

[54] **SHELF STRUCTURE**

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[*] Notice: The portion of the term of this patent subsequent to Apr. 1, 1992, has been disclaimed.

[22] Filed: **Apr. 29, 1974**

[21] Appl. No.: **464,916**

[52] U.S. Cl. **211/153; 34/238; 108/144; 108/156**

[51] Int. Cl.² **A47F 5/00**

[58] Field of Search **211/153; 34/238, 237, 57 A; 108/144, 156**

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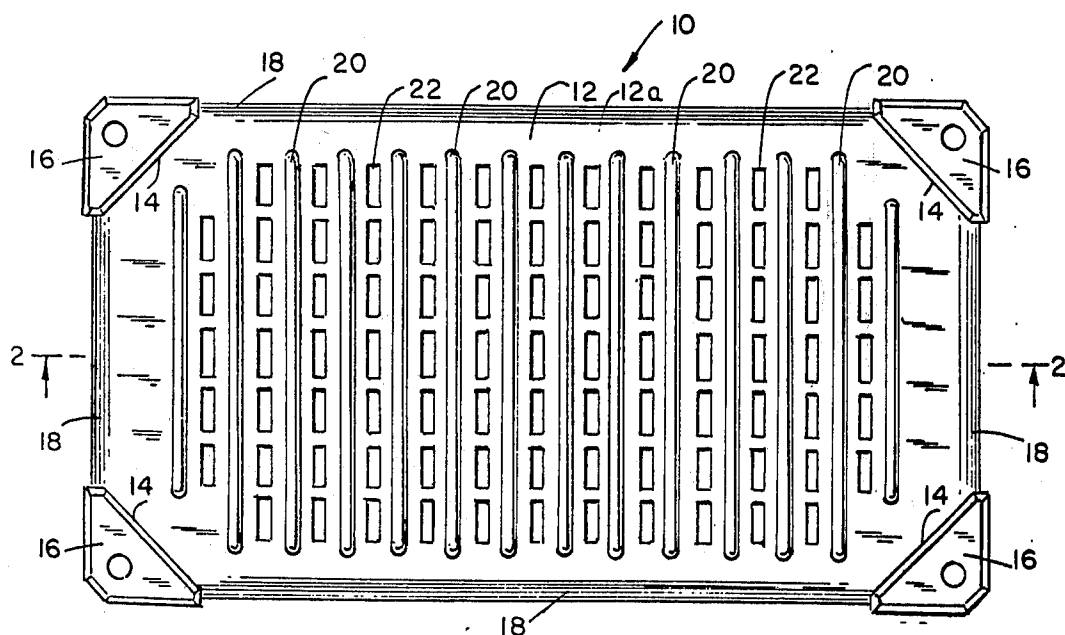
Attorney, Agent, or Firm—Friedman & Goodman

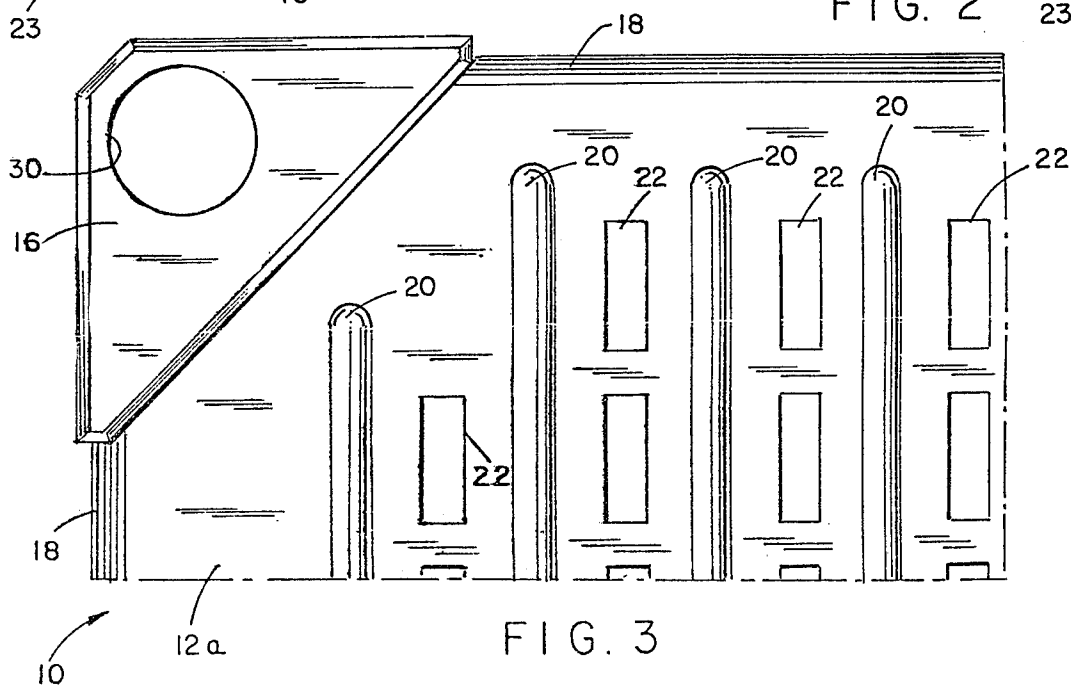
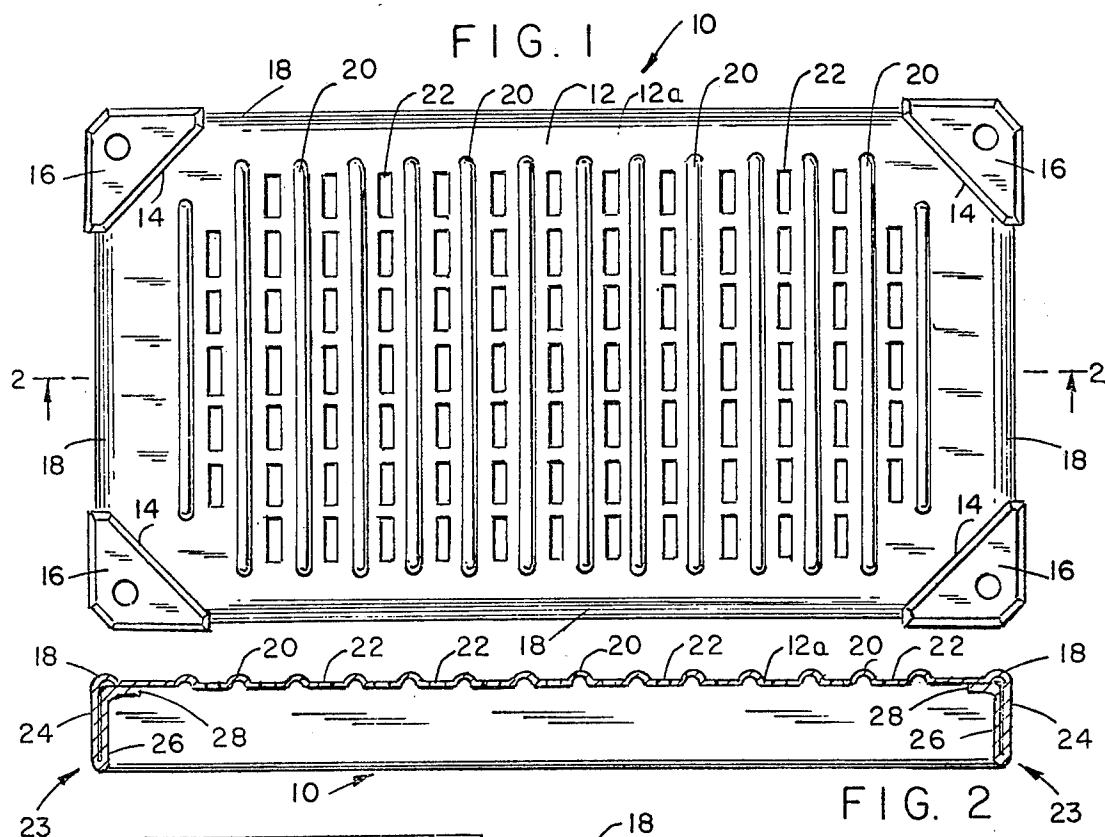
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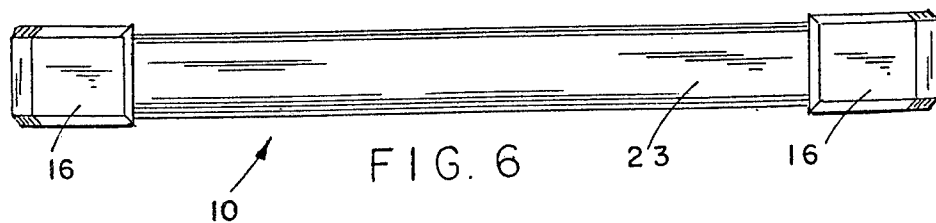
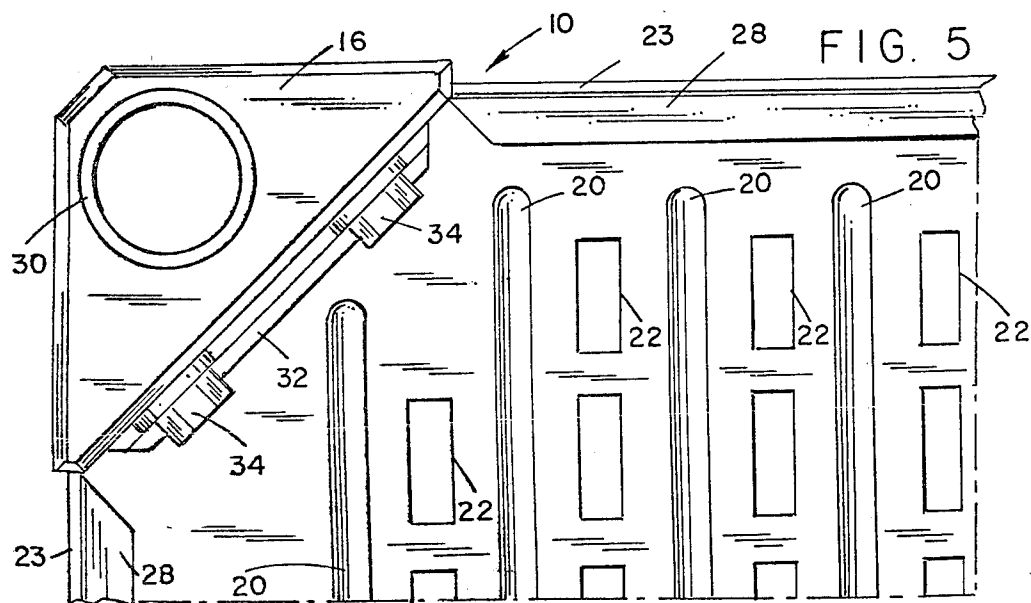
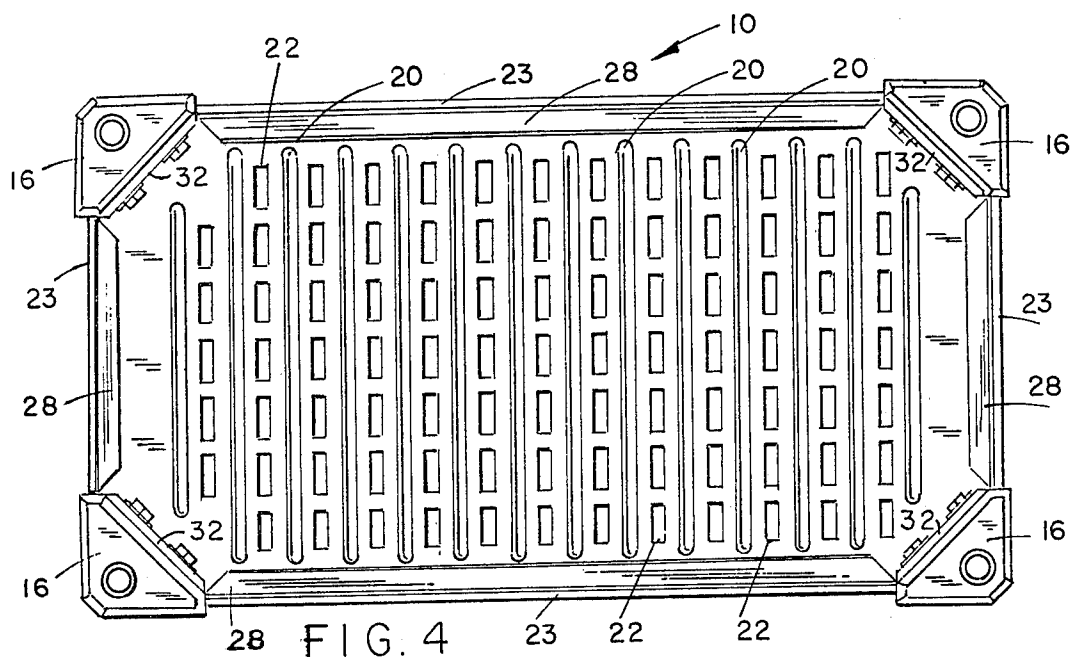
ABSTRACT

A shelf mountable on vertical support members is made of a rectangular piece of sheet metal and is provided with truncated corners. A flange extends around the periphery of the shelf including the regions of the truncated corners to reinforce the shelf. Connector members are clamped to the flange at the truncated corners and are adapted for mounting on the vertical support members. Spaced parallel ribs substantially extend between one pair of opposing edges of the shelf and are parallel to the other pair of edges. A row of elongate rectangular apertures is provided between each pair of spaced parallel ribs. The rows have lengths substantially corresponding to those of the ribs. In this manner, objects placed on the ribs are maintained at a level above the surface of the shelf and air is permitted to pass through the apertures and circulate around the objects including along the supported surfaces thereof. The ribs reinforce the shelf in the regions weakened by the apertures.

10 Claims, 6 Drawing Figures







SHELF STRUCTURE

BACKGROUND OF THE INVENTION

Shelves, and particularly those for industrial use, are frequently utilized to support objects while the latter dry or cool subsequent to a treatment process. To promote drying or cooling of objects in this manner, air is frequently circulated around the objects. However, objects placed on prior art shelves have frequently not been adequately dried or cooled on the undersides or in the regions of the support surfaces which abut against the shelf. The primary reason for this is that the known shelving does not permit free flow of air in the region between the shelving and the supported surfaces of the object.

For similar reasons, the known shelving has not been fully satisfactory when considered in connection with the hazards of fire. When objects accidentally ignite and water is directed in the region of the objects, such as by a sprinkler system, the water is not permitted to freely reach the regions of the supporting surfaces of the object, for the same reasons that air cannot freely reach these surfaces.

The present invention discloses a shelf which enhances the ability of air and water to flow between a shelf surface and the supporting surfaces of the objects while the strength or rigidity of the shelf is not compromised.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a shelf which does not have the above described disadvantages inherent in prior art shelves.

It is another object of the present invention to provide a shelf which is simple in construction and economical to manufacture.

It is still another object of the present invention to provide a shelf which supports objects a predetermined distance above the surface of the shelf and is provided with apertures over the supporting area to enhance circulation of air between the shelf and objects supported thereon.

It is yet another object of the present invention to provide a shelf which is provided with a plurality of spaced parallel ribs and straight rows of apertures between the ribs to increase the flow of air between the shelf and the object supported thereon to enhance the drying and/or cooling of the objects supported thereon.

It is a further object of the present invention to provide a shelf which supports objects above the upper surface thereof and which is provided with a plurality of apertures throughout the area to permit water to reach the supporting surfaces of the objects when the latter are on fire.

BRIEF DESCRIPTION OF THE DRAWINGS

With the above and additional objects and advantages in view, as will hereinafter appear, this invention comprises the devices, combinations and arrangements of parts hereinafter described by way of example and illustrated in the accompanying drawings of a preferred embodiment in which:

FIG. 1 is a top plan view of a shelf in accordance with the present invention, shown with connectors at the truncated corners thereof suitable for mounting on vertical shelf support members;

FIG. 2 is a cross section of the shelf shown in FIG. 1, taken along line 2—2;

FIG. 3 is a fragmented enlarged view of a corner of the shelf shown in FIG. 1;

FIG. 4 is a bottom plan view of the shelf shown in FIG. 1;

FIG. 5 is a fragmented enlarged view of a corner of the shelf shown in FIG. 4; and

FIG. 6 is a front elevational view of the shelf shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the FIGURES, wherein identical or similar parts have been designated by the same reference numerals throughout, a shelf 10 in accordance with the present invention is generally designated by the reference numeral 10.

The shelf 10 is shown in the FIGURES as being rectangular and having two pairs of opposing parallel sides or edges. However, it will become clear from the description that follows, that the invention is not limited to rectangular shelves and that any shelf configuration may be utilized while still embodying the essential features of the present invention.

The shelf 10 is advantageously made of plate or sheet material, such as sheet metal. Stainless steel, for example, may be utilized. However, any suitable material which can be formed in the manner to be described and which has sufficient rigidity to support the items or objects contemplated, may be utilized.

The rectangular shelf 10 of the present invention has two opposing major surfaces. The upper or supporting surface is designated by the reference numeral 12a in FIGS. 1-3.

The shelf is rectangular, as shown, and provided with truncated corners 14 where connector structures 16 are connected to the shelf. The connector structures 16 are suitable for mounting the shelf 10 on vertical support members (not shown) as to be described hereafter.

Extending about the periphery of the rectangular plate or sheet 12 is a bead 18, which is best shown in FIG. 2. The bead 18 reinforces the shelf and rigidifies the same for supporting heavy objects thereon.

A plurality of spaced protuberances in the form of ribs 20 are provided which rise above the surface 12a. The ribs 20 are parallel to each other and spaced from each other as shown. In the presently preferred embodiment, the ribs 20 substantially extend between one pair of opposing edges or sides of the rectangular sheet and are parallel to the other pair of opposing edges or sides. It has been found that the ribs 20 are effective for rigidifying the planar extent of the shelf when the ribs are straight. However, the present invention contemplates curved, undulating or other shaped ribs, which may be used with different degrees of advantage.

Disposed between each two ribs 20, there is provided a plurality of apertures 22. In the presently preferred embodiment, the apertures are arranged in rows, a row being provided between each two parallel ribs. Advantageously, the apertures 22 are rectangular and have dimensions of the same order of magnitude as the spacing between two adjacent ribs 20. In this manner, the spaces between adjacent ribs are substantially open to maximize the amount of air which can pass or circulate therethrough.

To maximize the ventilation effects and to rigidify or reinforce the shelf, the ribs and the rows of apertures are advantageously approximately the same length and each extends substantially across the width or the length of the shelf, each substantially extending between the regions of one pair of opposing edges or sides of the shelf. However, the ribs 20 and rows of apertures 22 advantageously do not extend to the very edges or sides themselves since this may somewhat weaken the shelf structure.

Referring to FIG. 2, it is shown that the shelf 10 includes two folded extensions or panels 24 and 26 which together form a sheet metal single edge 23. The sheet metal single edge 23 is in the nature of a peripheral flange which extends about the periphery of the shelf panel or sheet 12 including the regions of the truncated corners 14. The edge or flange 23 is provided to reinforce the shelf. Extending from the panels 26 are tabs 28 which are folded over into a plane parallel to the sheet 12 and connected to the latter in any suitable manner, such as by welding.

The connector structures are clamped to the flange 23 in the region of the truncated corners 14. The connector structures 16, which include tapered bores 30 therethrough, are clamped to the flange 23 by means of a clamping bar 32 which is disposed on the opposite side of the flange 23 from that on which the corner structure 16 is located. Screws 34 extend through the clamping bar 32 and through holes (not shown) which are provided in the flange 23. The screws 34 are received in threaded holes (not shown) of the corner structure 16 to thereby permit clamping or mounting of the corner structures 16 on the shelf.

The tapered bore 30 is suitable for receiving a tapered element which is complementary to the bore. When the tapered or conical elements are mounted on vertical support structures with their diameters decreasing in the upward direction, the tapered bores 30 can receive the tapered elements and abut thereagainst when the tapered bores are similarly oriented to have reduced diameters in the same direction. The corner structures 16 are more fully described in my co-pending application Ser. No. 369,523, filed on June 13, 1973 for "Shelving with Removable Corner Structures." My following patents describe vertical shelf support structures, including tapered elements, which are suitable for supporting shelves having corner structures as described above: U.S. Pat. Nos. 3,424,111; 3,523,508; 3,604,369; and 3,757,705.

As should be clear from the above description, the shelf 10 of the present invention permits objects to be placed on the ribs 20 and maintained at a level above a respective surface 12a. In this manner, air is permitted to pass through the apertures 22 and circulate around the objects including along the supported surfaces thereof. Objects placed on the shelving can thereby be more effectively dried or cooled. Similarly, a sprinkler system disposed beneath the shelf may also be made more effective for extinguishing a fire of an object by permitting water to flow through the apertures 22 and between the ribs 20.

The present invention is particularly practical because it exhibits the advantageous properties of rigidity and openness. Normally, the provision of apertures 20 alone would tend to weaken the shelf structure. However, this is alleviated in the present invention by the provision of the ribs 20 which reinforce the shelf throughout its supporting area. Accordingly, the ad-

vantage of openness is not sacrificed by the desirable characteristic of rigidity and strength. Such a shelf, as described above, can find many practical uses, particularly in industrial applications.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of the invention which is for purposes of illustration only and is not to be construed as a limitation of the invention.

What is claimed is:

1. A shelf mountable on a shelf support structure, said shelf comprising a substantially flat, one-piece rectangular sheet of material having downwardly depending corner portions, said corner portions at each corner being disposed in a plane substantially normal to a plane defined by said flat sheet; connector means on said sheet for mounting said shelf on the support structure, said connector means including corner connectors at each corner, each connector including a corner structure disposed on one side of a respective corner portion and a clamping bar disposed on an opposing side of the respective corner portion, at least one of said corner structure and clamping bar being provided with a recess dimensioned to receive a corner portion when the latter is clamped between an associated corner structure and clamping bar, surfaces of said corner structure and clamping bar being substantially complementary to each other; fastening means for maintaining each corner structure and associated clamping bar in abutment against each other and against a respective corner portion with the latter being received within the respective recess, said corner structures further being provided with means for mounting the same on a shelf support post, each corner connector defining a substantially closed crevice-free structure which houses a corner portion; a plurality of spaced protuberances projecting above one major surface of said sheet; and a plurality of apertures provided between said spaced protuberances, whereby objects placed on said protuberances are maintained at a level above said one major surface and air is permitted to pass through said apertures and circulate around the objects including along supported surfaces thereof.

2. A shelf as defined in claim 1, wherein said flat sheet of material is made from sheet metal.

3. A shelf as defined in claim 1, wherein said corner portions are truncated, said sheet being provided with a peripheral flange extending substantially around an entire periphery of said sheet including in regions of said truncated corner portions to reinforce said sheet.

4. A shelf as defined in claim 1, wherein said protuberances comprise a plurality of spaced ribs.

5. A shelf as defined in claim 4, wherein said ribs substantially extend between one pair of opposing edges and are parallel to the other pair of opposing edges.

6. A shelf as defined in claim 4, wherein said spaced ribs are straight and parallel to each other.

7. A shelf as defined in claim 6, wherein said apertures comprise a row of spaced apertures between each two spaced parallel ribs.

8. A shelf as defined in claim 7, wherein each aperture is substantially rectangular and has dimensions of the same order of magnitude as the spacing between two ribs, whereby the spaces between adjacent ribs are substantially open to maximize the amount of ventilation therethrough.

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9. A shelf as defined in claim 7, wherein said ribs and rows of apertures are straight and each parallel to one pair of opposing edges of said sheet.

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10. A shelf as defined in claim 9, wherein said ribs

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and rows of apertures are approximately the same length and each substantially extend between the other pair of opposing edges.
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