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(54) **An assembly of at least four mutually connectable substantially plate-shaped bodies**

(57) An assembly (1) of at least four substantially plate-shaped bodies (2,4,6,8) which are mutually connectable, wherein, in connected position, at the location of a connection, a first and second plate-shaped body (2,4) extend substantially in line with each other, and, at the location of the connection, a third and fourth plate-shaped body (6,8) extend substantially at right angles to the first and second plate-shaped body and in line with each other, wherein in connected position, the facing

edges (14,16) of the third and fourth plate-shaped body are received at least partly between the facing edges (10,12) of the first and second plate-shaped body and are each provided with a profile, which profiles interlock in connected position, and wherein further at least one connecting element (18) is provided for connecting the third and/or fourth plate-shaped body to at least one of the facing edges of the first and/or second plate-shaped body.

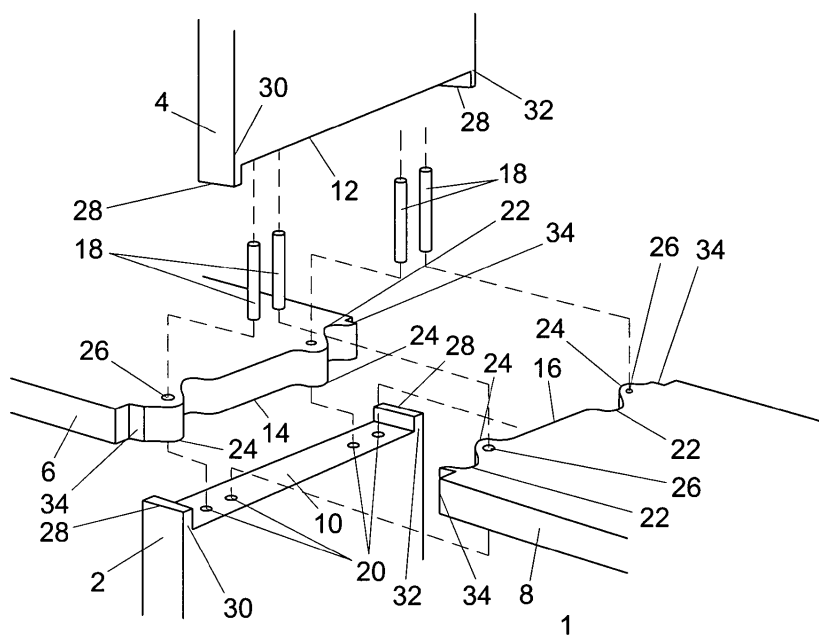


FIG. 1

Description

[0001] The invention relates to an assembly of at least four substantially plate-shaped bodies which are mutually connectable, while in connected position, at the location of a connection, a first and second plate-shaped body extend substantially in line with each other and, at the location of the connection, a third and fourth plate-shaped body extend substantially at right angles to the first and second plate-shaped body and in line with each other.

[0002] The invention also relates to a cupboard system provided with at least one assembly according to the invention.

[0003] Such an assembly is known from, for instance, Europeans patent application EP 0 270 495. The known assembly is provided with an intermediate part which, in connected position, is connected to the four plate-shaped bodies, for instance by means of pins. Here, the pins are provided with a groove and are secured in a plate-shaped body by means of a bolt connection. This has the drawback that mounting the known assembly requires many operations. Moreover, the known assembly is sensitive to loads directed substantially transversely to the plate-shaped bodies. That is why the connection of the known assembly is less stable.

[0004] One object of the invention is to provide an assembly with which the plate-shaped elements can be connected in a simple manner. It is a further object of the invention to provide an assembly with which, in connected position, a stable connection is formed.

[0005] To this end, the invention provides an assembly which is characterized in that, in connected position, the facing edges of the third and fourth plate-shaped body are received at least partly between the facing edges of the first and second plate shaped body, and are each provided with a profile, which profiles interlock in connected position while further at least one connecting element is provided for connecting the third and/or fourth plate-shaped body to at least one of the facing edges of the first and/or second plate-shaped body. This offers the advantage that the assembly can be mounted by introducing the plate-shaped bodies and the at least one connecting element into each other. To that end, no tools are required.

[0006] It is preferred that in connected position, the profiles fittingly interlock such that the third and fourth plate-shaped body are secured against shear forces in a plane of the third and fourth plate-shaped body parallel to their interface. As a result, during mounting of the assembly, when no connecting element has yet been placed, the third and fourth plate-shaped body 6, 8 can already be prevented from sliding relative to each other in said direction, which increases the ease of mounting the assembly.

[0007] Preferably, the at least one connecting element is a separate part, which, in connected condition, reaches partly in the facing edges of the first and/or second

plate-shaped part and, further, through an opening in the third and/or fourth plate-shaped body. As a result, the assembly can be produced in an inexpensive manner.

[0008] Preferably, the profiles of the facing edges of the third and fourth plate-shaped body which interlock when in connected condition, each comprise at least one recess and one protrusion, while at least one protrusion of the third body and at least one protrusion of the fourth body are each provided with an opening for the passage of the at least one connecting element. As a result, at the location of the opening for the passage of the connecting element, a reinforcement is provided in the form of the protrusion. Preferably, in the connected position, the third and fourth plate-shaped body reach, except at the location of the at least one recess and at least one protrusion, substantially as far as a first plane, which first plane extends substantially parallel to first and/or second plate-shaped body. It is preferred that the first plane is a central longitudinal plane of the first and/or second plate-shaped body. As a result, the connection of the assembly can be of compact design. If, in use, the third and fourth body extend substantially horizontally, as a result, the third and fourth plate-shaped body can bear on the first or second plate-shaped body to a substantially equal extent, over virtually the entire length of their facing edges.

[0009] Preferably, in connected position, the at least one connecting element is situated substantially in one second plane, which second plane extends substantially parallel to the first and/or second plate-shaped body. It is preferred that the second plane is a central longitudinal plane of the first and/or the second plate-shaped body. Preferably, the at least one connecting element comprises a pin. In addition or as an alternative, the at least one connecting element can comprise a plate and/or strip. This offers the advantage that the connection can be designed to be compact.

[0010] In one embodiment, in connected position, the first and second plate-shaped body are connected by means of at least two connecting elements, while a first connecting element reaches through an opening in the third plate-shaped body and a second connecting element reaches through an opening in the fourth plate-shaped body. This offers the advantage that the plate-shaped bodies can be manufactured inexpensively, for instance by means of (CNC) milling. Furthermore, in this embodiment, forces on the at least two connecting elements are distributed better, which keeps the third and fourth plate-shaped body from scissoring.

[0011] In an alternative embodiment, in connected position, the first and second plate-shaped body are connected by means of at least four connecting elements, and the third and fourth plate-shaped body are each provided with at least two recesses and at least two protrusions, while the at least two protrusions each comprise a hole for the passage of a connecting element. This offers the advantage that a stable connection of the assembly is formed.

[0012] Preferably, the interlocking profiles of the third and fourth plate-shaped body are designed and/or dimensioned such that, in connected position, they extend between the edges of the first and second plate-shaped body and are covered by these edges. This offers the advantage that the connection can be of compact design and the connection can also be used in applications where the exterior design is of importance.

[0013] Preferably, the first and/or second plate-shaped body are provided with at least one projection on their facing sides. The at least one projection is preferably located adjacent to an angle of the facing edges of the first and/or second fourth plate-shaped body. Preferably, adjacent to their facing edges, the third and/or fourth plate-shaped body are provided with at least one recess in which the at least one projection is fittingly receivable in connected position. In connected condition, the recesses engage the projections so that a robust connection is obtained, while clearance and a tendency of the plate-shaped bodies to mutually tilt is substantially prevented.

[0014] In a special embodiment, in connected position, the fourth plate-shaped body extends virtually completely between the facing edges of the first and the second plate-shaped body. Optionally, the fourth plate-shaped body forms an integral part of the first and/or second plate-shaped body. In this manner, the connection of the assembly according to the invention can also be used in applications where, normally, two or three plate-shaped bodies are connected.

[0015] An example of an assembly of at least four substantially plate-shaped, mutually connectable bodies according to the invention will presently be further elucidated with reference to the drawing. In the drawing:

Fig. 1 shows an exploded view of a first embodiment of an assembly according to the invention;

Fig. 2 shows a view of the embodiment shown in Fig. 1 in connected position;

Figs. 3a-d show views in perpendicular projection on a third and fourth plate-shaped body of four embodiments of an assembly according to the invention in connected position;

Fig. 4 shows an exploded view of a fifth embodiment of an assembly according to the invention;

Fig. 5a shows an exploded view of a sixth embodiment of an assembly according to the invention;

Fig. 5b shows an alternative embodiment of a first plate-shaped body according to the invention;

Fig. 6a shows a view of a cupboard system provided with connections of an assembly according to the invention;

Fig. 6b shows a view in perpendicular projection on a first and second plate-shaped body of the cupboard system shown in Fig. 6a; and

Fig. 6c shows a view in perpendicular projection on a third and fourth plate-shaped body of the cupboard system shown in Fig. 6a.

[0016] Fig. 1 shows an assembly 1 of four substantially plate-shaped bodies which are mutually connectable. Plate-shaped body is also understood to include an assembly of rods, tubes, profiles, plates and the like, which jointly define a body, whose contour and/or function is identical to that of a plate-shaped body. The plate-shaped bodies may for instance be completely or partially manufactured from wood, chipboard, fiberboard, interweaving, plastic, metal or glass, or a combination thereof.

[0017] A first plate-shaped body 2 and a second plate-shaped body 4 extend in line with each other. A third plate-shaped body 6 and a fourth plate-shaped body 8 extend substantially at right angles to the first and second plate-shaped body 2, 4, and in line with each other. The facing edges 14, 16 of the third and fourth plate-shaped body 6, 8 are received at least partly between the facing edges 10, 12 of the first and second plate-shaped body 2, 4. The facing edges 14, 16 of the third and fourth plate-shaped body 6, 8 are each provided with a profile. In the example shown, in connected position, the profiles fittingly interlock and can thus secure the third and fourth plate-shaped bodies against shear forces in a plane of the third and fourth plate-shaped body parallel to their interface. The embodiment shown in Fig. 1 is provided with four connecting elements 18 which, in this case, are designed as separate pin-shaped parts of for instance metal, wood or plastic. In connected condition, the connecting elements 18 extend partly in holes 20 in the facing edges 10, 12 of the first and second plate-shaped body 2, 4. The holes 20 in the second plate-shaped body 4 are not visible in Fig. 1.

[0018] In the embodiment of Fig. 1, the profiles of the facing edges 14, 16 of the third and fourth plate-shaped body 6, 8 which interlock in connected position each comprise two recesses 22 and two protrusions 24. The protrusions 24 of the third and the fourth body 6, 8 are each provided with an opening 26 for each allowing the passage of one of the four connecting elements 18. It will be clear that in this example, each connecting element 18 connects either the third or the fourth plate-shaped body to the first and/or the second plate-shaped body.

[0019] In this example, the facing edges 14, 16 of the third and fourth plate-shaped body 6, 8 abut each other over their entire length. It will be clear that it is also possible that the facing edges 14, 16 of the third and fourth plate-shaped body 6, 8 do not abut each other over their entire length, while the facing edges 14, 16 are each provided with a profile, while the profiles interlock. The interlocking profiles can be designed such that they ensure securing against shear forces in a plane of the third and fourth plate-shaped body parallel to their interface. As a result, during assembly, the profiles prevent shearing of the third and the fourth plate-shaped body (6, 8) relative to each other in a plane of the third and fourth plate-shaped body (6, 8) parallel to their interface. If the profiles fittingly interlock, as is the case in the example shown, they can also prevent shearing of the third and fourth plate-shaped body towards each other, trans-

versely to their interface. Further, profiles are conceivable (not shown) that interlock such shearing of the third and fourth plate-shaped body is prevented in a direction transverse to the plane in which these plate-shaped bodies (6, 8) extend.

[0020] Fig. 2 shows the embodiment shown in Fig. 1 in connected condition. It can be seen in Fig. 2 that the interlocking profiles of the third and fourth plate-shaped body 6, 8 are designed and/or dimensioned such that they extend between the edges of the first and second plate-shaped body 2, 4, and, in connected position, are covered by these edges (see also Fig. 3a). Fig. 1 also shows that, in this embodiment, the first and second plate-shaped body 2, 4 are provided with projections 28 adjacent to a first angle 30 and a second angle 32 of their facing edges 10, 12. The third and fourth plate-shaped body 6, 8 are provided at their facing edges 14, 16 with recesses 34 which correspond to the projections 28 on the first and second angle 30, 32 of the facing edges 10, 12 of the first and second plate-shaped body 2, 4. Here, the recesses 34 are designed and/or dimensioned such that, in connected condition, they engage the projections 28. As a result, mutual tilting of the plate-shaped bodies is prevented even better, and a stable connection of the assembly is obtained. In the embodiment shown, the projections 28 are placed on the first and second angle 30, 32 of the edges 10, 12 of the first and second plate-shaped body 2, 4. However, it is also possible to place the projections 28 at a different position on the edges 10, 12 (see, for instance, Fig. 5a).

[0021] Fig. 3 shows four embodiments of the interlocking profiles of the facing edges 14, 16 of the third and fourth plate-shaped body 6, 8, in perpendicular projection on the third and fourth plate-shaped body 6, 8 in connected position. Here, the contour of the first plate-shaped body 2 is represented by means of interrupted lines.

[0022] Fig. 3a shows the embodiment already shown in Figs. 1 and 2. In Fig. 3a it can be seen that the third and fourth plate-shaped body 6, 8, except from the location of the recesses 22 and protrusions 24, reach substantially to a first plane 36 (represented as a line in the perpendicular projection of Fig. 3a) which first plane 36 extends substantially parallel to the first plate-shaped body 2. In Fig. 3a, the first plane 36 is a central longitudinal plane of the first plate-shaped body 2. Notice that in Fig. 3a, the interlocking profiles of the facing edges 14, 16 of the third and fourth plate-shaped body 6, 8 are designed to be line-symmetrical relative to a line L (represented as a dot in the perpendicular projection of Fig. 3) which extends in the direction transverse to the third and fourth plate-shaped body 6, 8 and traverses substantially the center of the profiles.

[0023] Fig. 3b shows a second embodiment. In this embodiment, the third and fourth plate-shaped body 6, 8 are also each provided with two recesses 22 and two protrusions 24. The assembly 1 in Fig. 3b is provided with four connecting elements 20. The connecting ele-

ments 20 are substantially in one second plane 38 (represented as a line in the perpendicular projection of Fig. 3b). The second plane 38 extends substantially parallel to the first plate-shaped body 2. In Fig. 3b, the second plane 38 is a central longitudinal plane of the first plate-shaped body 2. Notice that in Fig. 3b the interlocking profiles of the facing edges 14, 16 of the third and fourth plate-shaped body 6, 8 are designed to be mirror-symmetrical in a plane V (represented as a line in the perpendicular projection of Fig. 3b) which extends in the direction transverse to the third and fourth plate-shaped body 6, 8 and transverse to the first plate-shaped body 2, while the plane V traverses, substantially, the center of the profiles.

[0024] Fig. 3c shows a third embodiment wherein the third and fourth plate-shaped body 6, 8 are each provided with one recess 22 and one protrusion 24. The connection shown in Fig. 3c is provided with two connecting elements 20.

[0025] Fig. 3d shows a fourth embodiment provided with alternative interlocking profiles. Such an embodiment can offer advantages depending on the manufacturing method of the profiles.

[0026] Fig. 4 shows an exploded view of a fifth embodiment of an assembly 1 according to the invention. The assembly shown in Fig. 4 comprises only one connecting element 18. In the embodiment of Fig. 4, the profiles of the facing edges 14, 16 of the third and fourth plate-shaped body 6, 8, which interlock in connected position, each comprise one recess 22 and one protrusion 24. Here, both with the third and fourth plate-shaped body 6, 8, the recess 22 and the protrusion 24 are provided next to each other in a direction in which the connecting element 18 extends. The parts of the third and fourth plate-shaped body 6, 8 which, in connected position, contact the facing edges 10, 12 of the first and second plate-shaped body 2, 4 are provided with recessed edges 40 for forming a receiving element for the first and second plate-shaped body 2, 4. These recessed edges 40 secure the first and second plate-shaped body 2, 4 in connected condition against rotation about the connecting body 18 which is designed as a pin in this embodiment. The first and second plate-shaped body 2, 4 can also be secured against rotation by for instance designing the connecting element as a plate and/or strip. In the embodiment shown in Fig. 4, the first and/or second body can also be provided with at least one projection 28, and the third and/or fourth plate-shaped body with a recess 34 corresponding thereto as shown in Fig. 1. As a result, mutual tilting of the plate-shaped body is prevented even better.

[0027] Fig. 5a shows an exploded view of a sixth embodiment where the dimensions of a fourth plate-shaped body 8' are selected such that, in connected position, this body extends virtually completely between the facing edges 10, 12 of the first and second plate-shaped body 2, 4. In that case, the fourth plate-shaped body 8' can also form an integral part of the first and/or second plate-shaped body 2, 4. This is shown in Fig. 5b. In this

manner, the connection of the assembly according to the invention can also be used in applications where normally two or three plate-shaped bodies are connected.

[0028] Fig. 6a shows a cupboard system 42 which is built up from plate-shaped bodies which are connected by means of the assembly 1 according to the first embodiment. In the cupboard system shown in Fig. 6a, the first and second plate-shaped bodies 2, 4 extend substantially in vertical direction and the third and fourth plate-shaped bodies 6, 8 extend substantially in horizontal direction. The first plate-shaped body 2 is arranged, on two opposite end faces 44, 46, for use in two connections which are not situated at the same location (see also Fig. 6b). The two opposite end faces 44, 46 of the first plate-shaped body 2 are of mirror symmetrical design in a plane 48 which lies substantially parallel between the two opposite end faces. It is, however, not necessary to design the opposite end faces 44, 46 so to be mirror-symmetrical, for instance, the one end face may be provided with projections 28 with a length which is equal to a thickness of the third and/or fourth plate-shaped body and the other end face may not be provided with projections 28. In Fig. 6b, the second plate-shaped body 4 is identical to the first plate-shaped body 2 of the assembly. In Figs. 6a and 6b, it is shown that it is also possible to combine first or second plate-shaped bodies 2, 4 with different dimensions in one cupboard system 42. As a result, in a simple manner, a modular cupboard system 42 is obtained.

[0029] The third plate-shaped body 6 is arranged, on two opposite end faces 50, 52, for use in two connections which are not at the same location (see also Fig. 6c). The two opposite end faces 50, 52 of the third plate-shaped body 6 are designed to be line-symmetrical relative to a line 54 (represented as a dot in the perpendicular projection of Fig. 6c) which traverses the third plate-shaped body 6 in the center and is transverse to the third plate-shaped body 6. It is, however, not necessary to design the opposite end faces 50, 52 so to be line-symmetrical. The two opposite end faces 50, 52 of the third plate-shaped body 6 can, for instance, also be designed so to be mirror-symmetrical in a plane which lies substantially parallel between the two opposite end faces. Conversely, the opposite end faces can also be designed so as to be asymmetrical, for instance to aid someone building up the cupboard system. Here, a cupboard system 42 can be designed such that the plate-shaped bodies can only be connected in one manner, like with a jigsaw puzzle, to form the cupboard system.

[0030] In Fig. 6c, the fourth plate-shaped body 8 is identical to the third plate-shaped body 6 of the assembly. In Figs. 6a and 6c, it is shown that it is also possible to combine third or fourth plate-shaped bodies 6, 8 with different dimensions in one cupboard system 42. Thus, in a simple manner, a modular cupboard system 42 is obtained. In Figs. 6a-c, it is shown that the connections of the cupboard system 42, in which normally, only two or three plate-shaped bodies are connected, in particular

at the angles or sides of the cupboard system, respectively, can also be formed by connections of the assembly according to the invention. To this end, the cupboard system 42 can for instance be provided with first, second and fourth plate-shaped bodies 2', 4', 8' modified to that end.

[0031] The invention is not limited in any manner to the described embodiments. In the described embodiments, substantially plate-shaped bodies 2, 4, 6, 8 are shown with a substantially rectangular contour (except at the interlocking profiles). It is also possible to connect plate-shaped bodies with different contours, for instance trapezoid or curved bodies, by means of a connection according to the invention, for instance for forming a cupboard system with the cupboard system as a whole exhibiting a twist or making a bend.

[0032] In the described embodiments, the first and second plate-shaped body extend in line over substantially their entire length, and the third and fourth plate-shaped body extend in line over substantially their entire length, substantially at right angles to the first and second plate-shaped bodies. However, it is also possible that the first and second plate-shaped body do not extend in line over substantially their entire length, and/or that the third and fourth plate-shaped body do not extend in line over substantially their entire length and/or that the third and fourth plate-shaped body are not substantially at right angles to the first and second plate-shaped body over their entire length.

[0033] The plate-shaped bodies in the described embodiments extend substantially in a flat plane. It is also possible to connect bodies which do not extend in a flat plane by means of a connection of an assembly according to the invention. Examples thereof are bodies describing a part of a cylinder surface, bodies with a curving surface and bodies having at least one bend.

[0034] Such variants are all understood to fall within the framework of the invention as set forth in the following claims.

Claims

1. An assembly (1) of at least four substantially plate-shaped bodies (2, 4, 6, 8) which are mutually connectable, while, in connected position, at the location of a connection, a first and second plate-shaped body (2, 4) extend substantially in line with each other, and, at the location of the connection, a third and fourth plate-shaped body (6, 8) extend substantially at right angles to the first and second plate-shaped body (2, 4) and in line with each other, **characterized in that** in connected position, the facing edges (14, 16) of the third and fourth plate-shaped body (6, 8) are received at least partly between the facing edges (10, 12) of the first and second plate-shaped body (2, 4) and are each provided with a profile, which profiles interlock in con-

- connected position, and wherein further at least one connecting element (18) is provided for connecting the third and/or fourth plate-shaped body (6, 8) to at least one of the facing edges (10, 12) of the first and/or second plate-shaped body (2, 4).
2. An assembly according to claim 1, **characterized in that**, in connected position, the profiles fittingly interlock.
 3. An assembly according to claim 1 or 2, **characterized in that** the profiles can fittingly interlock such that the third and fourth plate-shaped body (6, 8) are secured against shear forces in a plane of the third and fourth plate-shaped body (6, 8), parallel to their interface.
 4. An assembly (1) according to any one of claims 1 - 3, **characterized in that** the at least one connecting element (18) is a separate part which, in connected condition, reaches partly in the facing edges (10, 12) of the first and/or second plate-shaped body (2, 4) and further reaches through an opening (26) in the third and/or fourth plate-shaped body (6, 8).
 5. An assembly (1) according to any one of the preceding claims, **characterized in that** the profiles of the facing edges (14, 16) of the third and fourth plate-shaped body (6, 8), interlocking in connected position, each comprise at least one recess (22) and at least one protrusion (24), and wherein at least one protrusion (24) of the third body (6) and at least one protrusion (24) of the fourth body (8) are each provided with an opening (26) for allowing the passage of at least one connecting element (18).
 6. An assembly (1) according to claim 5, **characterized in that**, in connected position, besides at the location of the at least one recess (22) and at least one protrusion (24), the third and fourth plate-shaped body (6, 8) reach substantially to a first plane (36), which first plane (36) extends substantially parallel to the first and/or second plate-shaped body (2, 4).
 7. An assembly (1) according to claim 6, **characterized in that** the first plane (36) is a central longitudinal plane of the first and/or second plate-shaped body (2, 4).
 8. An assembly (1) according to any one of the preceding claims, **characterized in that**, in connected position, the at least one connecting element (18) is located in substantially one second plane (38), which second plane (38) extends substantially parallel to the first and/or second plate-shaped body (2, 4).
 9. An assembly (1) according to claim 8, **characterized in that** the second plane (38) is a central longitudinal plane of the first and/or second plate-shaped body (2, 4).
 10. An assembly (1) according to any one of the preceding claims, **characterized in that**, in connected position, the first and second plate-shaped body (2, 4) are connected by means of at least two connecting elements (18), wherein a first connecting element (18) reaches through an opening (26) in the third plate-shaped body (6) and a second connecting element (18) reaches through an opening in the fourth plate-shaped body (8).
 11. An assembly (1) according to any one of the preceding claims, **characterized in that** in connected position, the first and second plate-shaped body (2, 4) are connected by means of at least four connecting elements (18), and that the third and fourth plate-shaped body (6, 8) are each provided with at least two recesses (22) and at least two protrusions (24), while the at least two protrusions (24) each comprise a hole (26) for allowing the passage of a connecting element (18).
 12. An assembly (1) according to any one of the preceding claims, **characterized in that** the interlocking profiles of the third and fourth plate-shaped body (6, 8) are designed and/or dimensioned such that, in connected position, they extend between the edges (10, 12) of the first and second plate-shaped body (2, 4) and are covered by these edges (10, 12).
 13. An assembly (1) according to any one of the preceding claims, **characterized in that** the first and/or second plate-shaped body (2, 4) are provided with at least one projection (28) at their facing edges.
 14. An assembly (1) according to claim 13, **characterized in that** the at least one projection (28) is situated adjacent to an angle (30, 32) of the facing edges (10, 12) of the first and/or second plate-shaped body (2, 4).
 15. An assembly (1) according to claims 13 or 14, **characterized in that**, adjacent to their facing edges (14, 16), the third and/or fourth plate-shaped body (6, 8) are provided with at least one recess (34) in which the at least one projection (28) is fittingly receivable in connected position.
 16. An assembly according to any one of the preceding claims, **characterized in that** the two opposite end faces (44, 46; 50, 52) of a plate-shaped body (2; 4; 6; 8) are mirror-symmetrical in a plane situated substantially parallel between the respective two opposite end faces (44, 46; 50, 52).
 17. An assembly (1) according to any one of claims 1 -

15, **characterized in that** two opposite end faces of a plate-shaped body are rotation-symmetrical relative to a central axis extending at right angles to the respective plate-shaped body.

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18. A plate-shaped body (2, 4, 6, 8) comprising the features of a plate-shaped body (2, 4, 6, 8) as defined in an assembly according to any one of the preceding claims.

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19. A cupboard system (42) provided with at least one assembly according to any one of claims 1- 17.

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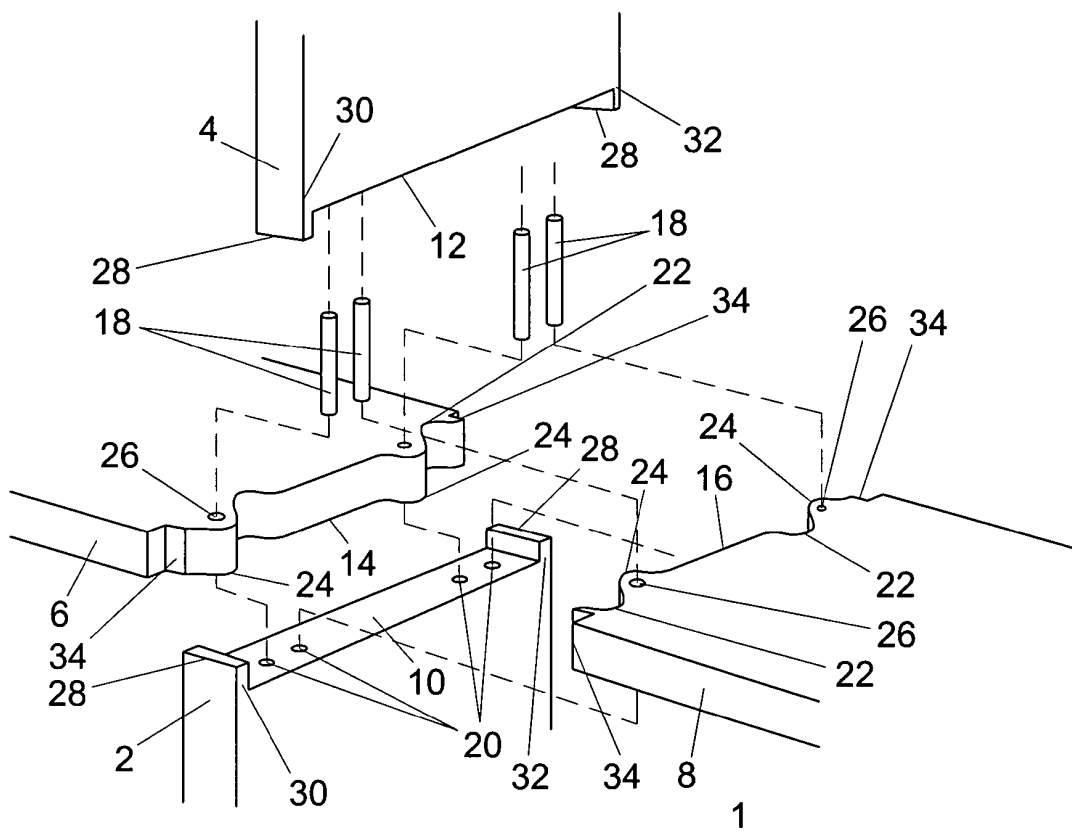


FIG. 1

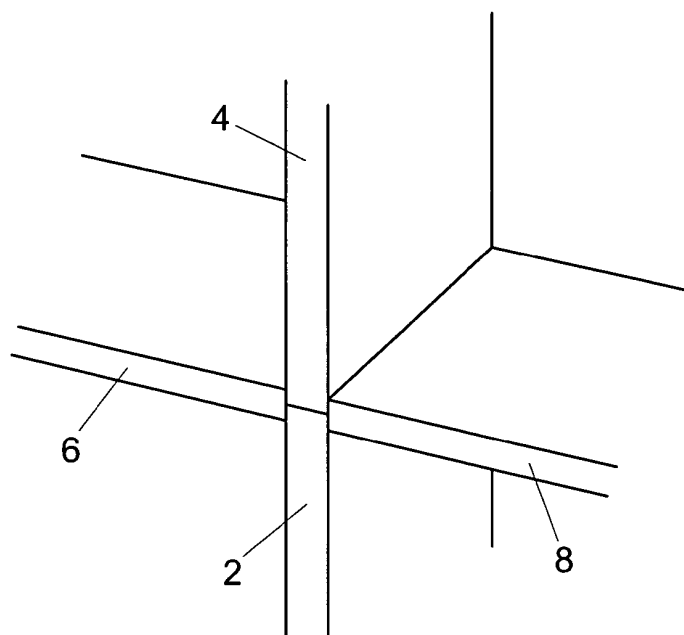


FIG. 2

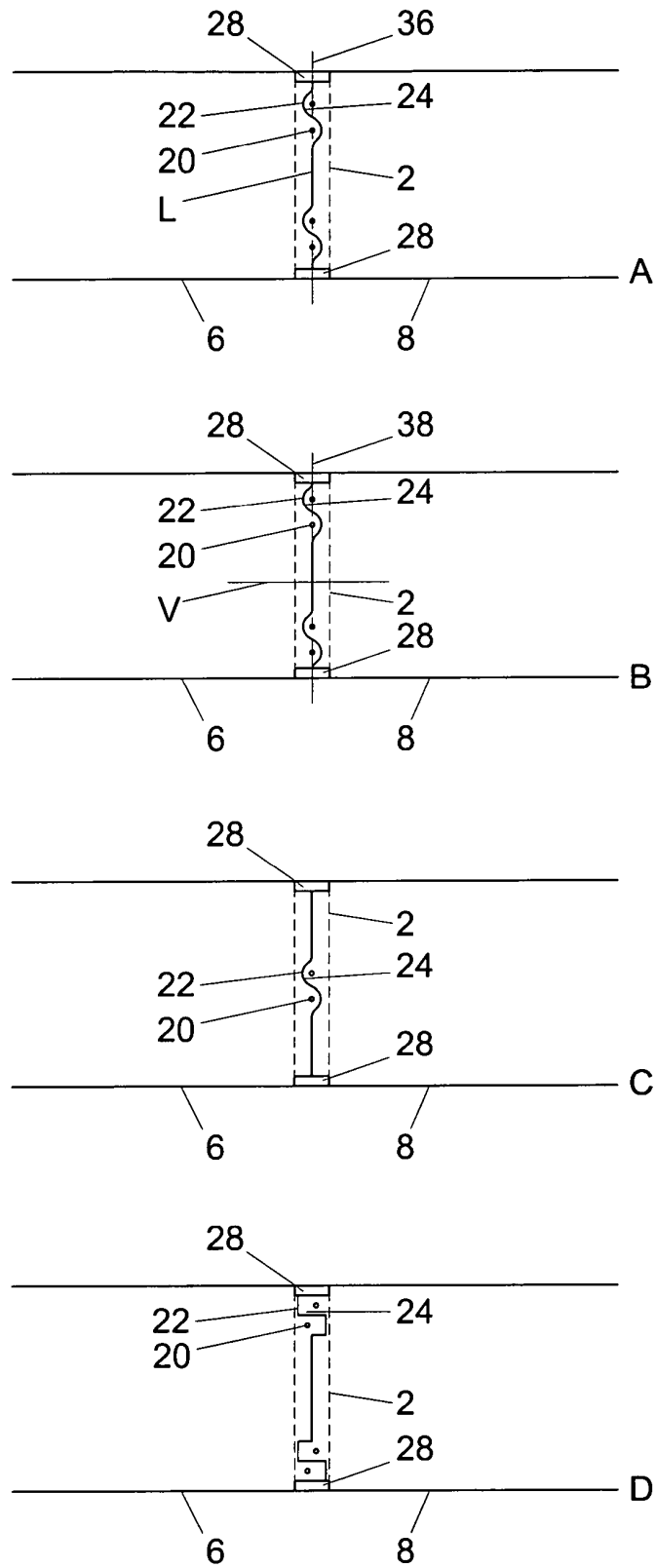


FIG. 3

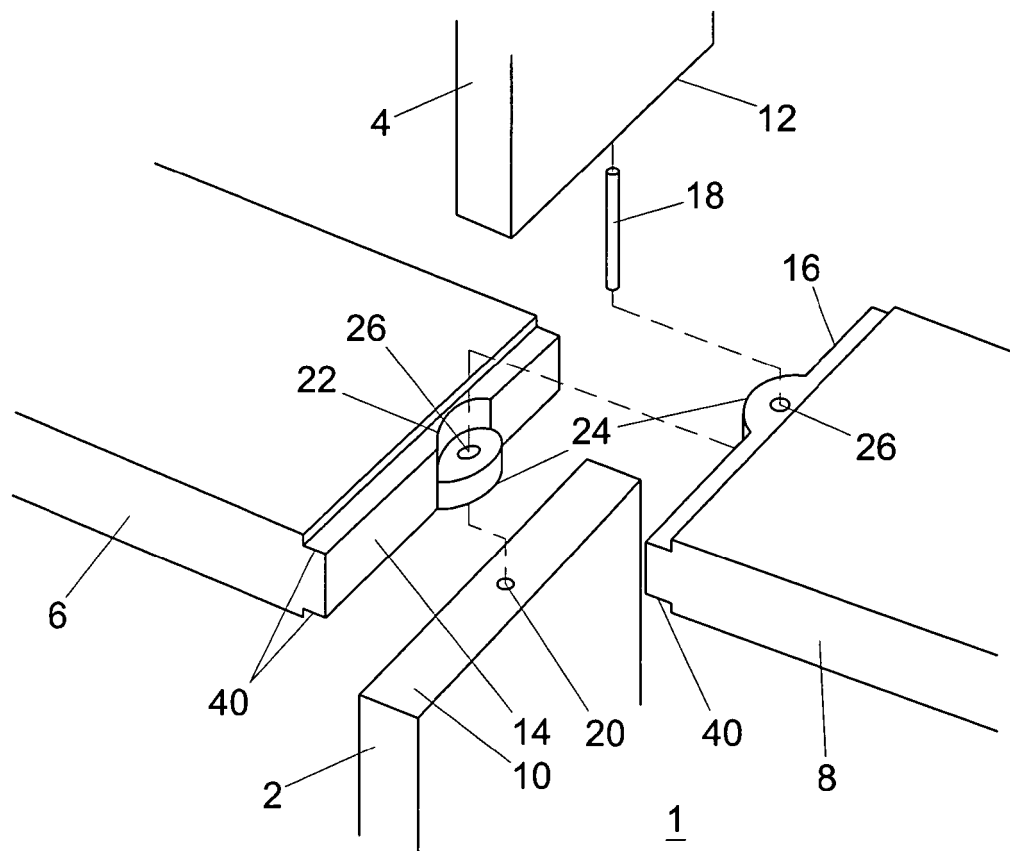


FIG. 4

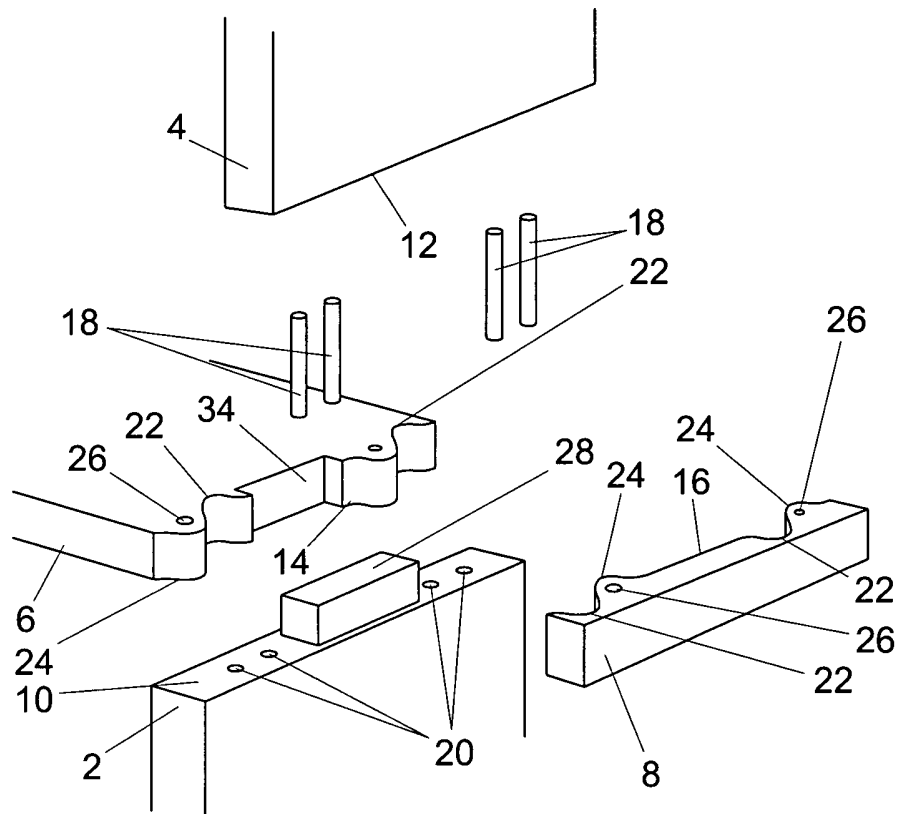


FIG. 5a

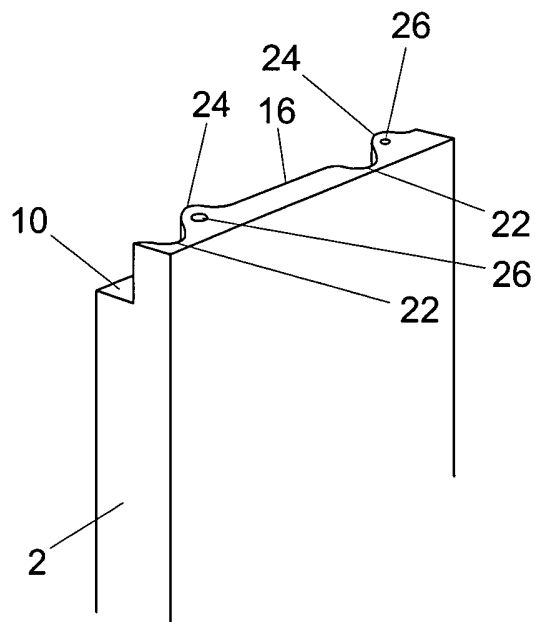


FIG. 5b

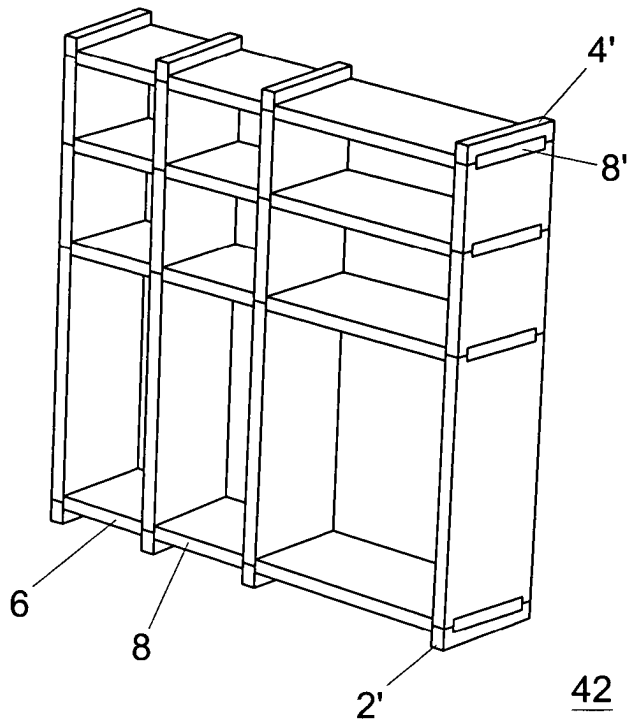


FIG. 6a

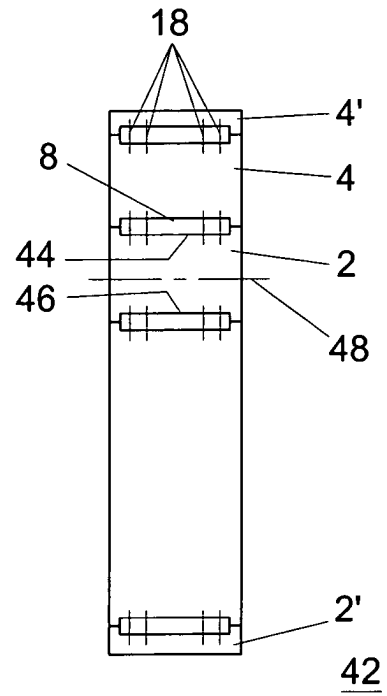


FIG. 6b

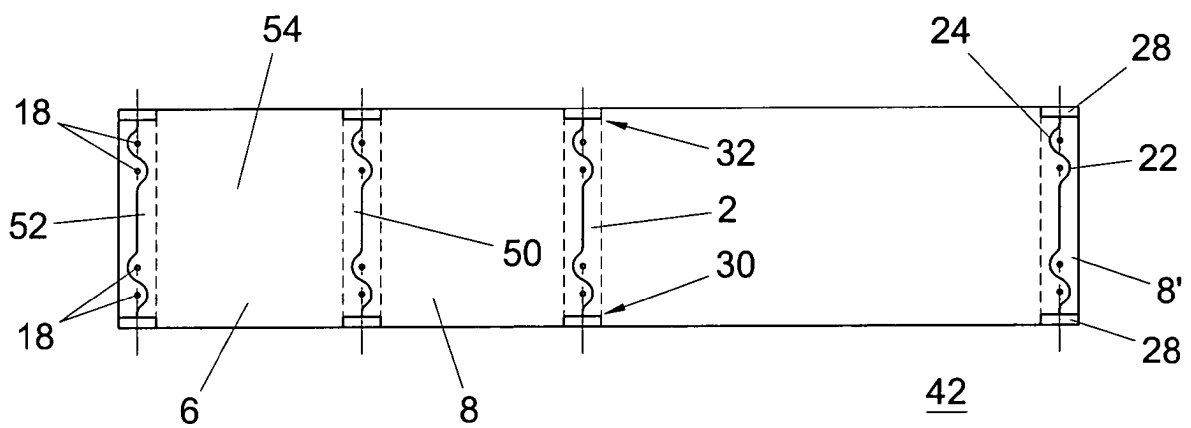


FIG. 6c



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 07 6604

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47B F16B
Place of search The Hague		Date of completion of the search 12 October 2005	Examiner van Hoogstraten, S
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			

2
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 05 07 6604

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