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(11) **EP 1 088 496 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
04.04.2001 Bulletin 2001/14

(51) Int. Cl.⁷: **A47B 57/40, A47B 47/02**

(21) Application number: **00203270.4**

(22) Date of filing: **22.09.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **29.09.1999 NL 1013161**

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(54) **System cupboard**

(57) The invention relates to a system cupboard comprising a number of uprights (1,2,3,4), connecting elements (9-12,16,17) provided with connecting projections or otherwise, for mutually connecting the uprights and supports (13) to be mounted to the uprights, for one or more shelves (14), the shelves being provided with openings for receiving supports and the connecting projections of the connecting elements and locking means for locking the connecting elements into the uprights have been provided. Said locking means comprise locking members, in which locking occurs under action of the resilient means, by displacement, or with the help of adjusting means.

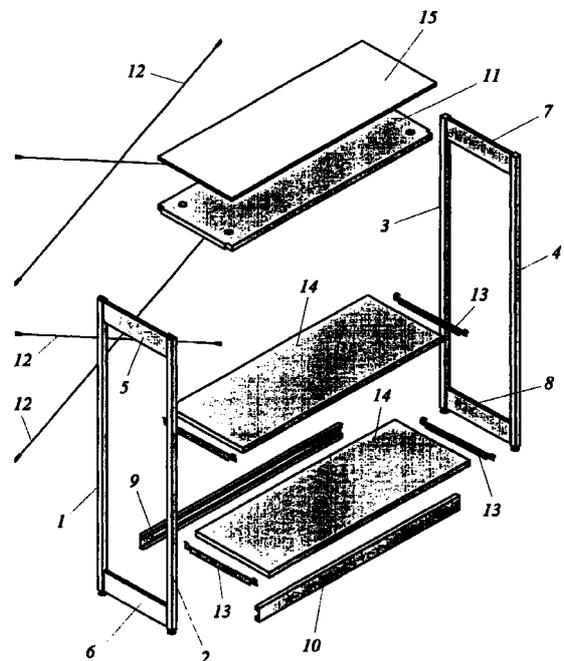


FIG. 1

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Description

[0001] The invention relates to a system cupboard comprising at least two uprights, connecting elements whether or not provided with connecting projections for mutually connecting the uprights and supports to be mounted to said uprights, for one or more shelves, the uprights at least being provided with openings for receiving said supports and connecting projections.

[0002] Such system cupboards are known per se and are intended to offer a user the possibility to assemble the cupboard entirely to his own liking. It is also possible to adapt such system cupboards continually to changing requirements and wishes without difficulty. However, in practice this happens only seldom since making another arrangement or extending a system cupboard still requires tools, simple as they may be, in order to establish and disengage connections, which makes the operations more elaborate and with that more time-consuming.

[0003] The object of the invention is to provide for a system cupboard which can be assembled quickly and in a simple way and in which the desired changes and extensions can also be made quickly and in a simple way as well without the need for any tools and in which the connections made, and with that the construction of the complete system cupboard can always comply with the requirements concerned.

[0004] Accordingly, according to the invention it is provided for, that at least part of the connecting elements is provided with locking means being intended for locking the connecting elements engaging the uprights through the connecting projections. According to a preferred embodiment, it has been provided for, that the connecting elements are provided with locking members at least at one side engaging into openings made in upright or connecting element, by means of a snap connection.

[0005] The combination of fastening projections and the locking means respectively provide for that the fastening means can be stuck in the proper or desired position into the further parts of the cupboard or can engage said position and that said elements can be kept in that position without or practically without any clearance. The snap connection of the locking means provides for that the fastening elements, after bringing them into the desired positions, will be immediately locked in that position. According to the invention it has been further provided for, that the locking means comprise locking members being designed in such a way, that the snap connection is reversible and the locking can be undone by manual force.

[0006] This has resulted in a system in which at least the parts of the cupboard which together determine the structural construction of a system cupboard or a part thereof, can be connected quickly and in a simple way, in which the established connections can be made undone in just such a quick and simply way as

well.

[0007] The openings engageable by the locking means or locking members can be openings or sets of openings made in the uprights especially for that purpose, but preferably locking means or locking members are designed in such a way that both the connecting means and also other possible assembling parts of a system cupboard can use the same set or sets of openings. For that purpose, the uprights have at least one other side than the side or sides in which said openings for the supports for one or more shelves have been made, said side being provided with one or more sets of openings, in which preferably the sides of the uprights intended to be positioned at the front or rear of a cupboard, are provided with a double row of vertical openings, and the immediately adjacent sides of the uprights each being provided with a row of horizontal openings. Applying a double row of vertical openings has the advantage that fastening elements and locking means of successive cupboard parts can always engage at the same height, in which, furthermore, the single upright can be kept relatively narrow.

[0008] Although it is possible to mount connecting elements with locking means between all uprights, it is preferred to fixedly connect two uprights together defining a side plane or a plane of a cupboard parallel to it, to one or more transverse elements and to employ the connecting means and locking means only between the sets of uprights assembled in said way.

[0009] According to the invention, a first locking member is provided which can be connected to at least one pivot point through a connecting element and at has at least one hook member intended for engaging into an opening of an upright and has resilient means by means of which said hook member or hook members are forced into a predetermined direction at least when mounting a connecting element with an upright. Said first locking member provides for a locking of said connecting element immediately following insertion of a connecting element into the openings provided in the upright.

[0010] Further, a second locking member is provided, which is slidable along, or slidably received in, a connecting element, in which said second locking member, at least at one outer end, in the direction in which the member is slidable relative to said connecting element, is provided with a projection member intended for being inserted into an opening of an upright. Here, the second locking member is provided with securing means, being under the action of resilient means, for securing the locking member onto said connecting element.

[0011] In this embodiment, the locking member should be slid as to provide for the locking. Preferably, said second locking member is mounted on the connecting element in such a way, that it is enclosed either by said connecting element, or by said connecting element and a further assembling part of the system cup-

board on mounting the connecting element.

[0012] First and second locking members are preferably manufactured from an resilient plastic so that the resilient means can use that property and the resilient means and the locking means can form an entity.

[0013] Finally, according to the invention it is provided for, that the locking means comprise further locking members consisting of hook members to be fitted at the outer ends of a connecting element, intended for hooking into openings provided in the upright, in which additionally adjusting means for engaging a connecting element are provided. Said locking members are particularly suitable for being employed together with connecting elements to be mounted at the back side of a system cupboard, with said connecting elements extending across an angle in relation to the main lines of the cupboard. At their respective outer ends, these connecting elements engage the upper side and the lower side of vertical openings or the left-hand side or right-hand side of horizontal openings, so that after insertion of the connecting element, its length must be shortened in order to be able to keep the connecting element within the openings and have it functioning as a shore too.

[0014] Such a connecting element can be designed in such a way that it substantially comprises a cable and the adjustment means consist of tensioning means being mounted on a hook member and being connected to the connecting element. Here, the tensioning means are preferably across a predetermined angle in relation to the part of the hook member being intended for bringing it into an opening of an upright, so that the connecting element can be mounted across said predetermined angle as well. By this, it is achieved that said connecting elements always extend parallel to each other or across the same angle in relation to each other, which is of great importance for visual aspects. Further, the adjusting means are designed such, that they can be adjusted by hand, without using any tools.

[0015] In the following, the invention is further explained by way of an example, illustrated in the drawing, in which:

Fig. 1 shows an open system cupboard with shores at the rear side;

Fig. 2 shows a closed system cupboard with closed rear side and lateral sides;

Figs. 3A, B, C show a front and side view of a system cupboard and a perspective view of a top plate, respectively;

Figs. 4A, B show perspective views of a first locking member;

Fig. 4C shows a perspective view of a mounted first locking member;

Figs. 4D, E, F show various cross-sections of a mounted first locking member;

Figs. 5A, B show perspective views of a mounted second locking member;

Fig. 5C shows a perspective view of a mounted second locking member;

Figs. 5D, E show cross-sections of a mounted second locking member;

Fig. 6A shows a number of possible positions of a further locking member;

Fig. 6B shows a side view of the further locking member; and

Fig. 6C shows a cross-section of a mounted further locking member.

[0016] Fig. 1 illustrates an open system cupboard having four uprights 1, 2, 3, 4, being fixedly connected two by two through yokes 5, 6, 7, 8. The sets of uprights are mutually connected with the help of a number of connecting elements. The connecting elements include the skirting parts 9, 10 to be mounted at the lower side between said uprights, the top plate 11 to be mounted at the top and the shores 12 or rear panels 16, 17 to be mounted at the rear side. It is possible to mount e.g. shelves 14 between the sets of uprights by supports to be stuck into said uprights. Finally, a sheet 15 to be mounted on the top plate 11 as finishing is illustrated.

[0017] Fig. 2 shows a partly closed system cupboard in which the shores 12 indicated in the previous figure have been replaced by rear panels 16, 17 and in which the lateral sides have been closed by side panels 18, 19. In a way known per se, the rear panels hook into the vertical openings made in the rear side of the uprights 1, 3 and thus form connecting elements as well. Further the cupboard corresponds to the one according to Figure 1.

[0018] Figs. 3A, B show a front and a side view, respectively, of a system cupboard with a rear side of the cupboard closed-off by panels, skirting 10 and top plate 11 with plate 15. Fig. 3C shows top plate 11 in perspective, with the profiled edges 20, 21 mounted at front and rear side being visible, as well as the lateral edges 22, 23. Locking members 24 are movably mounted in the profiled edges at or near their outer ends. Further, means 25 have been mounted in the plate in order to be able to fasten the sheet 15 releasably or otherwise onto the top plate.

[0019] Figs. 4A, B show a first locking member 26 being intended for locking the connection of the skirtings 9, 10 with the uprights 1, 2, 3, 4. The locking member has an outer end provided with two projecting arms 27, 28 each having a stub axle 29, 30. The stub axles 29, 30 are in one line and are meant to fall into holes 31, 32 made for that purpose in a skirting 9, 10, and forming a shaft around which the locking member can rotate across at least a certain angle. The holes 31, 32 have been made in the sides or flanged edges 33, 34 of the approximately U-shaped skirtings 9, 10.

[0020] At the opposite outer end, locking member 26 is provided with hook members 35, 36 substantially comprising arms 37, 38 having recesses 39, 40. Said hook members are meant to fall into the slots 41 made

in an upright and to be kept therein. In order to effect this, the locking member is provided with resilient elements 42, 43, which will come to lie against a vertical side 44 of the skirting 9, 10 in case of a mounted locking member. In order to limit the angle across which the locking member 26 can rotate, to no more than the desired angle, additionally, projections 45, 46 hitting the flanged edges 33, 34 have been provided.

[0021] Fig. 4C shows a perspective view in which for the sake of clarity in the figure of the upright 4 only the half situated at the outside has been illustrated. At its lateral sides, the upright is provided with a series of horizontal slots 41 and at its front side with two parallel vertical series of vertical slots 47, 48. Said last slots are recessed in relation to the front side of the upright.

[0022] The skirting 10 is provided with spaced-apart connecting projections 49, 50, which in turn are spaced from the hook members 35, 36. At said distances correspond to, or are a multiple of, the distance between successive slots 41. The hook members 35, 36 are further provided with bevels 51, 52, as a result of which the hook members are self-searching and the skirting with locking member can be directly stuck into a lateral side of the upright and is locked. In the locking, due to the recesses 39, 40 the hook members 35, 36 grip around the part of the lateral wall of the upright situated immediately adjacent the slot 41. The locking can be undone by pushing against the plane 53 of the locking member 26 and bringing the hook members into the correct position in relation to the slot 41 in order to be able to remove the skirting with the locking member from the upright.

[0023] Figs. 5A, B show a second locking member 25 in perspective which is intended to be movable along an edge, in particular a flanged edge 20, 21 of a top plate 11. The locking member 25 is formed symmetrically and has both outer ends provided with a locking projection 54, 55, as a result of which the locking member can be used in both a left-hand and a right-hand side of an edge 20, 21. The locking member holds aligned recesses 56, 57, as a result of which the locking member can be placed over an upwardly pointed portion 58 of the edge 21. At its top side, the locking member 25 is provided with projecting edge portions 59, 60, 61, by which the locking member can come to lie against the bottom side 62 of the top plate 11. Through the recessions 56, 57 and the edge portions 59, 60, 61, the locking member has been trapped in the flanged edge 21 of the top plate 11 and the locking projection 54, 55 always remains substantially parallel to the top plate 11 and with that, correctly oriented in relation to the slot 41.

[0024] In order to be able to secure the locking member 25 on the edge, a projection 63 mounted on a resilient arm 62 has been provided, which is intended to fall into the opening 64 made in the upwardly pointing portion 58 of the edge 21. Preferably, two openings 64, 65 are mounted, so that the locking member can also be

secured in a retracted position. The resilient arm 62 is further provided with a projecting operating part 66 by which the projection 63 can easily be pulled out of one of the openings 64, 65.

[0025] Flanged edges 20, 21 of a top plate 11 will come to lie between the uprights 2, 4 and 1, 3 and the edges fall into longitudinal slits 67 (Fig. 5E) mounted in the top sides of the yokes 5, 7. By sliding movement of locking members 25 mounted at the outer ends of the flanged edges 20, 21, the top plate 11 is locked. The locking projections 54, 55 protrude into an upright, in a different way from first locking members 26, to beyond the nearest series of vertical slots 47 or 48. The dimensioning of the various parts is chosen such, that the locking projections 54, 55 end exactly over the topmost connecting projection or hook 68 of a rear panel 16 or e.g. at the front side of a topmost connecting projection or hook of a topmost door hinge. This makes it possible to make a completely closed cupboard having closeable doors, which can not be disassembled from the outside.

[0026] Fig. 6A illustrates parts of shores 12 with further locking members 69 at their outer ends. The locking members have two planes 70, 71 being approximately perpendicular to each other, with a recess 72 being made in the plane 71. When hooking the further locking member 69 into a vertical slot 47 or 48, the further locking member can be slid upwards at one side of a shore across a distance equalling the depth of the recess 72, and be slid downwards at the other side, until it strikes. Due to the construction of the mutually perpendicular planes 70, 71, the slots 47, 48 recessed in relation to the upright's front side, and the plane 73 parallel to the plane 71, which will come to lie against the outside of an upright, only further locking member 69 can move in vertical direction.

[0027] In order to be able to bring the shore 12 into vertical slots at both ends, the length of said shore 12 should be larger than the final length, in which the outer ends are kept in the slots 47, 48 and the end planes of the recesses 72 engage an end of a vertical slot 47, 48. To this end, a case 74 mounted on the plane 70 is provided, into which at one side an externally threaded outer end 75 of a shore 12 projects and at the other side an internally threaded rotatable adjusting member 76. By rotating the adjusting member(s), connecting element 12 can be brought to the desired length, by which the connection of said connecting element with opposite uprights will be locked at the same time.

[0028] Preferably, one chooses a fixed angle across which said shore should be mounted in relation to the vertical uprights. Starting from said chosen angle, the edge portion 77 of the plane is measured such that it will always end in parallel to the longitudinal direction and, seen in transverse direction, against the centres of the uprights. Owing to this, shores appearing continuously to the eye can be mounted between successive parts of a system cupboard, or shores starting at the same height and extending across an equal angle but in oppo-

site directions in relation to an upright.

Claims

1. System cupboard comprising at least two uprights, connecting elements whether or not provided with connecting projections for mutually connecting the uprights and supports to be mounted to said uprights, for one or more shelves, the uprights at least being provided with openings for receiving said supports and connecting projections, characterized in that at least part of the connecting elements is provided with locking means being intended for locking the connecting elements engaging the uprights through the connecting projections. 5 10 15
2. System cupboard according to claim 1, characterized in that locking members engage into openings made in said uprights. 20
3. System cupboard according to claims 1 and 2, characterized in that at least one other side of an upright than the side or sides in which the openings for the supports for one or more shelves have been made, is provided with one or more sets of openings. 25
4. System cupboard according to claims 1 to 3, characterized in that the sides of the uprights intended for provision at the front or rear of a cupboard, are provided with a double row of vertical openings, and each of the directly adjacent sides of the uprights is provided with a row of horizontal openings. 30 35
5. System cupboard according to claims 1 to 4, characterized in that two uprights together defining a side plane or a plane being parallel to it, are mutually fixedly connected to one or more transverse elements. 40
6. System cupboard according to claims 1 to 5, characterized in that the connecting elements are provided with locking members at least at one side engaging into openings made in upright or connecting element with snap connections. 45
7. System cupboard according to claim 6, characterized in that a first locking member with at least one pivot point can be connected with a connecting element, has at least one hook member intended for engaging into an opening of an upright and has resilient means by which hook member(s) are forced into a predetermined direction at least when connecting a connecting element to an upright. 50 55
8. System cupboard according to claim 6, characterized in that a second locking member is provided, which is slidable along, or slidably received in, a connecting element, in which said second locking member, at least at one outer end, in the direction in which the member is slidable relative to said connecting element, is provided with a projection member intended for being inserted into an opening of an upright.
9. System cupboard according to claim 8, characterized in that said second locking member is provided with securing means, being under the action of resilient means, for securing the locking member onto said connecting element.
10. System cupboard according to claims 7 - 9, characterized in that the locking members have at least partly been manufactured from a resilient plastic and the resilient means are one or more plastic arms mounted in predetermined positions.
11. System cupboard according to claims 1 - 5, characterized in that said locking means comprise further locking members consisting of hook members mounted at the outer ends of a connecting element, intended for hooking into openings provided in the upright, adjusting means engaging a connecting element further being provided.
12. System cupboard according to claim 11, characterized in that said adjusting means substantially comprise tensioning means mounted on a hook member and connected to a connecting element.
13. System cupboard according to claim 12, characterized in that said the adjusting means are preferably across a predetermined angle in relation to the part of the hook member intended for bringing it into an opening of an upright.
14. System cupboard according to claims 1 - 13, characterized in that of said locking means, the first and second locking members are intended for engaging into one or more horizontal openings, and the further locking members for engaging into one or more vertical openings.
15. System cupboard according to one or more of the preceding claims, characterized in that the locking members for the connecting elements have been designed such that the locking between connecting elements and uprights can always be established by hand, without the use of any tools, and likewise be undone by hand, without the use of any tools.

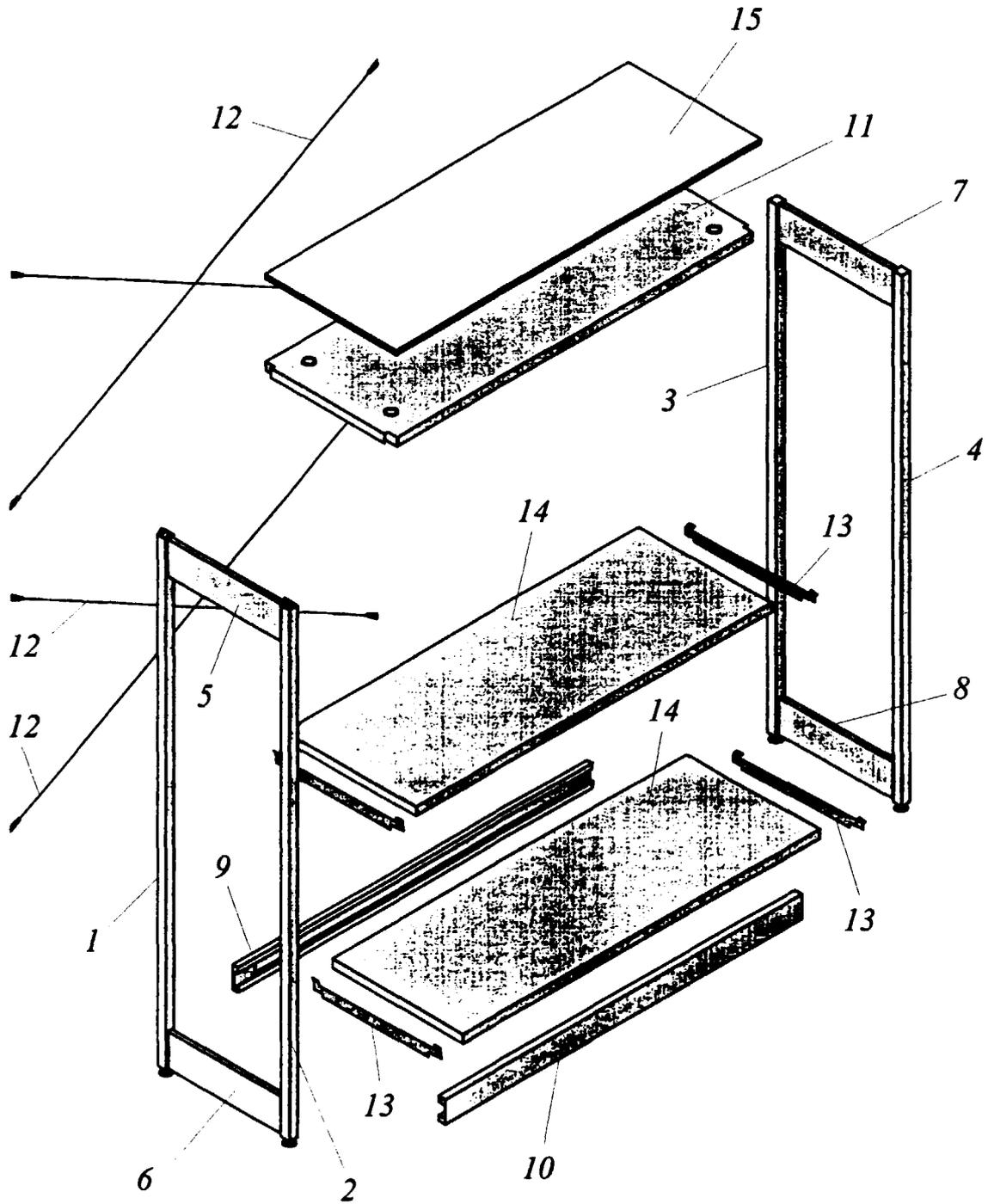


FIG. 1

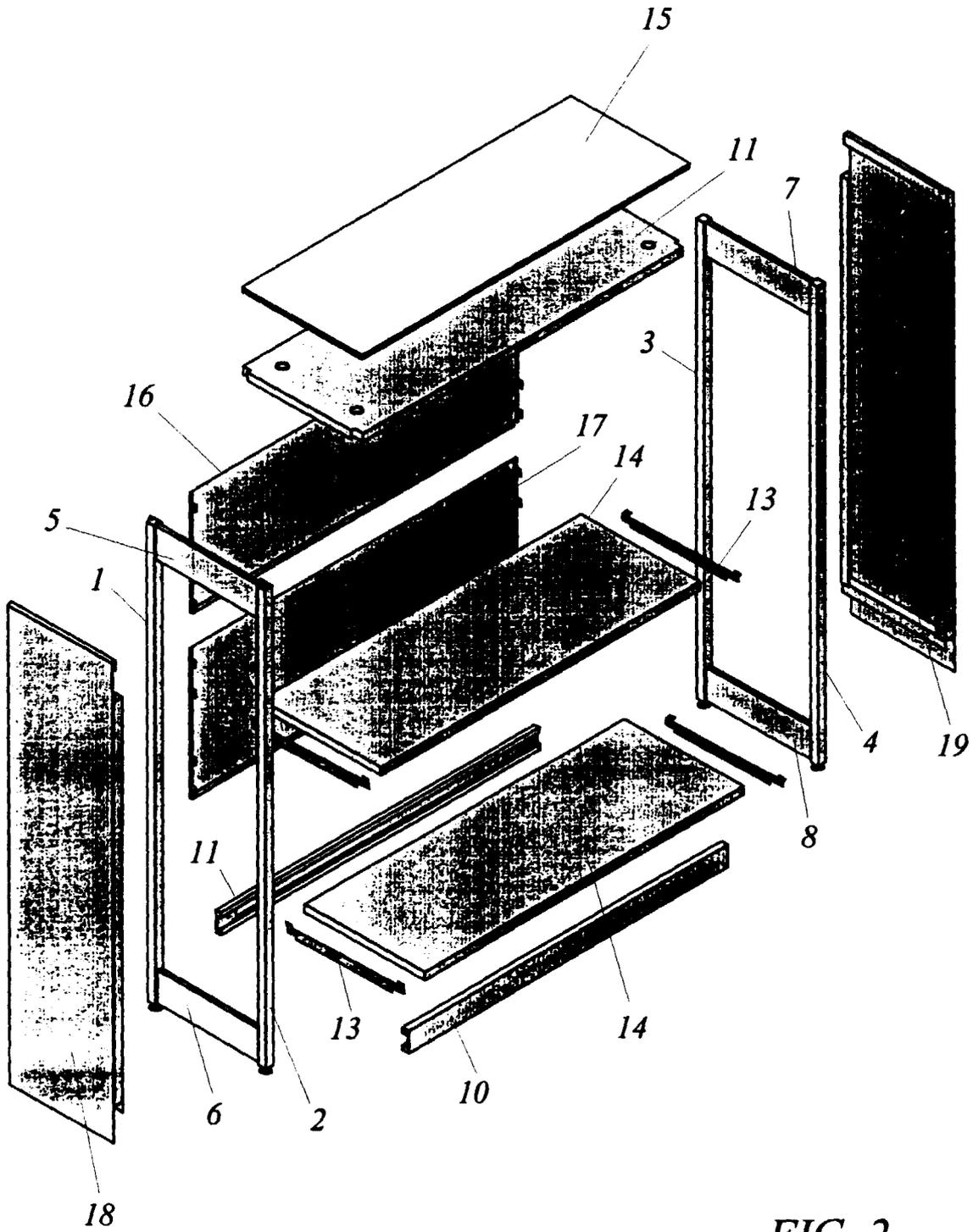


FIG. 2

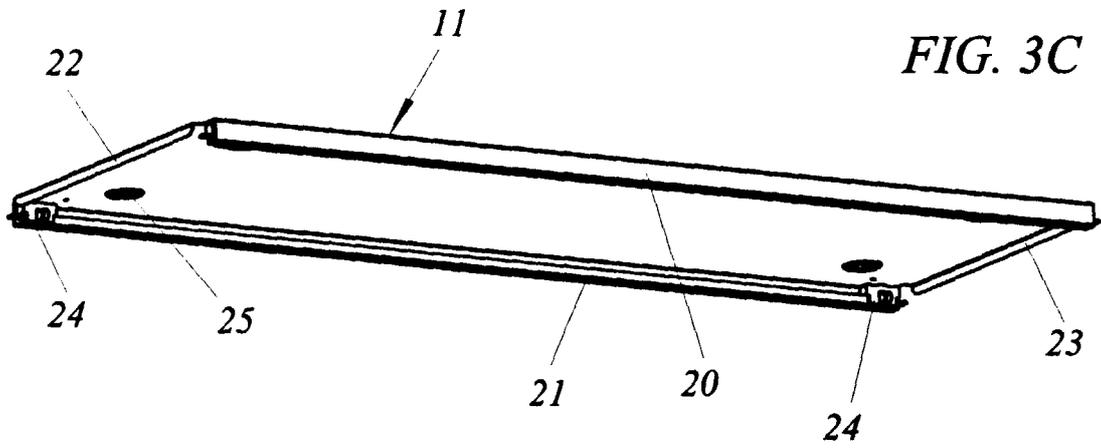


FIG. 3C

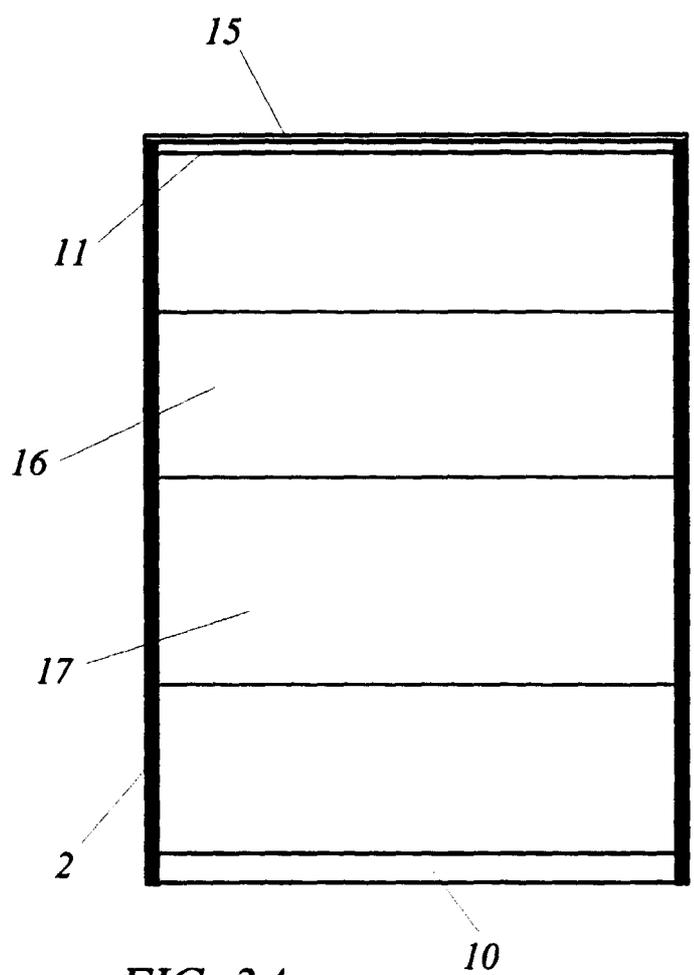


FIG. 3A

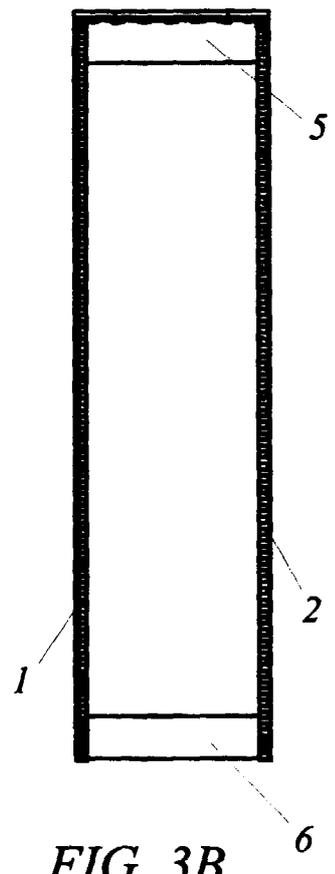
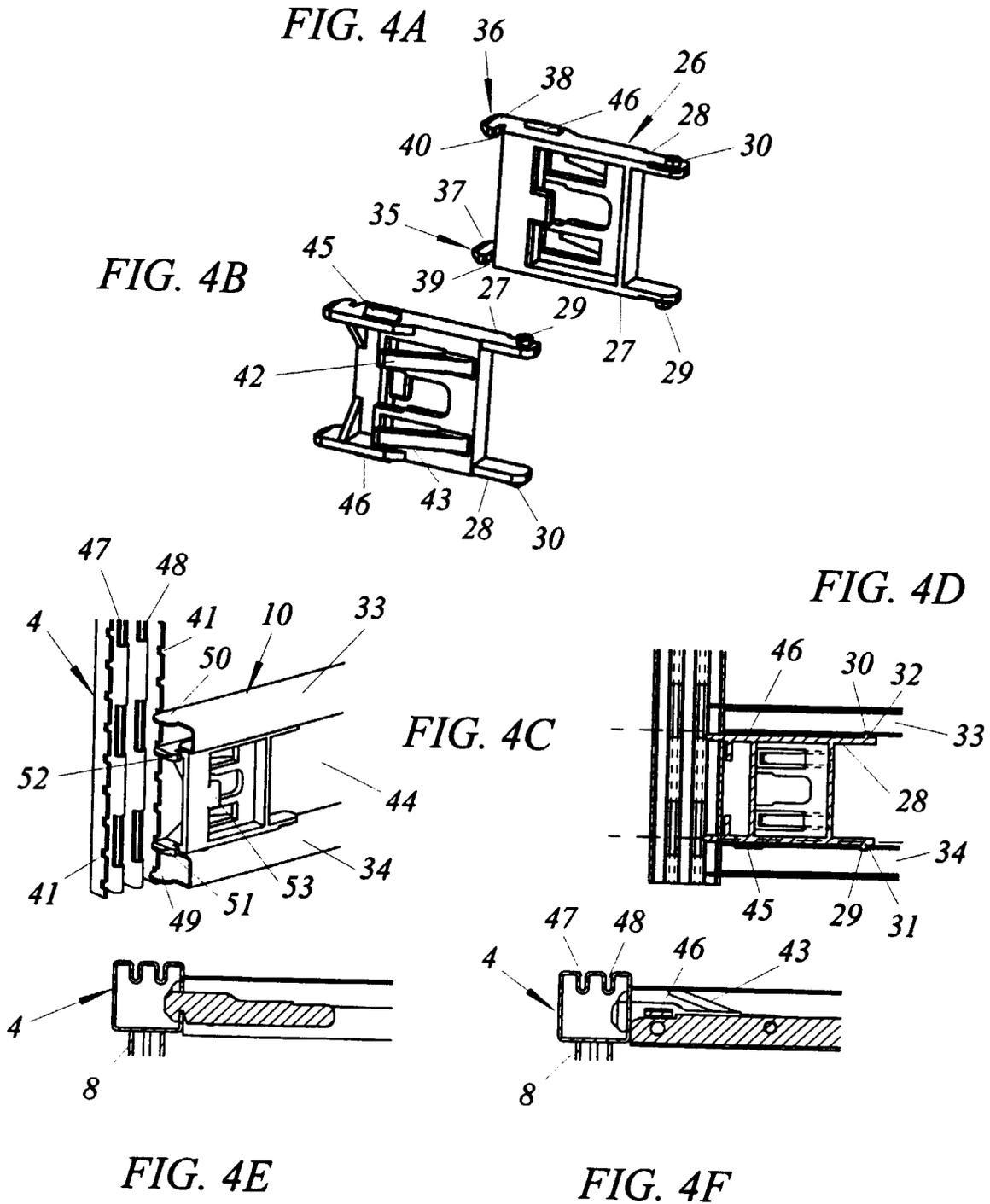


FIG. 3B



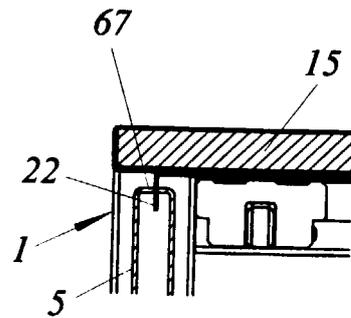
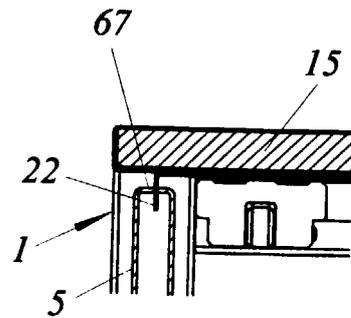
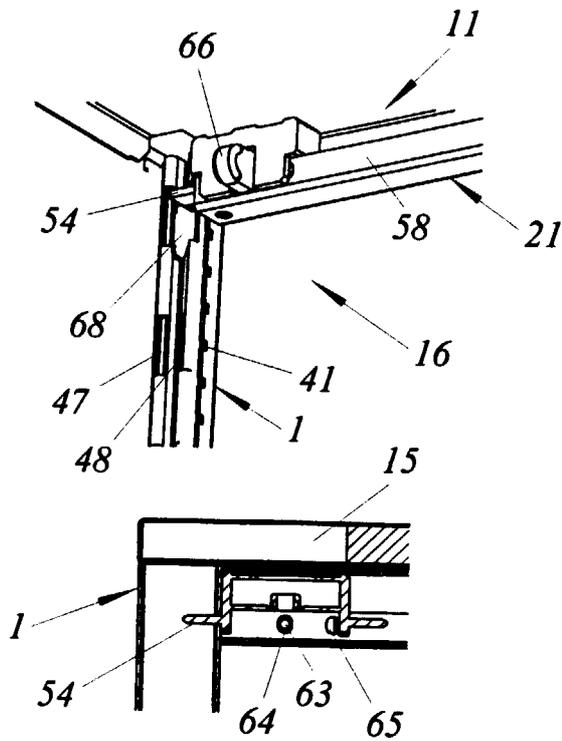
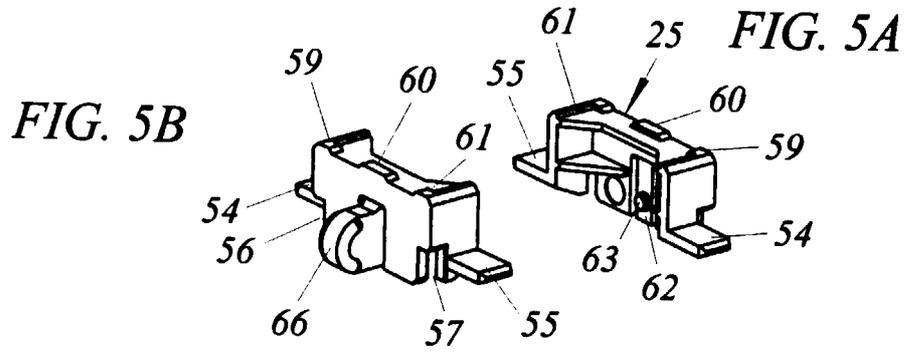


FIG. 5D

FIG. 5E

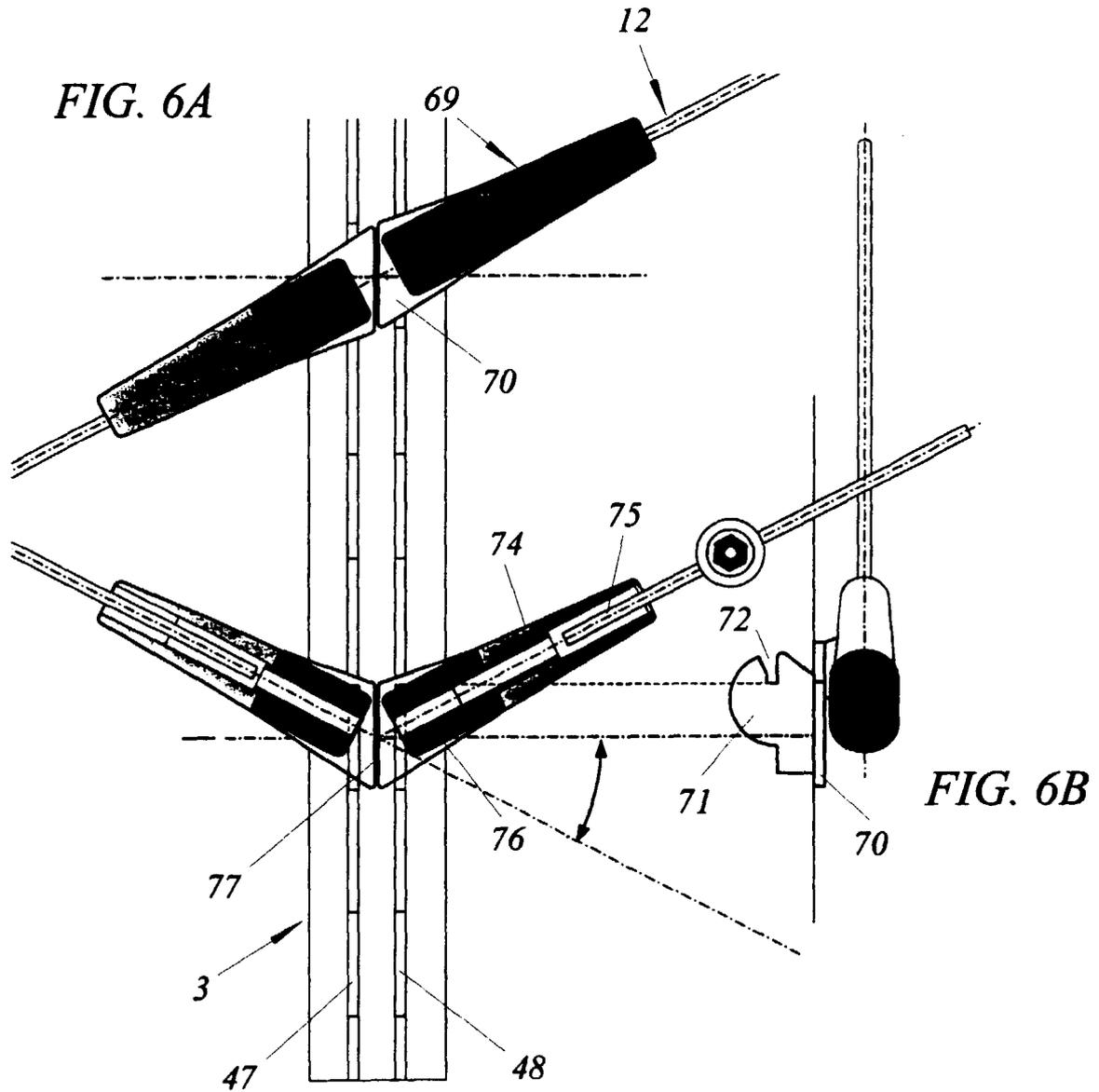
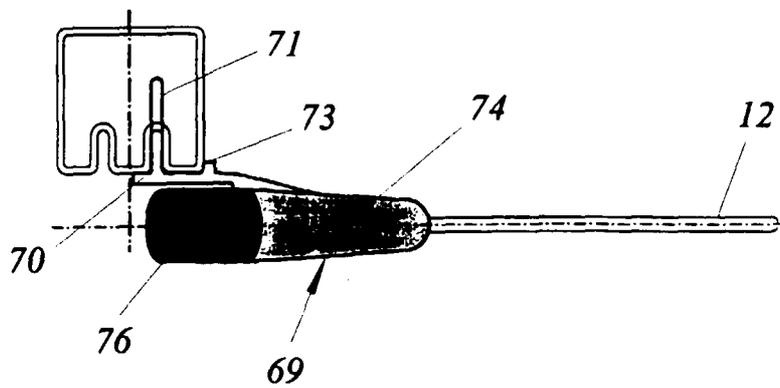


FIG. 6C





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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 3270

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29 November 2000	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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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