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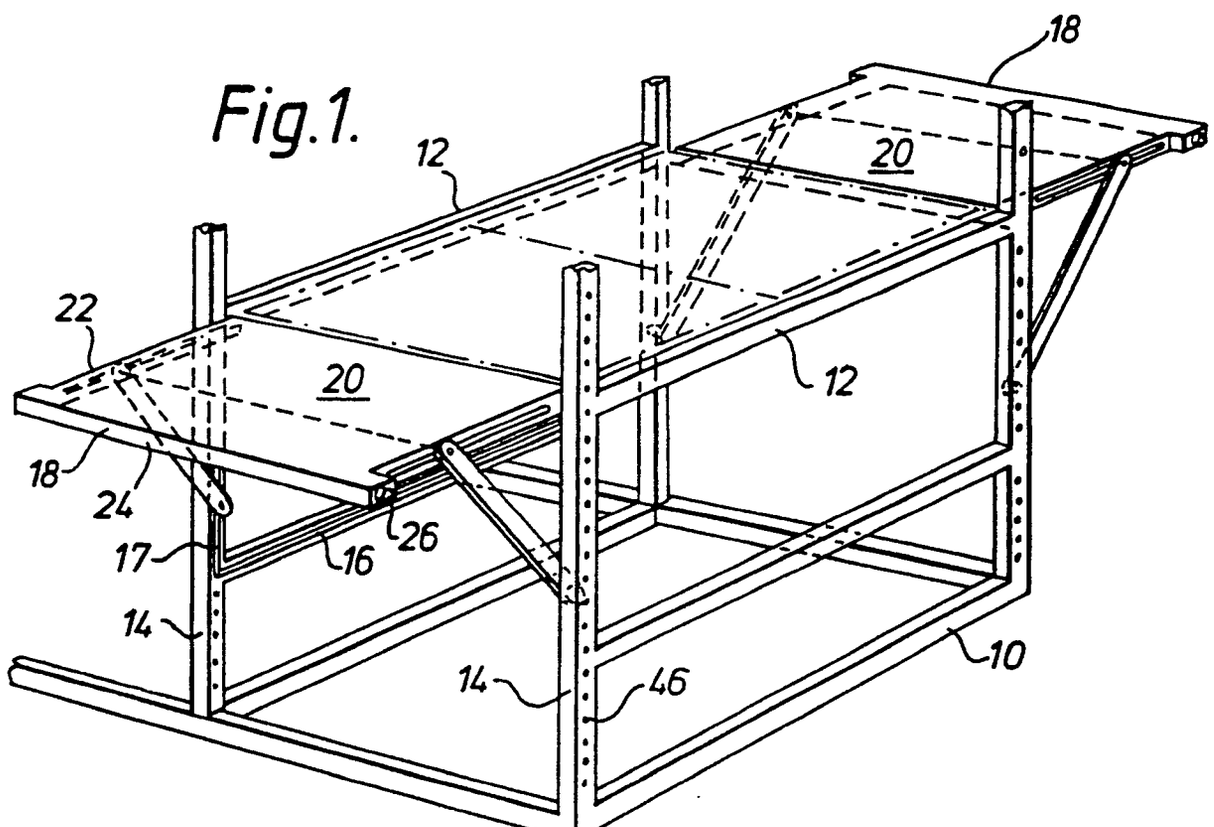
(54) Shelving assembly.

(57) A shelving assembly comprises a frame (10) and a plurality of shelf elements (18) which are supported in the frame (10), the frame (10) has a plurality of tracks (16,17) and the shelf elements (18) have guide elements (26) for engaging the tracks (16,17) and for allowing sliding movement of the shelf elements (18) in the frame (10). At least one of the shelf elements (18) is adjustable in level in the frame (10) and the tracks (16,17) and the guide elements (26) of the adjustable shelf elements (18) are such that it is slidable between retracted and extended positions, and between different levels in the frame (10) when in the extended position.

The shelving assembly permits an increase or decrease of available shelf surface according to particular requirements and simplifies restocking of perishable or durable goods.

Fig.1.



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A SHELVING ASSEMBLY

This invention relates to a shelving assembly which finds particular use in supporting items which are frequently used or replaced.

It is usual to place items which are frequently used such as office files or reference books at the front of a shelf or supporting surface so as to be within easy reach. However, in these cases there is often rear shelf capacity which is not being used.

In the restocking of perishable goods such as food or medicaments which must be used within a particular period of time, it is important to arrange the goods such that those with the earliest "sell-by"/"consume-by" date (that is, the "oldest" items) are closest to the front of a display so that they are sold/consumed first. A problem arises, therefore, when a new delivery of goods arrives before the existing stock is fully depleted because the "new" goods must be placed at the back of the display and the "old" at the front. The problem is most acute where the goods are handled in bulk such as in restaurants, supermarkets and hospitals.

Accordingly, the invention attempts to alleviate the above problems by a shelving assembly comprising a frame and a plurality of shelf elements which are supported in the frame, the frame having a plurality of tracks and the shelf elements having guide elements for engaging the tracks and for allowing sliding movement of the shelf elements in the frame, wherein at least one of the shelf elements is adjustable in level in the frame and the tracks and the guide elements of the adjustable shelf element are such that it is slidable between retracted and extended positions, and between different levels in the frame when in the extended position.

Preferably, the tracks in which the shelf element is supported when in the retracted position are horizontal. Preferably also, the tracks in which the shelf element is supported when in the extended position are vertical. In the extended position the shelf element may extend beyond the physical confines of the frame.

In the preferred embodiment the adjustable shelf element is provided with means for supporting it in the extended position. This allows shelf capacity to be increased as and when required. Struts may be provided as the means for supporting the adjustable shelf element in the extended position, each strut having one end connected to the shelf element and the other end connected to the frame. Preferably, a guide roller is attached to each said other strut end for engagement in one of the vertical tracks.

To limit or prevent vertical movement of the shelf element, the preferred embodiment of the invention includes detachable stop means associated with the vertical tracks. Such stop means may also limit horizontal movement of the shelf element. The stop means may be located in the path of the guide element in the tracks and may be a pin which extends through apertures on opposed sides of the track.

Advantageously, the shelf elements are reversible in that they can be inserted and withdrawn from either of opposite sides of the frame.

In the preferred embodiment the horizontal tracks are arranged in pairs and each pair can support at least two shelf elements. Preferably also, the tracks comprise partially closed channels and the guide members are rollers. Stabilising tracks may extend parallel to the vertical tracks for stabilising the shelf element during vertical sliding movement.

An embodiment of the invention will now be described by way of example with reference to the drawings, in which:

Figure 1 is a perspective view of part of a shelf assembly in accordance with the invention, having movable shelf elements shown in an extended position;

Figure 2 is a side view of the assembly of Figure 1, with the shelf elements shown in a retracted position.

Figure 3 is an enlarged perspective view of the junction of one of the vertical members and one of the horizontal members of the assembly of Figures 1 and 2;

Figure 4 is an enlarged perspective view of the side of one of the shelf elements;

Figure 5 is a cross-section along the line A-A in Figure 2;

Figure 6 is a cross-sectional side elevation of the junction shown in Figure 3, looking towards the outside of the assembly as shown by the arrows B in Figure 3; and

Figure 7 is an underside plan view of one of the shelf elements.

Referring to Figure 1, a shelf assembly has a frame structure 10 having horizontal and vertical channel members 12 and 14 respectively. Each channel member 12, 14 is open on its inwardly directed face and forms a track 16, 17 for guiding movable shelves 18 supported in the frame structure 10. Horizontal tracks 16 extend along the full length of the horizontal members 12, and vertical tracks 17 extend along the vertical members 14 at least up to the level of the highest horizontal track in the frame. Each shelf 18 has a load bearing surface 20 and opposed first 22 and second 24 sides depending therefrom. Two load transmitting guide rollers 26 having horizontal axes of rotation are mounted on each of the first sides 22. The track members are dimensioned to house the guide rollers 26, each track 16, 17 having, over at least part of its length, a partly closed channel cross-section.

In the following, reference will be made to one first side 22 of the shelf, the opposed side being identical. Referring to Figures 3 and 4, a recess 28 is formed in the first side 22 of the shelf 20 to accommodate a support strut 36 when in its rest or unextended position (Figure 4). A guide roller 26 is provided on each of the projecting portions 27 at either side of the recess 28. These portions 27 are shaped to fit between opposed, parallel rib members 30, 30' (Figure 3) on the vertical member 14. The parallel rib members 30, 30' extend alongside the vertical opening of the channel formed by track 17 and serve to provide lateral stability to the shelf 20 when in the vertical tracks 17. The lower edges of the projecting portions 27 rest upon ledges 15 when the shelf is in the horizontal tracks. The ledges extend along the inwardly directed face of the horizontal members immediately below the level of the opening of the channel member 12 and serve to reduce the shelf load on the guide rollers 26, as shown in Figure 5. A rib 19 is provided on the horizontal tracks 16 across the path of the guide rollers 26 near to the junction of the horizontal and vertical tracks 16, 17. The rib 19 serves to prevent any unwanted sliding of the guide rollers closest to the junction into the vertical tracks 17. When it is required to slide the shelf out of the horizontal tracks, a careful tug or slight lifting of the shelf is sufficient to cause the guide rollers to pass over the rib.

Formed in the recess 28 in the first side 22 of the shelf is a longitudinally extending slot 32 slidably housing an end of a bridging bar 34 connecting the support struts 36 on each side of the shelf. Each strut 36 has an aperture 38 at one end into which the end of the bar 34 fits so that each strut 36 is pivotally mounted on the shelf but rotatably locked with respect to the other strut 36. Wing nuts (not shown) retain the struts 36 on the bar 34 and clamp them at selected locations on the first sides 22 of the shelf. To limit the rotation of the struts 36, a vane 40 is mounted on the bridging bar 34, this vane being of a size such that it abuts the underside of the load-bearing part 20 of the shelf at predetermined limits of rotation. The underside of the load-bearing part 20 of the shelf is provided with opposed, parallel guide tracks 21, 21', (Figure 7), spaced sufficiently apart to allow the vane 40 to fit lengthwise between them. The guide tracks serve to guide the vane during movement of the bridging bar 34 along the slots 32 of the shelf and thereby to limit angular movement of the bar 34 relative to the second sides 24 of the shelf.A guide roller 42, similar to the rollers 26, is rotatably mounted on the other end of each strut 36 and is slidably received in the vertical and the horizontal tracks 16, 17 respectively. When the shelf is drawn out of its retracted position and reaches its fully extended position, the guide rollers 42 on the ends of the struts 36 drop into the vertical tracks 17. At the same time, the bridging bar 34 and the associated strut ends are allowed to slide in the slots 32 of the shelf until they locate in notches (not shown) in the slots 32 corresponding to a 45° downward inclination of the struts 36 when the shelf is fully extended. Subsequent movement of the bridging bar 34 is prevented by tightening the wing nuts referred to above. Movement of the guide rollers 26 in the respective tracks 16, 17 is prevented, as required, by means of releasable pins 44 located in opposed apertures 46 formed in the walls of the vertical members to extend transversely across the paths of the guide rollers in the tracks 16, 17. The apertures 46 are spaced along the vertical members so as to allow the shelf to be supported by the pins 44 at any selected height. The shelf is supported in the vertical tracks when guide rollers 42 and 26 abut against a respective pair of opposed pins 44. For lighter loads, however, the pins against which guide rollers 26 abut may be absent. The positioning of one or two such pins 46 prevents the complete withdrawal of the shelf 20 when in the extended position as is shown by Figure 6.

As shown in Figures 3 and 6, a flap 48 covers the end of the horizontal track 16. The flap 48 is pivotally mounted at its upper edge 50 to the vertical member and, when closed, lies flush with the outer surface of the vertical member 14. The wall 25 of the vertical member 14 formed with the flap 48 is of greater thickness than the other walls of the member to provide additional support to the frame structure. A releasable pin 23 located in apertures 27, 29 formed in the thickness of this wall and in the lower end of the flap 48, respectively, maintains the flap firmly closed. Since the pin 23 does not penetrate the inner space of the channel member 14, it does not obstruct shelf movement. When the pin 23 is removed and flap 48 is hinged outwards, the shelf may be withdrawn from the frame and another shelf inserted, as required. As an alternative to having flaps which are hinged and closed with pins, they may be adapted to slide vertically within the wall 25. In this case, the flaps may be provided at their lower or upper edges with an outwardly extending flange to allow them to be open and closed.

In use of the invention for restocking, therefore, where "old" goods are remaining on the rear shelf but the front shelf is empty of goods, the front shelf is pulled forwardly partially out of the horizontal tracks to a position in which the guide rollers 42 on the ends of the struts 36 can fall down into the vertical tracks 17. When this occurs, the shelf is pulled forward further until the rearmost guide members 26 at the sides 26 of the shelf are in the vertical tracks 17. The shelf can then, if required, be pulled vertically up or down the vertical track 17 and supported at a chosen height. To fix the shelf in a supporting position, struts 36 are placed at a suitable supporting angle and the ends are screw-fastened by the wing nuts. The pins 44 are placed in apertures on the vertical members beneath

the guide rollers 42. When supported, the shelf can be loaded with "new" goods. The rear shelf can then likewise be moved out of the horizontal tracks and along the vertical tracks so as to allow the shelf carrying the "new" goods to be released from its fixed position and move back into the horizontal tracks. When the shelf carrying the "old" goods is moved back into the horizontal tracks it is at the front of the frame.

The particular sequence of shelf movements described above is one of many sequences which are possible with the assembly shown and described. Thus, for example, the front shelf could be moved directly from one pair of horizontal tracks via the vertical tracks to another pair of horizontal tracks at a different level rather than be supported in the interim in the vertical members.

Claims

1. A shelving assembly comprising a frame and a plurality of shelf elements which are supported in the frame, the frame having a plurality of tracks and the shelf elements having guide elements for engaging the tracks and for allowing sliding movement of the shelf elements in the frame, wherein at least one of the shelf elements is adjustable in level in the frame and the tracks and the guide elements of the adjustable shelf elements are such that it is slidable between retracted and extended positions, and between different levels in the frame when in the extended position.

2. An assembly according to claim 1, wherein the tracks in which the shelf element is supported when in the retracted position are horizontal.

3. An assembly according to claim 1 or claim 2, wherein the tracks in which the shelf element is supported when in the extended position are vertical.

4. An assembly according to any one of the preceding claims, wherein the shelf element extends beyond the physical confines of the frame in the extended position.

5. An assembly according to any one of the preceding claims, wherein the adjustable shelf element is provided with means for supporting it in the extended position.

6. An assembly according to claim 5, wherein the means for supporting the adjustable shelf element in the extended position is a strut having one end connected to the shelf element and the other end connected to the frame.

7. An assembly according to claim 6, wherein the other end of the strut is provided with a guide roller for engagement in one of the vertical tracks.

8. An assembly according to any one of the preceding claims, further including detachable stop means associated with the vertical tracks to limit or prevent vertical and/or horizontal movement of the shelf element.

9. An assembly according to claim 8, wherein the detachable stop means is a pin which extends through apertures on opposed sides of the track.

10. An assembly according to any one of the preceding claims, wherein the shelf elements are reversible in that they can be inserted and withdrawn from either of opposite sides of the frame.

11. An assembly according to any one of the preceding claims, wherein the horizontal tracks are arranged in pairs and each pair can support at least two shelf elements.

12. An assembly according to any one of the preceding claims, wherein the tracks comprise partially closed channels and the guide members are rollers.

13. An assembly according to any one of the preceding claims, further comprising stabilising members extending parallel to the vertical tracks for stabilising the shelf elements during vertical sliding movement.

Fig.1.

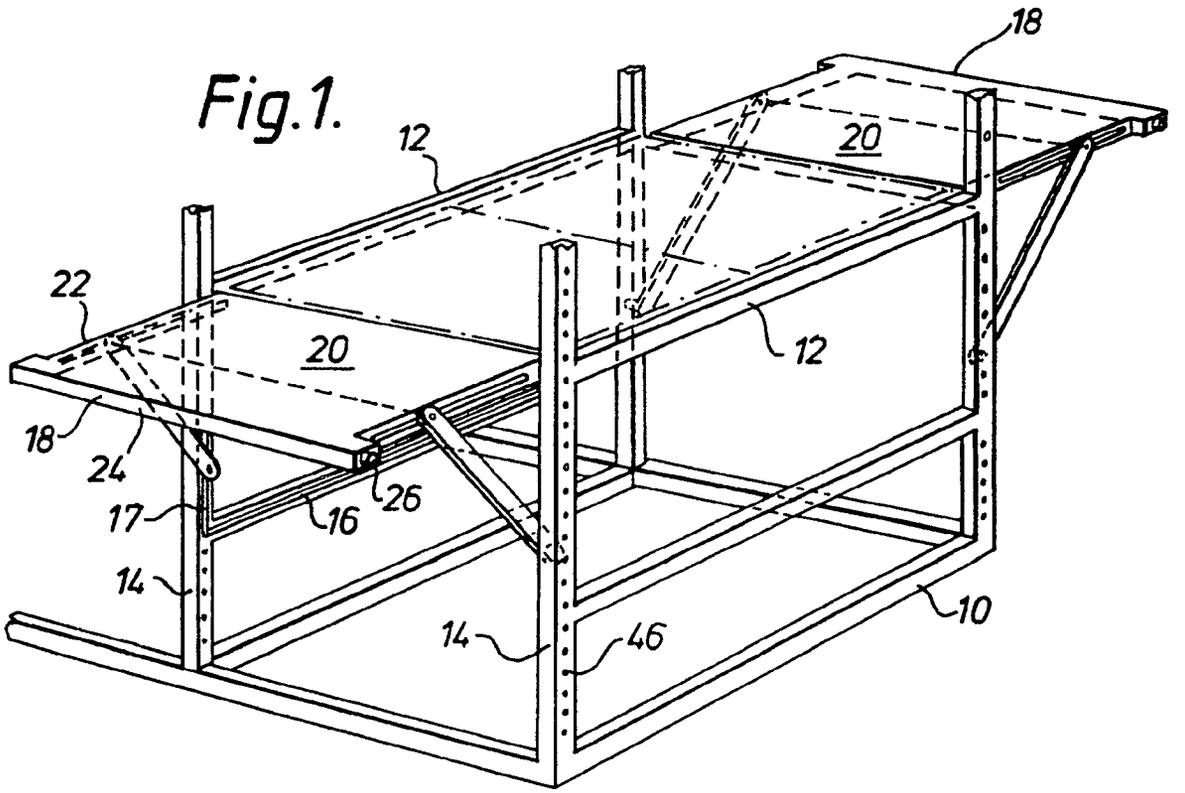
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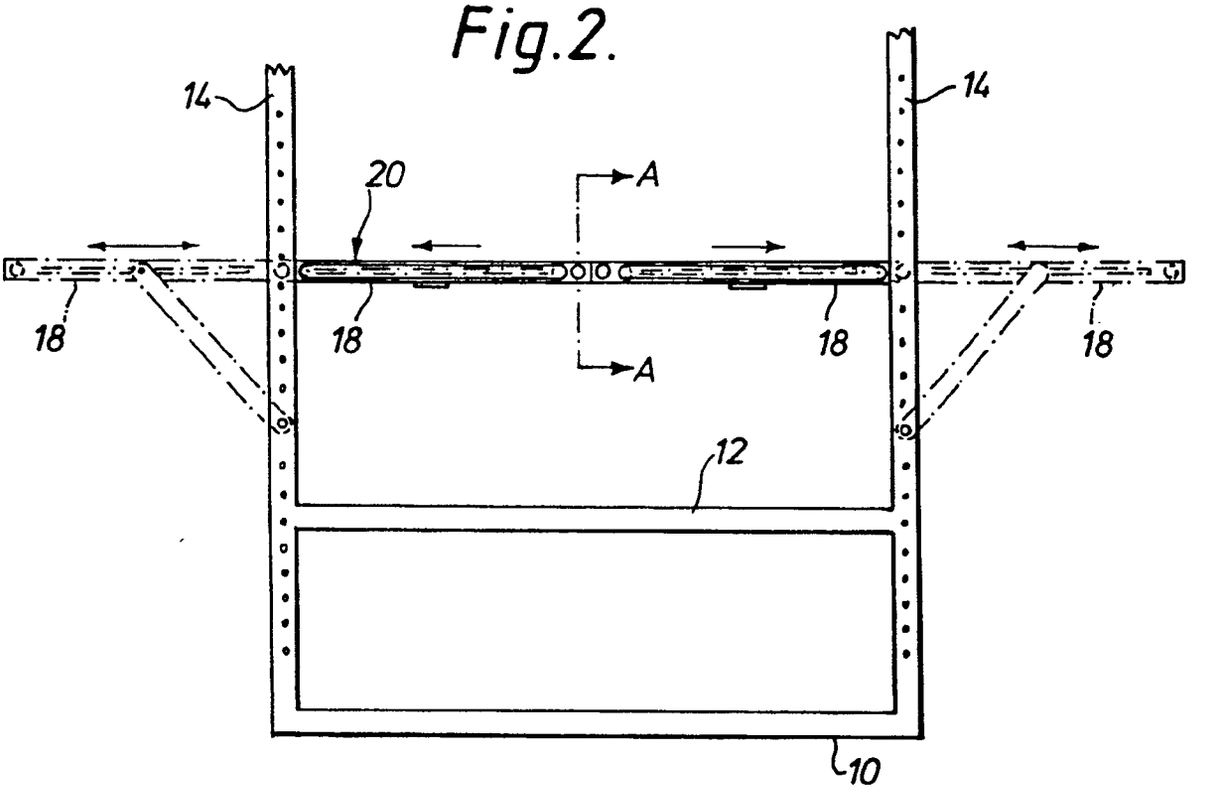
Fig.2.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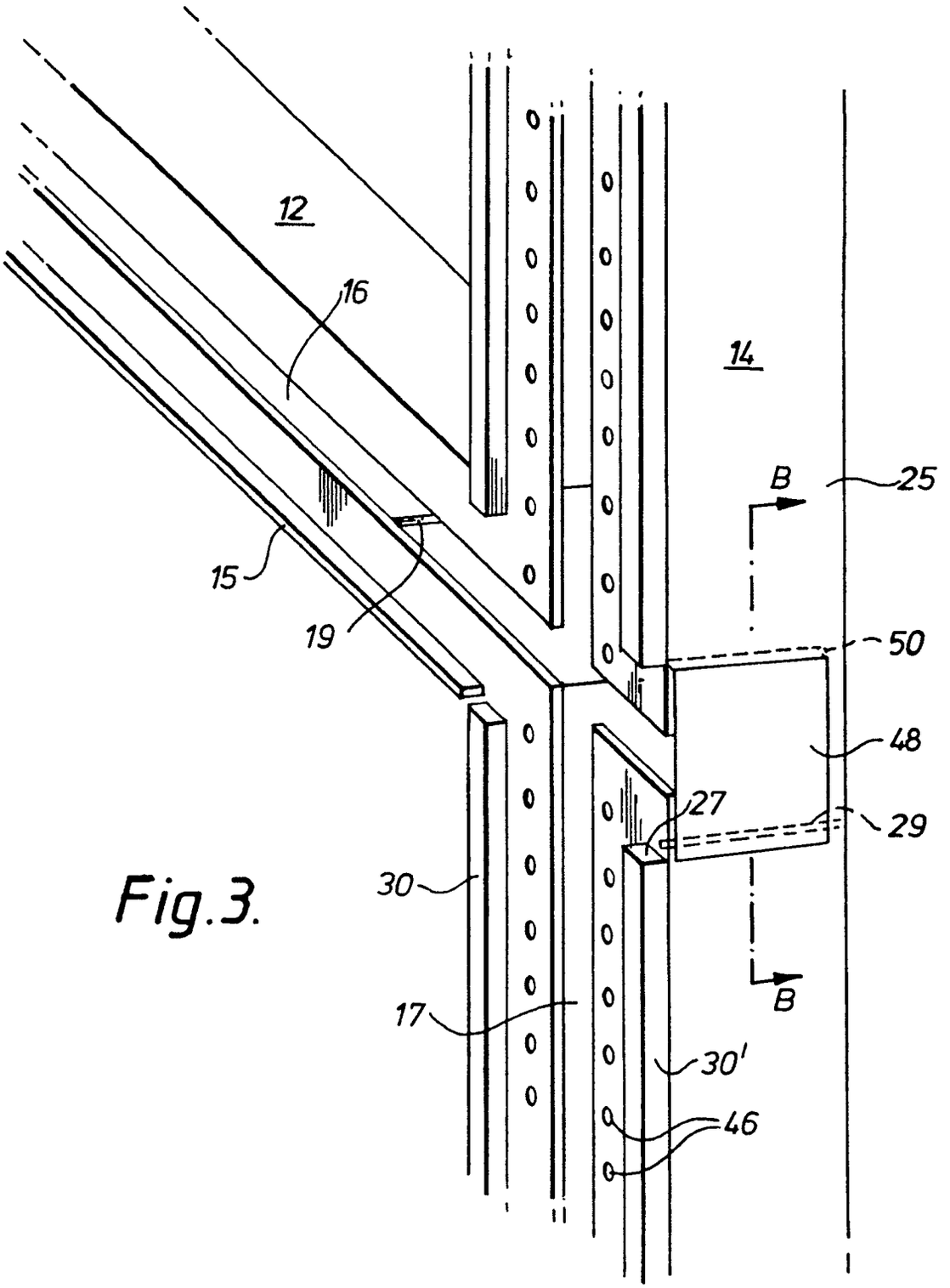

Fig.3.

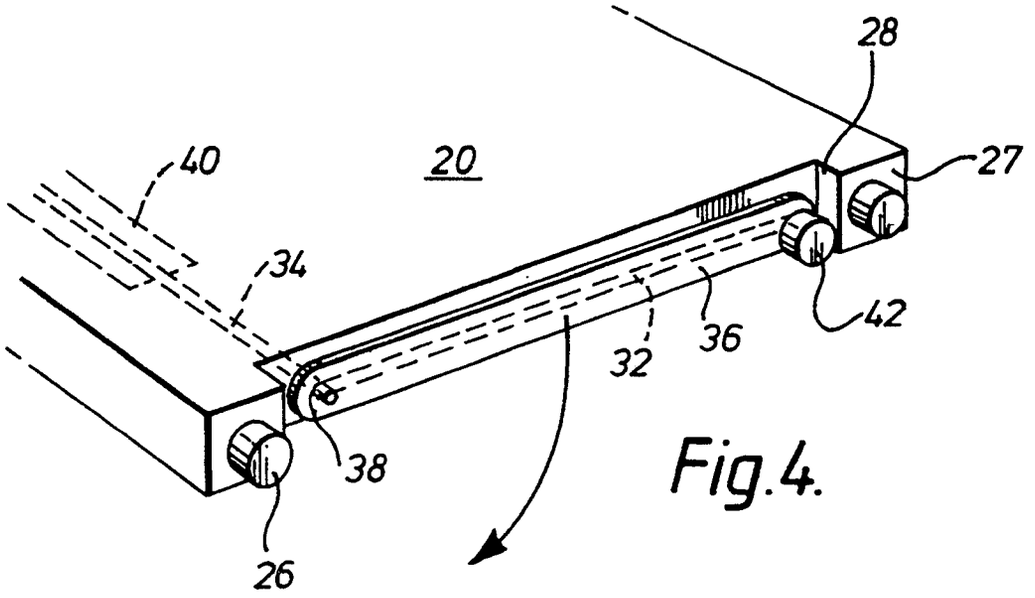

Fig.4.

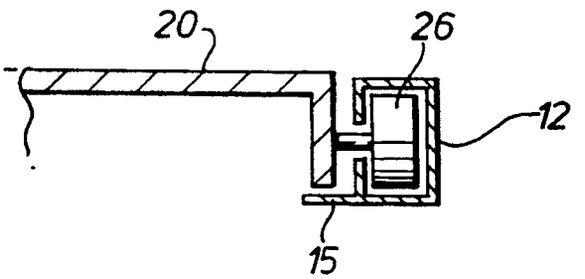

Fig.5.

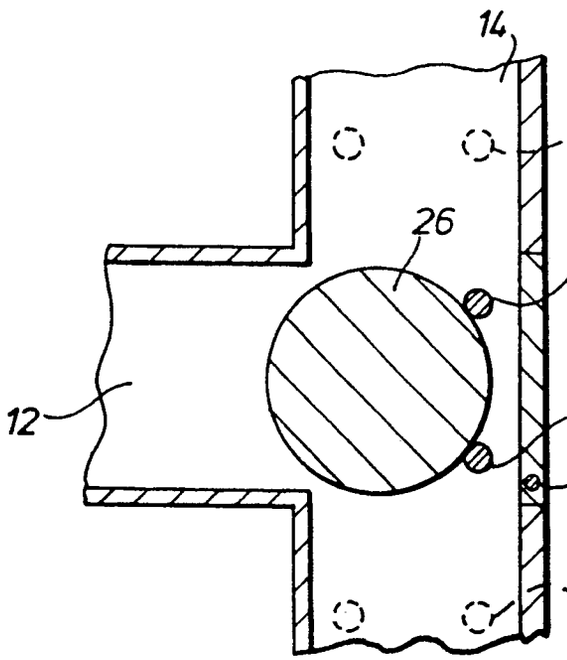

Fig.6.

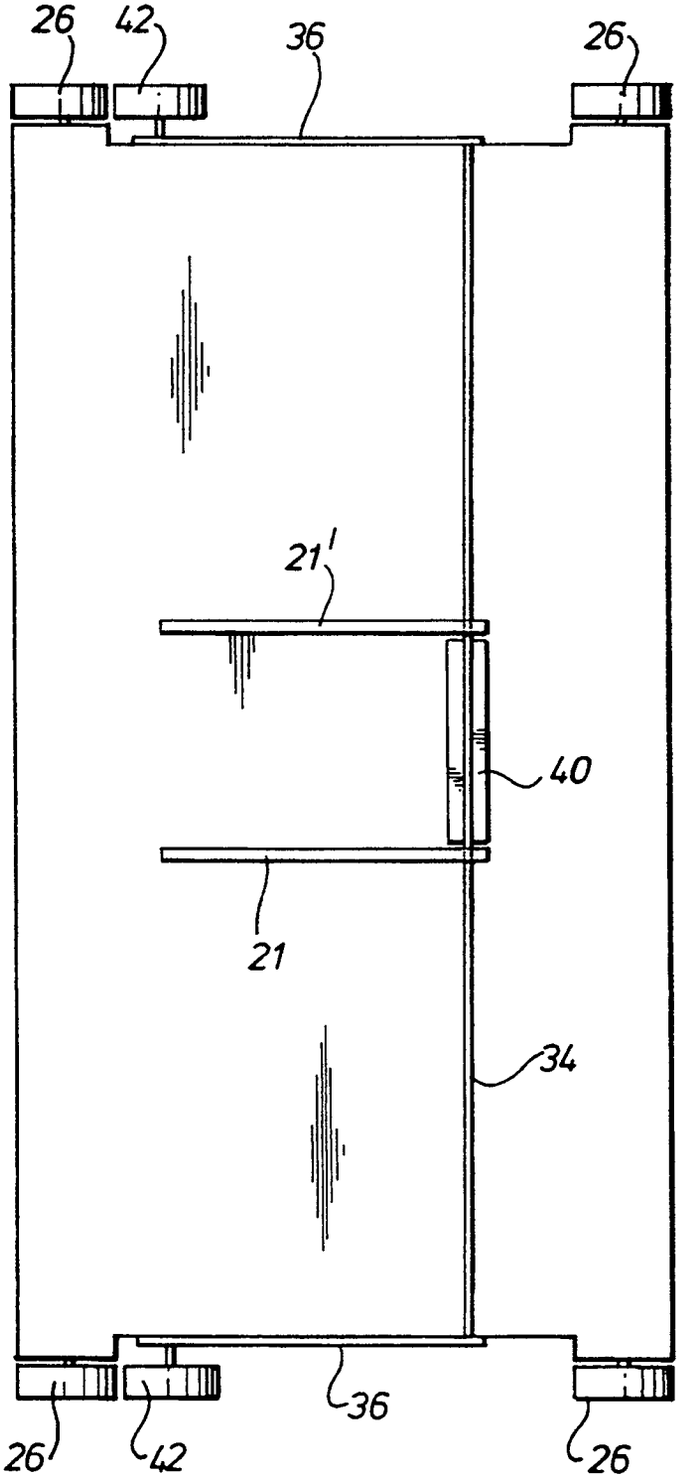

Fig.7.

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EUROPEAN SEARCH REPORT

Application Number

EP 91 30 1857

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.5)
X	FR-E-96126 (PERENTCHEVITCH) * page 2, line 4 - page 3, line 13; figures *	1-5, 12, 13	A47B51/00 A47F3/06
A		6, 7	
A	US-A-4482066 (DYKSTRA) * abstract; figure 1 *	1	
A	DE-A-2556093 (NELL) * pages 3 - 4; figures 1, 10 *	1-5	
A	US-A-4227466 (INDUSTRIAL MANAGEMENT) * abstract; figure 1 *	11	
A	FR-A-1427909 (GUARICHE) * figures 1, 2 *	5, 6	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A47F
A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	28 JUNE 1991	DE GROOT R.K.

CATEGORY OF CITED DOCUMENTS

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