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REMOVABLE SHELF PANEL

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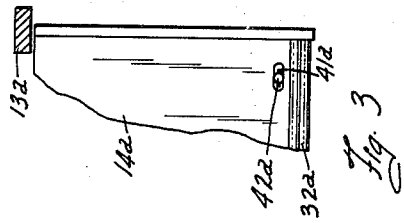


Fig. 3

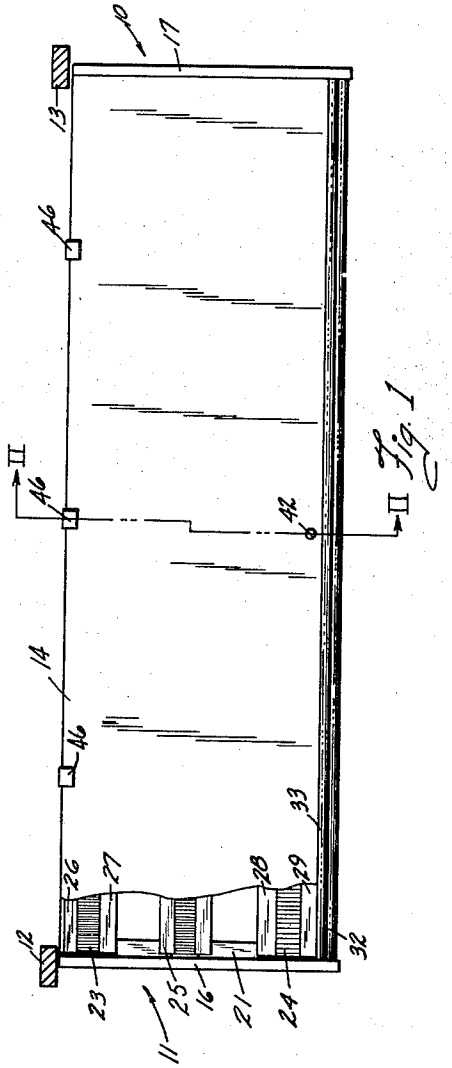


Fig. 1

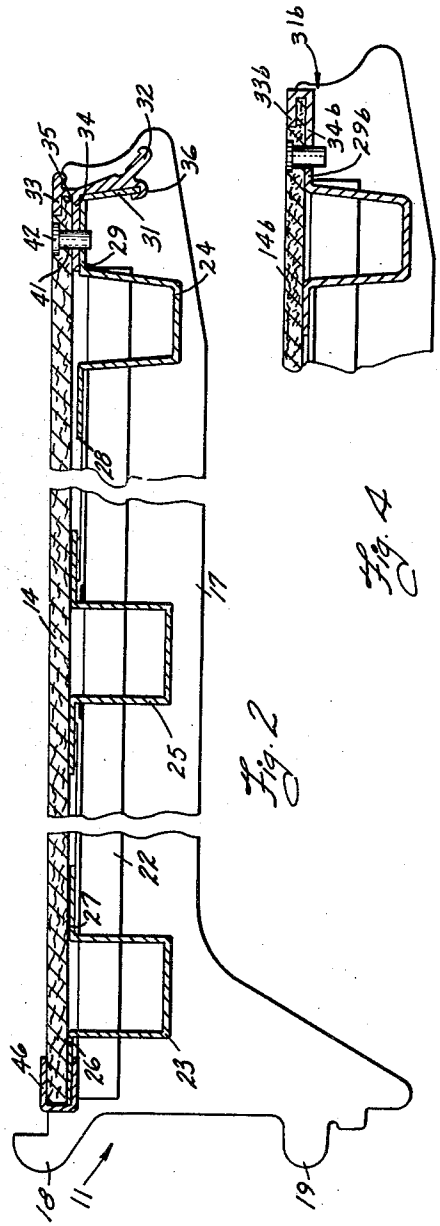


Fig. 2

Fig. 4

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REMOVABLE SHELF PANEL

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This invention relates in general to a removable shelf panel and more specifically relates to a shelf panel removably mounted on a frame and capable of expansion with respect thereto.

Previous shelf constructions utilizing a substantially planar shelf panel mounted upon and supported by suitable framing have generally secured the shelf panel to the frame by glueing or spot welding or by means generally including a plurality of widely spaced rivets, pins, bolts, or similar means whereby the shelf panel is rigidly secured to the supporting frame at points generally uniformly spaced over the surface thereof. Often, in such constructions, removal of the shelf panel from the supporting frame due, for example, to damage and the consequent need for replacement or repair to the panel, is difficult and time consuming especially if carried out by the user at the location of use. Moreover, such removal usually requires tools and may require, in the case of a riveted connection, tools not typically possessed by the shelf user. Hence, a damaged shelf panel may result in the replacement of the entire shelving unit although the supporting frame is still in satisfactory condition.

Furthermore, previous shelf constructions of the type above generally described often include a shelf panel made of materials such as plywood, fiberboard, and the like, which undergo expansion or contraction due to temperature and/or humidity changes in the surrounding atmosphere. Such shelf constructions have often been troublesome because of damage caused either to the shelf panel or to the entire shelf construction due to the action of the means securing the shelf panel to the frame during such expansions or contractions. For example, an expanding shelf panel secured to a dimensionally stable frame by widely spaced fastening devices will tend to bow or otherwise deviate from its desired and former planar condition thereby resulting in a shelf with rippling surface. On the other hand, a contracting shelf, similarly secured, will often disengage or loosen the means holding it to the frame or, more specifically, if secured by bolts, screws or rivets, will often enlarge the holes therein through which such fasteners pass whereby under other environmental conditions the shelf may become capable of movement as a whole with respect to the frame.

Accordingly, the objects of this invention include:

(1) To provide a shelf construction embodying a removable shelf panel.

(2) To provide a device, as aforesaid, wherein expansions or contractions of the shelf panel are freely allowed and hence do not result in temporary or permanent damage to the shelf.

(3) To provide a device, as aforesaid, readily adaptable to existing shelf constructions wherein a substantially rigid frame supports the shelf panel, such adaptation being achievable at minimum cost and in a minimum of time.

(4) To provide a shelf construction, as aforesaid, in which the shelf panel is securely held against movement as a whole with respect to the frame supporting same.

(5) To provide a shelf construction, as aforesaid, which is capable of manufacture and distribution at costs competitive with existing shelf constructions, which is ruggedly constructed and capable of a long service life with a minimum of maintenance, and which is easily and quickly assembled without tools or using only simple tools, from a knocked-down condition whereby same may

be easily shipped in a knocked-down condition to the point of use, and which may easily be demounted and disassembled for storage or repair by the user.

Other objects and purposes of this invention will become apparent to persons familiar with this type of equipment upon reading the following descriptive material and examining the accompanying drawings in which:

FIGURE 1 is a partially broken top elevational view of a shelf construction embodying the invention.

FIGURE 2 is an enlarged fragmentary sectional view taken on the line II—II of FIGURE 1.

FIGURE 3 is a fragment of FIGURE 1 showing a modification.

FIGURE 4 is a fragment of FIGURE 2 showing a further modification.

Certain terminology will be used in the following description for convenience in description only and will have no limiting significance. For example, the terms "upper," "lower," "front," "rear," "right," "left," derivatives thereof and words of similar import will have reference to the shelf construction embodying the invention in its normal position of use as appearing in FIGURE 1. The terms "inner," "outer," derivatives thereof and words of similar import will have reference to the geometric center of said shelf construction and parts thereof.

General description

The objects and purposes of this invention, including those set forth above, have been met by providing a shelf construction including a shelf panel removably supported upon a rigid frame. Means connecting the shelf panel to the frame allow unimpeded expansion and contraction of the shelf panel but prevent movement of said shelf panel as a whole with respect to the frame. Such means include a flange on the frame under which an edge of the shelf panel is slidably inserted and thereby retained against movement transverse to the plane of said shelf panel. Said means include also a pin extending through said shelf panel and said frame for preventing movement of said shelf panel as a whole within its own plane with respect to the framework. Said means may include a plurality of removable clips slidably engaging the shelf panel and the frame preferably along another edge of said panel opposite that held by said flange, said clips preventing movement of said shelf panel transverse to its own plane but allowing movement of the edge engaged thereby in the plane of the shelf due to expansion or contraction thereof.

Detailed description

The shelf construction 10 (FIGURE 1), which has been selected to illustrate a preferred embodiment of the invention, includes a preferably rigid, generally dimensionally stable frame 11 which is supported in any convenient manner upon fixed means such as the uprights 12 and 13 and which in turn supports a shelf panel 14.

The particular frame chosen to illustrate an environment for the device of the invention here includes a pair of support brackets 16 and 17 which are generally parallel and which are fixed at the rearward ends thereof to the respective uprights 12 and 13 by means such as the ears 18 and 19 (FIGURE 2). Said brackets 16 and 17 have fixed to the inner face thereof support angles 21 and 22, respectively, by any convenient means, such as spot welding. A plurality, here three, of essentially channel-shaped beams 23, 24 and 25 are preferably parallel to each other and are fixed at the ends thereof to the support angles 21 and 22 by any convenient means such as welding. The beam 23 has a pair of strips 26 and 27 integral therewith and the beam 24 has a pair of strips 28 and 29 integral therewith for supporting the shelf panel 14 thereon. The strip 29 may include a depending edge portion 31 to pro-

vide a location for a rail 32 of the type normally used on retail store shelves to display price tags relating to merchandise supported on the shelf construction. The above-described structure is known in the art and does not constitute the invention of this application. The above description is given to illustrate a typical environment for the device of the invention.

The rightward and leftward ends (FIGURE 1) of the panel 14 are preferably spaced slightly from the adjacent surfaces of the brackets 16 and 17 whereby said shelf may undergo endwise expansion without interference from said brackets. The following discussion assumes the total expansion or contraction of the panel 14 across its thickness essentially negligible which will indeed be the case in known shelf panels compared to total changes in its length or width of materials such as plywood, fiberboard, and the like wherein the shelf panel is thin compared to its length or width.

The rail 32 is provided with a pair of rearwardly extending, preferably parallel flanges 33 and 34 defining a rearwardly opening slot 35 therebetween, said flange 34 contacting the strip 29 of the beam 24. The upper flange 33 is spaced upwardly from the flange 34 a distance essentially equal to the thickness of the forward edge of shelf panel 14 whereby said forward edge may be slid between the flanges 33 and 34 to lie closely adjacent the rail 32 along its length. Said forward edge is thus constrained from vertical movement with respect to the rail 32. In the instant example, the front edge of the panel 14 is made, as by rabbeting, of slightly lesser thickness than the rest of the panel 14 and the flanges 33 and 34 are preferably spaced apart a distance equal to said lesser thickness whereby the upper face of the flange 33 is flush with the upper face of the panel 14 for providing a lip-free shelf area. If a lip on the shelf area is desired the forward edge of the panel 14 need not be reduced in thickness whereby the rearward edge of the flange 33 will provide said lip. The rail 32 may be secured, if desired, to the brackets 16 and 17, or to the beam 24 in any convenient manner not shown. The device of the invention, however, independently provides means adequately securing the rail 32 to the remainder of the shelf construction when the edge portion 31 is included on the beam 24 for resting in the upwardly opening groove defined by the extension 36 of the rail 32 (FIGURE 2) as further described hereinbelow.

The panel 14 has a hole 41 therethrough adjacent to but spaced from the forward edge of said panel sufficiently to clear the rearward edge of the flange 33 when the panel 14 is installed in its position shown. Coaxial holes are provided through the flange 34 and through the strip 29 of the beam 24. The hole 41 may be countersunk whereby a headed pin 42 inserted through the hole 41 will have its top surface flush with the top surface of the shelf panel 14. The pin 42 extends through the hole 41 and the coaxial holes in the flange 34 and strip 29 to locate the panel 14 against forward, rearward or sideward movement with respect to the frame 11. Therefore, the pin 42 prevents sliding movement of the shelf panel 14 rearwardly out of the slot defined by the flanges 33 and 34 but permits expansion of the panel both lengthwise and widthwise. The pin 42 is preferably located near the center of said forward edge so that the rail 32 may more effectively permit rotation of said panel 14 around the pin 42. The pin 42 is sufficiently close to the forward edge of the shelf that the change in distance between the hole 41 and said forward edge due to expansion or contraction of the shelf panel 14 will be sufficiently small as to cause no perceptible displacement of the pin 42 with respect to the rail 32 and will not cause the forward edge of the panel 14 to become disengaged from the rail 32.

A plurality of generally U-shaped clips 46, which may be of any generally springy material such as certain metals or plastics, are distributed along the rearward edge of the panel 14 and surround said rearward edge of the panel 14 and the adjacent rearward edge of the strip 26 to secure the rearward edge of the panel 14 against vertical movement with respect to said strip 26 and, hence, with respect to the beam 23 and the remainder of the frame 11. Said clips 46 do not, however, restrain the rearward edge of the panel 14 from within the plane of the panel 14 due to expansion or contraction. Hence, the panel 14 is free to expand or contract forwardly, rearwardly and sidewardly without restriction and is at the same time constrained from movement as a whole in any direction with respect to the frame 11. It will be apparent that the clips 46 are not essential because the weight of the shelf and any articles placed thereon may be sufficient to hold the shelf against vertical upward movement with respect to the frame.

Operation

The shelf construction hereinabove disclosed may be assembled as follows. Assuming the supporting frame 11 including the brackets 16 and 17, beams 23 and 24, and support angles 21 and 22 to be in an assembled condition and supported upon the uprights 12 and 13, the rail 32 if not already affixed to the frame 11 by other means may now be so affixed by hooking the extension 36 under the depending edge portion 31 and rotating the rail 32 so as to bring its lower flange 34 into contact with the upper face of the strip 29. The shelf 14 is then placed upon the frame 11 and slid forwardly until the forward edge thereof contacts the rail 32 and lies between the flanges 33 and 34 thereof and so that the hole 41 in the shelf 14 is aligned with the corresponding holes in the flange 34 and strip 29. The pin 42 is inserted in said coaxial holes whereby the rail 32 is positively prevented from movement with respect to the beam 24. Hence, the flange 33 is enabled to prevent the forward edge of the shelf 14 from vertical movement. The pin 42 also prevents horizontal movement of the panel 14.

The clips 46 are then slid forwardly upon the adjacent rear edges of the shelf panel 14 and strip 26 to prevent the rear edge of the shelf 14 from moving vertically with respect to the frame 11. Hence, the shelf panel 14 is prevented from movement as a whole with respect to the frame 11 but is allowed to expand or contract along its width and depth without inhibition.

The shelf panel 14 may be demounted from the frame 11 by reversing the above-described assembly procedure whereby the clips 46 and pin 42 are first removed whereafter the shelf 14 is slid rearwardly out of contact with the flanges 33 and 34 and is thereby freed from the frame 11. The rail 32 if not otherwise secured to the frame 11 may now be removed by rotation about the edge 31. It will be noted that the panel 14 may be demounted using only simple tools or in many cases without use of tools and with few motions in a very short amount of time.

Modification

If desired, as in the case of extremely long shelf panels, one or more pins 42*a* (FIGURE 3) in addition to said one pin 42 (FIGURE 1) may be employed to prevent movement of the forward edge of the shelf panel 14 from out of the slot defined by the flanges 33 and 34. Pins 42 and 42*a* are preferably aligned adjacent the front edge of the panel 14 to avoid problems due to forward-rearward expansion or contraction. To avoid the effects of sideward expansion or contraction of the shelf panel the elongated holes 41*a* (FIGURE 3) added to shelf panel 14*a* to receive the additional pins 42*a* are elongated in the direction in which the panel is likely to move due to expansion or contraction. Suitable holes (not shown) communicating with the slots 41*a* are provided in the rail 32 and strip 29 for receiving the pins 41*a* as was the case for the pin 42. Hence, the sides of an elongated hole 41*a* may move with respect to its pin 42*a* in a direction parallel to the rail 32*a* during expansion and contraction and the pin 42*a* will still retain the forward edge of the panel 14*a* in

the required contact with the rail 32. It is contemplated that the holes in the rail 32 and strip 29, rather than the hole 41*a* in the panel 14*a*, may be elongated.

As a further modification (FIGURE 4) in cases where a separate rail 32 is not desired the depending edge portion 31 of the beam 24 (FIGURE 2) may be replaced by an upwardly extending, rearwardly opening, U-shaped channel 31*b* (FIGURE 4) including a pair of rearwardly extending spaced flanges 33*b* and 34*b* for contacting in the manner of the flanges 33 and 34 above described, the forward edge of the panel 14*b*.

Although particular preferred embodiments of the invention have been disclosed above in detail for illustrative purposes, it will be understood that variations or modifications of such disclosure, which lie within the scope of the appended claims, are fully contemplated.

What is claimed is:

1. In a shelf construction, the combination comprising:

a frame;

a shelf panel supported on said frame;

pin means securing said shelf panel to said frame for preventing sliding movement of said shelf panel along said frame but allowing expansion of said shelf panel, said pin means being located adjacent the front edge of the panel;

said frame and said shelf panel having adjacent rear edges; and

connecting means connecting said shelf panel to said frame for preventing movement of said panel away from said frame but allowing movement of said shelf panel along said frame whereby said shelf panel is mounted on said frame, said connecting means comprising a plurality of generally U-shaped clips each having an upper arm in slideable contact with the top surface of said shelf panel and a lower arm in slideable contact with the bottom surface of said frame and a bight portion adjacent said rear edges of said shelf panel and said frame whereby said rear end of said shelf panel is held against movement away from said frame, said connecting means also including means constraining the front edge of said shelf panel from movement away from said frame.

2. In a shelf construction, the combination comprising:

a frame;

a shelf panel supported on said frame;

means fixed on said frame defining an elongated, inwardly opening slot adjacent to and embracing one end of said shelf panel whereby said one edge is constrained from movement away from said frame, said means defining said slot comprising an elongated rail having an upturned hook portion and a rearwardly facing flange lying upon said frame;

said frame having a depending edge portion received in said hook for preventing upward movement of said rail and forward and rearward movement of said hook; and

pin means securing said shelf to said frame for preventing movement of said shelf panel along said frame, said pin means being located adjacent said slot whereby said shelf panel is fixed to said frame, said pin means including at least one pin, and said shelf panel, said frame and said rearwardly facing flange having coaxial aligned holes therethrough for defining an opening for said pin whereby said pin prevents said rearwardly facing flange from moving off said frame and, therefore, secures said rail to said frame.

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