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(71) Applicant: **BERTELLO S.p.A.**
I-12011 Borgo San Dalmazzo (IT)

(72) Inventors:
- **Covella, Nicola**
  12011 Borgo San Dalmazzo (IT)
- **Boggero, Enrico**
  12100 Cuneo (IT)
- **Ghibaudo, Giuseppe**
  12010 Roaschia (IT)

(74) Representative: **Jorio, Paolo et al**
Studio Torta
Via Viotti 9
10121 Torino (IT)

(54) Guiding mechanism for a drawer

(57) In an automated vertical store (1), a number of modular drawers (7) slide on respective fixed brackets (6) superimposed with a given spacing (P), and each have an intermediate hollow body (8) for housing products for storage, and at least two lateral monolithic bodies (10) for connecting the hollow body (8) to the brackets (6); each monolithic body (10) having a first portion (12) defining a grip handle (12) by which to move the drawer (7) along the brackets (6), and a second portion (11) defining a skid having a first (21) and a second (22) sliding surface selectively connectable to the brackets, and which are parallel to each other and separated by a distance equal to a fraction of the spacing (P).

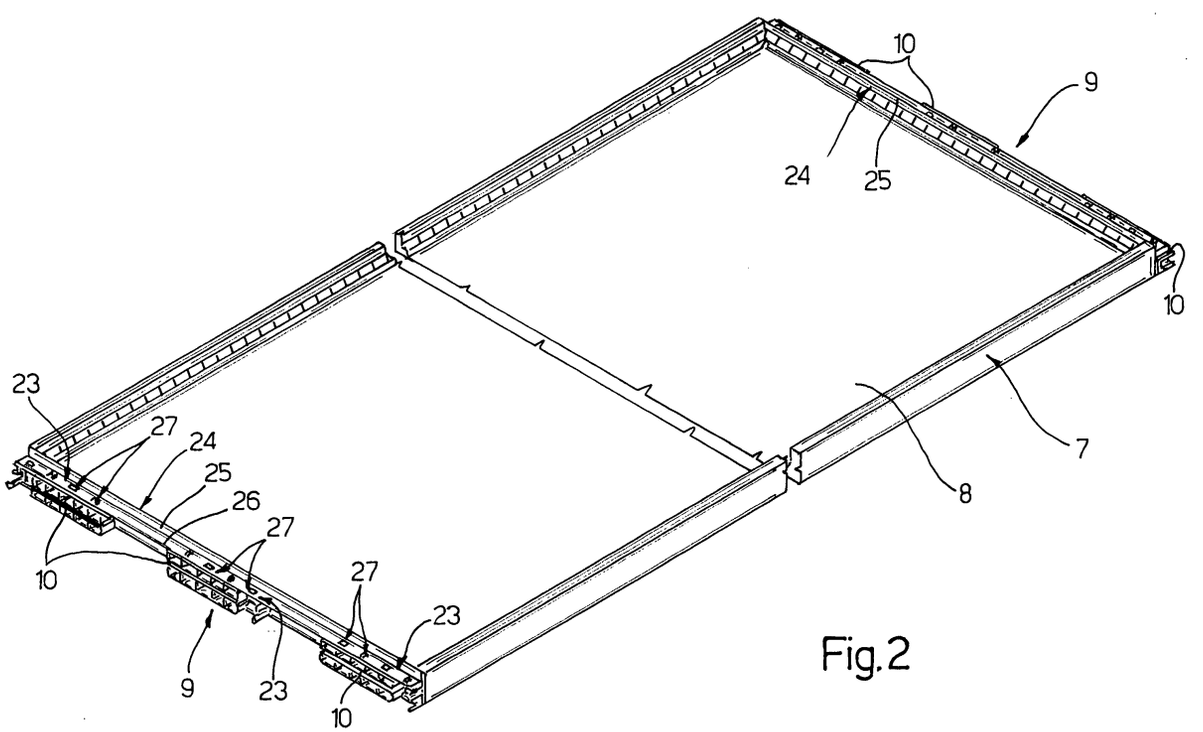

Fig.2

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Description

[0001] The present invention relates to a drawer for an automated vertical store, and to a store comprising such a drawer.

[0002] In product storage, drawer-type automated vertical stores are used comprising a fixed frame; a number of drawers for housing products for storage; and an automated drawer insertion/extraction assembly comprising two powered gripping and handling members for releasably engaging each drawer. The drawers are normally fitted to the frame by means of two columns of superimposed brackets located on opposite lateral sides of the drawers and connected comb-fashion to respective facing sides of the frame. The brackets in each column project towards those in the other column to define a number of runners for the drawers, and are equally spaced with a given constant spacing which varies from one store to another.

[0003] Though widely used, known stores of the above type have various drawbacks, all due to the space inside the frame not being fully exploitable. In known stores, in fact, the spacing between the brackets, and consequently the distance between adjacent drawers, cannot be reduced beyond a given threshold value imposed by the size of the gripping members of the drawer insertion/extraction assembly. That is, the size of the gripping members prevents the density of the brackets along the sides of the frame from being increased freely, and therefore the drawer spacing from being reduced over and above given limits.

[0004] Moreover, being formed by welding the various component parts, manufacture of the drawers of known stores of the above type is a particularly time-consuming job; and, being designed and manufactured for a specific type or size of store, the drawers are relatively expensive to produce.

[0005] It is an object of the present invention to provide a drawer for a vertical store, designed to provide a straightforward, low-cost solution to the above drawbacks.

[0006] According to the present invention, there is provided a drawer for an automated vertical store comprising a supporting frame, and a first and second column of substantially horizontal brackets; the brackets in each column of brackets projecting towards the brackets in the other column of brackets, and being spaced vertically with a constant spacing so as each to define a runner for said drawer; the drawer comprising a cavity for housing articles for storage, at least two skids located on opposite lateral sides of said cavity and each running along a respective bracket, and, for each said skid, a grip handle by which to move the drawer along said brackets; and being characterized by comprising an intermediate hollow body defining said cavity; and in that each said skid is defined by a first portion of a respective monolithic body separate from said intermediate hollow body and having a first and at least a second sliding surface selectively connectable to said brackets; said first and said second sliding surface being parallel to each other and spaced transversely by a distance equal to a fraction of said spacing; and locking means being provided to connect each said monolithic body to said intermediate hollow body.

[0007] A non-limiting embodiment of the invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a view in perspective, with parts removed for clarity, of a preferred embodiment of the drawer-type automated vertical store according to the teachings of the present invention;

Figure 2 shows a view in perspective of a preferred embodiment of a drawer of the Figure 1 store;

Figures 3 and 4 show two different, larger-scale views in perspective of a detail in Figure 2.

[0008] Number 1 in Figure 1 indicates as a whole an automated vertical store with modular drawers. Store 1 comprises a fixed frame 2, in turn comprising two facing, parallel lateral sides 3 extending vertically upwards and each fitted integrally with two or more columns 5 of parallel, superimposed, elongated horizontal brackets 6 spaced with a fixed spacing P conveniently equal to the minimum spacing permitted by the size of the drawer gripping and handling members described in detail later on.

[0009] The brackets 6 in each column 5 project towards the brackets 6 in the facing column to define a number of fixed runners for a number of drawers 7, only two of which are shown in Figure 1.

[0010] As shown in Figure 1, and particularly in Figure 2, each drawer 7 is modular and comprises a central or intermediate hollow body 8 conveniently made of bent, ribbed sheet metal and selectable from a number of hollow bodies of different shapes and sizes for housing one or more similar or different articles for storage; and two supporting and gripping assemblies 9 located on opposite lateral sides of the hollow body, and each of which slides, in use, on a relative bracket 6. In the example described, each supporting and gripping assembly 9 comprises three aligned, spaced, coplanar monolithic bodies 10 separate from hollow body 8 and made of plastic material with a sliding friction coefficient lower than that of an equivalent part made of metal. In variations not shown, bodies 10 are two or more in number.

[0011] Each monolithic body 10, measured perpendicular to brackets 6, is smaller than the distance between two adjacent brackets 6, so as to slide, in use, between two brackets 6 in a horizontal insertion/extraction direction A (Figure 1). As shown particularly in Figure 3, each monolithic body 10 comprises a portion 11 defining a skid cooperating in sliding manner with relative bracket 6; and a contoured end portion 12 defining a grip handle, which is gripped releasably by the drawer gripping and handling member (known and not shown)

for moving drawers 7 both ways along brackets 6 in insertion/extraction direction A.

[0012] As shown in Figure 3, portion 11 defining the skid is elongated with a U-shaped cross section, and comprises two parallel, facing, transversely spaced, elongated arms 14; and an elongated lateral wall or plate 15 connecting arms 14. Between them and together with plate 15, arms 14 define a longitudinal channel 16 parallel to insertion/extraction direction A and engaged with a certain amount of transverse clearance by brackets 6. In the example described, each arm 14 comprises two parallel, spaced plates 18 and 19; and a number of partitions 20 extending between plates 18 and 19. Plates 19 are bounded at the bottom by respective flat, parallel surfaces - indicated 21 and 22 in Figure 3 - spaced apart by a distance equal to a fraction of spacing P. In the example described, surfaces 21 and 22 are separated by a distance D equal to half spacing P, and can be selectively placed on the same bracket 6 to vary the distance between adjacent drawers 7.

[0013] With reference to Figure 2, each body 10 is connected to relative hollow body 8 by a releasable click-on connecting device 23. More specifically, connecting device 23 comprises, for each side of hollow body 8 facing brackets 6 in use, a T-shaped fastening bracket 24, which is common to drawers of all types and comprises a rear plate 25 connected integrally in known manner to the relative side of hollow body 8, and an intermediate wing 26 projecting from plate 25. Plate 25 and wing 26 have a number of respective through openings 27 (only the openings in the wing are shown in Figure 2) forming part of connecting device 23, which, for each opening 27, also comprises a projection 28 engaging opening 27. Some 28a of projections 28 are retainers and conveniently L-shaped; others 28b of projections 28 are shaped to click inside the respective openings to form respective releasable click-on connecting devices; while the rest 28c of projections 28 absorb the pull exerted on drawer 7 to prevent the pull on the drawer from acting on projections 28b.

[0014] Each drawer 7 is formed by selecting the relative hollow body 8, to which T-shaped fastening brackets 24 are then connected; and by fitting monolithic bodies 10 to the T-shaped fastening brackets by attaching projections 28a and clicking projections 28b inside respective openings 27. At this point, the finished drawer 7 is fitted to relative brackets 6 by placing either of surfaces 21, 22 on relative bracket 6 to vary the degree of saturation of the store.

[0015] The design of drawers 7 described - in particular, using a central storage body selectable from a number of storage bodies of different sizes, and fitting monolithic bodies 10 releasably to the central storage body - therefore provides, on the one hand, for obtaining modular, as opposed to specially designed, drawers using a small number of components parts, and, on the other, for greatly reducing the time taken to produce each drawer. In fact, using monolithic bodies 10 - which may conveniently be the same shape and size regardless of the type of drawer being produced - provides for simultaneously connecting both the skid and grip handle to the hollow storage body in one operation.

[0016] Providing a fast-fit connecting device between storage body 8 and each monolithic body 10 further reduces assembly and maintenance time.

[0017] Making monolithic bodies 10 of plastic material provides for obtaining drawers which are lighter than conventional metal drawers of the same mechanical strength, and which have a particularly low sliding resistance, thus eliminating the need for layers of low-friction material on the monolithic bodies, which is practically indispensable with conventional metal skids, especially when minimum power of the drawer insertion/extraction assembly is required.

[0018] Clearly, changes may be made to drawer 7 and store 1 as described herein without, however, departing from the scope of the present invention. In particular, monolithic bodies 10 may be shaped and sized otherwise than shown by way of example, and may be made of different materials from the one indicated. Each monolithic body 10 may have more than two sliding surfaces selectively engaging the brackets to further vary the spacing between the drawers. And finally, monolithic bodies 10 may be connected to storage body 8 otherwise than as shown, and by devices other than those described, and each assembly 9 may comprise a single elongated monolithic body. In particular, at least some of projections 28 may be provided on fastening bracket 24, and fastening bracket 24 itself may form an integral part of body 8.

Claims

1. A drawer (7) for an automated vertical store (1) comprising a supporting frame (2), and a first and second column (5) of substantially horizontal brackets (6); the brackets (6) in each column (5) of brackets projecting towards the brackets in the other column (5) of brackets, and being spaced vertically with a constant spacing (P) so as each to define a runner for said drawer (7); the drawer (7) comprising a cavity for housing articles for storage, at least two skids (11) located on opposite lateral sides of said cavity and each running along a respective bracket (6), and, for each said skid (11), a grip handle (12) by which to move the drawer along said brackets (6); and being **characterized by** comprising an intermediate hollow body (8) defining said cavity; and in that each said skid is defined by a first portion (11) of a respective monolithic body (10) separate from said intermediate hollow body (8) and having a first (21) and at least a second (22) sliding surface selectively connectable to said brackets (6); said first (21) and said second (22) sliding surface being parallel to each other and

spaced transversely by a distance equal to a fraction of said spacing (P); and locking means (23) being provided to connect each said monolithic body (10) to said intermediate hollow body (8).

2. A drawer as claimed in Claim 1, **characterized in that** said first (21) and said second (22) sliding surface are separated by a distance (D) equal to half said spacing (P) .

3. A drawer as claimed in Claim 1 or 2, **characterized in that** each said monolithic body (10) also comprises a second portion defining said grip handle (12).

4. A drawer as claimed in any one of the foregoing Claims, **characterized in that** each said monolithic body (10) is made of plastic material.

5. A drawer as claimed in any one of the foregoing Claims, **characterized in that** said first portion (11) of each monolithic body (10) has a substantially U-shaped cross section, and comprises two arms (14) bounded by the first (21) and second (22) sliding surface respectively.

6. A drawer as claimed in Claim 5, **characterized in that** each arm (14) is hollow, and comprises two facing lateral walls (18)(19), and a number of partitions (20) connecting said lateral walls (18)(19).

7. A drawer as claimed in any one of the foregoing Claims, **characterized in that** said locking means (23) are releasable connecting means.

8. A drawer as claimed in Claim 7, **characterized in that** said locking means (23) comprise a fastening bracket (24) carried by said intermediate hollow body (8); a number of projections (28) carried by either one of said fastening bracket (24) and said monolithic body (10); and a number of retaining seats (27) carried by the other of said fastening bracket (24) and said monolithic body (10) and engaged by said projections (28).

9. A drawer as claimed in Claim 8, **characterized in that** at least some (28a) of said projections (28) are shaped to click inside said seats.

10. A drawer as claimed in any one of the foregoing Claims, **characterized in that** said intermediate hollow body (8) and said monolithic bodies (10) are selectable respectively from a number of hollow bodies and a number of monolithic bodies of different shapes and/or sizes to form a number of different modular drawers.

11. An automated vertical store (1) comprising a supporting frame (2); a first and second column (5) of substantially horizontal brackets (6), the brackets (6) in each column of brackets projecting towards the brackets in the other column of brackets, and being spaced vertically with a constant spacing (P) so as each to define a runner; and one or more drawers (7), each comprising a cavity for housing articles for storage, at least two skids (11) located on opposite lateral sides of said cavity and each running along a respective bracket (6), and, for each said skid, a grip handle (12) by which to move the drawer (7) along said brackets (6); **characterized in that** each said drawer (7) comprises an intermediate hollow body (8) defining said cavity; and **in that** each said skid (11) is defined by a first portion (11) of a respective monolithic body (10) separate from and connected to said intermediate hollow body (8) and having a first (21) and a second (22) sliding surface selectively connectable to said brackets (6); said first (21) and said second (22) sliding surface being parallel to each other and spaced transversely by a distance equal to a fraction of said spacing (P).

12. A store as claimed in Claim 11, **characterized in that** said first (21) and said second (22) sliding surface are separated by a distance equal to half said spacing (P).

13. A store as claimed in Claim 11 or 12, **characterized by** comprising gripping and handling means for gripping and handling said drawers; and in that said spacing (P) is the minimum spacing permitted by the size of said gripping and handling means.

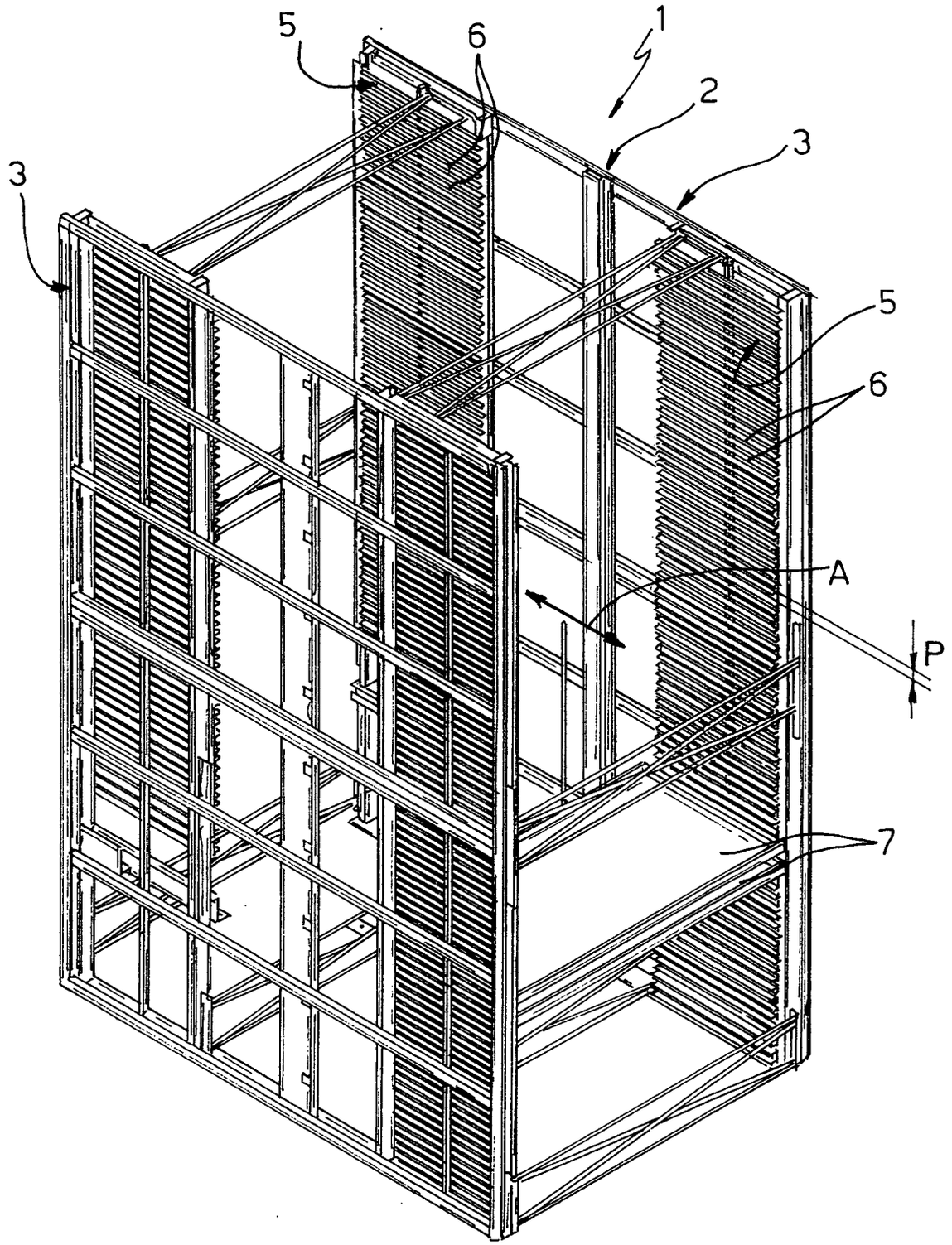

Fig.1

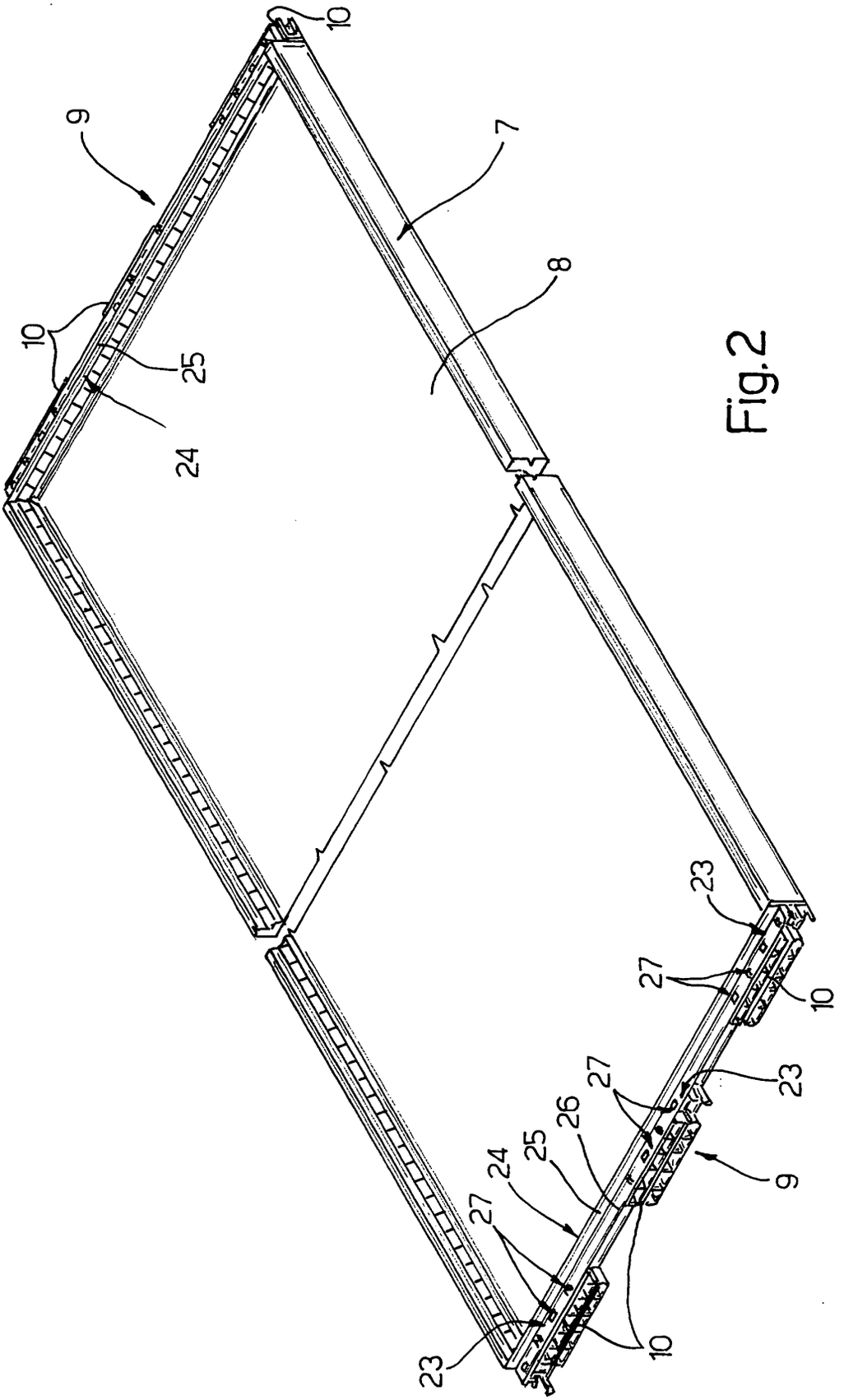

Fig.2

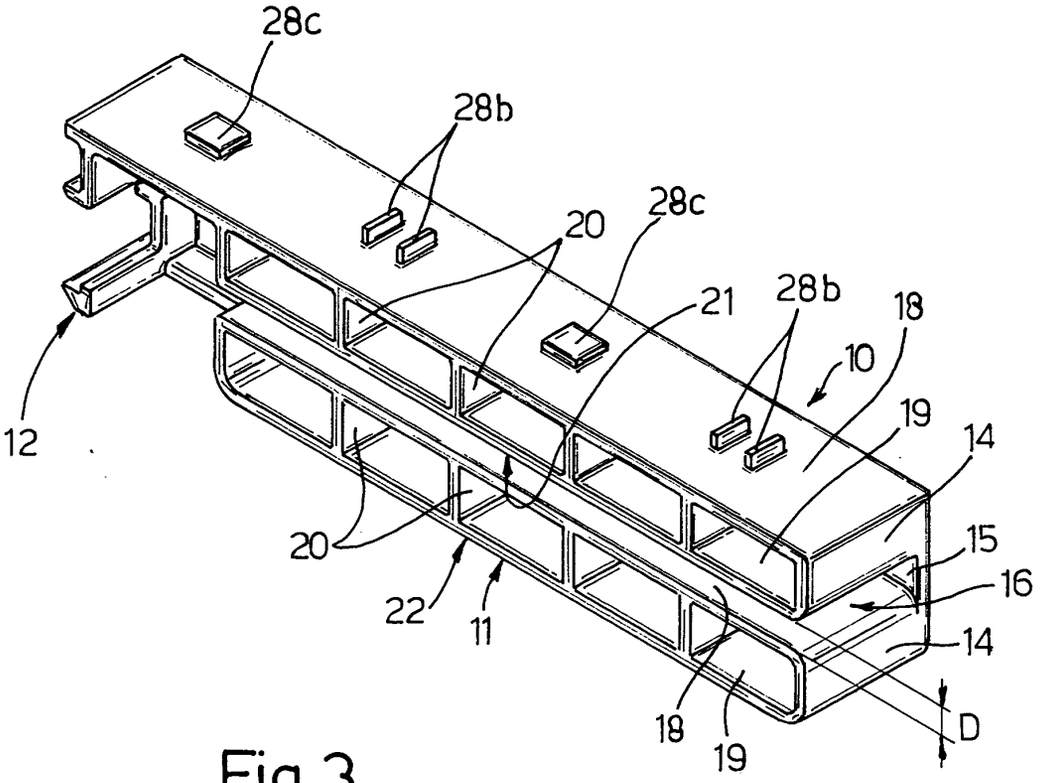
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Fig.3

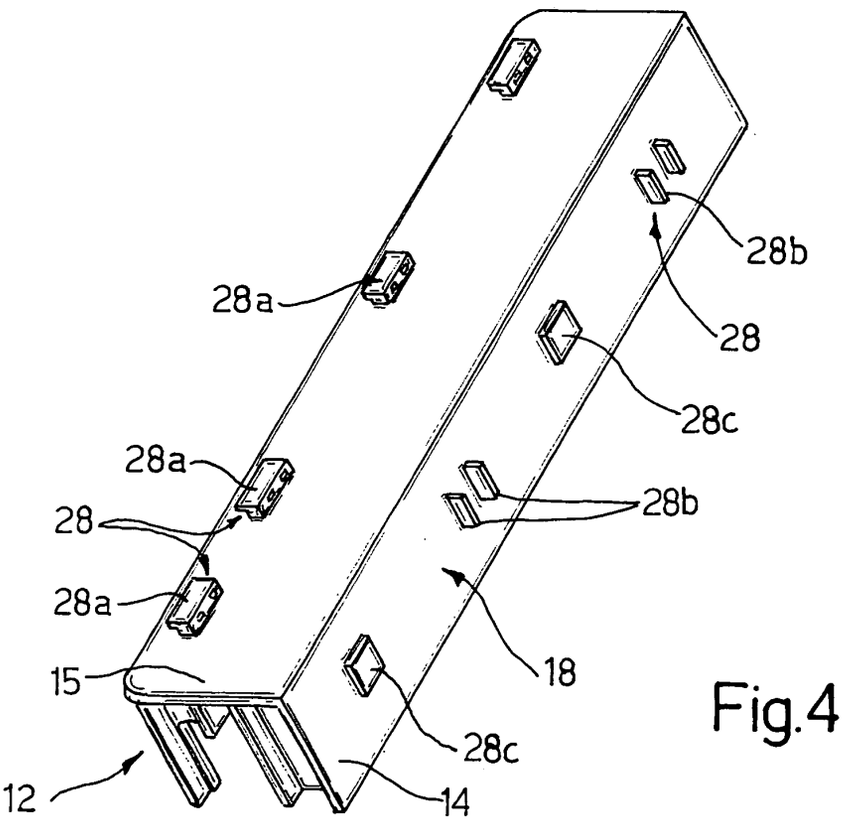
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Fig.4

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EUROPEAN SEARCH REPORT

Application Number
EP 03 02 1227

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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A	* abstract; figures 1-4 *	2,6-9, 12,13	

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A	* page 7, line 20 - page 9, line 12; figure 1 *	2,3,5-9, 12,13	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	17 December 2003	Klintebäck, D

CATEGORY OF CITED DOCUMENTS

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