June 6, 1950 R. W. MOHRING 2,510,243

SHELF CONSTRUCTION

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Fig. 1

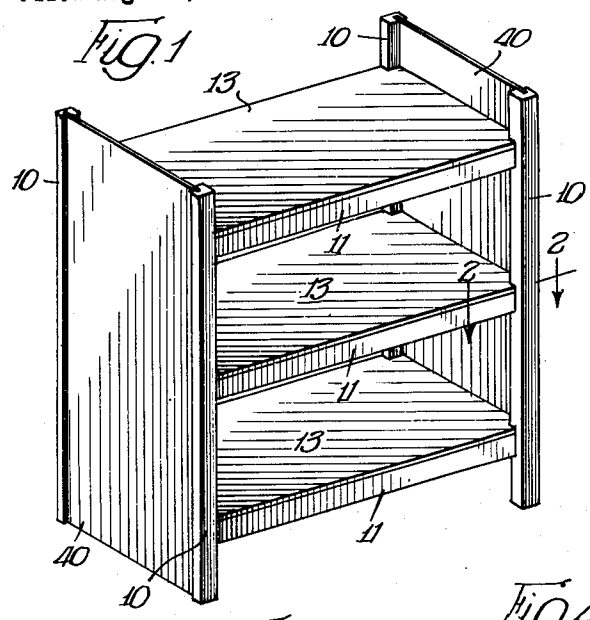


Fig. 2

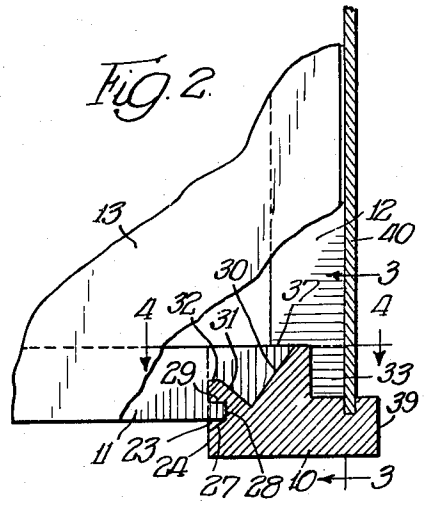


Fig. 3

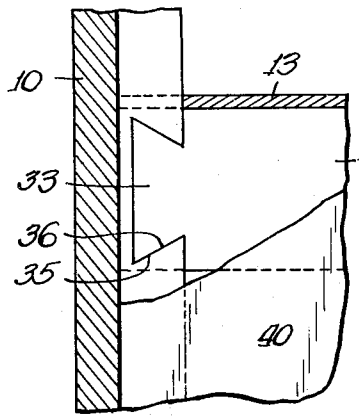


Fig. 4

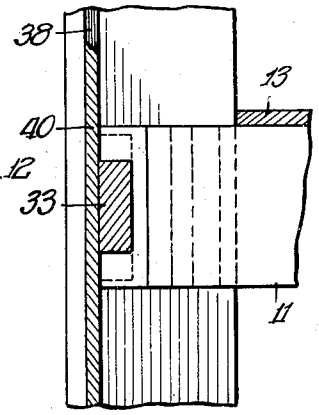


Fig. 5

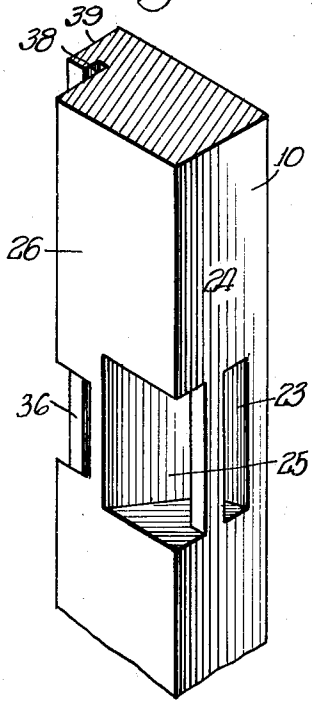
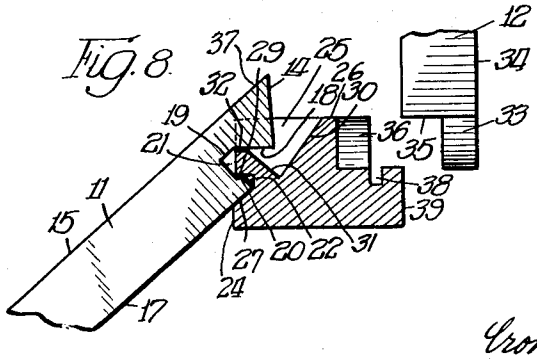


Fig. 8



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Fig. 6

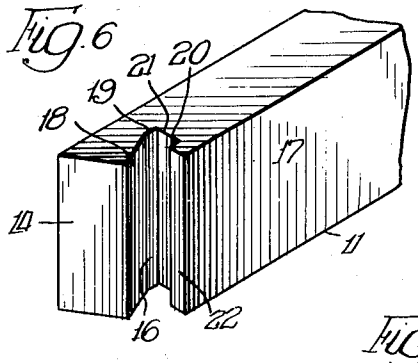


Fig. 7

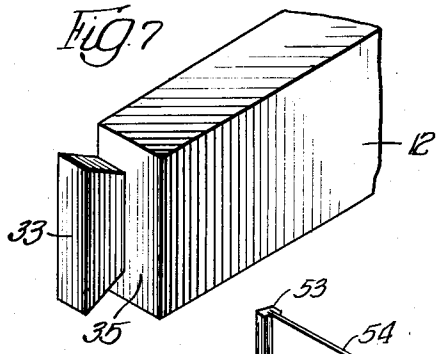


Fig. 9

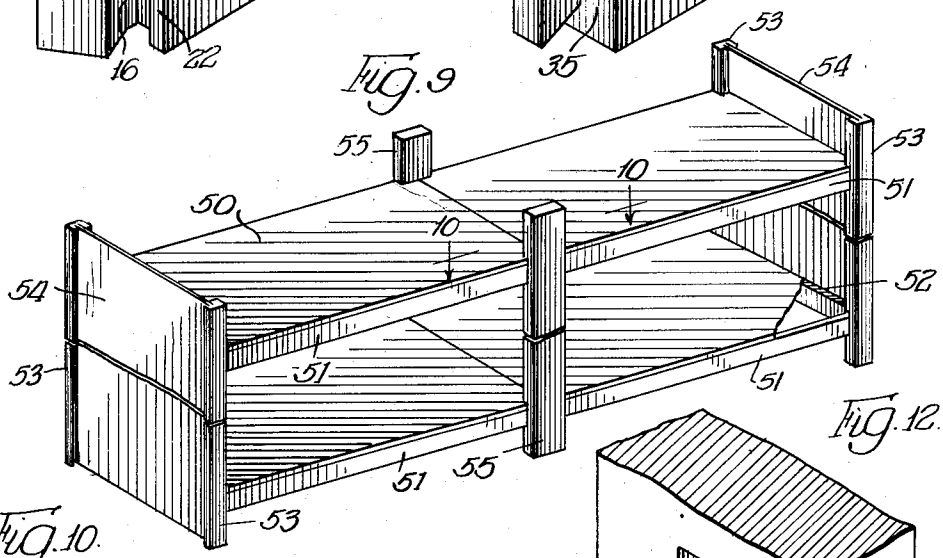


Fig. 10

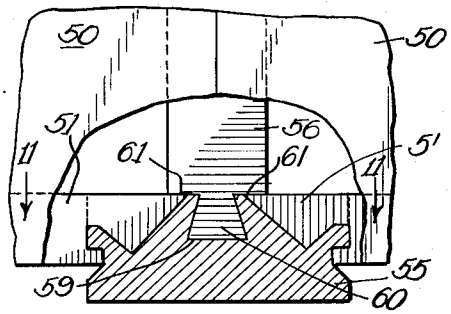


Fig. 11

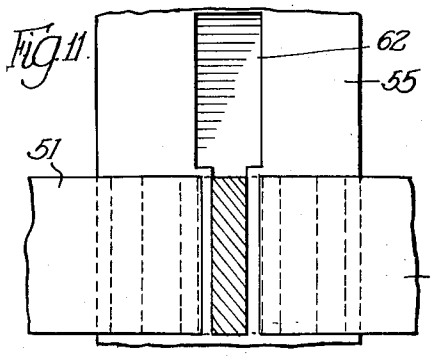


Fig. 12

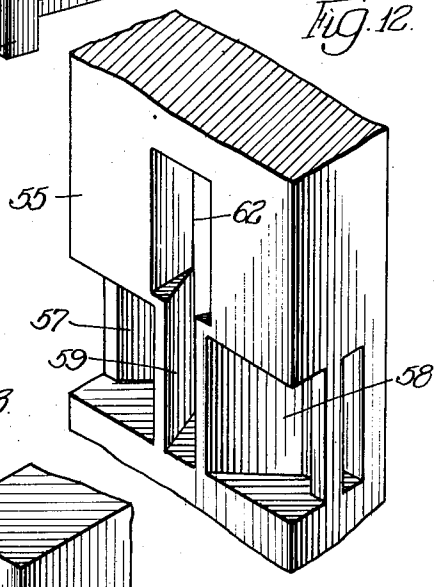
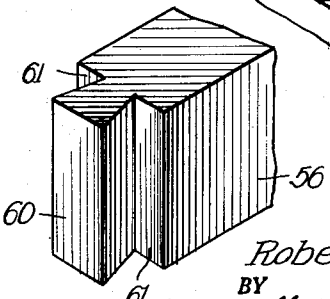


Fig. 13



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SHELF CONSTRUCTION

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Application August 13, 1947, Serial No. 768,290

9 Claims. (Cl. 211—148)

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This invention is concerned with improvements in a knockdown shelf construction.

It is an object of the invention to provide a lightweight knockdown shelf construction which is free of fastening devices and which may be assembled without the use of tools.

It is a further object of the invention to provide a pre-fabricated shelf construction adapted to be quickly and easily assembled and in which the parts are successively interlocked with each other to provide a sturdy and rigid construction.

It is a more specific object of the invention to provide a free standing self-contained unitary shelf structure which comprises a rigid frame formed by interlocking connecting the ends of horizontal frame members to a plurality of vertical frame or post members and confining the frame members in interlocked relation by means of panels in sliding engagement with the vertical frame members.

It is another object of the invention to provide a shelf which is flexible in use and which is adapted to be constructed in a plurality of interconnected units to provide a continuous shelf of any desired length.

It is a further object of the invention to provide a shelf construction comprising end units and intermediate frame members adapted for interengagement with the frame members of the end units to form intermediate units and provide a continuous shelf consisting of a plurality of units or sections in interlocked connected relation.

It is a still further object of the invention to provide in a shelf construction of the type described an improved joint for interlocking the ends of the horizontal rails in engagement with the vertical post members.

These and other objects of the invention will be apparent from a description of the preferred forms thereof which are shown by way of illustration in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a single unit shelf construction embodying the principles of the invention;

Fig. 2 is a section, to an enlarged scale, on the line 2—2 of Fig. 1, with parts broken away;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a section on the line 4—4 of Fig. 2;

Fig. 5 is a perspective view of a portion of one of the vertical frame or post members;

Fig. 6 is a perspective view of the end portion of a side rail member;

Fig. 7 is a perspective view of the end portion of an end rail member;

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Fig. 8 is an exploded sectional view illustrating the assembly of the side and end rail members with the vertical frame member;

Fig. 9 is a perspective view of a plural unit shelf construction embodying the principles of the invention;

Fig. 10 is a section, to an enlarged scale on the line 10—10 of Fig. 9, with portions broken away;

Fig. 11 is a section on the line 11—11 of Fig. 10;

Fig. 12 is a perspective view of a portion of an intermediate vertical frame or post member; and

Fig. 13 is a perspective view of an end portion of an intermediate cross rail member.

The construction illustrated in Figs. 1 to 8 provides a single unit shelf having three vertically spaced horizontal shelf panel members which are supported by rigidly connected horizontal and vertical frame members.

The frame for the single unit shelf is formed by four vertically positioned uprights or corner posts 10 which are connected in interlocking relation with oppositely disposed pairs of horizontal front and back side rails 11 and end rails or cross members 12. The shelf panel members 13 are supported by horizontal frames each formed by a pair of side rails 11 and a pair of end rails 12 connected at their respective ends to the posts 10 at the same level. The ends of each side rail 11 are detachably connected to the respective corner posts 10 by means of an interlocking corner joint construction. The ends of each end rail 12 are detachably connected to the respective corner posts 10 by means of a cooperating corner joint construction which locks the ends of the adjacent side rails 11 in position.

Each side rail 11 is formed on its ends as illustrated in Figs 2, 6 and 8, to provide a beveled end face or surface 14 which extends transversely from the inner face 15 of the rail 11 for a greater portion of its thickness and merges into a groove 16 adjacent the outer vertical face 17 thereof. The groove 16 is defined by the beveled surface 18, parallel side surfaces 19 and 20 and bottom surface 21. The side surface 20 is spaced from the outer face 17 of the rail and extends a short distance beyond the base 21 defining with the outer face 17 a rib-like outer ridge along the groove 16 which terminates in an end surface 22.

Each end of side rail 11 is adapted to be received in interlocking relation in a socket-like formation provided in a vertical post 10, as particularly illustrated in Fig. 5. The socket formation comprises a groove 23 which is formed in the inside edge 24 of the post 10 and a V-like

groove 25 which is formed in the inner face 26 of the post 10. The grooves 23 and 25 extend a sufficient distance axially or vertically of the post 10 to accommodate the vertical depth of the rail 11.

The groove 23 is formed by beveled outer wall 27, bottom wall 28 and inner wall 29. The groove 25 is formed by converging beveled walls 30 and 31 and a narrow straight wall portion 32 which extends from the beveled wall 31 to the surface of the inside edge 24 of the post 10. The grooves 23 and 25 accommodate the protruding portions of the joint formation on the end of the rail 11 (Fig. 8). The end of the rail 11 is engaged in the socket formation on the post 10 by inserting the protruding ridge portion adjacent the groove 16 of the rail 11 in the groove 23 of the post 10 and pivoting the rail 11 inwardly to bring the beveled surface 14 on the rail 11 into contact with the beveled surface 30 on the post 10. When in fully engaged position the rail 11 can be disengaged only by a pivoting movement.

Each end rail 12 is formed on its ends as illustrated in Fig. 7, to provide a dovetail tongue 33 which extends from the outer face 34 of the rail 12 transversely of the thickness of the rail a distance preferably somewhat less than half the thickness thereof, the end of the rail being cut away to provide an end abutment surface 35 adjacent the base of the tongue 33. The post 10 is provided with a dovetail groove 36 adjacent the groove 25 for receiving the dovetail tongue 33. The dovetail groove 36 is positioned relatively close to the groove 25 in the post 10 so that when the tongue 33 is inserted in the groove 36 the abutment surface 35 on the end of the rail 12 will extend over the end portion 37 of the inside face 15 of the adjacent side rail 11.

The end posts 10 are each provided on the inside surface 26 with a vertical groove 38 which is spaced inwardly from the outer edge face 39 of the post 10 and extends to a depth slightly greater than the dovetail groove 36 (Figs. 2 and 8). The post 10 is cut away at the corner beyond the groove 38 to provide clearance for the dovetail tongue 33. The groove 38 accommodates a sliding end panel 40 which is inserted after the rails 11 and 12 have been positioned in interlocking relation with the posts 10 and which locks the rail 12 in its fully engaged position.

The shelf panels 13 are cut away or notched at the corners to accommodate the inside corner edges of the posts 10 and the panels are preferably made slightly less in length than the distance between the end panels 40 so that they may be used interchangeably in providing the plural unit shelf construction illustrated in Figs. 9 to 13.

The plural unit construction which is illustrated in Figs. 9 to 13 provides two or more vertically spaced horizontal shelves of any desired length. The end sections of the plural unit are formed with shelf panel members 50, side rails 51, end rails 52, end posts 53 and end panels 54 which are the same construction as the corresponding members in the single unit construction illustrated in Figs. 1 to 8. The intermediate sections of the plural unit are formed with intermediate posts 55 and cross rails 56 which embody a modified form of interlocking joint construction.

The intermediate vertical posts 55 are each provided with socket formations 57 and 58, as shown in Fig. 12, to receive the interlocking projections on the ends of the side rails 51. The socket formations 57 and 58 are identical with the corresponding socket formations on the vertical posts of the single unit construction. The socket formations 57 and 58 are arranged on opposite sides of a dovetail groove formation 59 which is adapted to receive the dovetail tongue 60 on the end of the cross rail 56. The dovetail tongue 60 extends from the vertical center of the rail 56 and abutment end surfaces 61 extend on either side of the base of the same for engagement with the end portions of the inner surfaces of the side rails 51. A rectangular socket formation 62 is provided in the post 55 above the dovetail groove 59 to permit the insertion of the dovetail tongue 60 in the groove 59.

The plural unit is assembled in the same manner as the single unit. The ends of the side rails 51 are engaged in the sockets in the end posts 53 or the intermediate posts 55 as required. The ends of the intermediate cross rails 56 are next engaged in the sockets in the intermediate posts 55. The end rails 52 are engaged with the end posts 53 and the end panels 54 are slid into position in the grooves provided in the end posts 53. The shelf panel members 50 are positioned on the frame structure with the adjoining ends in abutting relation to provide a continuous shelf surface.

The single unit device comprises a unitary shelf construction which may be readily assembled or erected without the use of any tools to provide a self-supporting, rigid device capable of a great variety of uses. The relative size and number of shelves per unit may be varied as desired.

The plural unit device comprises a shelf construction which may be extended as desired to provide continuous shelves of greater length than provided by the single unit device. This construction may utilize the same shelf panel members, end members and side rail members which are provided for use in the single unit device. Such members may be interchangeably used and any length shelf may be provided by supplying the required number of intermediate cross rails and vertical posts which are necessary for the formation of the intermediate sections.

Both shelf constructions illustrated are particularly adapted to be made of wood but any similar material which can be shaped or formed to provide the interlocking joint connections and which has sufficient strength and rigidity may be used.

While specific details of construction have been referred to in describing the illustrated forms of the invention, it will be understood that other details of construction may be resorted to within the spirit of the invention.

I claim:

1. A sectional shelving structure comprising a plurality of vertical supporting frame members, side and end rails, means for engaging the ends of said side and end rails in detachable interlocking engagement with said vertical frame members, said side and end rails being adapted to provide a plurality of vertically spaced horizontal shelf supports, panels connecting certain of said vertical frame members and means on said panels and said frame members to slidingly connect the same and to lock said side and end rails in position.

2. A shelf structure comprising a plurality of vertical supporting posts, side rails, cooperating means on the ends of said side rails and on said posts to connect said side rails in interlocking detachable engagement with said vertical posts, end rails, means on the ends of said end rails

and on said posts to connect said end rails in detachable interlocking engagement with said posts, the connecting portion of said end rails with said posts overlapping the connecting portions of said side rails with said posts and preventing disengagement of the ends of said side rails, said side and end rails cooperating to provide a shelf support, and end panels, said end panels having means connecting the same in interlocking engagement with pairs of said posts to lock said end rails in position.

3. In a shelving structure, a plurality of vertical supporting frame members, side rails having their ends provided with a beveled surface terminating in a groove adjacent one vertical face and a ridge portion adjacent said groove, said vertical frame members having generally V-shaped socket formations for receiving axially extending portions of said side rail ends and a groove for receiving said ridge portion to secure said frame and rail members in interlocking engagement, end rails having their ends provided with a dovetail tongue, said vertical frame members being provided with dovetail grooves adjacent the V-shaped socket formations for receiving said dovetail tongues whereby said side rail ends are locked in engagement in said socket formation when said end rail ends are positioned in tongue and groove engagement with said vertical frame members.

4. In a shelving structure as recited in claim 3 wherein vertical grooves are provided in said vertical frame members and end panels are positioned in said grooves to lock said end rails in engagement with said vertical frame members.

5. In a shelving structure, a plurality of vertical posts, a plurality of pairs of side and end frame members, said side frame member having end formations, said vertical posts being provided with socket formations for receiving in horizontal interlocking engagement the end formations on said side frame members, said end frame members having end abutment surfaces and dovetail tongues extending axially therefrom, and said vertical posts having dovetail grooves adjacent said socket formations for receiving said dovetail tongues in interlocking relation, said end abutment surfaces projecting over said socket formations and locking said side frame members in engagement with said vertical posts.

6. In a shelving structure as recited in claim 5 wherein said side frame members have their ends engaged with said vertical posts by a horizontal and pivotal movement and said end frame members have their ends engaged with said vertical posts by a horizontal movement and wherein end cross members are interengaged with said vertical posts to lock said end frame members in engagement therewith.

7. A sectional shelf construction comprising pairs of vertically arranged end frame members, intermediate vertically arranged frame members, side and end rails, said vertical frame members and said side and end rails having cooperating grooved portions and projecting portions respectively which are adapted to be detachably interengaged to provide horizontal shelf supports, cross members connected with said intermediate vertical members, said cross members and said intermediate vertical members having cooperating projecting portions and grooved portions respectively which are adapted to be detachably interengaged and which prevent disengagement of the side rails and the intermediate vertical members, and end panels engaged with the end frame members, said end frame members having grooves for receiving said end panels to lock the side and end rails thereto.

8. A shelf construction as recited in claim 7 wherein said cross members and intermediate vertical members are interlockingly connected by a tongue and groove joint construction and wherein said intermediate vertical members are provided with recesses immediately above said joint to permit limited movement of said cross members.

9. In a knockdown frame construction wherein a pair of frame members of generally rectangular cross section have their ends interlocked with a third frame member of generally rectangular cross section to provide a corner joint construction, one of said pair of members being provided on its end with a V-shaped groove merging at one side with a relatively narrow rib-like projection extending axially of the member, said groove merging at its other side with a V-shaped portion projecting transversely of the member, said third member having an axially directed groove in one of its side faces which is adapted to accommodate said rib-like end projection in a pivoting movement, said third member having a generally V-shaped groove in the first mentioned and adjoining side faces for receiving said V-shaped portion, said members being interlockingly engaged by relative pivoting movement, the other of said pair of members having a dovetail tongue on the end thereof and an end abutment surface positioned laterally of the same, and said third member having a dovetail groove adjacent the V-shaped groove with its open side directed toward the side face thereof which is opposite the first mentioned side face whereby when said dovetail tongue is positioned in said groove the end abutment surface will extend over said adjoining V-shaped groove and prevent disengagement of the first mentioned one of said members and said third member.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
453,504	Rieckert	June 2, 1891
1,569,832	Byrne et al.	Jan. 12, 1926
1,990,046	Mayrose	Feb. 5, 1935
2,199,238	Fisher	Apr. 30, 1940
2,365,622	Bockius	Dec. 19, 1944
2,375,726	Bales	May 8, 1945