April 19, 1960

A. D. DE MATTIA

2,933,193

CORNER LOCK CONSTRUCTION FOR RACKS

Filed Nov. 13, 1956

Fig. 1

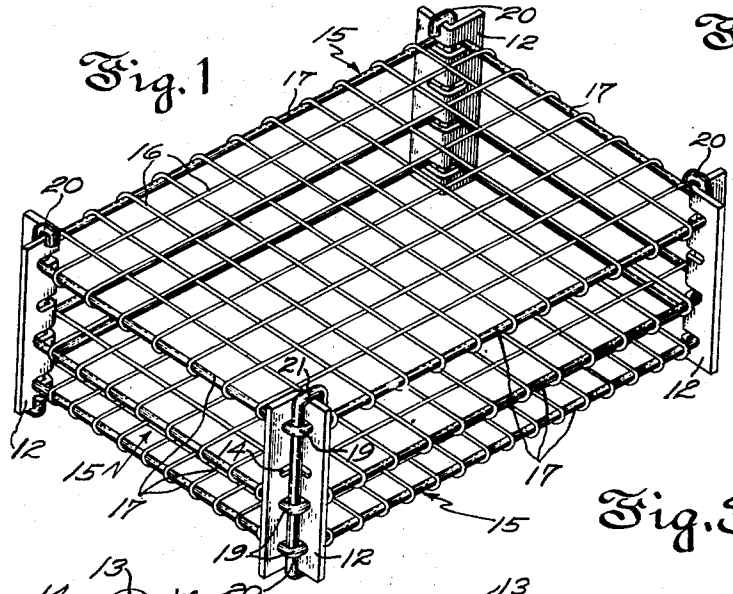


Fig. 2

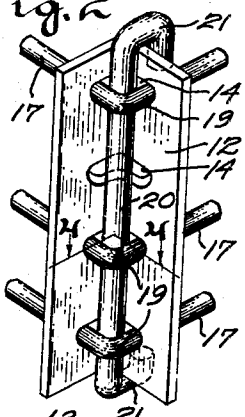


Fig. 3

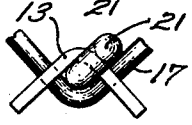


Fig. 4

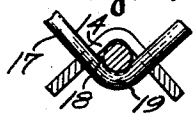


Fig. 9

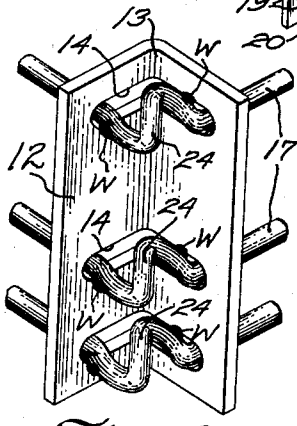


Fig. 8

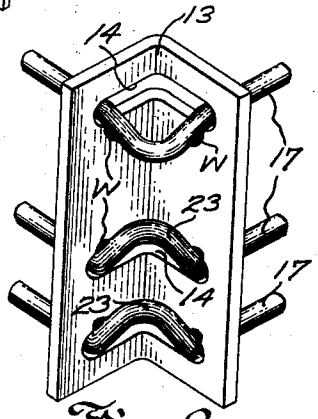


Fig. 7

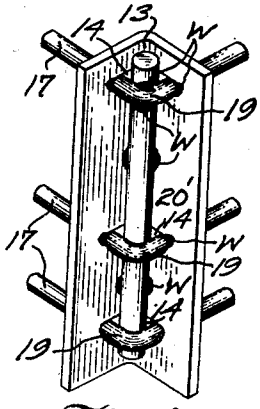


Fig. 6

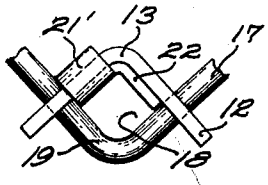
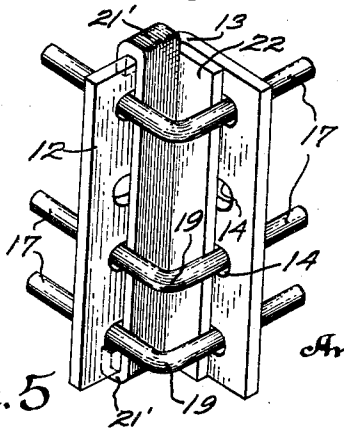


Fig. 5



INVENTOR

Andrew D. DeMattia

BY

ATTORNEY

United States Patent Office

2,933,193

Patented Apr. 19, 1960

2,933,193

CORNER LOCK CONSTRUCTION FOR RACKS

Andrew D. De Mattia, Fairfield, Conn., assignor to Rolock, Incorporated, Fairfield, Conn., a corporation of Connecticut

Application November 13, 1956, Serial No. 621,825

10 Claims. (Cl. 211—134)

This invention relates to a multiple level material handling rack of skeleton construction preferably light enough in weight to be portable and having vertically spaced perforate work carrying shelves or trays that permit free access to the workpieces of heat or a fluid processing medium such as will enable the fluid, if a liquid, to drain off readily through the perforations in the shelves.

It has been proposed to make a rack or tray for this purpose in the form of a unitary structure usually including upright corner posts supporting the margins of work carrying shelves or trays in vertically spaced relation and on which posts the rack may stand. In former types of construction it has been proposed to weld the corner of each shelf rigidly and permanently to its supporting post. Where open mesh, stiff wire fabric serves as the web of the shelf it has been proposed first to weld a course of horizontally extending shelf framing rungs to the corner posts and thereafter to apply the open wire mesh fabric by anchoring its marginal edges to such framing rungs. Edge anchorage is sometimes accomplished by clinching fringe ends of individual wires of the shelf forming fabric about the frame rung or by welding the margins of the wire mesh thereto.

These formerly proposed constructions have proven costly because involving much hand labor. They fail to lend themselves to economical quantity production of skeleton racks. They further have the disadvantage of relying on positive rigidity alone at the points of joinder of the shelves to the corner posts which rigidity can promote a tendency of the welds or welded members to be torn apart by intense stress and strain caused by abrupt temperature changes that are unevenly distributed over different portions of the rack structure in high temperature treating processes. Even more abrupt temperature changes occur when heat treatment is followed by the sudden dropping of rack temperature occasioned by plunging the rack and its carried work pieces into a cooling liquid for quenching.

An object of this invention is to provide racks having multiple level perforate shelves or trays so constructed that each shelf, including its wire mesh fabric and supporting frame rungs, can be prefabricated individually by automatic machine processes and used as an interchangeable component in a knockdown type of rack assemblage including upright corner posts.

A further object is to enable the corner posts likewise to be manufactured individually as separate pieces and brought independently one by one into separable joinder with the margins or corners of the prefabricated shelves thereby to form a rack of knockdown construction in which selected prefabricated shelves can be supported by the corner posts at selectively spaced heights and can be individually replaced if damaged or worn out in use while continuing to utilize all of the other parts of the rack.

A further object is to avoid dependence solely on unyielding rigidity of joinder of the shelf corners with the

corner posts by employing mechanical locking means of a nature to permit slight relative movement therebetween in the assembled structure.

The foregoing and other objects of the invention will appear from the following description of preferred embodiments of the impovements having reference to the figures of the drawings wherein:

Fig. 1 shows an assembled annealing rack with multiple shelves embodying the invention.

Fig. 2 is an enlarged view of one of the standards or posts of Fig. 1 supporting the corners of a plurality of vertically spaced rack shelves.

Fig. 3 is a fagmentary plan view looking downward on Fig. 2.

Fig. 4 is a view taken in horizontal section on the plane 4—4 in Fig. 2.

Fig. 5 shows a modification of the mechanical locking element used to maintain the assemblage of corner posts and shelves.

Fig. 6 is a plan view looking downward on Fig. 5.

Fig. 7 shows the use of welding both for holding a mechanical corner locking element in place and if desired for holding the corner posts and shelves in permanently assembled relation independently of the locking element.

Fig. 8 shows a means for mechanically interlocking shelf corners to corner posts by distorting the shelf corners making unnecessary the use of a separate part to serve as locking element.

Fig. 9 shows a different manner of distorting the shelf corners to accomplish mechanical interlocking thereof with the corner posts.

The rack or multiple level tray of Figs. 1 to 4 is shown to comprise supporting corner posts 12 each of which comprises a vertically disposed bar which may be of V-shape, L-shape, U-shape or other arched shape in cross section having two angularly related side walls which may or need not be flat, such walls at the crest of such shape meeting at a lengthwise extending turn or bend 13 of the post. According to these improvements the concavity of each post 12 faces outward of the rack. In other words the bar which constitutes the post has its vertically extending corner directed inward of the rack. Each post 12 contains a slot 14 preferably closed at both ends which extends crosswise of the post and is continuous through the corner 13 and both side walls of the bar.

Through each of slots 14 in four or more corner posts such as 12 there extends horizontally on a common level the outward pointing corners 19 or other bowed border of a rack shelf 15. The shelves herein shown may be prefabricated by attaching the margins of an open mesh stiff wire fabric 16 to a course of shelf framing rungs 17 preferably of wire or rod stock that is coarser and stronger than the wire of the mesh. The shelf corners 19 which extend through the slots 14 in the corner posts 12 protrude into the concavity of the channels of the latter. Thus there is formed cooperatively by the sides of the post and the aperture bordering shelf corners a tier of closed loops 18 spaced vertically one above another in the concavity of a single corner post. Loops 18 are thus receptive to a vertical straight anchor pin 20 whose ends 21 may be clinced over either or both the top and/or bottom ends of the corner posts 12, respectively. If only one of the ends of anchor pin 20 is turned or clinched over the end of the corner post the pin may be withdrawn from the loops 18 for separating any corner post from its supported shelf corners without use of tools of mutilating the structure in any way. Pin 20 will preferably have a free or snug sliding fit in the loops 18 when the frame rung 17 of each shelf abuts both ends of the slot 14.

Fig. 7 shows how a headless straight anchor pin 20'

may be held in place permanently by welding it to the corner posts and/or to the shelf corners 19.

Figs. 5 and 6 show an angle iron type of anchor pin or member 22 which may be substituted for pin 20 and made of bent sheet metal to lie face to face against the cavity bordering surface of corner post 12. Anchor member 22 sufficiently fits the aperture 18 to positively prevent or limit play between the corner post and the frame rung of the shelf as can the pin 20. Anchor member 22, like pin 20, may have its end or ends 21' bent to overlap or to loop and clinch over the end or ends of corner post 12. Anchor members such as pin 20 and angle iron 22 may be dispensed with altogether if the frame rung 17 which forms the corners of the shelves is bent upward or downward within the channel of the post as shown in Fig. 8. Or these frame rungs 24 may be bent in a twisting manner as shown in Fig. 9 to effect an equivalent mechanical locking together of the corner posts and the shelves.

Parts for making up this improved construction of rack to differing specifications when not in use may be stocked and compactly stored in differing groups of like shelves and like corner posts and selected for assemblage as hereinbefore described to suit the needs of the work currently being processed. This results in much saving of storage space.

Skeletonized shelf webs may consist of apertured sheet metal, one of the apertures therein occurring at each extreme corner of each shelf to occupy the corner post channel and form the loop 18. The shelves may comprise a web of woven wire of any suitable sizes for example if the channel iron of the posts is 3/16" thick the rung wires 17 may appropriately be 3/8" diameter rod. Arc welding may or need not be applied to the corner fastening construction at points designated W in Figs. 7, 8 and 9. Chrome-nickel alloy is a preferred material from which to make the parts.

Other variants of the particular size, shape and relationship of the rack parts coming within the new principles of construction of the rack examples herein illustrated and described will be suggested to those skilled in the art by the present disclosure and all such variants are intended to covered that come within a broad interpretation of the language of the claims.

I claim:

1. In a rack an interlocking construction embodying in combination, a support post having a cross section of arched shape directed inward of the rack and formed by side walls of the post meeting at the crest of said shape said side walls bordering a concavity of the post that faces outward of the rack and said post containing a continuous slot extending cross-wise thereof through both of said side walls at said crest, a rack shelf having a border portion bowed convexly toward said post extending through said slot and both of said side walls and occupying said concavity of the post, and locking means within said concavity of the post comprising shelf anchoring detent structure formed and arranged to project from said border portion of the shelf beyond the width of said slot to a position for engagement with both of said side walls of the post in a manner to prevent withdrawal of said shelf border from the concavity of the post.

2. In a rack an interlocking construction as defined in claim 1, in which the said rack shelf has angularly related edges meeting to form a shelf corner constituting the said bowed border portion of the shelf.

3. In a rack an interlocking construction as defined in claim 1, in which the said rack shelf includes a mesh of crossed wires and the said shelf border includes an edge rung framing said mesh and secured thereto and forming the said bowed border portion of the shelf.

4. In a rack an interlocking construction as defined in claim 1, in which the said rack shelf includes a web of crossed wires, and the said shelf border comprises an edge rung attached to and supporting said wires and bent in the said border portion to form a corner of said shelf.

5. In a rack a plurality of interlocking constructions as defined in claim 1, in which the said shelf includes an open mesh web of stiff wire fabric and the said shelf border comprises a circuitous course of rungs to which said web is secured, together with a plurality of posts like the said support post spaced along said course of rungs and anchored thereto respectively by said interlocking constructions.

6. In a rack an interlocking construction as defined in claim 1, in which the said means to prevent withdrawal of the said shelf margin from the said post slot comprises a portion of said shelf margin bent beyond the width of said slot within the said concavity of the post.

7. In a rack an interlocking construction as defined in claim 1, in which the said means to prevent withdrawal of the said shelf margin from the said post slot comprises a portion of said shelf margin twisted beyond the width of said slot within the said concavity of the post.

8. In a rack an interlocking construction as defined in claim 1, in which the said locking means comprises an anchor pin in the said post concavity intervening between said bowed border of the shelf and both of the said side walls of the post in a manner positively to block said shelf border against withdrawal from said cavity through the said slot.

9. In a rack an interlocking construction as defined in claim 8, in which both the said bowed border of the shelf and the said side walls of the post interloop with each other to form and surround a space occupied by the said anchor pin.

10. In a rack an interlocking construction as defined in claim 8, in which the said bowed border of the shelf forms an angle flanking two sides of the said anchor pin and the said side walls of the post form an angle flanking two other sides of said pin thereby to imprison said pin in relation to said bowed border of the shelf.

References Cited in the file of this patent

UNITED STATES PATENTS

893,786	Collis et al.	July 21, 1908
1,060,919	Luten	May 6, 1913
1,172,026	Hough	Feb. 15, 1916
1,625,612	Jensen	Apr. 19, 1927
1,827,449	Wood	Oct. 13, 1931
2,093,137	Reeves	Sept. 14, 1937
2,240,367	Fernholtz	Apr. 29, 1941
2,300,783	Grubel et al.	Nov. 3, 1942
2,652,768	Moreno	Sept. 22, 1953
2,804,227	Elfgren	Aug. 27, 1957

FOREIGN PATENTS

122,204	Sweden	July 13, 1948
931,418	France	Oct. 20, 1947