March 26, 1963 N. A. VETERE 3,082,711

ADJUSTABLE SHELVING

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FIG. 1

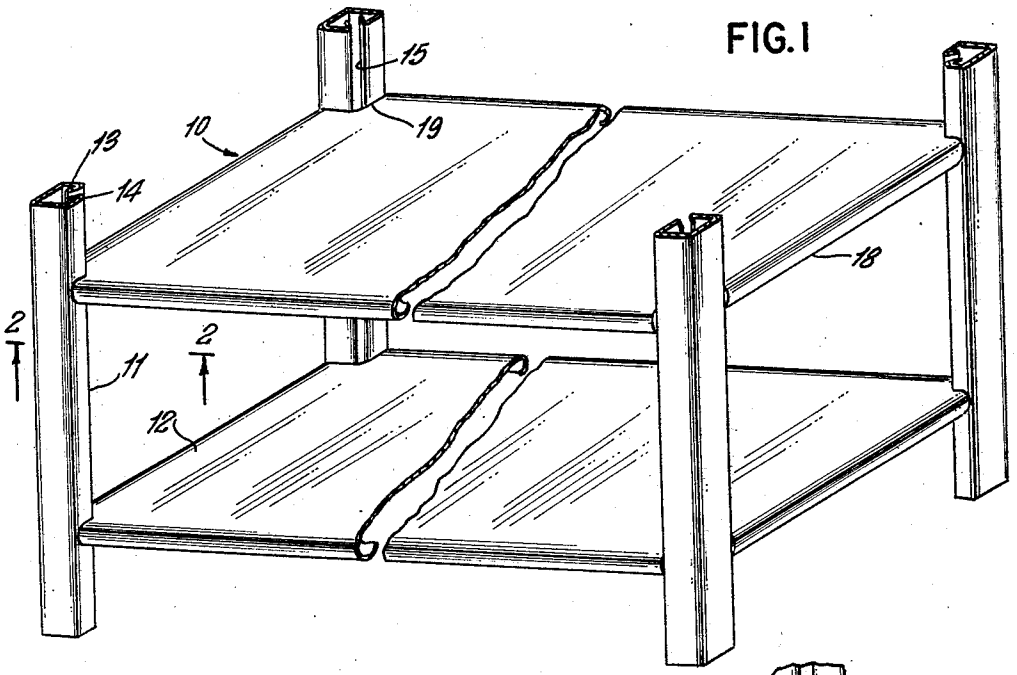
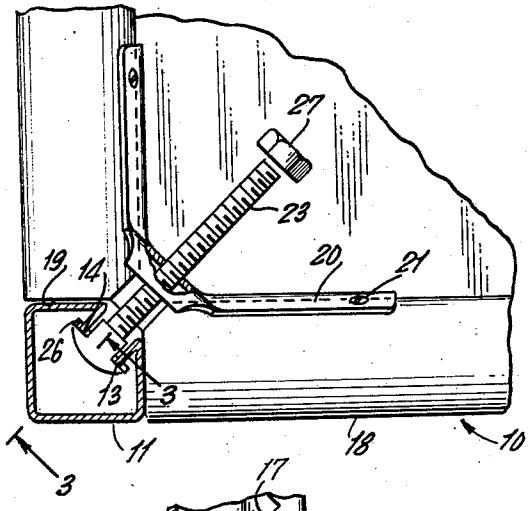


FIG. 2



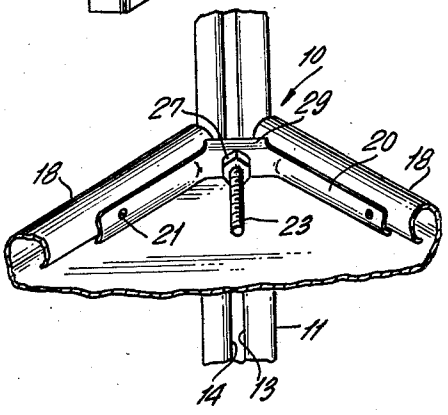


FIG. 4

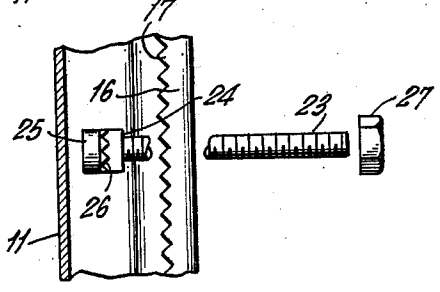


FIG. 3

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FIG. 5

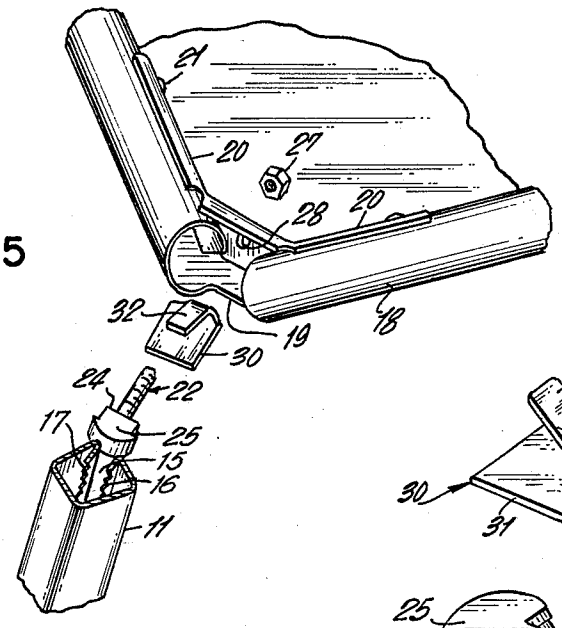


FIG. 7

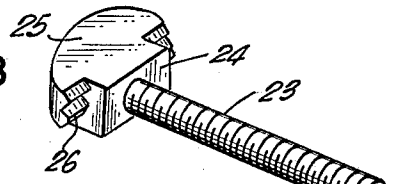


FIG. 8

FIG. 9

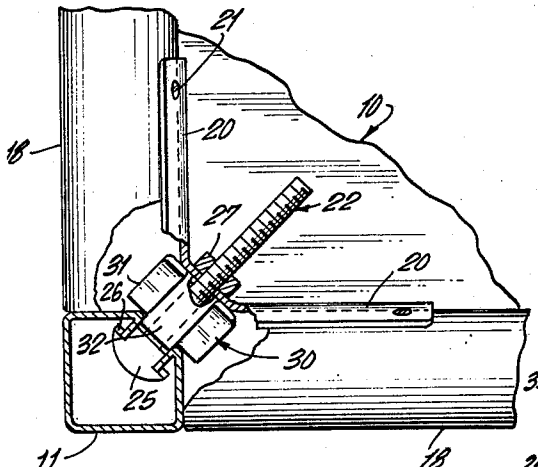
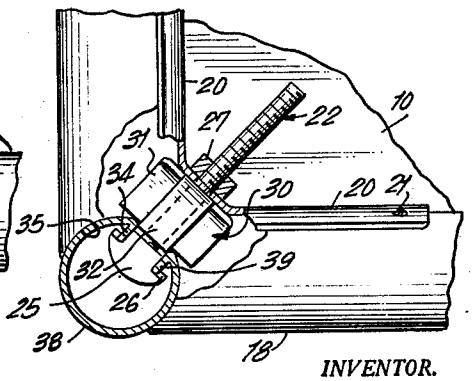


FIG. 6



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3,082,711
ADJUSTABLE SHELVING

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4 Claims. (Cl. 108—107)

This invention relates to adjustable shelving and particularly shelving which can be adjusted to vary the space between adjacent shelves.

Presently known metal shelving is formed of a plurality of upstanding support members which are provided with a series of holes to receive bolts so that the horizontal shelves can be attached thereto. Structures of this nature are limited in their adjustability in that the shelves can only be located where holes are provided. In addition, presently known shelving units require cross bracings in order to give them structural rigidity. In an effort to add strength to presently known adjustable shelf structures it has been found necesary to provide extremely heavy metal elements which add to the weight and cumbersome nature of these devices.

Accordingly, it is an object of the present invention to provide an adjustable shelving structure which is completely adjustable so that the shelves may be placed at any desired height.

Another object of the present invention is to provide an adjustable shelving assembly which is easy to assemble and disassemble.

Still another object of the present invention is to provide a light weight shelving assembly which will nevertheless have substantial strength and be capable of supporting heavy articles.

An object of the present invention is to provide an adjustable shelving structure which can be assembled merely by the use of a pliers or wrench.

A feature of the present invention is its novel vertical support members.

Another feature of the present invention is its use of a T bolt having a toothed head for positive engagement with the vertical supports.

Still another feature of the present invention is its cut-away shelf corner construction and rolled edge whereby the maximum strength and ready attachment to the vertical members is provided.

A feature of the present invention is its use of a locking key arrangement for adding to the positive interconnection between vertical and horizontal members of the shelving.

The invention consists of the construction, combination and arrangement of parts, as herein illustrated, described and claimed.

In the accompanying drawings, forming a part hereof are illustrated three forms of embodiment of the invention, in which drawings similar reference characters designate corresponding parts and in which:

FIGURE 1 is a somewhat isometric view partly broken away of a complete adjustable shelving assembly made in accordance with the present invention.

FIGURE 2 is a fragmentary sectional view taken on line 2—2 of FIGURE 1, looking in the direction of the arrows.

FIGURE 3 is a view taken on line 3—3, in FIGURE 2, looking in the direction of the arrows.

FIGURE 4 is a fragmentary view in elevation of a shelf corner made in accordance with the present invention, turned upside down for the purpose of illustration.

FIGURE 5 is an exploded view of a corner assembly according to the present invention.

FIGURE 6 is a view similar to FIGURE 2 showing the manner in which a locking key is inserted into the corner locking assembly.

FIGURE 7 is a somewhat isometric view showing the locking key used in conjunction with the adjustable shelving.

FIGURE 8 is a somewhat isometric view of the fastening T bolt used to secure the horizontal shelf members to the vertical upright support members.

FIGURE 9 is a fragmentary view showing a round post structure.

Referring to the drawings and particularly to FIGURES 1–3, 10 indicates an adjustable shelving assembly consisting of upright support members 11, and horizontal shelves 12, attached thereto. The upright support members 11 are formed of a continuous strip of metal bent as shown in FIGURES 1 and 2, to have a substantially hollow rectangular cross-sectional shape. The longitudinal edges 13 of the upright support members are bent inwardly as indicated at 14 in FIGURES 1 and 2, so that they are disposed parallel to each other and extend in the direction of the opposite corner of the upright support members 11. The longitudinal edges 13 are spaced from each other and thereby provide an elongated slot 15 which extends the length of the upright support members 11. The margins 16 of the longitudinal edges 13 are provided with serrations or teeth 17 for their entire length or at least for that portion of their length which is to support the shelves 12.

The shelves as best shown in FIGURES 1 and 4, comprise a rectangular single foil of metal rolled at its edges as indicated at 18 to provide structural rigidity and a pleasing finish to the shelving structure. The shelves 12 are cut away at their corners as indicated at 19 to receive the slotted portion of the upright support member 11 therein. A bracket member 20 is secured to the rolled edges 18 beneath the shelves as shown in FIGURES 2 and 4. The bracket member 20 is somewhat L shaped and is fastened to the rolled edge portion 18 by screws 21. The bracket 20 fits into the corner of the shelves 12 and is provided with a central bore 28 through which a T bolt may be slipped.

The T bolt 22, best shown in FIGURE 8 consists of a threaded portion 23 and a head portion 24 integral therewith. The head portion 24 is flattened or cut away as indicated at 25 so that it can slip within the slot 15 on the upright support members 11. The inner face of the head portion 24 is provided with teeth 26, which correspond in shape to the serrations or teeth 17 on the upright members 11. A nut 27 is threadably received upon the thread portion 23 of the T bolt 22 for the purpose of tightening the assembly consisting of the uprights and shelf members.

In order to secure the shelves 12 to the upright support members 11 it is merely necessary to slip the T bolts through the bore 28 in the brackets 20. The heads 24 of the T bolts 22 are slipped within the slots 15 and rotated so that they span the distance between the longitudinal edges 13 of each of the upright support members 11. With the shelf 12 held at the proper height the nut 27 is then tightened until the teeth 26 of the T bolt member engage the teeth 17 of the upright support member 11. The shelf will thereupon be firmly locked to the upright support members and when a similar operation is conducted at all four corners the shelving will be assembled. Since pressure of the head 24 of the T bolt 22 upon the longitudinal edges 13 of the upright support members 11 is compressive, a great amount of pressure can be applied at this point without collapsing the metal of the support members. As a result, a very firm and positive connection can be made between the shelves and the upright support members. When several shelves are secured to the upright support members 11 the entire structure is extremely rigid and capable of supporting substantial weights. The toothed arrange-

ment between the upright support members 11 and the T bolt heads 24 provide a positive lock which can be adjusted and secured at any point on the upright support members 11. It will be noted that the bracket 20 is provided with a flat bearing surface 29 against which the bolt 27 rests when the assembly is tightened.

As a further means of adding support and locking strength to the assembly, it is possible to add the locking key 30, shown in FIGURES 5, 6 and 7. The key 30 is made of a single strip of metal doubled back upon itself into a somewhat C shaped cross-sectional form. The locking key 30 has a broad tab 31 of a width greater than the distance across the slot 15 in the upright support members 11, and a small tab 32 of a width slightly larger than the width of the slot 15 in the upright support members 11. The locking key 30 is also provided with an opening 33 through which the T bolt 22 may be slipped. The locking key 30 as shown in FIGURES 5 and 6 is fitted into the assembly between the bearing portion 29 of the bracket 20 and the upright support member 11. The T bolt 22 is slipped through the locking key 30 before it is slipped through the bore 28. After the assembly is put together in the manner shown in FIGURE 6 and the nut 27 tightened the small tab 32 of the locking key 30 is forced into the space between the margins 16 of the upright support members and provides additional frictional engagement between the shelf members 12 and the upright support members 11. The large tab member 31 in bearing against the outside of the upright support member 11 causes the locking key 30 to skew upon the inclined face 34 between the two tabs 31, 32, as the nut 27 is tightened. Skewing action causes the locking key 30 and small tab 32 to dive into the slot 15 for greater and greater frictional contact.

In lieu of the rectangular cross-sectional shape shown in FIGURES 1–8, it is within the purview of the present invention to use an upright support member 38 having a substantially circular cross-sectional shape as shown in FIGURE 9. The upright support member 38 may be made of flat material and rolled into the circular form with inwardly turned edges 39 serrated in the manner hereinabove described in connection with the longitudinal edges 13. Alternately, the circular upright members may be made of tubular stock which is longitudinally slit and serrated and then bent inwardly to form the edges 39. Where tubular upright members are used the corners of the shelves 12 are provided with arcuate cut-outs 35 to form a seat for the upright members. In all other respects the adjustable shelving structure is the same as that hereinabove described in connection with the rectangular upright support members.

From the foregoing it will be seen that there has been provided an adjustable shelving assembly which can be rapidly put together or disassembled, and which requires only a single tool such as a pliers or wrench for complete assembly. In addition, the shelves can be adjusted at any desired height and positively lock the upright members by reason of the toothed arrangement between the T bolts and serrated slots 15. The rolled shelf edges provide a structural feature which improves the rigidity of the said shelves and adds strength to the corners where the locking T bolt assembly is applied. The disclosed adjustable shelving assembly moreover, requires a minimum number of parts to achieve a complete structure.

Having thus fully described the invention, what is

claimed as new and desired to be secured by Letters Patent of the United States, is:

1. An adjustable shelving assembly comprising hollow upright support members formed of a single length of metal and having a substantially rectangular cross-sectional shape, spaced inwardly turned longitudinal margins on said support members to form a slot along one corner in the support members, serrations on the edges of said margins, rectangular shelves for the support members, rolled edges on each of the shelves, said shelves and rolled edges being cut away at each corner to receive the slotted corner of the upright support members and a T bolt receivable within each of the upright support slots and coupled by bracket means to the shelf rolled edges adjacent thereto to secure the shelf and upright support members together.

2. An adjustable shelving assembly comprising hollow upright support members formed of a single length of metal and having a substantially circular cross-sectional shape, spaced inwardly turned longitudinal margins on said support members to form a slot in the support members, serrations on the edges of said margins, rectangular shelves for the support members, rolled edges on each of the shelves, said shelves and rolled edges being cut away at each corner to receive the slotted portion of the upright support members and a T bolt disposed across the margins, receivable within each of the upright support slots and coupled by bracket means to the shelf rolled edges adjacent thereto to secure the shelf and upright support members together.

3. An adjustable shelving assembly comprising hollow upright support members, spaced inwardly turned longitudinal margins on said support members to form a slot in the support members, serrations on the edges of said margins, rectangular shelves for the support members, said shelves being cut away at each corner to receive the upright support member, a bracket member in each corner of the shelves secured at each end to the shelf, an opening in said bracket member and a T bolt receivable within each of the upright support slots and carried within the bracket opening so as to be coupled to the shelf adjacent thereto a head on said T bolt flattened at its sides to slip within the upright support slots and of a dimension to span the said support slot, teeth on the inner face of the T bolt head to engage the serrations of the margins and a nut received upon the T bolt, a locking key comprising a somewhat C-shaped foil of metal, tabs extending from each free end of the key in the direction of the slot said key being bored to receive the T bolt therethrough to secure the shelf and upright support members together.

4. Shelving according to claim 3 in which the locking key is provided with an inclined bearing surface adjacent the bore to cause the key to skew as the nut is tightened.

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