

March 18, 1930.

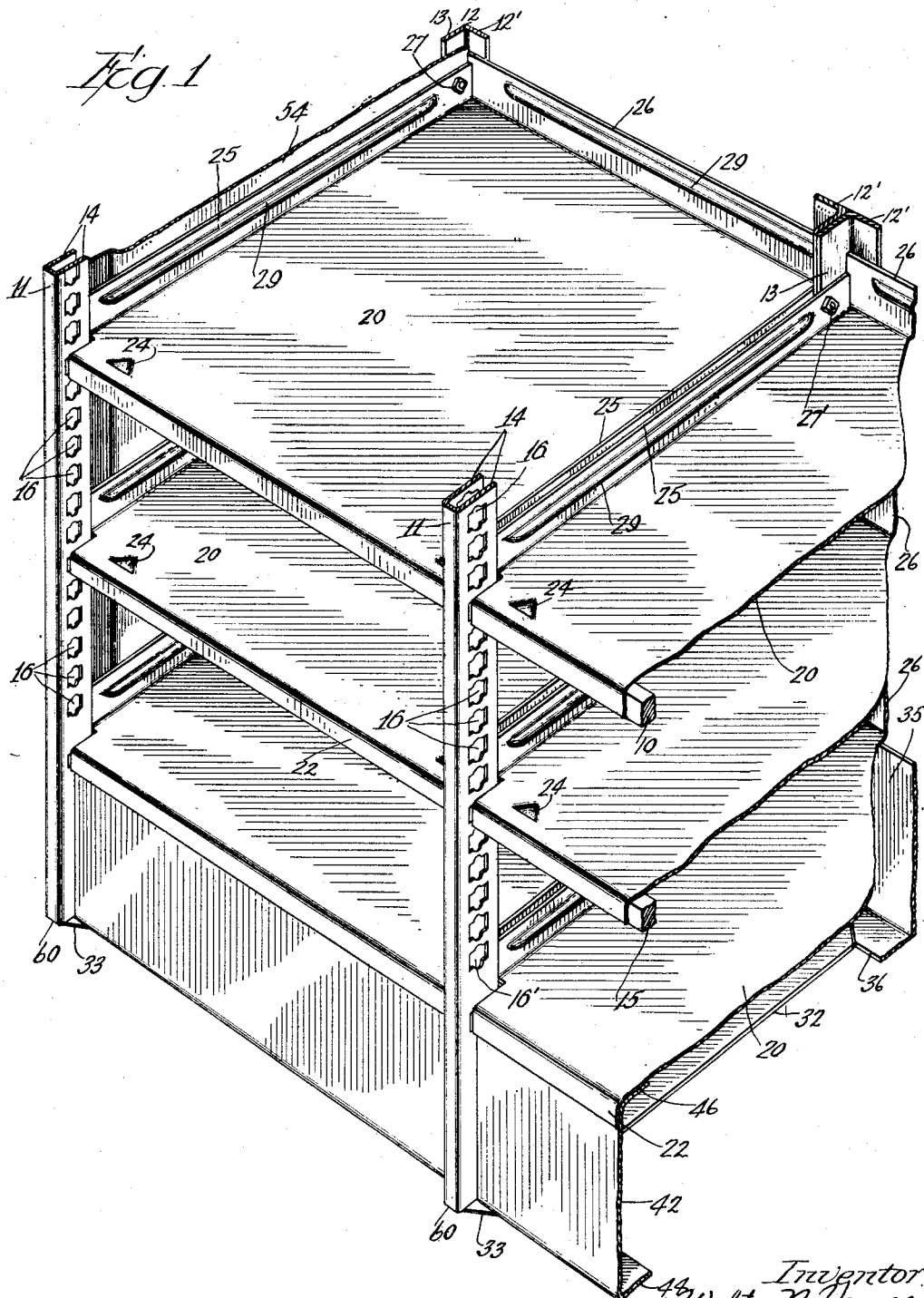
W. N. VANCE

1,750,696

SHEET METAL RACK

Filed May 16, 1927

5 Sheets-Sheet 1



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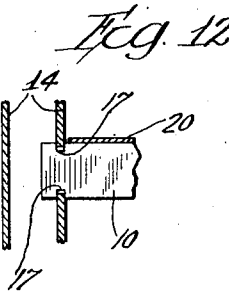
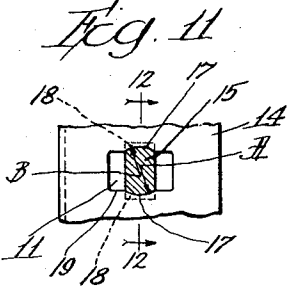
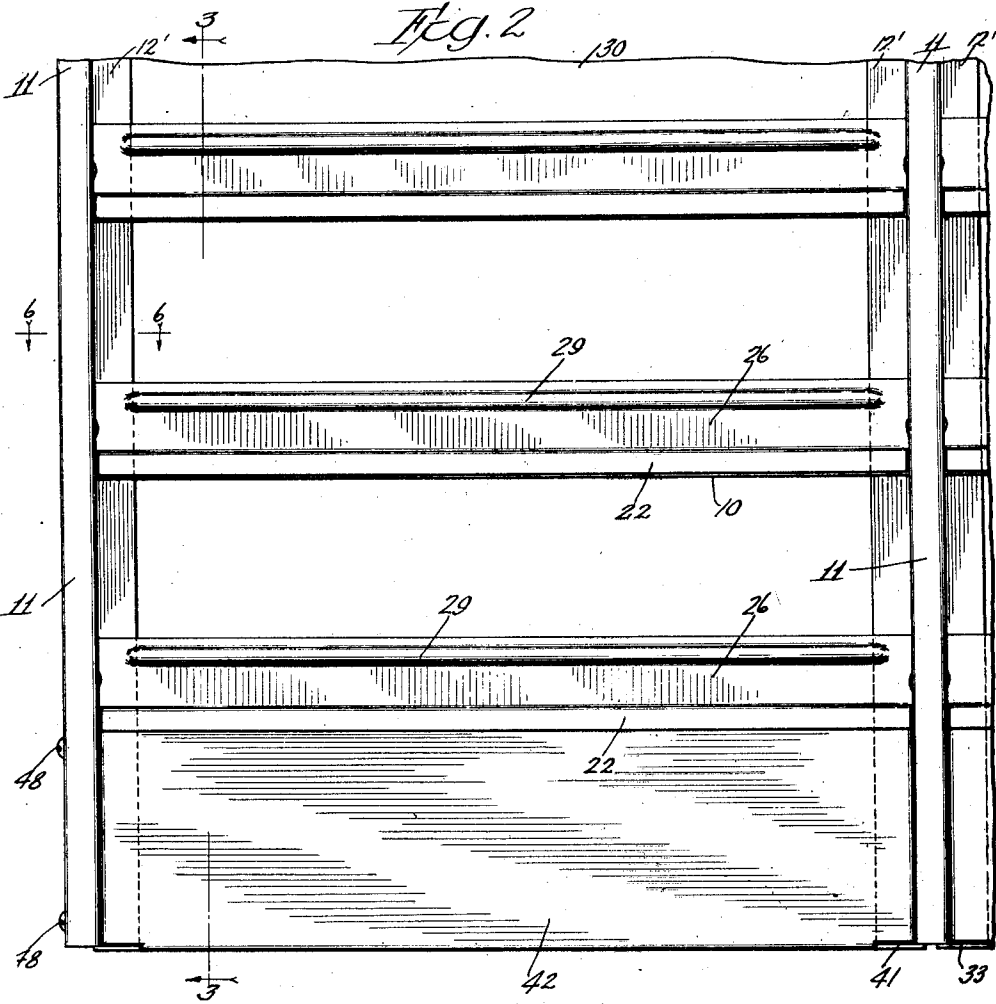
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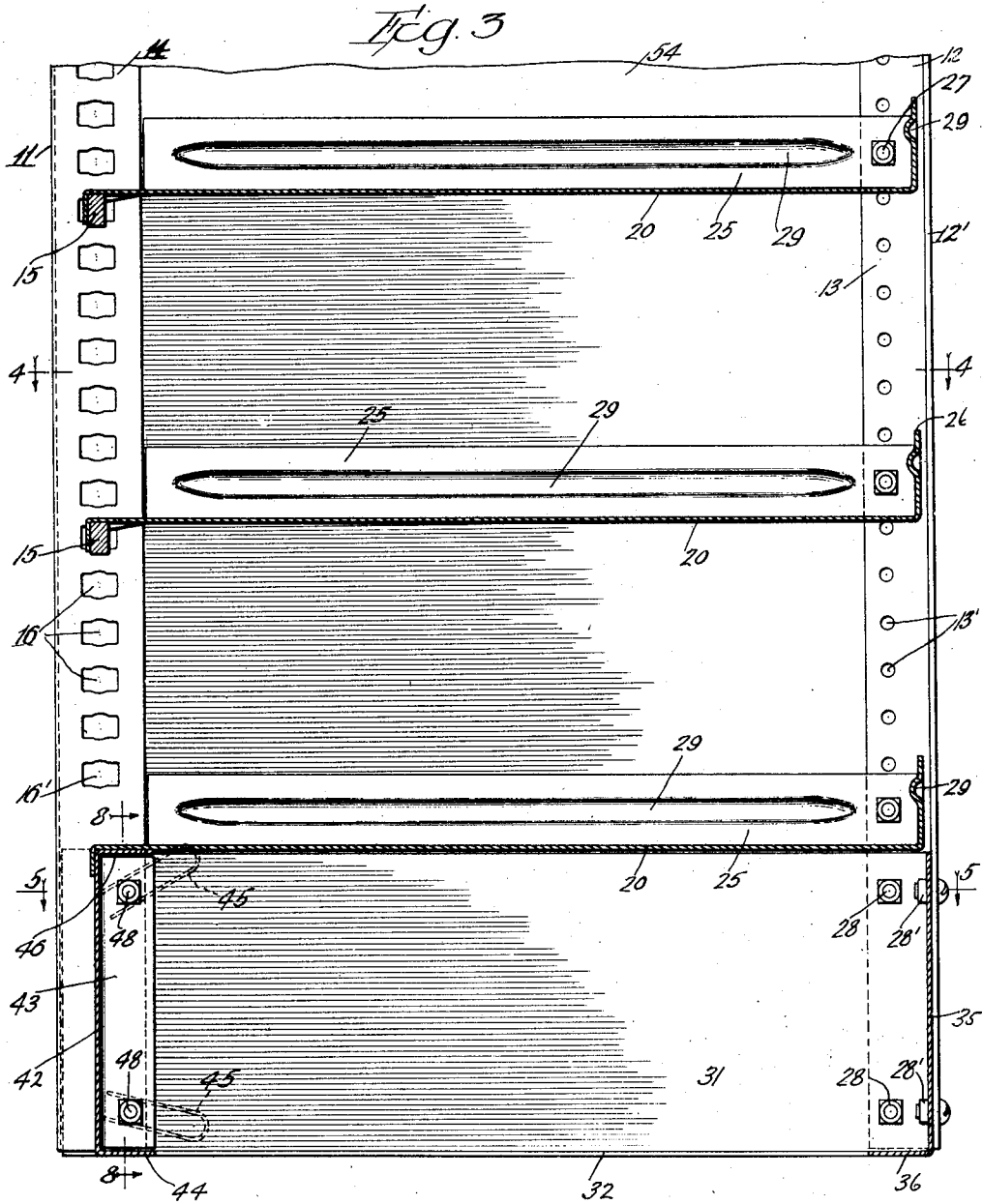
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SHEET METAL RACK

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5 Sheets-Sheet 3



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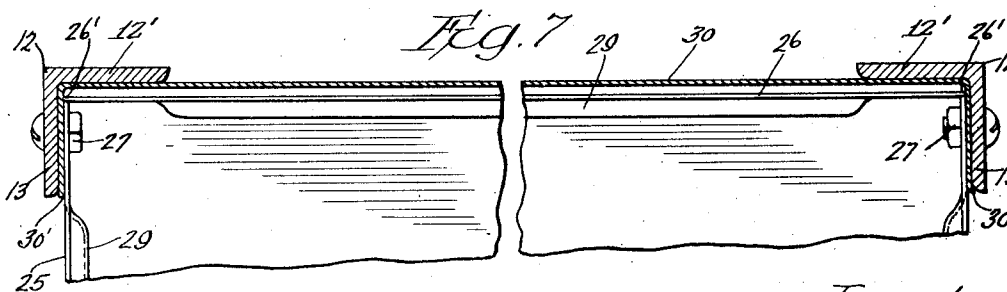
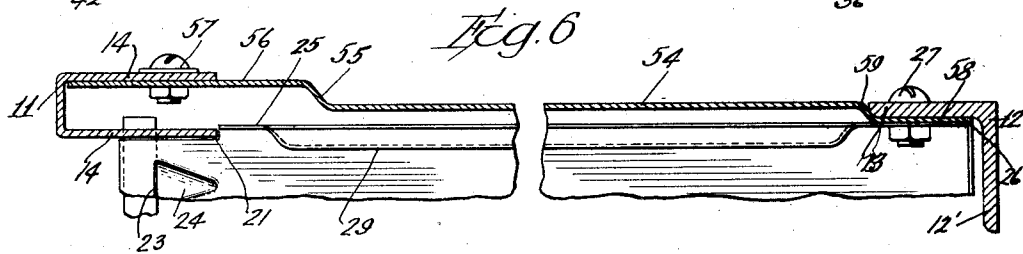
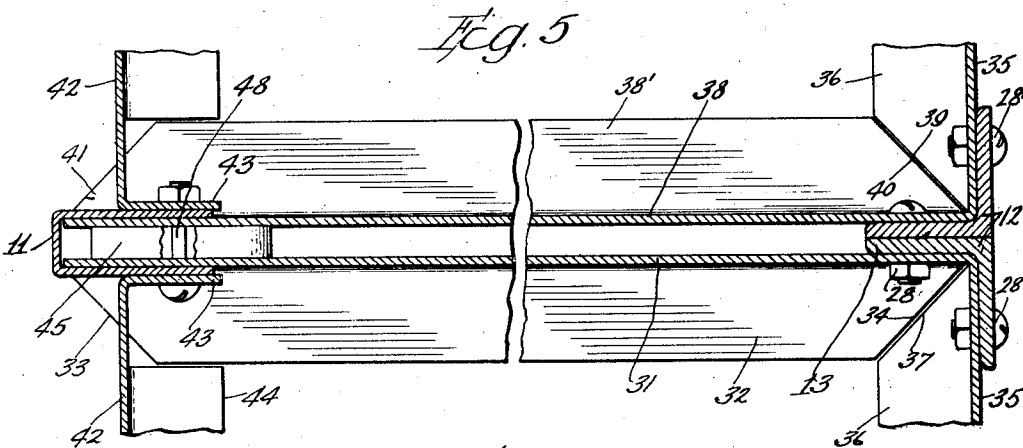
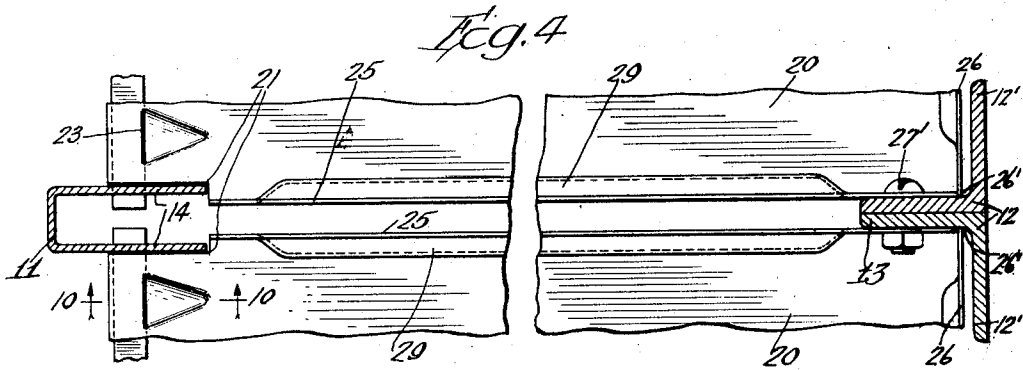
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SHEET METAL RACK

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5 Sheets-Sheet 4



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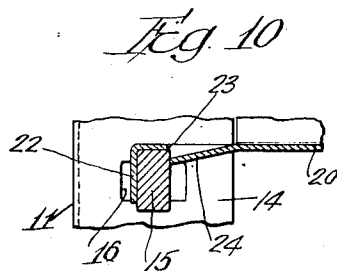
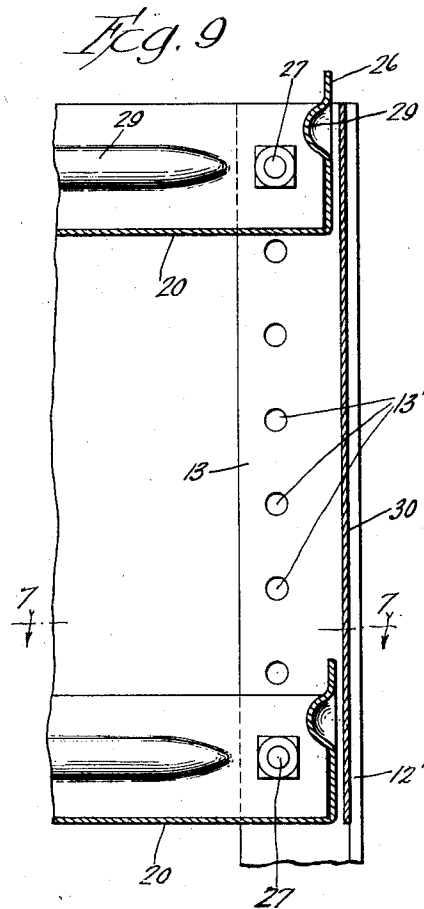
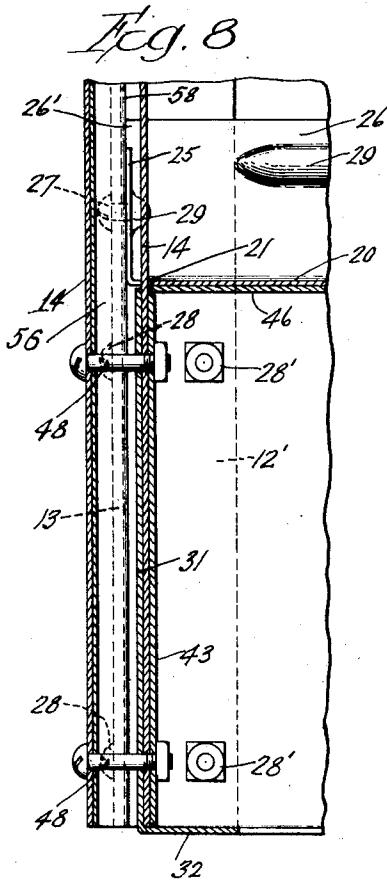
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SHEET METAL RACK

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

WALTER N. VANCE, OF CHICAGO HEIGHTS, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO LYON METAL PRODUCTS, INCORPORATED, OF AURORA, ILLINOIS, A CORPORATION OF ILLINOIS

SHEET-METAL RACK

Application filed May 16, 1927. Serial No. 191,584.

This invention relates in general to sheet metal racks or shelf structures and has particular reference to a rack for storing relatively light weight objects and adapted for installation where conservation of space is a chief consideration.

The principal object of the invention is the provision of an improved sheet metal rack of simple construction in which the shelves are placed relatively close together to provide a maximum amount of shelf space in a given shelf structure.

Another important object of the invention is the provision of a simplified shelf structure having shelves bolted directly to spaced apart uprights to eliminate cross bearers between uprights.

Another object of the invention is the provision of an improved shelf member for a shelf rack, said shelf member having flanges adapted to engage and brace upright portions of the shelf rack and replace cross bearers and braces heretofore considered necessary.

Another object of the invention is the provision of a shelf structure having an improved supporting base adapted to receive and distribute the load carried by the uprights of the shelf structure.

Another important object of the invention is the provision of a shelf structure having channel shaped uprights provided with improved slots for engaging cross bearers mounted therebetween.

Numerous other objects of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a perspective view of a sheet metal shelf structure embodying my invention, parts thereof being broken away to reveal details of constructions;

Fig. 2 is a front view of the shelf structure;

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

Fig. 4 is a section taken on line 4—4 of Fig. 3;

Fig. 5 is a section taken on line 5—5 of Fig. 3;

Fig. 6 is a section taken on line 6—6 of Fig. 2;

Fig. 7 is a section taken on line 7—7 of Fig. 9;

Fig. 8 is a section taken on line 8—8 of Fig. 3;

Fig. 9 is a side view of the structure shown in Fig. 7;

Fig. 10 is a detail view showing the construction of a shelf member and bearer;

Fig. 11 is a detail view showing a bearer mounted in the notched upright support member; and

Fig. 12 is a section taken on line 12—12 of Fig. 11.

To illustrate my invention I have shown on the drawings a shelf structure consisting of a plurality of shelf sections. Each section comprises front uprights 11, rear uprights 12, a plurality of bearers 15 engaging between said front uprights and shelf members 20 supported upon said bearers at the front and bolted to said rear uprights at the rear.

Each front upright 11 comprises a column of U-shaped cross section, the sides 14 of which are disposed rearwardly and provided with a plurality of spaced slots 16. These slots provide means for mounting the bearers of adjacent sections. The bearers of any one shelf section are mounted between opposed faces of adjacent front uprights, and each upright provides support for two adjoining shelf sections.

The rear uprights 12 comprise angle irons adapted to form the rear corners of each shelf section. The angle irons have legs 12' arranged to embrace the rear edges of the shelf members 20, and forwardly extending legs 13 arranged to embrace the side edges of the shelf members 20. The legs 13 are provided with a series of spaced bolt holes 13' which are spaced to correspond with slots 16, and which provide means for attaching the shelves 20 to the rear uprights.

The adjacent rear uprights of adjoining shelf sections are arranged having outer faces of legs 13 in registering engagement and are fastened together by shelf supporting bolts

27' which pass through the aligned holes 13' of each upright.

The sides 14 of the front uprights are provided with a plurality of closely spaced slots 16 which are adapted to detachably engage the ends of the bearers 15. The lowermost slot 16' is spaced from the bottom of the upright to provide room for the attachment of a base structure to the upright therebelow. The slots are of substantially rectangular form having long sides 19 disposed horizontally, that is to say at right angles to the longitudinal axis of the upright 11. Each side 19 is provided with an arcuate portion 17, cutout therefrom and having centers of curvature A and B. The bearers 15 comprise rods of rectangular cross section and are provided at each end with notches 18 for engagement with slots 16. Notches 18 are provided in opposite short faces of each bearer near the ends thereof. The bottoms of the notches comprise arcuate surfaces 18 corresponding to the arcuate portions of the slot 16. The rectangular portion of slot 16 is adapted to permit endwise insertion of the bearer 15. The bearer is thus inserted until the arcuate portions 17 of the slot register with the arcuate surfaces of the bearer notches 18. The bearer is then rotated about its longitudinal axis until the curved surfaces 18 of the notches wedge into engagement with the corresponding arcuate portions 16 of the slot and the bar is tightly held in place. The bar may be removed by rotating it in either direction to disengage the curved surfaces.

The foregoing construction of notched bearer and slotted upright allows the provision of a structure in which shelf supporting bearers may be positioned relatively close together and is a fundamental factor making possible the arrangement of shelves in closely spaced relationship.

Shelves 20 are formed from single sheets of metal. Each shelf member comprises a rectangular shelf portion, integral side and rear flanges 25 and 26 bent upwardly from the shelf portion at the side and rear edges thereof. The side edges of the shelf member are notched as at 21 to engage the rearwardly disposed sides of uprights 11. Each shelf member extends between adjacent front uprights and is provided at its forward edge with a downwardly disposed flange 22 adapted to engage the front face of bearer 15. The body of the shelf member 20 is provided near the front edge with slits 23 and portions 24 are struck out therebehind to provide a downwardly disposed V-shaped depression having a lip for engaging the rearward face of bearer 15, which is held against rotation and consequent disengagement from slots 16 by engagement between flange 22 and struck out portion 24. The shelf members extend rearwardly of the bearers and front uprights and engage the rear uprights

12, having rear corners adapted to fit into the angle made by the two legs 12' and 13 of the uprights. The side flanges 25 are provided with bolt holes and are secured to the rear uprights by shelf bolts 27 and 27' mounted through said holes and registering holes 13' of adjacent rear uprights. The bolts 27' are slightly longer than bolts 27 and are adapted to fasten the flanges of shelf members of adjacent shelf sections to the adjacent legs 13 of adjacent rear uprights 12, and also serve to fasten the adjacent rear uprights of adjacent shelf sections together. The upstanding side and rear flanges provide a ledge around the side and rear of each shelf to prevent the spilling of articles stored thereon. The side and rear flanges 25 and 26 of the shelf member are provided with inwardly disposed ridges 29 therealong, which portions overhang the exposed heads of bolts 27 and 27' and the inner edges of the rearwardly disposed faces 14 of the front uprights, and prevent boxes or other articles stored on the shelf from catching upon the exposed bolt heads or the front uprights during withdrawal from the rack. These inwardly disposed portions also provide great rigidity for the flanges and give added strength to the whole structure.

The rear flanges 26 have lateral cut edges 26' extending outwardly past the plane of the side flanges 25 so that when the shelf bolts 27, 27' are tightened, the cut edges 26' bite into the legs 13 of the rear uprights, and form firm bracing joints between the shelf members and the rear uprights. These joints multiplied by the number of shelves in a section provide great rigidity in the shelf structure and eliminate the necessity of having cross brace members to strengthen the structure.

A side panel 54 adapted to enclose the sides of the shelf structure, is provided. Its function is to close the sides of the structure for the sake of appearance and to resist front-to-back sway in structures where the shelves are placed relatively far apart. The panel comprises a sheet of metal adapted to be fastened between the outer front and rear uprights. The rear edge 58 of the panel is secured between the vertical side flanges of the shelf members 20 and the lateral leg 13 of the rear upright and is fastened therebetween by the shelf bolts 27. The plate is bent at 59 to embrace the end of the leg 13 and extends forwardly as a continuation of the outer face of the rear upright. The panel is offset outwardly as at 55 and thence forwardly again as at 56 and extends within the front channel member 11 and is secured to the outer side 14 thereof by bolts 57 fastened through the slots of the channel.

The back of each shelf section may be enclosed by an optional rear panel 30 which comprises a sheet of metal sufficiently wide to

extend between rear uprights and having inwardly extending flanges 30' adapted to engage the inner faces of the lateral legs 13 thereof. The flanges 30' are provided with

5 a series of bolt holes to correspond with holes 13' in the legs 13 of the uprights and are adapted to be secured between lateral legs 13 and the lateral flanges 25 of the shelf members by the shelf bolts 27 and 27'.

10 The base for the rack consists of a plurality of box like structures engaging the bases of the uprights. Each shelf section has a separate base structure. Each base structure includes front, side and rear walls, comprising

15 vertical sheet metal panels. The side and rear walls are formed from an integral sheet of metal shaped and bent to form a vertical side panel 31 having an inwardly extending flange 32 bent therefrom at its base. This

20 flange has beveled edges 33 and 34. The front end of the side panel 31 is arranged to extend within the U-shaped upright 11 and to engage the inner face of a side 14 thereof. A vertical rear panel 35 is bent from the side

25 panel at the rear edge thereof and has an inwardly extending base flange 36. This flange also has beveled ends 37 and 39 which engage the beveled portions 32 and 40 of the side flanges. A vertical side panel 38, bent from

30 the rear wall portion 35 and integral therewith, extends forwardly therefrom and parallel with the opposite side panel 31. This panel also is provided with an inwardly extending base flange 38' corresponding to

35 flange 32 of the opposite wall portion. This flange 38 has beveled ends 41 and 40 to correspond with the similarly beveled portions of the other base flanges. The front end of the side panel 38 is arranged to extend within

40 the U-shaped upright 11 and to engage the inner face of a side 14 thereof. The rear corners of the combination side and rear base panels are adapted to engage in the interior angles of the rear uprights 12. Bolts 28

45 adapted to engage registering holes provided in the side panels 31 and 38 of adjacent base structures and the adjacent legs 13 of rear uprights 12, secure the side panels to the rear uprights. The rear panel is similarly secured

50 to the rear legs 12' of the rear uprights 12 by means of bolts 28' engaging registering holes provided in said rear panel and said rear uprights. The forward ends of adjacent panels 38 and 31 are spaced apart within

55 the front upright by means of a spacing block 45.

The front of the base, comprises a vertical sheet metal panel 42 extending between adjacent front uprights and having opposite

60 ends bent inwardly to form flanges 43 and an inwardly disposed flange 44 bent therefrom at the base thereof to form a foot or base for the front portion corresponding with the

65 inturned flanges 32, 36 and 38' of the side and rear walls respectively. The outer faces

of the sides 14 of a front upright 11 are engaged by the side flanges 43 of front panels of adjacent shelf sections. The inner faces of the upright are engaged with the forward edges of the side panels 38—31 of adjacent shelf structures. The flanges 43 and the panels 38—31 are fastened to the front upright by means of bolts 48 which pass through registering bolt holes provided in the flanges 43, the panels 38—31, the sides 14 of the uprights 12 and through the spacing block 45 to clamp the parts tightly together.

In this construction, the bases 60 of front uprights 11 are supported upon the lateral base flanges 32 and 38' of adjacent shelf sections. The flanges form relatively broad feet for the base portion of the upright and distribute the load carried by the front upright over a large floor space.

The front plate 42 of the base is provided with an inwardly extending flange 46 at its top edge which is adapted to support the front edge of the lowest shelf of the rack of the shelf structure, and to serve as a bearer for the lowest of shelf members 20. The downturned flange 22 of the bottom shelf member is arranged to overlap the front base plate 42 and the shelf extends rearwardly thereof and is attached to the rear uprights in the same manner as are the other shelves of the section.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A sheet metal rack, comprising spaced front U-shaped uprights and rear angle iron uprights, said front uprights having a longitudinal series of spaced apart slots, a plurality of bearers detachably engaging in said slots, sheet metal shelves having forward flanges folding over said bearers and having means engaging the bearers to prevent their disengagement from said slots, each of said shelves having side and rear upstanding flanges, means for bolting said flanges to said rear angle irons, and a side panel closing the opening between the sidemost front and rear uprights, said side panel having a front edge engaging the sides of said front U-shaped upright and bolted thereto through a slot in the outermost side and a rear edge secured to the rear upright.

2. A sheet metal rack, comprising spaced apart U-shaped front uprights and rear uprights, each of said U-shaped uprights having a vertical series of spaced apart slots, each

slot being rectangular in shape and having opposed arcuate portions, bearers for engaging in said slots, each bearer having arcuately notched ends to correspond with the opposed arcuate portions of a slot, whereby a bearer may be inserted in a slot and angularly turned and locked in position, and shelf members mounted on said bearers.

3. A sheet metal rack, having spaced uprights, said uprights having a plurality of spaced apart notches, each notch having straight parallel sides and opposed arcuate portions formed on different centers on said sides intermediate their ends, a plurality of bearers, each bearer having opposite ends formed with opposed arcuately shaped portions to correspond with the arcuate shaped portions of one of the notches, whereby the end of a bearer may be inserted in a notch and turned to lock it in position, and shelf members mounted on said bearers and having a part extending over the front edge of the bearers.

4. In a sheet metal rack, the combination of an upright provided with a series of bearer receiving slots, each slot having straight edges and opposed arcuate portions formed on different centers intermediate the ends of said edges, and a shelf bearer having ends formed with opposed arcuately shaped portions adapted to register with and be engaged in the arcuate portions of said slots.

5. A sheet metal rack, comprising spaced front and rear uprights, said front uprights being provided with a series of bearer receiving slots, each slot being rectangular in shape and having opposed arcuate portions, a plurality of shelf bearers having ends formed with opposed arcuately shaped portions adapted to register with and be engaged in the arcuate portions of said slots and shelves having front depending flanges engaging the front faces of the bearers and depending portions adapted to engage the rear faces of the bearers to prevent their disengagement from the slots.

6. A sheet metal rack, comprising spaced front and rear uprights, said front uprights being provided with a series of bearer receiving slots, each slot being angular in shape and having opposed arcuate portions of different centers arranged midway of said slots, a plurality of shelf bearers having ends formed with opposed arcuately shaped portions adapted to register with and be engaged in the arcuate portions of said slots, and shelves adapted to be supported by said shelf bearers, said shelves having struck out means engageable with said bearers to hold said bearers in position in said slots.

7. In a sheet metal rack construction, the combination of front U-shaped channel members and rear angle irons, said rear angle irons being arranged with corresponding legs engaged back to back and extending

forwardly opposite the opening of the front U-shaped channel members, said front U-shaped channel members being provided with a series of bearer receiving slots, a plurality of shelf bearers adapted to engage in said slots, horizontal sheet metal shelf members engaging said bearers, said shelf members having upstanding side and rear flanges, and means for attaching said flanges to said rear angle irons.

8. In a sheet metal rack construction, the combination of front U-shaped channel members and rear angle irons, said rear angle irons being arranged with corresponding legs engaged back to back and extending forwardly opposite the opening of the front U-shaped channel members, said front U-shaped channel members being provided with a series of bearer receiving slots, a plurality of shelf bearers adapted to engage in said slots, horizontal sheet metal shelf members engaging said bearers, said shelf members having upstanding side and rear flanges, side walls extending between the uprights, the front edge of said side walls being secured within the U-shaped channel members and the rear edge engaging the inner face of said rear angle irons, and means for attaching said flanges and said rear edge to said angle irons.

9. In a sheet metal rack construction, the combination of spaced-apart uprights having a series of bearer receiving slots, a shelf bearer having ends adapted for insertion in said slots, a sheet metal shelf having its forward edge provided with a depending flange adapted to engage the front face of said bearer, depending portions struck out from the face of said shelf and adapted to engage the rear face of said bearer, upstanding flanges formed at the side and rear edges of said shelf, said flanges having an integral, horizontally extending struck-out portion projecting inwardly of the shelves, and means to secure said flanges to said uprights.

10. In a sheet metal rack construction, the combination of spaced apart uprights having registering slots, a bearer having opposed ends adapted for insertion in the registering slots of adjacent uprights, a sheet metal shelf having its forward end provided with a depending flange adapted to engage the front face of said bearer, and having a depending portion adapted to engage the rear face of the bearer to hold said bearer in position.

11. In a sheet metal rack, the combination of spaced apart uprights provided with spaced apart slots, a bearer having opposed ends inserted in slots of adjacent uprights, a shelf member having its forward end provided with a depending flange overlying the front face of the bearer, the upper face of said shelf being slotted and depressed to en-

gage the adjacent rear face of the bearer to hold said bearer in position.

12. In a sheet metal rack construction, the combination of spaced uprights provided with spaced apart slots, a bearer having opposite ends mounted for angular locking movement in registering slots of adjacent uprights, a shelf member carried by said bearer, and means on said shelf member to hold said bearer in position in said slots.

13. In a sheet metal rack construction, the combination of spaced uprights, a sheet metal base therefor comprising an integral strip of metal bent to provide two vertical side walls and a connecting rear wall, said side and rear walls having inwardly extending base flanges forming relatively broad supports, and a sheet metal member bent to provide a front vertical wall and having an inwardly extending base flange providing a relatively broad support, said front member comprising the front wall of said first named member, certain of said uprights resting on the basal flanges of said sheet metal base and having lower portions bolted to the side wall of said sheet metal base, whereby to distribute the load of said upright.

14. A sheet metal rack construction, comprising a base having vertical front, back, and side wall portions and integral flanges on all of said wall portions and constituting broad base supports, all of said flanges lying in the same horizontal plane and spaced apart uprights bolted to said vertical wall portions and resting upon the horizontal flanges, whereby to distribute the load on said vertical uprights.

15. In a sheet metal rack construction, the combination of a sheet metal base, comprising vertical walls and integral horizontal base flanges forming relatively broad supports, an upright comprising a channel shaped member, said base being arranged with its vertical wall portion lying in the opening of the channel shaped member and bolted thereto with the bottom of the upright resting upon the horizontal flange of the base.

16. In a sheet metal rack, the combination of sheet metal base members, each base comprising rectangular sheet metal vertical walls having horizontal base flanges providing relatively broad supporting means and a plurality of channel shaped uprights, each upright disposed having adjacent vertical walls of two adjacent bases arranged within the opening of the channel upright, and resting on the horizontal flanges of adjacent base members, and means for securing together the walls of the upright and the walls of the adjacent bases.

17. In a sheet metal rack construction, comprising a base member formed of sheet metal, panels disposed in rectangular arrangement to provide front, back and side

vertical walls, said walls having lateral horizontal flanges provided at their bases, spaced apart uprights bolted to certain of said vertical walls and supported on the horizontal flanges thereof, bolts fastening said uprights and vertical walls, a shelf member resting on said base member and closing the top thereof, and shelves carried thereover by said uprights.

18. In a sheet metal rack construction, the combination of a plurality of base members, each comprising a sheet metal member bent to provide vertical side walls, and connecting vertical rear wall, said side walls having inwardly extending horizontal flanges at their bases, the ends of said flanges having diagonally cut ends, a sheet metal member bent to provide a front wall having lateral flanges at its opposite ends and an inturned, horizontal base flange, a plurality of channel shaped uprights having one of said vertical side walls having a portion disposed within the opening of the channel and a lateral flange of the front wall in engaged contact with the outer face of said channel member, bolts passing through said channel member and through said inwardly disposed portion of said side wall and the inturned flange of said front wall in engaged contact with the outer face of said channel member, bolts passing through said channel member and through said inwardly disposed portion of said side wall and the inturned flange of said front wall, a sheet metal member enclosing the top of said side, rear, and front wall members, whereby to form a shelf, and a vertical series of shelves carried thereover by said uprights.

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