

[54] **ADJUSTABLE SHELVING STRUCTURE**
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339/128

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[57] **ABSTRACT**

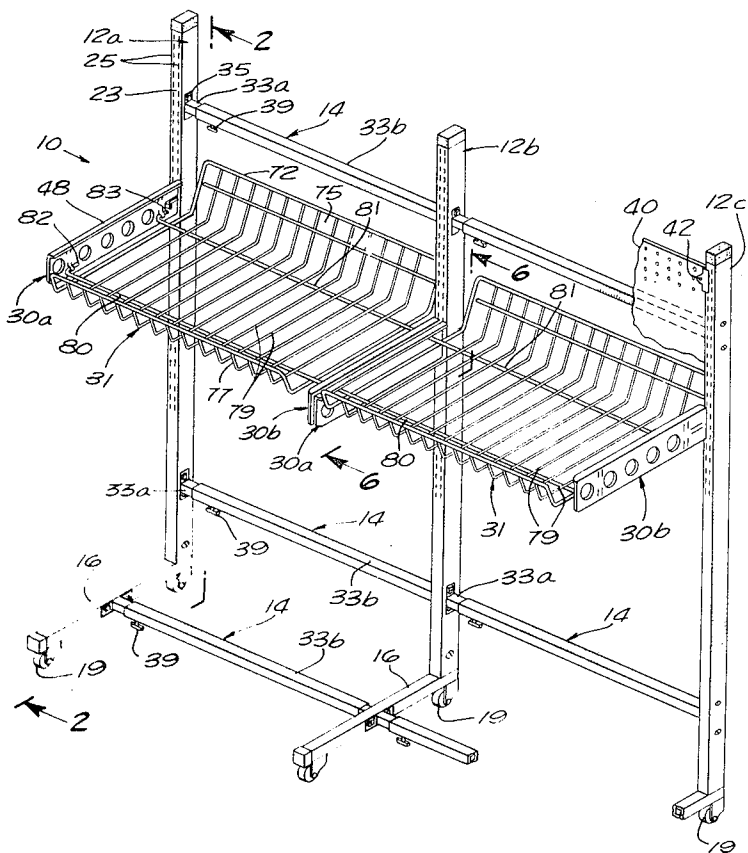
An adjustable shelving structure is provided which includes horizontally extending brackets for supporting wire shelves on vertical upright posts. Each of the brackets is adapted to be attached by loop elements located along either its upper or lower portions to hook on the end of the wire shelf. When the bracket is attached to the shelf by the loop elements along its lower portion, the top of the bracket extends above the bottom plane of the shelf such as to provide an end-wall therefor and when the bracket is attached to the shelf by the loop elements along its upper portion, the top of the bracket is even with the bottom plane of the shelf such as to provide an unobstructed end therefor.

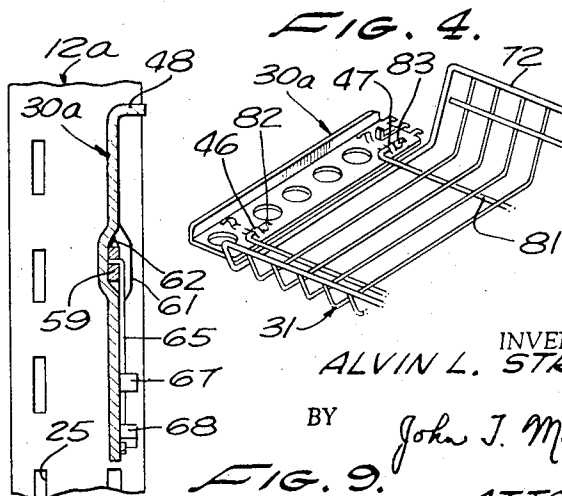
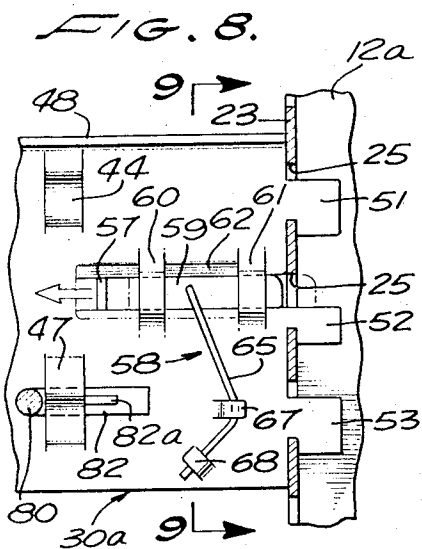
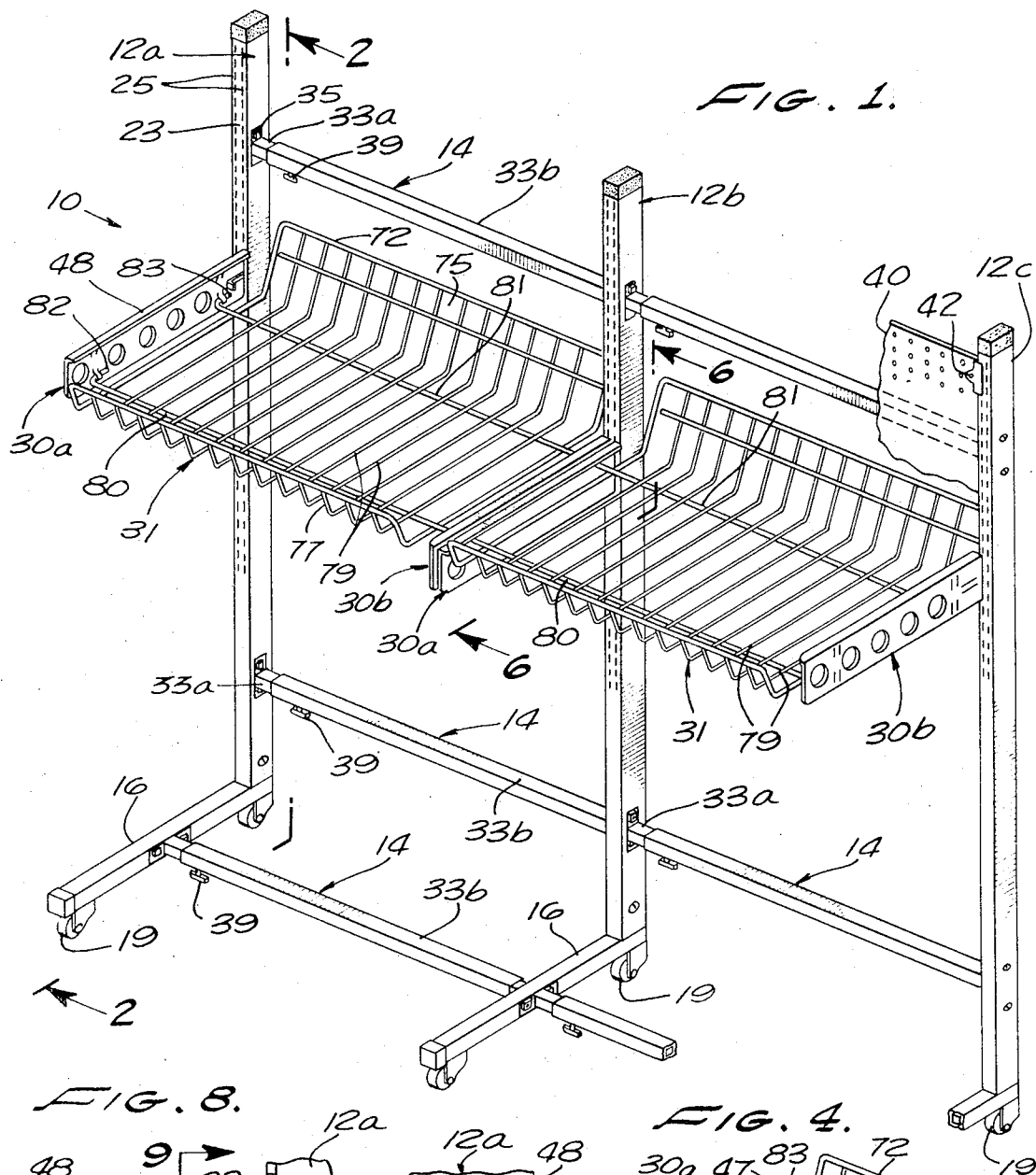
7 Claims, 10 Drawing Figures

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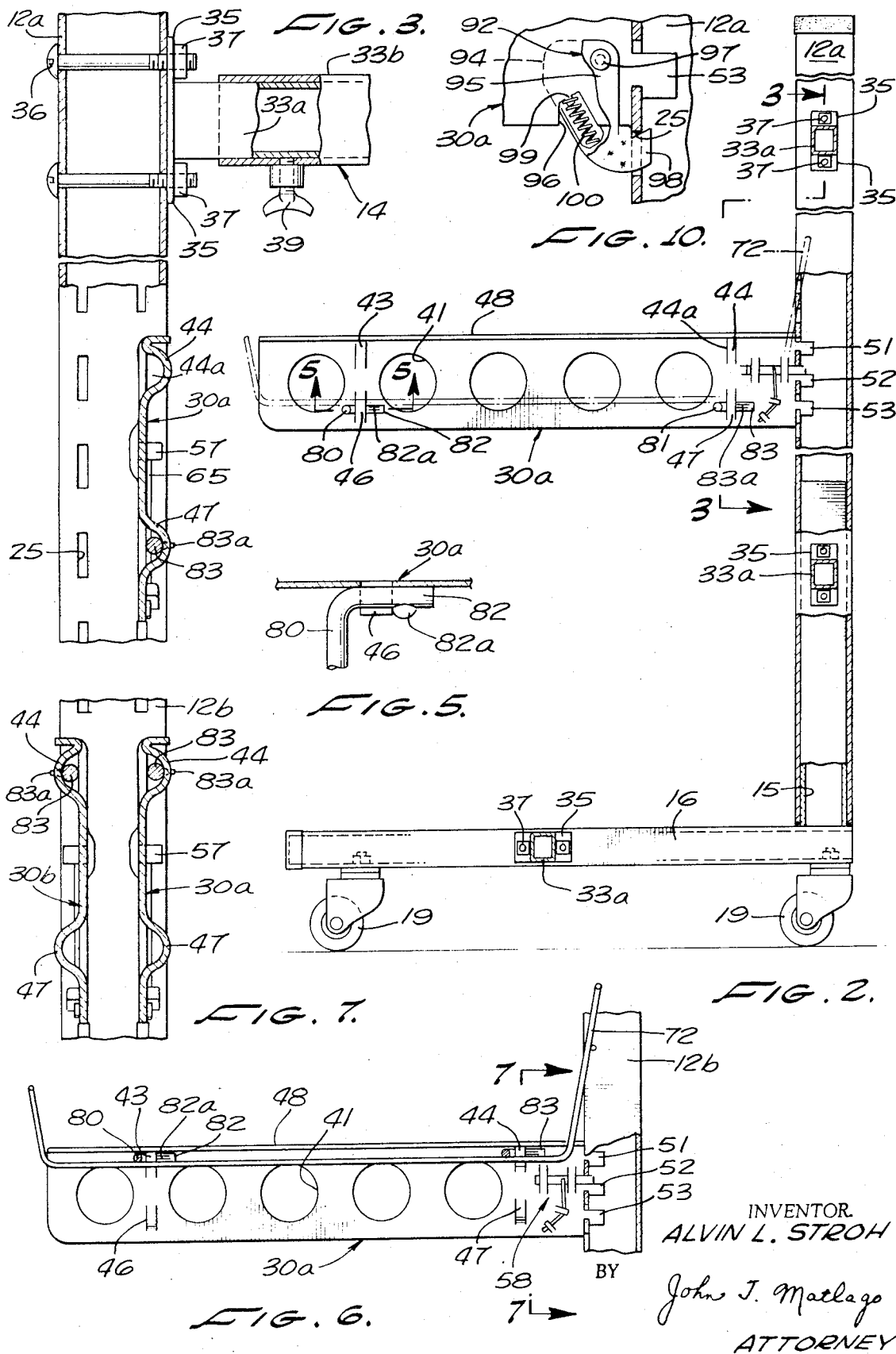
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ADJUSTABLE SHELVING STRUCTURE

This invention relates to display rack assemblies and more particularly to a display rack assembly especially useful for displaying merchandise in retail stores.

In order to reduce the number of component parts required to assemble different size display racks for use in supermarkets, for example, it is highly desirable to provide some component parts therefor that are capable of being connected in more than one way and others that are adjustable so as to permit a choice in the spacing and number of parts used, thereby enabling the overall storage capacity and length of the rack assembly to vary. Thus by selecting and combining appropriate ones of a limited number of such component parts it is possible to provide a display rack assembly for meeting any one of a variety of merchandising situations.

Accordingly, one of the objects of the invention is to provide an easily assembled, adjustable display rack for displaying merchandise in a retail store.

Another object of the invention is to provide a simplified structure for attaching a wire shelf on a shelf supporting bracket.

Another object of the invention is to provide a novel bracket for supporting the end of a wire shelf on an upright structure, the bracket being capable of being connected to either, provide an end-wall for the wire shelf or not provide an end-wall therefor.

A further object of the invention is to provide a simplified mechanism for positively locking a horizontally extending bracket onto an upright post.

With these and other objects in view, the invention consists of the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained as herein set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

FIG. 1 is a perspective view illustrating the display rack of the present invention;

FIG. 2 is a side elevational view of the display rack taken along the arrows 2—2 of FIG. 1 showing a bracket attached to an upright post and the bracket attached to the end of a wire shelf to provide an end wall therefor;

FIG. 3 is a sectional view showing a portion of an upright post with an adjustable spacer bar attached thereto as taken along the arrows 3—3 of FIG. 2;

FIG. 4 is a perspective view showing how the bracket is positioned relative to a wire shelf to enable the hooks on the ends of the wire shelf to be inserted in the openings of the loop elements provided on the bracket;

FIG. 5 is a sectional view taken along the arrows 5—5 of FIG. 2 showing how the hook on the end of the wire shelf is locked on the loop element of the bracket;

FIG. 6 is an elevational view taken along the arrows 6—6 of FIG. 1 showing a bracket attached on the upright post and the bracket attached to the end of a wire shelf without providing an end wall therefor;

FIG. 7 is a sectional view as taken along the arrows 7—7 in FIG. 6 showing the wire shelves attached to the respective brackets carried on the middle upright post;

FIG. 8 is an enlarged view of the inner end portion of the bracket showing details of the locking mechanism for locking the bracket to the upright post;

FIG. 9 is a sectional view of the locking mechanism as taken along the arrows 9—9 of FIG. 8; and

FIG. 10 is a view of another embodiment of the locking mechanism shown in FIG. 8.

Referring to FIG. 1 of the drawings, a perspective view of an embodiment of the display rack 10 of the present invention is shown. In order to best disclose the features of the invention, the rack 10 is shown as including a framework comprising three spaced upright posts 12a, 12b, and 12c, with adjacent upright posts interconnected by upper and lower horizontally disposed adjustable spacer bars 14. It should be noted, however, that a basic module of the display rack in accordance with the invention need only provide for two such upright posts. The upright posts are formed of a rectangular steel tube structure and the lower end of each upright post is slidably fitted over the end of a vertical member 15 (FIG. 2) attached to the back end of a forwardly extending horizontal base 16. The horizontal bases 16 are likewise interconnected by adjustable spacer bars 14, as shown in FIG. 2, to thereby form a sturdy overall frame structure. Casters 19 may be provided on each of the lower ends of the base 16 to facilitate the movement of the display rack.

The front wall 23 of each of the upright posts is provided with two columns of vertically spaced openings 25, as shown, in which the inner ends of a shelf supporting bracket 30a or 30b can be inserted and secured. Thus, as shown in FIG. 1, a first wire shelf 31 having brackets 30a and 30b respectively connected on the left and right ends thereof spans the distance between the left upright post 12a and the middle upright post 12b, with the inner end of bracket 30a secured to the left upright post 12a and the inner end of the bracket 30b secured to the middle upright post 12b. In a similar manner a second wire shelf 31 having brackets 30a and 30b respectively connected on the left and right end thereof spans the distance between the middle upright post 12b and the right upright post 12c, with the inner end of bracket 30a secured to the middle upright post 12b and the inner end of bracket 30b secured to the right upright post 12c.

Each of the adjustable spacer bars 14, which is formed of rectangular steel tubing, comprises a first tube 33a which telescopically fits within a second tube 33b. Each of the tubes 33a and 33b is provided with vertically disposed ears 35 on the outer ends thereof by which the adjustable bar 14 is attached to a respective side of the upright posts. Thus, as shown in FIGS. 2 and 3, bolts 36 passing through the upright post 12a and the ears 35 are provided with nuts 37 for holding the tube 33a to the upright post 12a. After the tubes 33a and 33b of each of the bars 14 have been adjusted to provide the span between adjacent upright posts for accommodating a particular length wire shelf 31, wing nuts 39 on each of the bars 14 lock the tubes 33a and 33b thereof in a fixed position. It should be noted that by providing for the upright posts 12a, 12b, and 12c to be adjustable in their horizontal spacing, the posts can be readily positioned to accommodate wire shelves of different lengths. It should be further noted, as illustrated in FIG. 1, that a peg board 40 may be provided on the display rack. The peg board 40 would preferably span the distance between adjacent upright posts and be attached at either end thereof to the upright posts by end holders, such as the end holder 42 shown attached to upright post 12c.

An elevational view of the display rack is shown in FIG. 2, while looking in the direction of arrows 2—2 in FIG. 1. As shown, the left hand bracket 30a is generally rectangular in shape and formed of sheet metal with spaced openings, such as the circular opening 41 shown, to lighten the weight of the bracket and provide a pleasing appearance. The sheet metal bracket 30a is formed with a pair of upper loop elements 43 and 44 horizontally spaced from each other along the upper portion of the bracket, and a pair of lower loop elements 46 and 47 similarly spaced from each other along the lower portion of the bracket. Each of the loop elements is preferably formed by punch equipment employing a die which first severs the vertical sides of a band of the metal forming the wall of the bracket and then causes the band of metal to be permanently deformed in an outwardly bowed shape with both the ends thereof preferably forming an integral part of the wall of the bracket. Thus each of the loop elements forms a horizontally extending opening, i.e., an opening extending parallel to the wall of the bracket such as opening 44a for loop element 44. As will be more clearly discussed hereinafter in connection with FIGS. 3 and 7, the horizontally extending opening of loop elements thus formed on the bracket is provided with a cross-sectional shape necessary in assembling and fastening the wire shelf to the bracket. A top ledge 48 is formed along the length of the upper end of the bracket 30a for the purpose of stiffening the bracket.

The inner end of each of the brackets 30a and 30b is provided with three lugs 51, 52 and 53. As shown in FIG. 8 for brackets 30a, each of these lugs has an outwardly projecting portion 54 and a downwardly projecting hook portion 55 provided with an inner notch 56. The lugs 51, 52 and 53 are vertically spaced from each other a distance equal to the vertical spacing of adjacent openings 25 in the upright post 12a. The bracket 30a is mounted on the upright post 12a at a desired vertical position by inserting the three lugs 51, 52 and 53 through three adjacent openings 25 in the upright post. After inserting these lugs through the openings 25, the bracket 30a is forced downwardly whereby the front wall 23 of the upright post 12a engages the respective notches 56 on each of the lugs to hold the bracket 30a in place. It should be noted that the vertical height of the middle lug 52 is smaller than the height of the other lugs such that it occupies less of the opening 25 in which it is seated. As will be explained infra, the remainder of this opening 25 is used for receiving a sliding arm member 59 which provides for locking the bracket on the upright post.

Each of the brackets 30a and 30b is provided with a locking mechanism 58. Thus, as shown for bracket 30a in FIGS. 8 and 9, the locking mechanism comprises a horizontally extending arm member 59 which is fitted to slide in a pair of horizontally spaced loop elements 60 and 61 formed across a depression 62 provided on the inner end portion of bracket 30a. The loop elements 60 and 61 are formed, similarly to the loop elements 43 and 44, by shearing the right and left vertical sides of two spaced bands of the metal forming the wall of the bracket and then permanently outwardly deforming the bands to form horizontally extending openings therein. A stiff spring wire 65 has its lower portion permanently held by clips 67 and 68 formed on the

wall of the bracket below the sideable arm member 59. The clip 67 is formed by punching out a small rectangular portion of the wall of the bracket leaving only the left side, as shown, integrally connected to the wall. The clip 68 which is located below and to the left of the clip 67 is similarly formed leaving only its lower side integrally connected to the wall. The lower portion of the spring wire 65 is then anchored in the two clips and the upper portion is pulled forward against the action of the spring such that the upper end of the spring can be fastened on the arm member 59. The spring action of spring wire 65 thus tends to hold arm member 59 in a rearward direction in which the inner end of member 59 fits into the portion of the opening 25 in the upright post 12a remaining after the middle lug 52 on the bracket 30a has been inserted and seated therein, thus serving to positive lock the bracket on the upright post 12a. An outwardly extending tab 57 on the forward end of the arm member 59 enables the arm member 59 to be retracted against the action of spring wire 65 to withdraw the inner end of arm member 59 out of the opening 25 when it is desired to detach the bracket 30a from the upright post 12a. It should be noted that no special action other than inserting the lug end of the bracket in openings 25 is required to attach the bracket to the upright post 12a, and the only action required to detach the bracket is to retract the locking arm member 59 to enable the lug end to be lifted and removed from the post 12a.

The wire shelf used on the display rack 10 is formed of a generally U-shaped outer frame 72 inasmuch as the outer frame 72 has a flat bottom with a back portion 75 and a front portion 77 bent upwardly to form a retainer for articles positioned on the wire shelf. The outer frame 72 is fabricated from relatively heavy gauge wire. The outer frame 72 is provided transversely along the length thereof with a plurality of regularly spaced lighter gauge wire elements 79, each having a U-shape corresponding to that of the outer frame 72. The outer frame 72 is also provided on the bottom thereof with a pair of spaced longitudinally extending heavy gauge reinforcing wire members 80 and 81. The wires of the shelf are secured to frame 72 by spot welding. Each of the wire members 80 and 81 extend beyond the outer sides of the frame 72, and the outer ends of each of the wire members are bent inwardly at a right angle to form L-shaped hooks 82 and 83, respectively. Hooks 82 and 83 are spaced apart a distance equal to the horizontal spacing of the pair of upper loop elements 43 and 44 or the pair of lower loop elements 46 and 47 on the brackets such that when the wall of the bracket is positioned adjacent the hooks either the upper or lower pair of loop elements can be slidably positioned over the hooks.

The respective hooks 82 and 83 of the wire elements 80 and 81 are provided with protuberances 82a and 83a on the inner sides thereof. As shown in FIG. 3, the walls of the upper and lower loop elements 44 and 47, respectively, formed on the right end portion of the bracket 30a, as shown in FIG. 2 for example, have a particular curvature which provides a clearance that enables the protuberance 83a on the hook 83 of the wire shelf 31 to be slidably inserted in the horizontal opening of either the loop element 44 or 47 when the plane of the bracket 30a is held parallel to the plane

formed by the wire members 80 and 81. The manner in which the bracket 30a is held with the wall thereof in a horizontal position to enable hooks 82 and 83 of the horizontally disposed wire shelf 31 to be slidably inserted in the horizontally extending openings of lower loop elements 46 and 47 is shown in FIG. 4. After the hooks 82 and 83 have been inserted in the respective lower loop elements 46 and 47 of the bracket 30a, the bracket 30a is then rotated on these hooks vertically upward such that the protuberances 82a and 83a on the respective hooks are now located on the outer side of the wall of the loop elements 46 and 47, as shown in particular for hook 82 inserted in loop element 46 in FIG. 5, thus preventing the hooks 82 and 83 from sliding out of the loop elements 46 and 47 when the bracket 30a is held in its vertical position in the upright post 12a. It should be noted that when the bracket 30a and 30b is attached to the wire shelf 31 by its lower loop elements 46 and 47, the bracket serves as an end wall for the wire shelf.

Referring next to FIG. 6 which is a view taken in the direction of arrows 6—6 in FIG. 1, the left hand bracket 30a is shown with the wire shelf 31 attached thereto such that the bracket 30a does not function as an end wall but rather permits the shelving to continue on without having an end wall. For this purpose hooks 82 and 83 on the ends of the wire shelf 31 are respectively inserted into the upper loop elements 43 and 44 formed on the bracket 30a while the wall of bracket 30a is disposed in a horizontal position, and then upon rotating the bracket 30a to a vertical position, the protuberances 82a and 83a on the hooks 82 and 83 lock the bracket 30a on the wire shelf 31. In this instance, the lugs 51, 52 and 53 on the inner end portion of the bracket 30a are inserted in openings 25 at a lower vertical level on the upright post 12b so that the shelf 31 remains horizontal.

In FIG. 7, a sectional view taken in the direction of arrows 7—7 in FIG. 6, shows the brackets 30a and 30b being carried on the middle upright post 12b. More particularly, FIG. 7 shows the manner in which the hook 83 extending from the right side of the first wire shelf 31 is held on the upper loop element 44 of the bracket 30b, and the hook 83 extending from the left side of the second wire shelf 31 is similarly held on the upper loop element 44 of the bracket 30a.

The advantage of using brackets 30a and 30b which can be attached to hooks on the ends of a wire shelf 31 with the top of the bracket even with the plane of the shelf 31 or with the top and therefore the wall of the bracket extending above the plane of the shelf 31 resides in the fact that when the top of the bracket is even with the plane of the shelf a plurality of shelves can be mounted end to end without any intervening wall structure, and when the top of the bracket extends above the plane of the shelf the presence of the wall of the bracket serves as an end retainer for articles positioned on the wire shelf. It should be appreciated that if each wire shelf had a permanent end wall, when the wire shelves are supported end to end the entire shelf structure would be fixedly compartmented to the size of the respective shelves. However, since it is desirable in some applications to vary the compartment size to suit different types of merchandise, or in other applications to have no compartments at all, each of the

brackets 30a and 30b of the present invention need be merely mounted by its upper or lower pair of loop elements to the pair of hooks 82 and 83 on the wire members 80 and 81 of the wire shelves 31 to provide the desired type shelving. It should be noted that by use of the brackets of the present invention there is no need to provide separate end wall component parts for compartmentalizing the shelving structure.

FIG. 10 shows an alternate locking mechanism 92 for the inner portion of the bracket 30a on the upright post 12a. As indicated, mechanism 92 is provided with two mating walls 94 and 95, the upper portions of which are spaced to straddle the lower end of the bracket, enabling the mechanism 92 to be pivotally held on the bracket by a pin 97. The lower portions of the wall 94 and 95, extending below the lower end of the bracket, are welded together to form a lug portion 98. A spring 100 having one end fitted over a projection 99 provided on a cutout 96 on the lower end of bracket 30a and the other end bearing on lug portion 98 rotates the mechanism 92 about pivot pin 97 in a counter-clockwise direction such that its lug portion 98 extends upwardly at an angle into an opening 25 on the upright post 12a when the lugs 51, 52 and 53 are seated in respective openings 25 of the upright post. The mechanism 92 thus provides for locking the inner end of bracket 30a on upright post 12a. By grasping the lower end of the lug portion 98 with the thumb and forefinger it is possible to rotate the mechanism 92 in a clockwise direction about its pivot pin 97 against the action of spring 100 when it is desired to unlock and withdraw the bracket 30a from the upright post 12a.

From the foregoing it will be noted that an adjustable shelving structure has been provided in which wire shelves 31 of different lengths may be readily installed or removed from brackets 30a and 30b used to support the respective ends of the wire shelves on adjustably spaced upright posts. Furthermore, the shelving structure is provided with brackets 30a and 30b that may be easily attached on the ends of the wire shelves such as to function either as an end wall therefore or as a mere support for the wire shelves to thereby permit the shelving to be installed as endless shelving.

Although the preferred form of the invention has been illustrated and described in detail, it will be apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or form the scope of the appended claims.

What is claimed is:

1. An adjustable display rack assembly comprising:
 - a plurality of spaced upright supports;
 - a wire shelf spanning the distance between adjacent upright supports; and
 - a bracket for each end of said wire shelf;
- each said bracket provided with an attachment means on the upper portion thereof and an attachment means on the lower portion thereof; and
- each said bracket being attached to an end of said wire shelf either by the attachment means on its lower portion whereby the bracket serves as an end-wall for said wire shelf, or by the attachment means on its upper portion whereby the top of the bracket is level with the wire shelf; and
- means on the inner end of each said bracket for locking said bracket on an upright support.

2. The invention in accordance with claim 1 wherein each said wire shelf includes a pair of spaced reinforcing wire members extending from either end thereof, each said wire member having an L-shaped hook on the end thereof;

wherein the attachment means on each said bracket comprises a pair of spaced loop elements on the upper portion thereof and a pair of spaced loop elements on the lower portion thereof, each said loop elements having a horizontally disposed opening therein; and

wherein each said bracket is attached to an end of said wire shelf by slidably fitting either the pair of spaced loop elements on the upper portion thereof or the pair of spaced loop elements on the lower portion thereof on the hooks provided on the ends of said wire members.

3. The invention in accordance with claim 1 including adjustable spacer members for holding adjacent upright supports at a desired spaced relation.

4. The invention in accordance with claim 1 wherein said means on each said bracket for locking said bracket on said upright support includes a mechanism pivotally connected to the inner portion of the bracket, said mechanism including lug means on the lower portion thereof; and a spring for urgingly holding said lug means in an opening in said upright support when the lugs on the inner end of said bracket are inserted and seated in openings on said upright support.

5. An adjustable display rack assembly comprising a plurality of spaced upright supports;

a wire shelf spanning the distance between adjacent upright supports, each said wire shelf including a pair of spaced reinforcing wire members extending from either end thereof, each said wire member having an L-shaped hook on the end thereof, and each said hook provided with a protuberance on the side thereof;

a bracket for each end of said wire shelf, each said bracket provided with a pair of spaced loop elements on the upper portion thereof and a pair of spaced loop elements on the lower portion thereof, each said loop elements having a horizontally disposed opening therein;

each said bracket being attached to an end of said wire shelf either by slidably fitting the pair of spaced loop elements on the lower portion thereof on the hooks provided on the ends of said wire members whereby the bracket serves as an end wall for said wire shelf or by slidably fitting the pair of spaced loop elements on the upper portion thereof on the hooks provided on the ends of said wire members whereby the top of the bracket is level with the wire shelf;

said horizontally disposed openings of said loop ele-

ments being shaped to permit said loop elements to be slidably positioned on said hooks past said protuberances when the plane of said bracket is held in a position parallel to the plane of said reinforcing wire members, said protuberances providing for locking said brackets on the ends of said wire shelf when said brackets are rotated on said hooks into an upright position; and

means for securing the inner end of each said bracket to an upright support when said bracket is in said upright position.

6. an adjustable display rack assembly comprising a plurality of spaced upright supports, the face of each said upright support being provided with vertically spaced openings;

a wire shelf spanning the distance between adjacent upright supports;

a bracket for each end of said wire shelf each said bracket having a pair of loop elements on the lower portion thereof, a pair of loop elements on the upper portion thereof, a pair of loop elements on the central portion near the inner end thereof, and a pair of clip elements below said latter pair of loop elements;

each said bracket attached to an end of said wire shelf either by the pair of loop elements on the lower portion thereof whereby the bracket serves as an end wall for said wire shelf or by the pair of loop elements on the upper portion thereof whereby the top of the bracket is level with the wire shelf;

each said bracket provided with three notched lugs on the inner end thereof extending through and seated on the lower edges of selected adjacent vertically spaced openings on said upright support;

a locking arm member mounted on the bracket to be slidably movable within the openings of the pair of loop elements on the central portion thereof, and

spring means including a length of stiff spring wire having its lower end securely held by the pair of clip elements on said bracket and having its upper end attached to said arm member for urging said arm member to extend through a portion of an opening in the upright support remaining after one of the lugs on the inner end of said bracket has been seated therein to thereby lock the bracket on said upright support.

7. The invention in accordance with claim 6 wherein said bracket is formed of a generally rectangular metal plate; and

wherein each of the loop elements on said bracket is formed by permanently outwardly deforming a vertically slit band of metal forming a part of the metal plate.

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