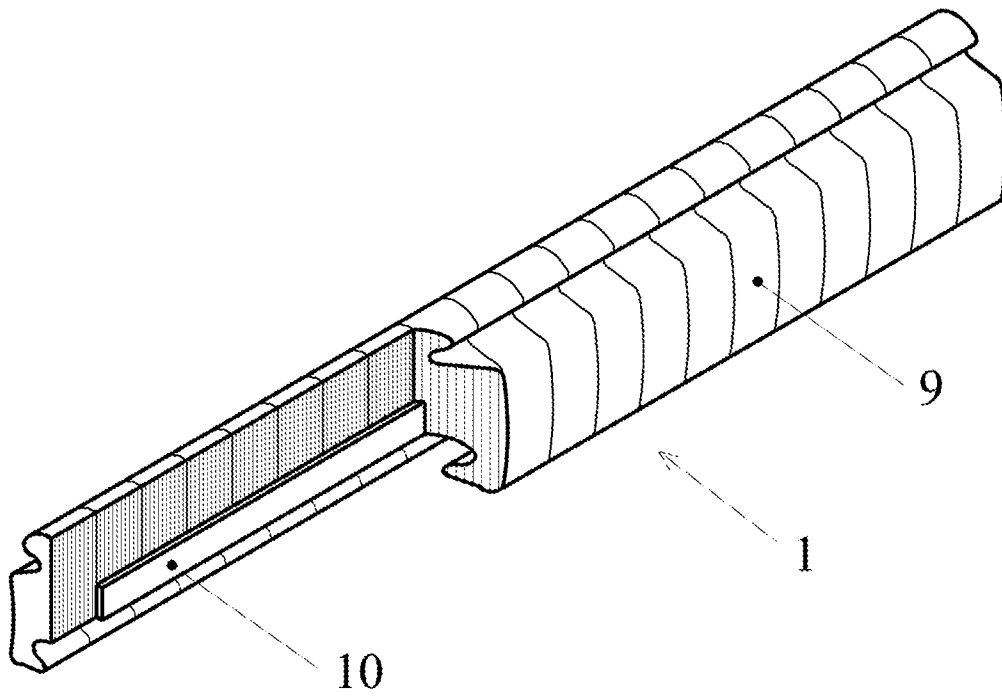


Fig. 8

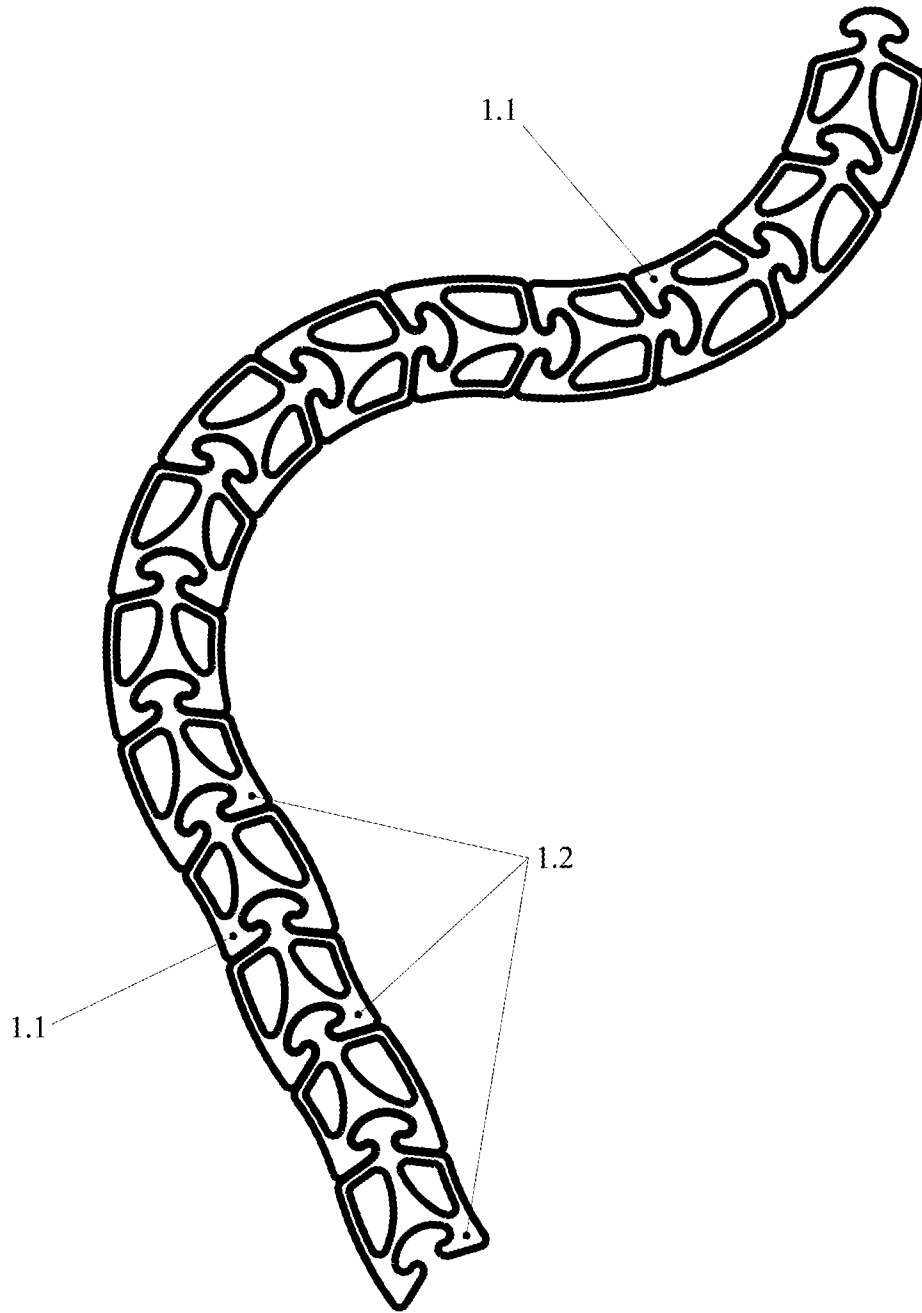


Fig. 9

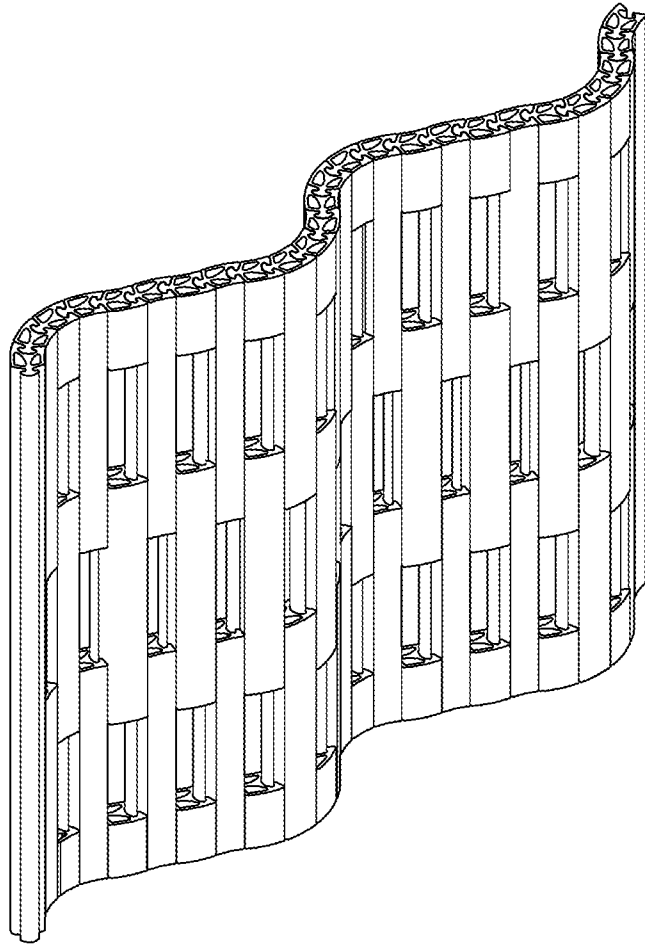


Fig. 10

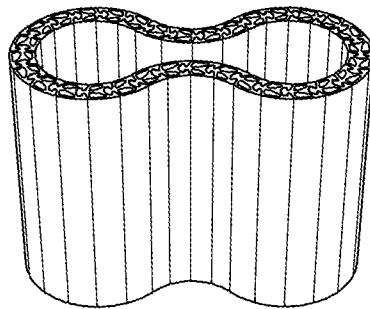


Fig. 11

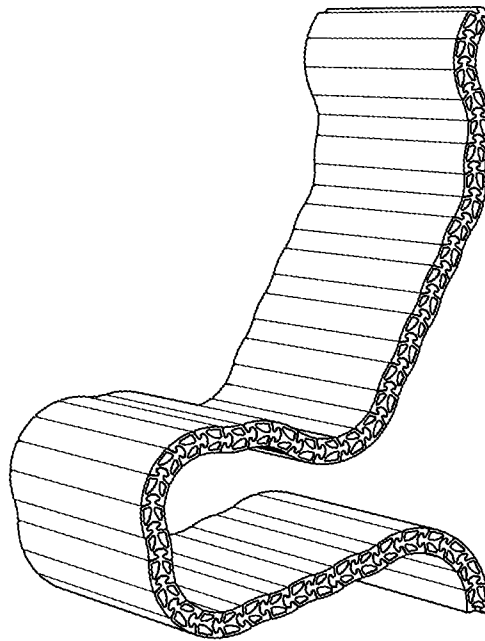


Fig. 12

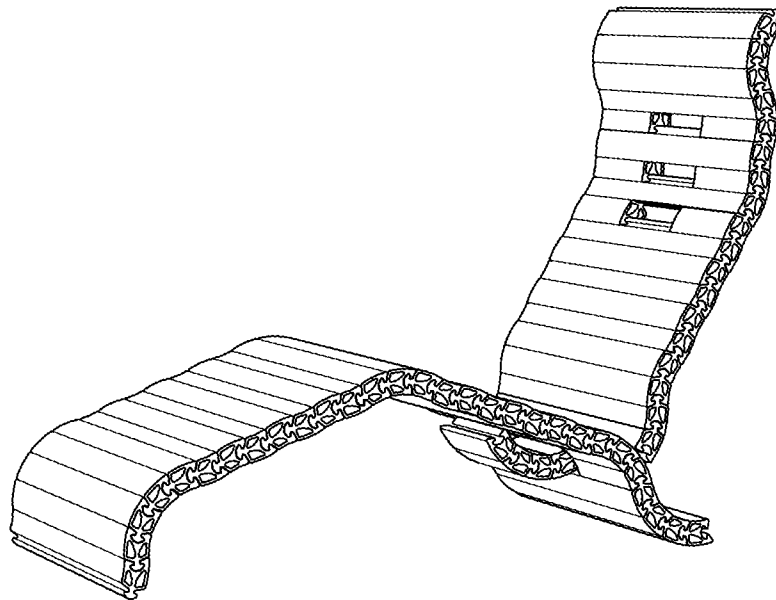


Fig. 13

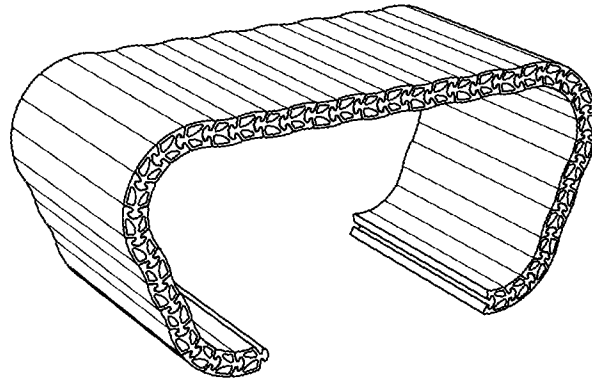


Fig. 14

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2019/055313

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A47B1/06 A47B3/04 A47B85/04 A47C4/02 A63H33/08
 ADD.
 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)
 A47B A47C A47D A63H
 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)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 538 823 A (FORD GLOBAL TECH LLC [US]) 30 November 2016 (2016-11-30) page 1, line 19 - page 8, line 27; figures 1-14b -----	1-7,9, 10,12-14
X	FR 1 430 011 A (ASEGUINOLAZA HERMANOS S R C) 25 February 1966 (1966-02-25) -----	1,2, 5-10, 12-14
Y	column 1 - column 4; figures 1-4 -----	11
Y	DE 30 33 599 A1 (POLLAK OTTO F) 18 March 1982 (1982-03-18) the whole document -----	11

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
---	---

Date of the actual completion of the international search 2 October 2019	Date of mailing of the international search report 11/10/2019
--	---

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Kohler, Pierre
--	---

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2019/055313

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2538823	A	30-11-2016	
		CN 106901497 A	30-06-2017
		DE 102016123510 A1	29-06-2017
		GB 2538823 A	30-11-2016
		US 2017181536 A1	29-06-2017

FR 1430011	A	25-02-1966	NONE

DE 3033599	A1	18-03-1982	
		DE 3033599 A1	18-03-1982
		DE 8023859 U1	04-12-1980
