

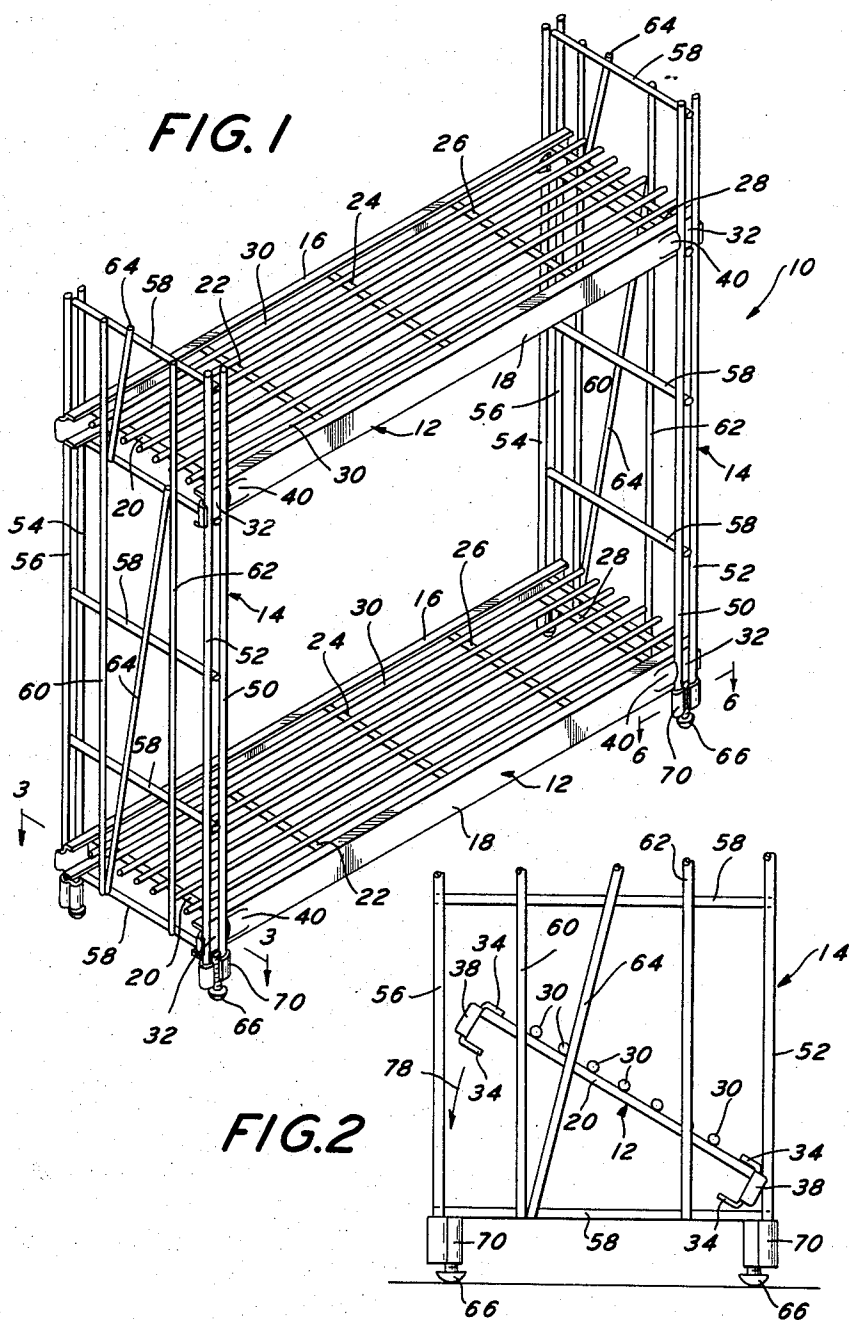
Sept. 1, 1964

S. KESILMAN ETAL  
SHELVING SYSTEM

3,146,734

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

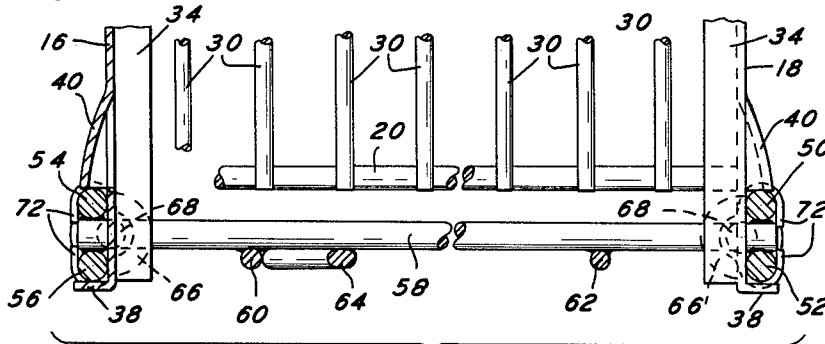


FIG. 3

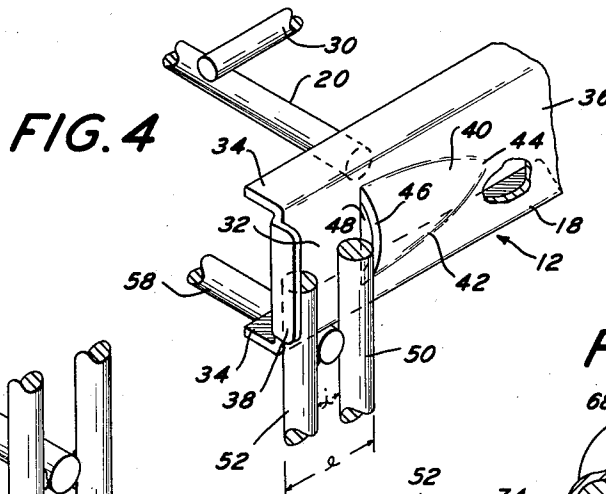


FIG. 4

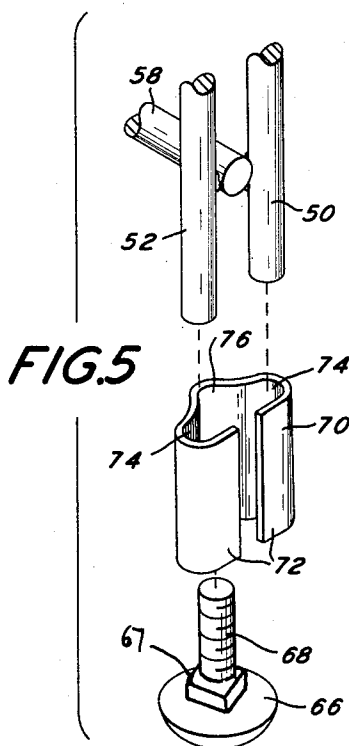


FIG. 5

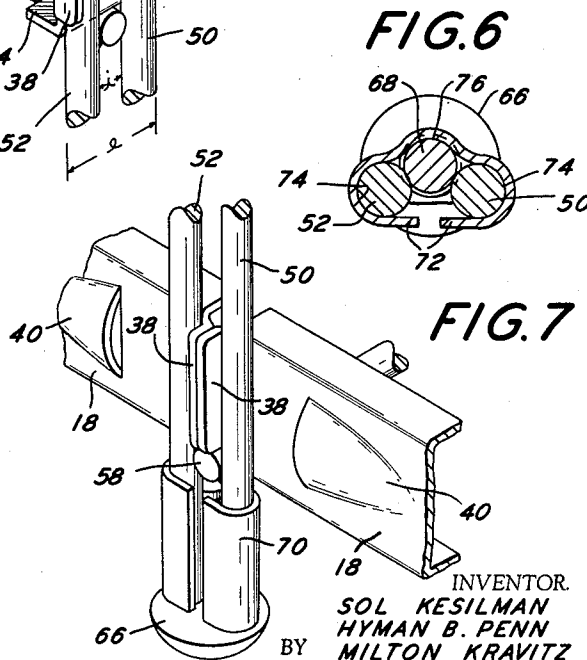


FIG. 6

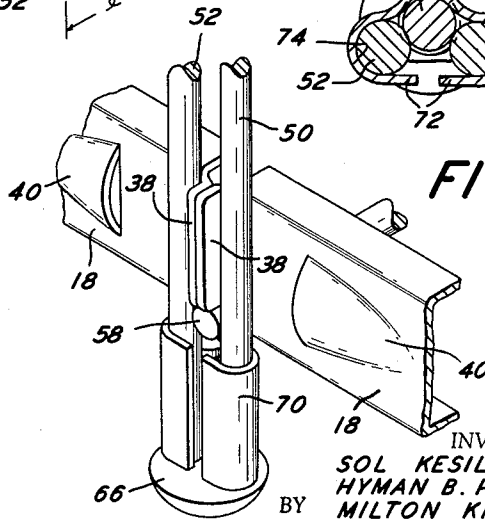


FIG. 7

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3,146,734

## SHELVING SYSTEM

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4 Claims. (Cl. 108—111)

This application refers to a shelving system and has as its objective the provision of a shelving system which is self-locking and which can be assembled by a single person without special skills, special tools and which does not require any fastening means whatsoever.

Yet a further objective of the invention is to provide a shelving system which will be economical in manufacture and which can be easily disassembled where desired and yet which will provide maximum strength and rigidity for storage.

The foregoing as well as other objects of the present invention are achieved by providing a shelving system which can be assembled between spaced parts. The shelves include channels at certain corners thereof defined by an upstanding tab and a struck out portion. The parts include pairs of vertical rods which are spaced so as to be adapted to be frictionally engaged in said channels in a simple manner. When so engaged, said members of the shelf rest upon horizontal separate bars in the upright thereby providing a reliable assembly. The vertical rods of the upright are spaced from each other a distance slightly less than the width of the shelf such that the shelf slightly spreads the vertical rods apart thereby enhancing a frictional fit of the rods in the channels of the shelves.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a fragmentary, perspective view of a shelving system erected in accordance with the present invention.

FIG. 2 is a fragmentary, enlarged, side elevational view of the system of FIG. 1 but showing the shelving about to be assembled in the horizontal position.

FIG. 3 is an enlarged sectional view taken along the lines 3—3 of FIG. 1.

FIG. 4 is an enlarged, fragmentary, detailed, perspective view of one end of a side member of a shelf engaged in the vertical rods of an upright.

FIG. 5 is an enlarged, fragmentary, detailed, exploded, perspective view showing the floor leveling glides.

FIG. 6 is an enlarged sectional view taken along the lines 6—6 of FIG. 1.

FIG. 7 is a perspective view showing the shelving of the present invention secured longitudinally with respect to each other.

Referring now in greater detail to the various figures of the drawings wherein similar reference characters refer to similar parts, a shelving system embodying the present invention is generally shown at 10 in FIG. 1. Device 10 basically comprises horizontal shelves 12 supported by spaced uprights 14.

Each shelf 12 generally comprises a pair of spaced parallel longitudinally directed side members 16 and 18. The side members 16 and 18 are spaced from each other and held in position by means of lateral rods 20, 22, 24, 26 and 28 having their free ends respectively secured to one of the side members 16 or 18 by well known techniques such as welding, soldering etc. As shown in FIG. 4, a typical lateral rod 20 is secured to a typical side member 18 by being joined to the lower surface of one of the legs constituting the side member 18 as will be discussed in greater detail hereinafter. The other free end

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of the lateral rod 20 is similarly joined to the side member 16. As shown in FIG. 1, the lateral rods 20, 22, etc. not only serve to space and hold the side members 16 and 18 in the desired position, but also support a plurality of longitudinal rods 30 which are positioned upon the lateral rods in order to provide adequate support for any article which may be placed upon the shelf 12, thereby completing the structure of the shelf. The longitudinal rods 30 are welded to the lateral rods 20, 22, etc. at their points of contact.

As shown or indicated in FIGS. 1 and 4, each end of the side members 16 and 18 includes a channel 32 which assists in locking the shaft 12 in a stable operative position in conjunction with the uprights 14. As clearly shown in FIG. 4, a typical side member 18 is composed of channel stock and includes legs 34 connected by web 36. The channel 32 is formed by well known cutting and stamping techniques and is defined as the area lying between an upstanding tab 38 and a struck out portion 40. In manufacture, the tab 38 is preferably an integral portion of the side member 18, although it may be separable where desired. During the cutting and stamping operations the tab 38 is bent so as to lie perpendicular to the struck out portion. The struck out portion 40 includes a generally convex portion 42 which converges to a substantial point 44 as it merges into the plane of the web 36. The other end of the struck out portion 40 abruptly terminates in a raised arcuate edge 46 projecting outwardly from the plane of the web 36. A slot 48 in the form of an arc separates the edge 46 from the plane of the web 36. As shown in FIG. 4, the raised edge 46 constitutes an abutment surface in defining the extremity of the channel 32 and is spaced from the tab 38, the other extremity defining the channel 32.

Each channel 32 of the side members 16 and 18 cooperates with the vertical rods of the upright 14 in order to lock the shelf 12 in the horizontal position of FIG. 1.

As shown in FIG. 1, the upright 14 basically comprises a first pair of spaced vertical rods 50 and 52 and a second pair of spaced vertical rods 54 and 56. Laterally extending horizontal rods 58 have their ends interposed between and welded to the vertical rod pair 50, 52 and second vertical rod pair 54, 56 respectively. Thus, the cross sectional diameter of the rods 58 essentially fixes the spacing of the first rod pair 50, 52 with respect to each other and the second rod pair 54, 56 with respect to each other. In addition, the horizontal rods 58 serve to space the first rod pair 50, 52 as a unit from the second rod pair 54, 56 as a unit. Additional vertical rods 60 and 62 which are generally parallel to the rods 50, 52, 54 and 56 are welded to the horizontal rods 58 from strengthening purposes. In addition, an inclined rod 64 lying in a vertical plane crosses between the rods 60 and 62. Rod 64 has its lower end secured adjacent the rod 60 and its upper end secured adjacent the rod 62. The vertical rods 60 and 62 and the inclined rod 64 are welded to certain of the horizontal rods 58 which they contact.

As shown in FIG. 5, the lower edges of a vertical rod pair, such as the rods 50 and 52, terminate in a floor leveling glide 66 which is essentially the head of a bolt having a threaded stem 68. The threaded stem 68 is received in a sleeve 70 which basically comprises opposed sides 72 which curve approximately 180° into rod receiving chambers 74 which in turn curve and merge in stem receiving chamber 76.

As shown in FIGS. 5 and 6, the collar 70 is telescoped over a lower section of the vertical rods 50, 52 such that the rods 50 and 52 are seated in the rod receiving chambers 74. The threaded stem 68 is then positioned in the thread receiving chamber 76 in contact with the rods 50 and 52. The collar 70 is then compressed in order to

unite the floor leveling glide assembly. It is usually preferred that the threads of the stem 68 be of a harder material than that of the rods 50, 52 and the collar 70, so that when the collar 70 is compressed, the threads of the stem 68 will bite into the collar 70 and the rods 50 and 52.

Where desired, mating threads may be preformed in the chamber 76 and in the rods 50 and 52 in order to receive the threads of the stem 68. It is thus seen that the uprights 14 may be leveled by a simple adjustment of the floor leveling glides 66. A square shoulder 67 is provided for this purpose.

Where desired, the uprights 14 may be fitted with casters (not shown) instead of the glides 66. The caster may be secured to a pair of vertical members by simply employing a caster sleeve in place of the threaded stem 68 such that the sleeve will receive the caster socket which will include an annular area to receive the upstanding pin of the caster.

As previously stated, the cross sectional diameter of the horizontal rod 58 determines the spacing of the rods constituting a rod pair such as the rods 50 and 52. As shown in FIG. 4, the internal spacing between the rods 50 and 52 is identified as "i" and the external spacing between the rods 50 and 52 is defined as "e." These dimensions are important inasmuch as the vertical rod pairs 50, 52, 54, 56 are to be frictionally seated in the channel 32.

In order to secure the shelf 12 to an upright 14, the channels 32 must frictionally engage a pair of vertical rods 50, 52 or 54, 56 as shown in FIG. 4. The shelf 12 is forced against the vertical rod pair 50, 52 such that the rods 50, 52 are forced into the channel 32 with the rod 50 frictionally engaging the arcuate edge 46 of the struck out portion of the tabs and rod 52 frictionally engaging the inner surface of the tab 38. Here, the external spacing "e" of the rod pairs should be substantially the same as the width of channel 32 in order to achieve a tight fit. This operation may be repeated at the other end of the side member 18. The shelf 12 is now inclined, as shown in FIG. 2 with the side member 16 projecting upwardly. The shelf 12 is then forced to a horizontal position in the direction of arrow 78 of FIG. 2 such that the vertical rods 54 and 56 are forced into the channels 32 in side member 16 at both ends thereof. In order to gain a tight fit between the shelf 12 and the upright 14, the first pair of vertical rods 50, 52 is spaced from the second pair of vertical rods 54, 56 a distance slightly less than the distance between the side members 16 and 18. In other words, the shelf 12 is slightly wider than the space between the pairs of vertical rods. In this manner, the shelf 12 will force or spread the vertical rod pairs further apart from each other for a slight amount thereby enhancing the frictional engagement of the vertical rod pairs in the channels of the shelf side members. As indicated in FIG. 4, the shelf 12 is further supported in a horizontal position inasmuch as the lower legs 34 of the side members 16 and 18 rest upon the horizontal rods 58 of the uprights 14.

Furthermore, as previously described, the external distance "e" between the rods 50, 52 is substantially the same as the width of the channel 32 in order that a tight fit will be achieved between the shelf 12 and the upright 14. Where desired to secure a second shelf in longitudinal space relationship to the first shelf as previously described, the internal spacing "i" between the rods 50 and 52 is employed. As shown in FIG. 7, the tab 38 of the first side member 18 is positioned between the vertical rods 50, 52 to rest upon the horizontal rod 58. The tab 38 of the second side member 18 is then forced between the vertical rod 50 and the first tab 38, also to rest upon the horizontal rod 50. It is thus seen that the thickness of the tab 38 should be approximately one-half of the internal spacing between the rods 50 and 52. Furthermore, many additional shelves may be secured to each other in

the longitudinal direction in this manner, and, of course, the ends of the outermost shelf are secured to an upright 14 as shown in FIG. 4.

Should it be desired to secure the shelves laterally with respect to each other, an H shaped clip is employed to secure adjacent supports 14 to each other. The shelves may also be assembled at right angles to each other by means of an S shaped clip, on an M shaped clip may be employed to join the shelves lengthwise where the assembly of FIG. 7 will not provide sufficient strength. Back and side ledges may be secured to the uprights 14 by having off-set tabs which may be positioned behind the vertical rods 60 and 62.

Furthermore, the shelving may be positioned upon a dolly or may be presented as a platform.

It therefore follows, as generally indicated in FIG. 1, that the shelving may be presented in the form of several vertical spaced rows, that such rows each may be comprised of several shelves and may be joined to each other either longitudinally, as shown in FIG. 7, or by using an M shaped clip, that such rows may be joined to each other laterally, as by using an H shaped clip that such rows may be joined at right angles to each other, with the use of an S shaped clip, and that back and side ledges may be provided as desired. It is further to be appreciated that the shelving system of the present invention may be simply erected without fasteners, special tools or special skills by merely forcing pairs of vertical rods in channels formed in the side members of the shelves. Such channels are defined by a positioning tab and a struck out portion formed in the side members.

Where desirable, the rods 50 and 52 could be merged into a single bar with slots to perform the function of internal spacing "i." In such an embodiment, the horizontal support rods 58 would be substantially retained in order to give support to the side members of the shelving. However, it is entirely possible that the horizontal rods would be replaced with a continuous wall having spaced openings to receive the ends of the side members 16 and 18.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed as the invention is:

1. A shelving system comprising in combination at least two uprights supporting a shelf, said shelf including a pair of spaced parallel side members, each having a channel formed adjacent each end thereof, said channel being defined by an upstanding tab adjacent an end of a side member and by a struck out portion formed in the side member, each of said uprights including two spaced and opposing pairs of vertical rods, each pair of rods including two closely aligned parallel rods having a space therebetween, the width of said rod pair constituting an external dimension and said space constituting an internal dimension, said external dimension of a rod pair being substantially the same as the width of said channel, whereby each of said rod pairs is forcingly and frictionally engaged in one of said channels.

2. The invention of claim 1 wherein said opposing rod pairs are spaced from each other a distance less than the width of said shelf whereby said shelf is adapted to be forcingly and frictionally received between said rod pairs.

3. The invention of claim 2 wherein said upright includes spaced horizontal rods interposed between each pair of vertical rods thereby spacing the individual vertical rods of a rod pair from each other and also spacing the rod pairs from each other, said shelf resting at each end thereof upon one of said horizontal rods.

4. The invention of claim 1 including two longitudinally aligned shelves supported by two end uprights and a middle upright, said shelves each including a pair of

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spaced parallel side members having said channels formed adjacent each end thereof, the rod pairs of said end up-  
rights being forcingly and frictionally engaged in certain  
of said channels with said external dimension being sub-  
stantially the same as the width of said channel, the rod  
pairs of said middle upright securing and supporting both  
of said shelves, an upstanding tab of each of said shelves  
being forcingly and frictionally engaged in the space be-  
tween a rod pair of said middle upright, said space con-  
stituting said internal dimension, and said tabs being in  
mutual abutment along one surface thereof.

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