April 27, 1954 A. CHAPPORY 2,676,712

DISPLAY STAND

Filed Aug. 29, 1950 3 Sheets-Sheet 1

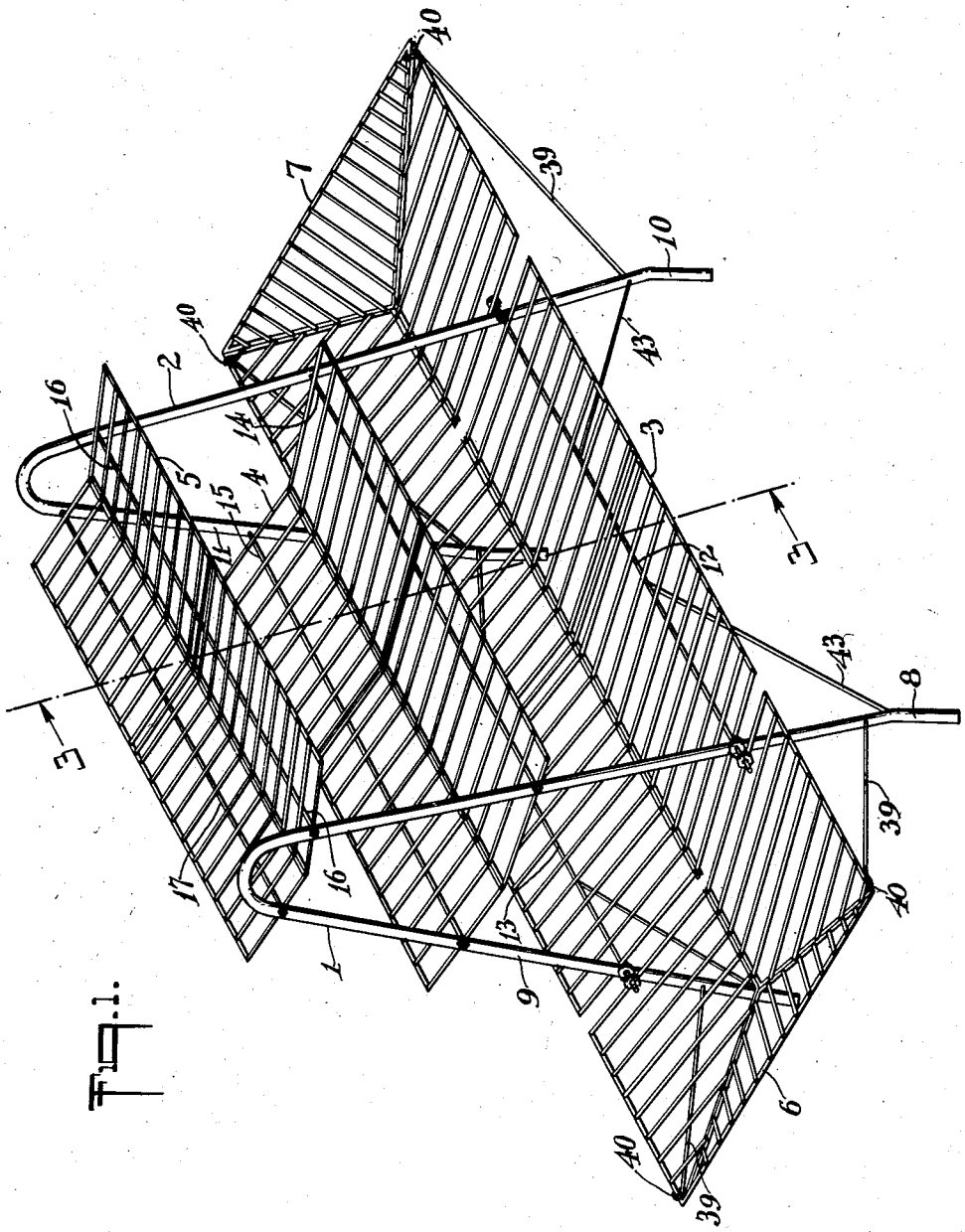


Fig. 1.

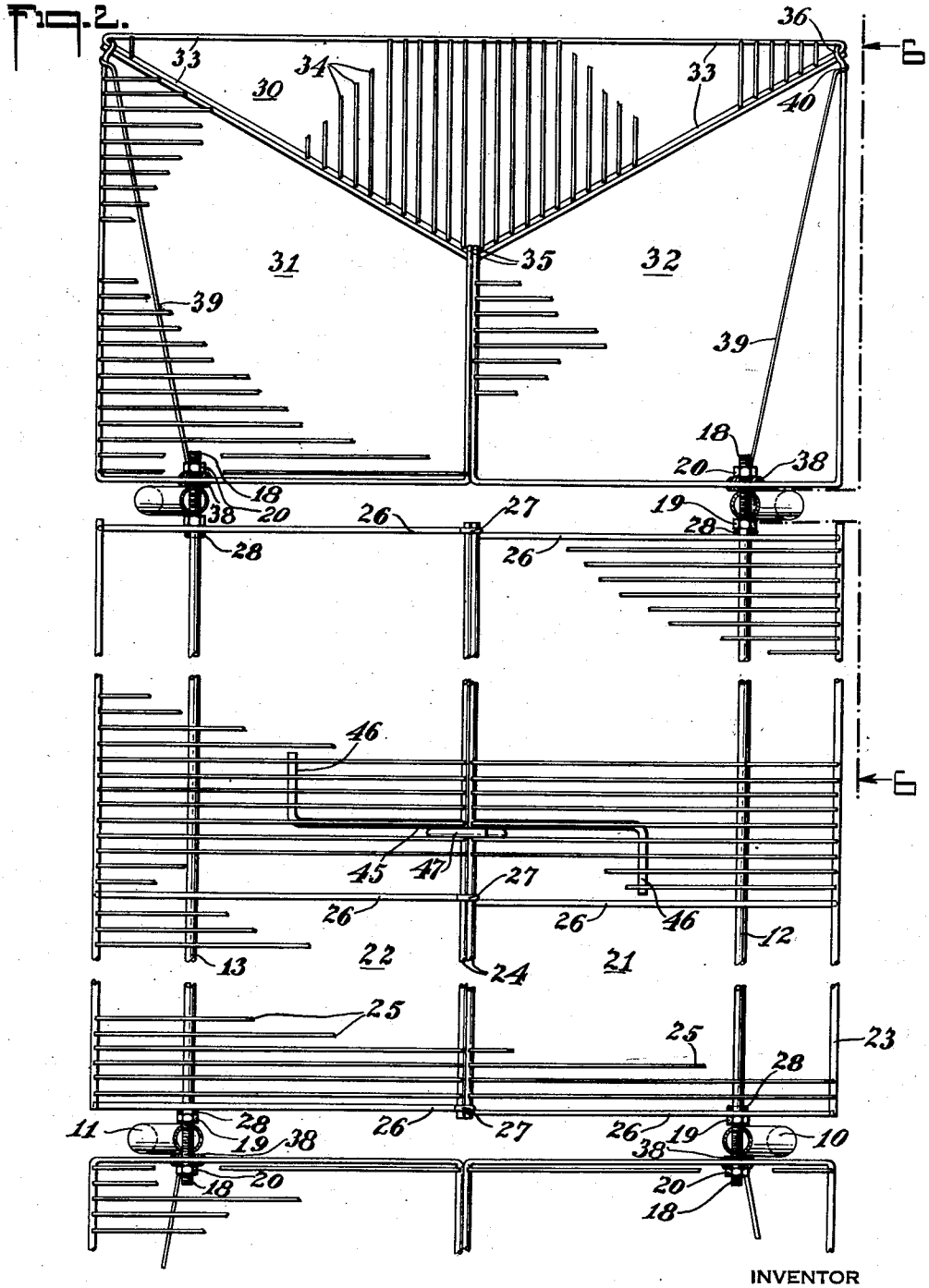
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April 27, 1954 A. CHAPPORY 2,676,712

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Filed Aug. 29, 1950 3 Sheets-Sheet 2

Fig. 2.



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DISPLAY STAND

Filed Aug. 29, 1950 3 Sheets-Sheet 3

Fig. 3.

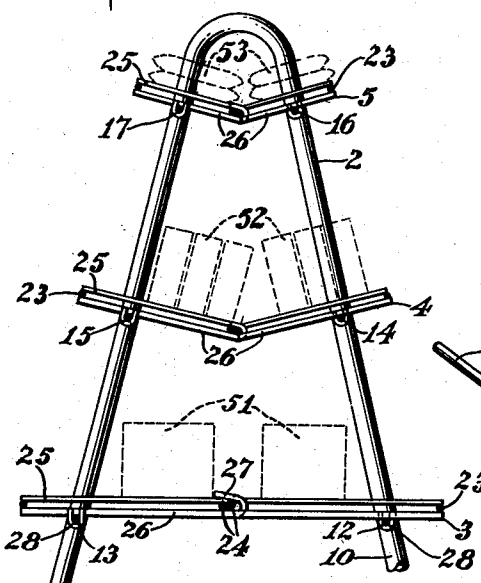


Fig. 7.

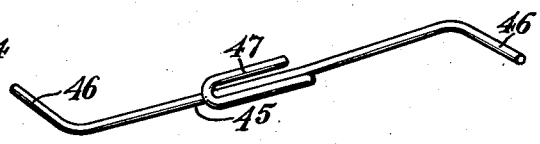


Fig. 4.

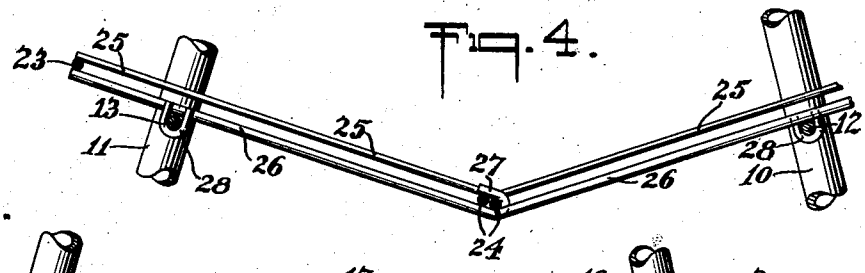


Fig. 5.

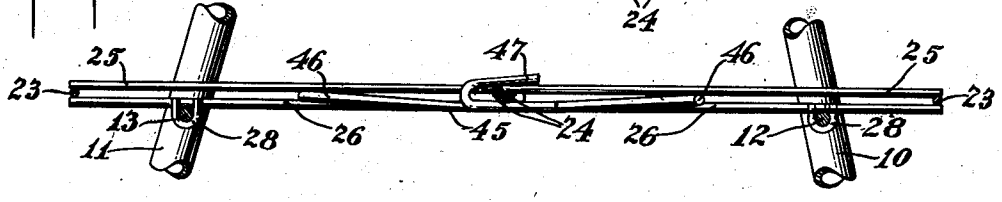
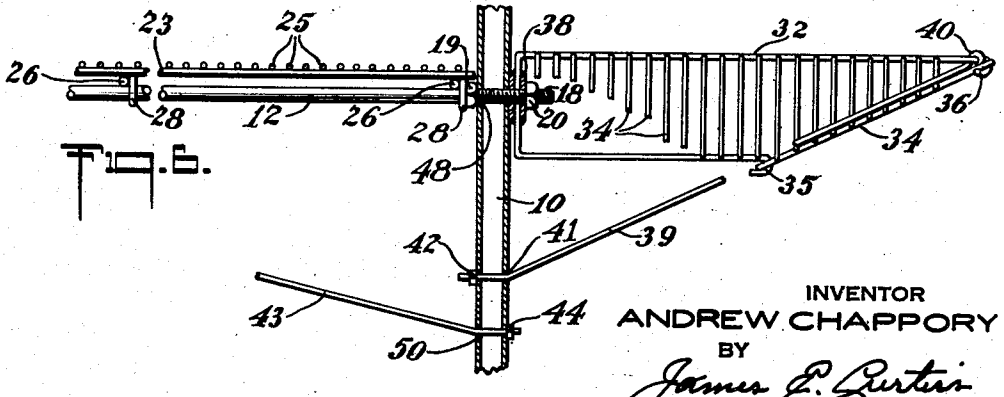


Fig. 6.



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UNITED STATES PATENT OFFICE

2,676,712

DISPLAY STAND

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Application August 29, 1950, Serial No. 181,992

9 Claims. (Cl. 211—138)

1

This invention relates to display racks, and particularly to a display rack which is constructed of metal tubing and welded wire rod to provide a strong, lightweight structure and, as will be pointed out hereinafter, a tensioning action which contributes to the carrying out of the invention.

The class of merchandise with which the display rack is intended primarily to be used is that including packaged bakery products such as biscuits, crackers, cookies, cakes, pretzels and the like. However, it will be obvious that the rack is not limited to use with these specific goods, but may be utilized wherever a maximum amount of merchandise is required to be effectively displayed in a minimum amount of space, for example, in stores of the self-service type.

The prevailing tendency is to package merchandise in transparent cellophane or waxed paper bags, or in trays wrapped in those materials, in order that the contents may be seen by the purchaser. This is particularly true of items which have eye or taste appeal and are purchased on impulse. Various types of display stands for dispensing this class of merchandise have been devised heretofore, but they have not been satisfactory for many reasons, chief among which are visibility from one side only, complexity of fabrication and the tendency to gather dust and other foreign matter, necessitating continual and often difficult cleaning. The present invention contemplates obviating these and other objectionable features of the prior art.

One of the main features of the present invention is the provision of a shelf-angle adjusting structure whereby any one or all of the shelves of the display rack may be adjusted at will from a horizontal position to an inclined position of substantially open V-shape. Thus each shelf offers a choice of positions, either angular or horizontal, for displaying packages, bags, cartons, etc. in the most advantageous, effective and appealing manner. In addition, the open-work structure of the display rack lends itself to the provision of maximum visibility of the merchandise from every angle of view. Each shelf is provided with an automatic locking structure which maintains it in either of its selected positions. Thus, the main or end supports of the rack are formed of metal tubing bent into an inverted V-shape, and the shelves are formed so that when adjusted to horizontal position the legs of each support are sprung apart and placed under tension. Means associated with each shelf acts, under the influence of the tension referred to, to lock the shelf in horizontal position.

2

Another feature of the invention is the absence of nonessential parts, which enhances its aesthetic simplicity and efficiency. The display rack is constructed of parts arranged to provide a relatively lightweight structure in view of the overall dimensions of the assembled rack, yet when erected, the rack presents a strong, rigid unit. Being made entirely of metal, the display rack can be finished easily in any color or combination of colors which will harmonize with store fixtures or decorations; and if minimizing cost of manufacture is a prime factor, the entire structure may be sprayed with aluminum paint or chrome plated.

The invention provides a rack which is exceptionally well suited for setting up a so called island display. This adapts it especially for use in stores of the self service type, wherein customers are attracted to merchandise by its appeal and effective presentation. For certain types of store arrangements, the display rack is particularly adaptable in that when the shelves are in inclined position they can be loaded from the rear, and the packages will move by gravity to the base of the incline as other packages nearer the front of the shelves are removed. Furthermore, should it be desirable to stack merchandise on a horizontal shelf surface, say in arranging pyramid displays, any or all of the shelves may easily and readily be adjusted to horizontal position. Whether in horizontal or inclined position, in the event that several different items are placed in different areas of the shelves, nevertheless substantially all of them will be visible to the customer from any given position relative to the rack.

Still another feature of the invention, and one of great advantage, is the compactness of the rack in storage and when packed for shipment. The rack is constructed so as to be knocked down and assembled with ease and is held together by nuts tightened on the threaded ends of certain crossbars. Alternatively, either an inexpensive stamped metal wrench may be furnished with each rack if ordinary square or hex nuts are used, or to obviate the necessity of furnishing a wrench, acorn head hex nuts, which are easily held and tightened by hand, may be used. In its knock-down or collapsed form, the stand occupies very little space and all of the component parts can be packed in a small carton by arranging the flat surfaced parts and uprights in layers.

In the accompanying drawings, the invention has been shown merely by way of example and in preferred form and obviously many modifica-

tions and variations may be made therein and in its mode of application which will still be comprised within its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or embodiment except insofar as such limitations are specified in the appended claims.

Referring to the drawings:

Fig. 1 is a perspective view of the display rack embodying the present invention, the rack being shown in its fully erected display position;

Fig. 2 is a top plan view of the bottom shelf, portions of the shelf being broken away and some of the structure being shown in part only;

Fig. 3 is a vertical section, taken substantially on the line 3—3 of Fig. 1, one of the legs being partly broken away;

Fig. 4 is a slightly enlarged sectional view of the bottom shelf when in V-shaped position;

Fig. 5 is a view similar to Fig. 4, showing the shelf in horizontal position;

Fig. 6 is a detail vertical section, the view being taken substantially on a line 6—6 of Fig. 2, looking in a direction indicated by the arrows; and

Fig. 7 is an enlarged perspective view of an auxiliary shelf-locking support.

The display rack shown in Figs. 1 to 7, inclusive, is made entirely of metal tubing and welded wire rod. Referring particularly to Fig. 1, the rack comprises spaced-apart uprights or end supports 1 and 2, a series of shelves 3, 4 and 5 supported one above the other between the uprights, and shelves 6 and 7 located outside the uprights one at each end of the rack at the level of the bottom shelf 3. The uprights 1 and 2 are made preferably of tubular metal, such as iron pipe, bent to form substantially inverted V-shaped members which provide integral legs 8, 9 and 10, 11. The shelves 3, 4 and 5 are fabricated of wire rod and are pivotally supported on horizontal crossbars 12 and 13, 14 and 15, 16 and 17, which extend between the uprights 1 and 2 and hold them in spaced apart relation. As shown in Fig. 2, at each shelf level the legs 8, 9 and 10, 11 are drilled to receive threaded ends 18 of the crossbars, the ends of each crossbar extending through both walls of the respective leg and being secured thereto by a pair of nuts 19 and 20 threaded on the end of the crossbar so as to clamp the respective leg between them. Thus, the uprights are held together in spaced-apart relation by bars which are constructed preferably of a substantially heavy gauge iron rod.

Referring to Fig. 1, it can be seen that the display stand is built with a plurality of superposed wire rod shelves of identical construction. Their structure can be seen in Fig. 2, wherein the lower shelf 3 is shown as comprising front and rear hingedly connected shelf sections 21 and 22, respectively. Both front and rear shelf sections are substantially similar in construction and in the description to follow corresponding parts of each member are designated by corresponding reference numbers. Each shelf section comprises a front bar or rod 23 and a rear rod 24, to which a plurality of shelf wires 25 are connected preferably by lap welding, to form the actual package supporting surfaces. Preferably three rods 26 are located one at each end and a third substantially at the center of each member, the rods 26 being constructed of substantially heavier gauge wire than the cross wires 25 which form the shelf surfaces. The rods 26 are lap welded to the undersurface of the front and rear rods 23 and 24, thereby forming a frame to stiffen and strengthen

the structure of the shelf sections. The shelf stiffening rods of the rear shelf section 22 extend beyond the rear rod 24 and are bent to form a loop 27 (Figs. 2, 4) which pivotally encircles the adjacent rear rod 24 of the front shelf section 21, thus forming a hinged connection between each pair of shelf sections 21 and 22. This construction furnishes a pivotal connection which is very readily and quickly formed and assembled, thereby uniting the two shelf sections to provide a foldable and unitary shelf structure.

Each of the heavy gauge rods 26 has welded to it a U-shaped eyelet 28 near its outer end as shown in Figs. 2 and 3, and in greater detail in Figs. 4, 5 and 6. Each of the eyelets 28 is formed from a suitable length of heavy gauge iron rod, bent to form a snug fit around the crossbars 12—13, 14—15 and 16—17 and are tack welded at one side of their terminal ends to an appropriate side of the rods 26. Looking from right to left in Fig. 2, it will be seen that the eyelets 28 are welded to the right-hand sides of the rods 26 of the front shelf section, whereas the rear shelf section is constructed with its respective eyelets 28 welded to the left-hand side of the rods 26. This method of attachment is to compensate for the space occupied by the loops 27 which preclude the rods 26 from occupying the same front-to-rear vertical plane and necessitates their side by side arrangement on the rear rods 24. Also, in addition to their use as pivotal supports for the shelf sections 21 and 22, they serve as spacers on the crossbars 12 and 13. The same is true in connection with the shelves 4 and 5.

As already stated, the present embodiment of the invention includes auxiliary left and right end shelves 6 and 7 (Figs. 1, 2 and 6) although it is fully contemplated that end shelves of a substantially similar character may be included at the higher shelf levels. A preferred construction of the end shelves (which are identical) is illustrated in detail in Fig. 2 and Fig. 6. Referring particularly to Fig. 2, the shelf 7 comprises three sections 30, 31 and 32 of which the element 30, substantially triangular in outline, is hingedly joined to the trapezoidal-shaped members 31 and 32 to form a substantially basket-like end shelf of rectangular outline. The basket or deep-tray effect is best illustrated in Figs. 1 and 6. The members 31 and 32 are disclosed as converging in a general direction toward a center line extending lengthwise through the display stand. Actually it provides a continuation of the V-shaped trough formed by the shelf 3 (Fig. 4) when in its depressed V-shaped position. The apex of the triangular member 30 is pointed downwardly toward the V-shaped trough formed by the members 31 and 32, and the surface of the member 30 slopes upwardly and outwardly therefrom.

The member 30 comprises a substantially triangular frame 33 formed by bending a suitably rigid gauge of wire rod stock to shape. The extremities of the wire rod are lap welded to form a closed frame for supporting a plurality of shelf wires 34, which are spaced parallel to one another, extending from the base of the frame to the opposite sides of the triangle, and are welded to the upper surface of the frame 33.

The trapezoidal-shaped members 31 and 32 consist of frames constructed of wire rod similar to that used in forming the triangular shaped member 30 and are similarly formed by being bent to shape. However, by loops 35 and 36, formed similarly to the loops 27 and the rods 26,

the members 31 and 32, one arranged at each side of the member 30, are each hingedly connected to the member 30 at its apex and at the respective base angle. The loops 35 and 36 form a hinged connection which enables the three members 30, 31 and 32 to be collapsed from their erected basket-shaped structure into a substantially flat unit which is comparatively less bulky and more economical to carton and store than when in its erected condition.

Means for securing the end shelves 6 and 7 to their respective uprights 1 and 2 is provided in each instance by welding a washer 38 (Figs. 2, 6) of suitable dimensions to the frame of each trapezoidal member 31 and 32 in position so that the center holes thereof are disposed to receive the threaded ends of the crossbars 12 and 13 and be clamped against the outer surface of the respective upright by the nuts 20. Additional means for supporting the shelves 6 and 7 is provided by braces 39, one of which is anchored to each upright leg 8, 9, 10 and 11 and has its opposite end fastened to the frame of its respective shelf by being looped, as at 40, therearound at the base angle of the triangular member 30, thus forming a pivotal connection sufficiently flexible to permit the braces 39 to be folded flat when the display stand is disassembled, yet of sufficient rigidity when in erect position to lend support to the end shelves. Drilled holes 41 (Fig. 3) are formed in the leg members 8, 9, 10 and 11 of the uprights through which threaded ends of the braces 39 are inserted and fastened by the nuts 42.

Further rigidity in the display stand is obtained by the provision of iron rod braces 43 (Figs. 1, 6), one pair of which is employed to brace the front crossbar 12, and another pair similarly employed for bracing the rear crossbar 13. The braces 43 are welded at their upper terminal ends to the undersurface of the crossbars 12 and 13 and are formed to extend downwardly therefrom to the upright legs of the uprights 1 and 2. As in the case of the braces 39, the uprights 1 and 2 are drilled, as at 50, to receive the free, threaded ends of the braces 43, which are fastened thereto by nuts 44.

In order to insure effective rigidity of the shelves 3, 4 and 5 when in their horizontal position, especially when they are to support extraordinarily heavy display of merchandise, there is provided an auxiliary brace or locking member 45 (Fig. 7) for each shelf. Inasmuch as the widths of the various shelves may vary substantially, the braces 45 differ in length accordingly although they are formed alike. As will be seen in Fig. 7, the braces are formed from a length of heavy gauge iron rod bent at right angles at both ends to form a pair of parallel arms 46 adapted to provide a transverse support beneath a group of the shelf wires 25 (see Fig. 2). A shorter length of rod stock, preferably of equivalent gauge, is bent to form a substantially U-shaped member 47, one leg of which is lap welded to the center of the brace 45 in a position such that the legs of the member 47 extend parallel with main portion of the brace 45 and the unattached leg of the member 47 is above and spaced from said main portion. The brace 45 is applied beneath a shelf by sliding the U-shaped member 47 over the center rods 24, whereupon the main portion of the brace extends beneath the shelves on opposite sides of the rods 24 and the arms 46 thereof underlie a group of the shelf

wires 25 near the outer edges of the shelves. It is obvious that whenever it is desired to tilt the shelves to their inclined positions, the braces 44 are readily removed and laid aside.

As already stated the display stand is of the knock-down type which can be assembled easily. In erecting it, either upright 1 or 2 is held in standing position and one end of the crossbars 12 and 13 of the lower shelf 3 are inserted in drill holes 48 (Fig. 6). The nuts 20 may be loosely screwed on the ends of the crossbars 12 and 13 to hold them in place, although in practice this may be unnecessary since the frictional engagement of the threaded ends of the crossbars in the holes 48 will probably suffice. The opposite ends of the crossbar are then loosely attached to the other upright in like manner. The remaining shelves 4 and 5 are then attached to the uprights in the same way as the shelf 3 and at this point may be left loose or fastened securely, as desired, but the bottom shelf cannot be tightly fastened until the braces 39 and 43 and the end shelves 6 and 7 are in place. Thus while the uprights can still be moved or sprung apart both front and rear pairs of braces 43 are inserted in their respective drill holes 50 in the uprights. Then end shelves 6 and 7 are placed in position on the threaded ends of the crossbars 12 and 13 (Fig. 6) projecting through the drill holes of the uprights and the free ends of the braces 39 are inserted through the drill holes 50 in the uprights. The nuts 20 on the crossbars 12 and 13, and the nuts 42 and 44 on the braces 39 and 43, respectively, may now be set up to secure the shelves 3, 6 and 7 in place.

Any or all of the shelves 3, 4 and 5 may now be adjusted to either their horizontal position, as illustrated by the lower shelf 3 in Fig. 3, or to their inclined positions illustrated by shelves 4 and 5 in Fig. 3. Merchandise placed on the horizontal shelf 3 is indicated by dotted outline and designated 51, and with the shelf in this position the brace 45 is inserted in place as shown in Fig. 4. The intermediate and top shelves, if depressed to their inclined position, will assume the position taken by shelves 4 and 5 in Fig. 3 and merchandise carried on these shelves may be placed as indicated by the dotted outline and identified by numbers 52 and 53.

In order to maintain the various shelves of the display stand in either their horizontal or their depressed V-shaped position, advantage is taken of the resiliency inherent in the uprights 1 and 2. The width of the shelves is such that in erected condition the legs of the uprights 1 and 2 are normally in outwardly sprung condition when the shelves are in horizontal position. Thus when the shelf is in horizontal position the inward pressure of the leg members will be applied through the shelf sections against the center rods 24, tending to force the shelf sections against each other laterally. The looseness of the rods within the loops 27 causes one to ride up on the other to a slight extent above center (see Figs. 3 and 5) and make an effective friction lock which can be released only when sufficient downward pressure is exercised on the shelf to spring the legs farther apart. When a shelf is in its V-shaped position, the uprights 1 and 2 will move inward, and tend to maintain the hinged shelf sections in their V-shape position.

It is pointed out that due to the resiliency of the uprights 1 and 2, all of the wire rod shelving

is continuously under tension and, consequently, looseness at the various pivotal connections is reduced to a minimum.

It may be appropriate to further describe how the shelves are prevented from rising at any time above their horizontal position to an inverted V-shaped condition. Referring to Fig. 4, it will be observed that the right hand shelf section is mounted off-center above the crossbar 12 a distance equivalent to the radius of the crossbar 12 by means of the U-shaped eyelet 28. In like manner, the left hand shelf section is mounted off-center an equivalent distance above the crossbar 13 by means of a similar eyelet 28. In their horizontal positions, best illustrated by the lowermost shelf of Fig. 3, the sections are forced inwardly against each other, and looseness at the hinged joints is taken up to maintain rigidity. When the shelves are forced downward to their V-shaped position, the rotation of the sections about their pivots on the crossbars 12 and 13 will cause opposed arcs to be described by the inner extremities of the shelf sections, which arcs will gradually recede from one another as the angular rotation of the associated shelf sections is increased. Consequently, any downward movement of the shelves will be limited by the looseness in the hinged connection between the shelf sections, which looseness will be taken up by the horizontal distance which separates the arcs of the respective shelf sections. Inasmuch, however, as the shelf sections are mounted off-center and above their pivots (the crossbars 12 and 13) the arc separation of the opposed shelf sections generated from the horizontal position downward to the depressed position, is substantially narrower than it would be if the shelf sections were mounted on center. Conversely, since the upwardly directed arcs formed by the shelf sections would recede from each other at a substantially faster rate than the downwardly drawn arcs, it is obvious that the separation distance between the hinged ends of the shelf sections will, should any attempt be made to invert the shelves upwardly, become suddenly too wide to permit such movement, because the hinge construction 24—27 is not provided with sufficient looseness to separate the required distance. This arrangement insures a positive locking arrangement at all times against any upwardly directed movement of the shelves above the horizontal position.

Having thus described my invention, what I claim is:

1. A display stand comprising a pair of inverted V-shaped uprights, horizontally disposed crossbars connecting said uprights in spaced-apart relation, a shelf extending between said uprights and comprising a pair of inclinably adjustable sections mounted on said crossbars, a pivotal connection joining said sections longitudinally with one another, said sections forming a substantially V-shaped shelf surface when in their inclined position, pivotal means associated with said sections and mounted on said crossbars with the pivot axes below the shelf sections whereby the angle of inclination formed by said shelf sections may be increased to a straight angle, and resilient locking means including said uprights for maintaining said adjustable shelf members in either of said positions, said V-shaped uprights being constructed and arranged to effect inward pressure edgewise against said shelf sections.

2. A display stand comprising a pair of inverted V-shaped uprights, horizontally disposed front and rear crossbars connecting said uprights in spaced-apart relation, pivotal supports mounted on said crossbars, a shelf mounted above said pivotal supports comprising a pair of pivotally connected sections, and locking means including said uprights for maintaining said sections in a transverse horizontal plane, said means being constructed and arranged to effect inward pressure edgewise against said shelf sections and to yield when said sections are depressed to assume an inwardly converging position and being effective to maintain said sections in their depressed position.

3. A display stand as set forth in claim 2, wherein said uprights and crossbars are fastened together with detachable connectors and formed to be disassembled into a flat compact condition for shipment and storage.

4. A display stand comprising a pair of inverted V-shaped uprights, horizontally disposed crossbars connecting said uprights in spaced-apart relation, pivotal supports mounted on said crossbars, a shelf pivotally mounted above said crossbars and being movable from a transversely horizontal position to an inwardly and downwardly inclined V-shape position, said shelf including a pair of sections each having a frame defining its marginal edge and the sections being hinged together along their contiguous inner edges, and resilient locking means including said uprights for maintaining said shelf and sections in their horizontal position, said locking means being constructed and arranged to effect inward pressure edgewise against said shelf sections and to yield when said sections are depressed to assume their V-shaped position and being effective to maintain the sections in such position.

5. A display stand comprising a pair of inverted V-shaped uprights, horizontally disposed crossbars connecting said uprights in spaced-apart relation, pivotal supports mounted on said crossbars, a shelf pivotally mounted above said crossbars and being movable from a transversely horizontal position to an inwardly and downwardly inclined V-shaped position, and vice versa, said shelf including a pair of sections each having a frame defining its marginal edge and the sections being hinged together along their contiguous inner edges, and resilient locking means including said uprights for maintaining said shelf sections in either their horizontal or depressed positions and being constructed and arranged to effect inward pressure edgewise against said shelf sections and to yield when the sections are subjected to pressure to move them from one position to the other.

6. A display stand comprising a pair of resilient inverted V-shaped uprights, a plurality of pairs of horizontally disposed crossbars located one pair above the other and connecting said uprights in spaced-apart relation, pivotal supports mounted on said crossbars, a plurality of shelves pivotally mounted one above each pair of crossbars, each of said shelves including a pair of pivotally connected sections movable from a transversely horizontal position to an inwardly and downwardly inclined V-shape position, and vice versa, means including a loop joining said connected shelf sections for preventing the sections from rising above their horizontal position, and resilient locking means including said uprights common to all said shelves for maintaining said shelf sections in either their horizontal or downwardly inclined V-shaped position and being constructed and arranged to effect inward pressure

edgewise against said shelf sections and to yield when any pair of sections is subjected to pressure to move them from one position to another.

7. A display stand according to claim 6, wherein the locking means includes independent pivotal connections associated with each pair of sections and wherein the locking means yields when one pair of sections is moved and at the same time maintains its locking effect on the remaining pairs of shelf sections.

8. In a display stand, the combination of a pair of inverted V-shaped uprights in laterally spaced-apart relation, a plurality of pairs of horizontal crossbars connecting said uprights and holding them in their spaced-apart relation, and a plurality of wire rod shelves each having a wire rod frame and wire loop supports by which the frame is pivotally mounted above a pair of said horizontal crossbars and comprising a pair of front and rear sections loosely hinged to one another along contiguous edges between and parallel with the crossbars, and the shelves being mounted on the crossbars at points such that when in horizontal position the legs of the uprights are sprung apart and the tension thus created reacts through the crossbars and shelf

sections and forces one of said contiguous edges off center relatively to the other to lock the shelf in its horizontal position.

9. In a display stand according to claim 6, a plurality of demountable end shelves secured to the uprights to extend laterally therefrom and being shaped to conform with the V-shaped contour of the lowermost shelf when said shelf is placed in its downwardly inclined V-shaped position, and to form an end closure at each end of said lowermost shelf whereby merchandise may be piled within the end shelves and the stand and prevented from falling therefrom.

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