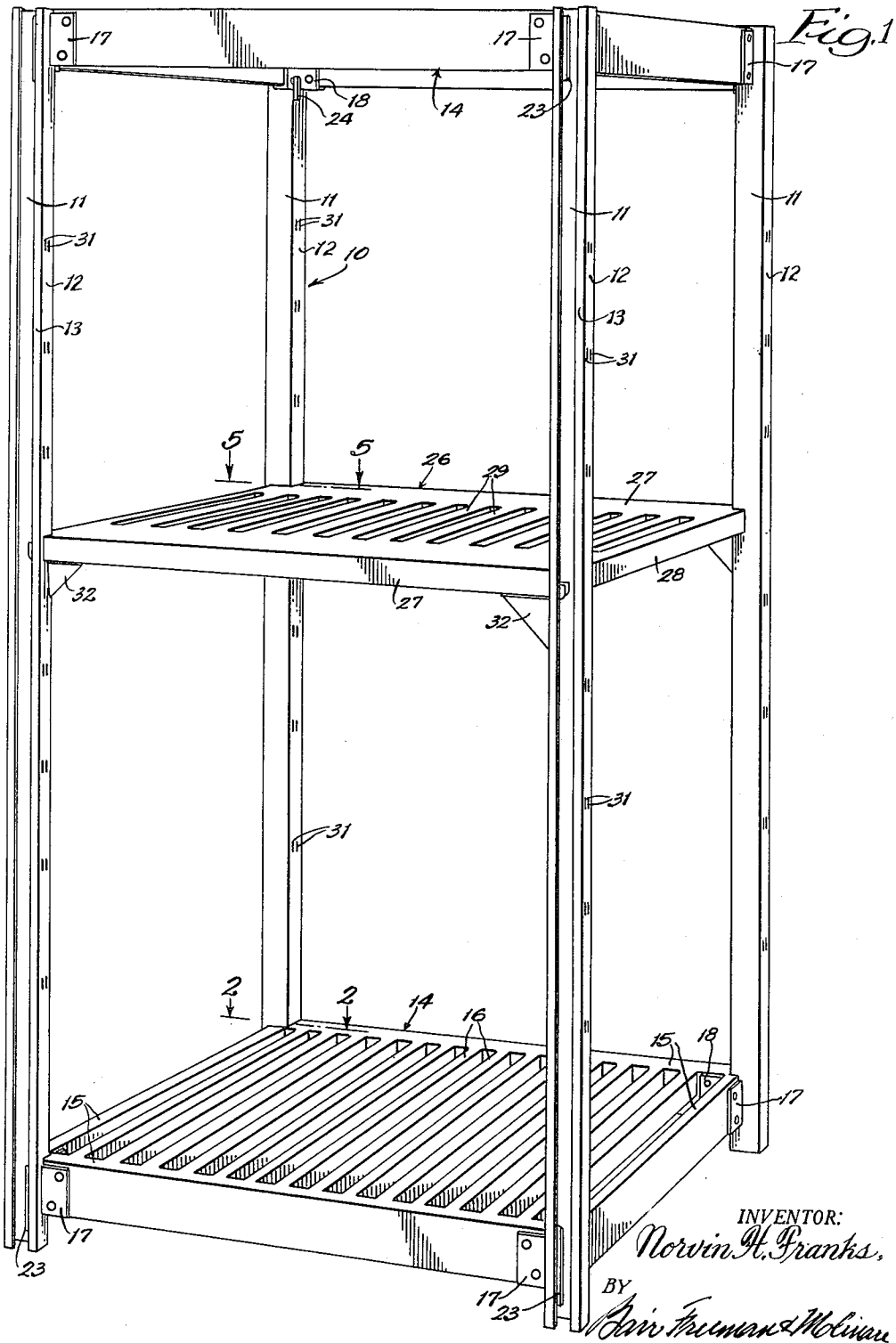
Aug. 28, 1956 N. H. FRANKS 2,760,650

KNOCK-DOWN SHELVING UNIT

Filed Aug. 16, 1954

3 Sheets-Sheet 1

Fig. 1



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KNOCK-DOWN SHELVING UNIT

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Fig. 2

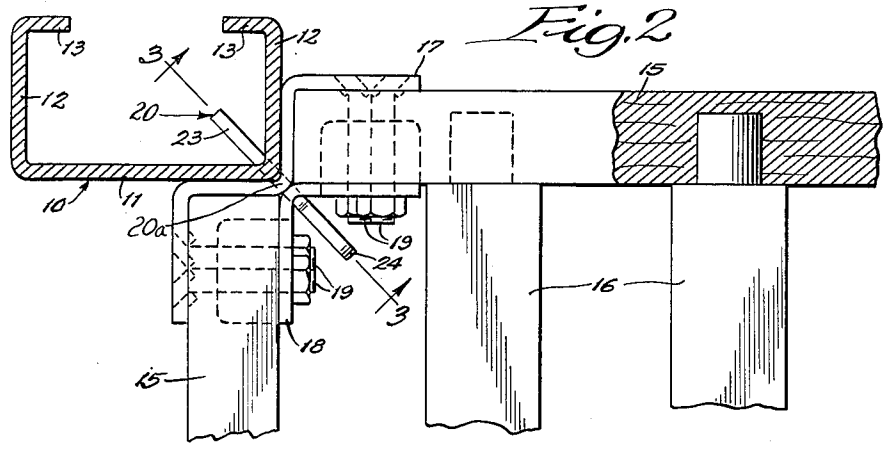


Fig. 3

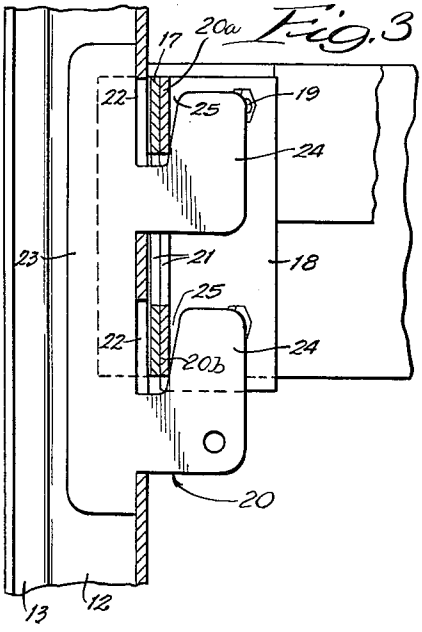
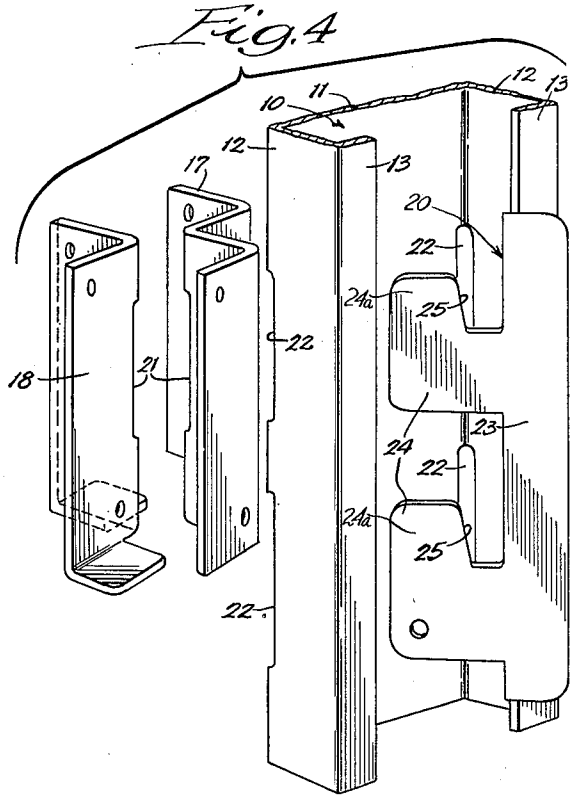


Fig. 4



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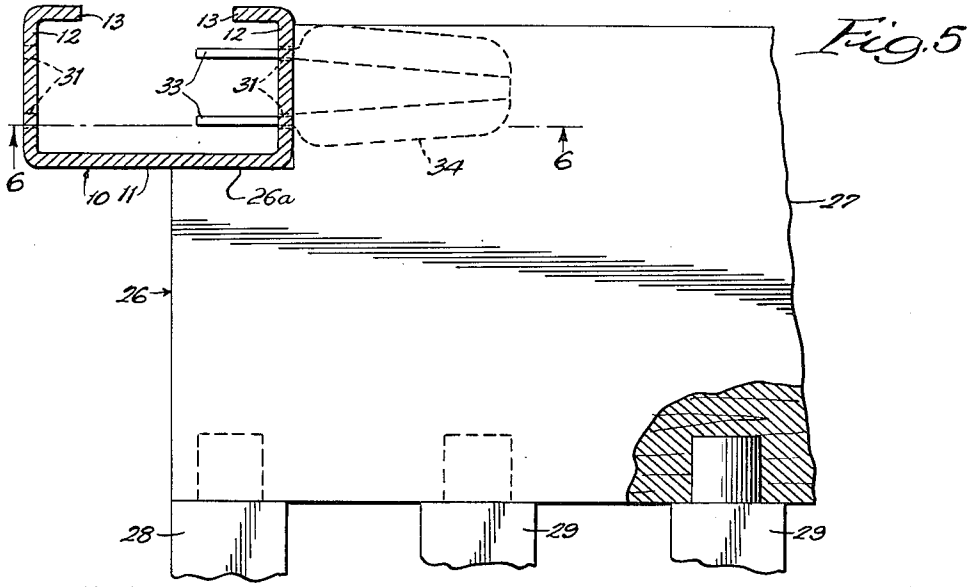


Fig. 5

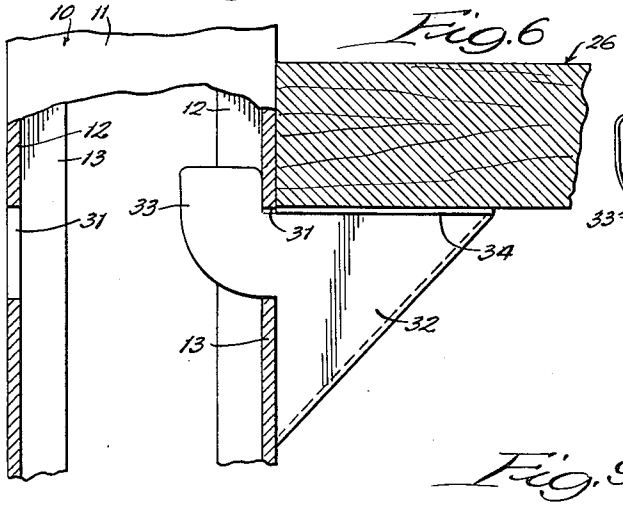


Fig. 6

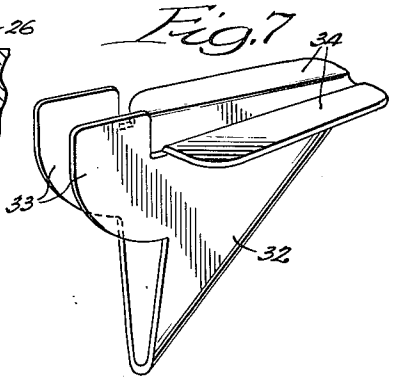


Fig. 7

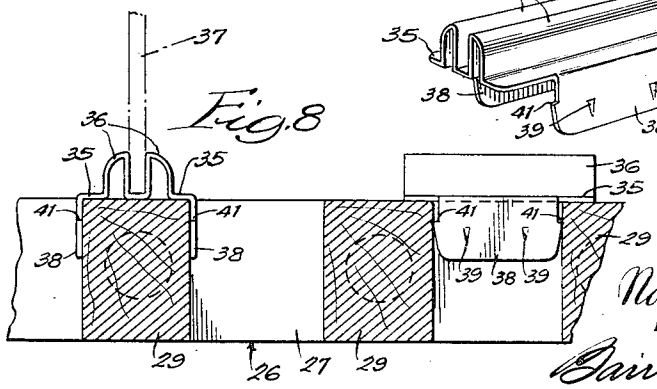


Fig. 8

Fig. 9

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KNOCK-DOWN SHELVING UNIT

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Application August 16, 1954, Serial No. 449,835

6 Claims. (Cl. 211—148)

This invention relates to a knock-down shelving unit and more particularly to a shelving unit which can be easily assembled and disassembled without the use of tools.

It is one of the objects of the present invention to provide a knock-down shelving unit which can easily and quickly be assembled and disassembled without the use of any tools and which is extremely strong and rigid when assembled.

Another object is to provide a shelving unit formed basically by upright corner posts connected at the top and bottom by top and bottom shelf units which are secured to the corner posts by a wedging action and with intermediate shelves supported by the corner posts in desired positions.

According to one feature of the invention, the shelf units are formed with square end surfaces to abut flat against the sides of the corner posts and are drawn securely against the corner posts by wedging type supports.

According to another feature, the wedging effect is produced by floating hook members carried by the posts and engaging the shelf units so that pressure at the corner post surfaces is equalized at opposite sides and an extremely rigid joint is provided.

A further object is to provide a shelving unit in which the shelves may be divided into separated compartments by divider strips detachably secured to the shelves.

According to one feature, the divider strips are held by sheet metal holders which clamp over slats of which the shelves are formed or which may fit between adjacent slats at right angles thereto.

The above and other objects will become apparent from the following description when read in conjunction with the accompanying drawings, which serve merely to illustrate the invention. In the drawings:

Figure 1 is a perspective view of a complete shelf unit embodying the invention;

Figure 2 is a partial enlarged section on the line 2—2 of Figure 1;

Figure 3 is a partial section on the line 3—3 of Figure 2;

Figure 4 is a disassembled view of a corner showing the joint construction;

Figure 5 is a partial section on the line 5—5 of Figure 1 showing the mounting of an intermediate shelf;

Figure 6 is a section on the line 6—6 of Figure 5;

Figure 7 is a perspective view of the intermediate shelf support;

Figure 8 is a partial section through a shelf showing mounting of divider holders thereon in two positions; and

Figure 9 is a perspective view of a divider holder.

The complete unit, as best shown in Figure 1, is formed by corner posts indicated generally at 10 which, as best seen in Figure 2, are formed of sheet metal of a channel section to provide a flat face or web 11, flat ends 12 at right angles to the face 11 and inwardly turned flanges 13 at the edges of the ends 12. The corner posts 10

may be made of any desired length depending upon the height of the shelving unit desired and the number of intermediate shelves to be carried thereby. As shown in Figure 1, only one intermediate shelf is present, although it will be understood that in a normal installation not only the top and bottom shelf units, but also a plurality of intermediate shelves would be employed.

The corner posts 10 are connected at their upper and lower ends by upper and lower shelf units 14 which may be identical. Each of the shelf units 14 is formed by outer wooden side and end members 15 meeting at right angles and joined at their corners by connecting members. The shelves are completed by spaced slats 16 secured between the side members to provide a supporting surface for articles to be stored.

As best seen in Figure 2, the side and end members 15 are formed with square ends which terminate spaced from each other to overlie and abut against the face 11 and one end 12 of the adjacent corner posts. The end and side members are connected by a sheet metal connecting part including an outer strip 17 extending over the outer face of the side members and over the ends thereof to abut squarely against the corner post 10. The connecting part is completed by an inner angle strip 18 fitting in the internal angle between the adjacent side and end strips 15 and secured to the strips and to the outer connecting part 17 by bolts, or the like, shown at 19. The connecting parts 17 and 18 are formed intermediate their ends with registering openings 21 at the apex of the angle so that the openings will register with the corner of a corner post when the parts are assembled. The openings 21 divide the connecting parts into an upper portion 20*a* and a lower portion 20*b* to provide a double wedging connection as described hereinafter.

To secure the parts together, the corner posts 10 are formed at the apex of the angle between the face 11 and the end surfaces 12 with vertically spaced openings 22. The uppermost opening 22 may register with the opening 21 in the connecting part when the parts are assembled and the lowermost opening may register with the lower edge of the connecting portion 20*b*, as best seen in Figure 3.

A hook member indicated generally at 20 is provided formed with a flat elongated shank 23 to fit into the hollow corner post and with projecting hook portions 24 projecting outward from the shank intermediate its ends and then upward in the form of hook projections 24*a*. The hook portions 24 are of a length less than the length of the openings 21 and 22 to extend through the openings 21 and 22. The hook projections are formed with inner wedging surfaces 25 extending upwardly at an acute angle to the shank 23 to receive and hold the connecting portions 20*a* and 20*b* formed by the strips 17 and 18. To assemble the parts the hook members are inserted in the upper and lower ends of the corner posts with the hook portions 24 projecting through the openings 22 and the hook projections 24*a* facing upwardly. The upper and lower shelf members may then be placed between the corner posts with the lower edges of the connecting portions 20*b* fitting into the lower hook 24 and with the upper hook extending through the openings 21 and receiving the connecting portions 20*a*. When the shelf units are pressed downward they will be wedged inward toward the corner posts by the angular surfaces 25 to draw the connecting part 17 and the square ends of the side and end strips 15 tightly against the adjacent surfaces of the corner posts. Since the hook can turn or float freely, the pressures between the surfaces at each corner will be equalized so that a uniform and secure gripping effect is provided. The connecting parts and the corner posts are preferably relatively deep, on the order of several inches, so that the surfaces will press against each

other and provide an extremely rigid and sturdy joint. At the same time, the complete assembly can be put together without the use of any tools and can easily be disassembled without the use of tools.

It is to be noted that the vertically spaced hook portions 24*a* and 24*b* engage the connecting portions 20*a* and 20*b* at points spaced longitudinally of the corner posts to provide a very rigid assembly which will not sway or rock easily and which has a very large load carrying capacity.

Alternatively to the method of assembly described above, the shelf units can be positioned between the posts and the hook members inserted from the shelf side with the upper hook portion 24 extending through the opening 21 and one of the openings 22 and the lower hook portion 24 extending through the next lower opening 22 with the projections 24*a* facing down. In this position the lower edges of the connecting portions 20*a* and 20*b* engage the flat ends of the hook portions 24 and the wedging surfaces 25 engage the inner surfaces of the post 10 at the lower ends of the openings 22 to draw the parts together in the same manner as in the first type of installation described above.

Between the upper and lower shelf units 14, any desired number of intermediate shelves, indicated generally at 26, may be mounted. The intermediate shelves are formed in much the same manner as the upper and lower shelves with front and back wooden strips 27 and side strips or slats 28. The front and back strips 27 may be rigidly connected by a plurality of spaced intermediate slats 29 to complete a shelf upon which articles can be supported.

The intermediate shelves 26 are preferably notched at the corners as indicated at 26*a* to fit against the corner posts, as best seen in Figure 5. To support the intermediate shelves in any one of a plurality of desired positions, each corner post is formed in its end surfaces with vertically spaced sets of slots 31. Each set of slots, as best seen in Figures 1 and 5, comprises a pair of side-by-side vertically elongated openings. The slots are adapted to receive supporting brackets of the type best shown in Figures 6 and 7 which are formed of sheet metal bent to provide a main U-section body 32 of triangular contour with the hook members 33 extending from the ends of the body sides. Preferably the edges of the body sides may be bent over, as shown at 34, to provide flat outwardly extending flanges upon which the shelves may rest. To assemble the supports on the corner posts a support may be turned upwardly with the flanges 34 flat against the end surface 12 of the corner post and the hook members 33 may be inserted through slots 31 in the posts. The support may then be turned down to the position shown in Figures 5 and 6 in which its lower edge portion abuts against the end 12 of the corner post and the hook members 33 grip the internal surface of the corner post to prevent accidental removal of the support. Supports can easily and quickly be attached to the corner posts at desired positions after which intermediate shelves 26 can be placed thereon and will be securely held without requiring the use of any tools to complete the assembly.

In many cases, it may be desired to divide the shelf surface into compartments to receive different types of articles. This may be accomplished by utilizing relatively thin flat dividers, such as conventional fiber board, or the like, supported by holders, as shown in Figures 8 and 9. The holders may be attached to the shelves in either of two reversed right angular positions so that they will hold dividers extending at right angles to each other and separating the shelf surface into separate compartments.

As shown, each divider holder is formed of sheet metal with flat top surfaces 35 to rest on the top of a slat 29, as shown at the left of Figure 8, and with upwardly rebent portions 36 spaced to receive between them a divider panel, as indicated in dot-dash lines at 37 in Figure 8. Side flanges 38 extend downwardly from the outer edges of the surfaces 35 and may, if desired, be formed with pressed-in teeth 39 to grip the sides of the slats. The holders are made of such a size as to fit over a slat, as shown at the left in Figure 8, and to grip it securely so that they can easily be pressed on to the slats where it is desired and hold dividers 37 in the required position.

For mounting the holders in the reverse position, as shown at the right of Figure 8, the side flanges 38 are made of a length to fit between adjacent slats and may be formed on their ends with relatively sharp teeth to bite into and grip the surfaces of the slats. The body portions 35 and central rebent portions 36 are longer than the space between adjacent slats to span the slats, as shown. With this construction, the holders can be pressed onto a shelf into either of two right angular positions and will securely grip the shelf to hold divider strips thereon.

The shelf unit of the present invention can easily be packaged or shipped in disassembled condition and can be set up at the desired point of use easily and quickly without requiring any tools. When set up, the unit is extremely strong and rigid and will support very substantial weights in a rigid fashion without any wobbling or weaving. When shelf units are to be moved they can easily be disassembled by hand and re-erected at any other desired point.

By providing the openings 22 at both corners of the posts where sides 11 and ends 12 join and by providing the slots 31 in both ends 12 of each post the shelving units of the invention can be erected as continuous multiple units with each post except the extreme end posts being common to two units. Thus by mounting hook members at two corners of each post, two top and bottom shelf units can be secured to each post so that a continuous multiple unit assembly is provided. Also by mounting supporting brackets on both end walls 12 of each post, intermediate shelves can be supported at each side of each post. In this way, a single assembly of any desired size can be built up in a unitary structure.

While one embodiment of the invention has been shown and described in detail, it will be understood that this is illustrative only and is not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. A knock-down shelving unit comprising a hollow post of sheet material of rectangular section having a pair of vertically spaced openings in one corner, a hook member including an elongated straight shank of a length to span two openings fitting in the hollow post at said corner and a pair of spaced hook portions shorter than the openings and projecting through the openings respectively, and a connecting part having flat sides meeting at a right angle to fit against said corner of the post and formed with vertically spaced web portions at the intersection of the sides to fit into the hook portions respectively.

2. A knock-down shelving unit comprising a hollow post of sheet material of rectangular section having a pair of vertically spaced openings in one corner, a hook member including an elongated straight shank of a length to span two openings fitting in the hollow post at said corner and a pair of spaced hook portions shorter than the openings and projecting through the openings respectively, and a connecting part having flat sides meeting at a right angle to fit against said corner of the post and formed with an opening therein to receive the upper hook portion, the lower edge of the connecting part fitting into the lower hook portion.

3. A knock-down shelving unit comprising a hollow sheet metal post having angularly related sides and having a series of spaced openings therethrough adjacent to the juncture of the sides, a connecitng plate having angularly

related side portions lying at the same angle to each other as the sides of the post and fitting face-to-face against the sides of the post and formed with at least one opening therethrough registering with an opening through the post, and a hook member having an elongated shank to span at least two openings in the post and having two spaced hook portions intermediate its ends of a length less than the length of and passing through the openings in the post and the connecting plate, the hook portions having inner wedging surfaces at acute angles to the shank and converging to a minimum spacing from the shank less than the combined thickness of the post and the connecting plate to wedge the plate and post tightly together at two points spaced longitudinally of the post.

4. A knock-down shelving unit comprising a post of sheet metal having two flat sides lying at an angle to each other and connected together at an elongated straight juncture, there being a series of spaced openings through the post at the juncture, a unitary connecting plate having flat side portions lying at the same angle to each other as the sides of the post fitting face to face against the sides of the post and formed with at least one opening therethrough at the juncture of the side portions registering with an opening through the post and forming at the juncture of the side portions two edges spaced apart the same distance as corresponding parts of the openings in the post, and a hook member having an elongated shank of a length to span two openings in the post and two hook portions spaced longitudinally of the shank the same distance as corresponding parts of the openings in the post and projecting from the shank intermediate its ends and of a length less than the length of and passing through the openings in the post and connecting plate, the hook member lying at an acute angle to the sides of the post and the side portions of the connecting plate, the hook portions having inner wedging surfaces at acute angles to the shank and converging to a minimum spacing from the shank less than the combined thickness of the post and the connecting plate to wedge the connecting plate and the post tightly together at two points spaced longitudinally of the post.

5. A knock-down shelving unit comprising a post of sheet metal having two flat sides lying at an angle to each other and connected together at an elongated straight juncture, there being a series of spaced openings through the post at the juncture, a unitary connecting plate having flat side portions lying at the same angle to each other as the sides of the post fitting face to face against the sides of the post and formed with at least one opening therethrough at the juncture of the side portions registering with an opening through the post and forming at the juncture of the side portions two edges spaced apart the same distance as corresponding parts of the openings in the post, and a hook member having an elongated shank of a length to span two openings in the post and two hook portions spaced longitudinally of the shank the same distance as corresponding parts of the openings in the post and projecting from the shank intermediate its ends and of a length less than the length of and passing through the openings in the post and connecting plate, the hook member lying at an acute angle to the sides

of the post and the side portions of the connecting plate, the shank of the hook member lying in the concave angle between the sides of the post with the hook portions projecting through the openings in the post and extending upward to receive said edges of the connecting plate, the hook portions having inner wedging surfaces at acute angles to the shank and converging to a minimum spacing from the shank less than the combined thickness of the post and connecting plate to wedge the connecting plate and the post tightly together at two points spaced longitudinally of the post.

6. A knock-down shelving unit comprising a hollow post of sheet metal of channel section with flat sides joined by a web at an angle to the sides and having a series of spaced openings adjacent to the juncture of each of the sides and the web, a unitary connecting plate having flat side portions lying at the same angle to each other as the sides and web of the post and fitting face to face against the web and one of the sides of the post and formed with at least one opening therethrough at the juncture of the side portions registering with an opening through the post and defining two edges spaced apart the same distance as corresponding parts of adjacent openings in a series in the post, and a hook member having an elongated shank of a length to span at least two openings in a series in the post and having two hook portions spaced longitudinally of the shank intermediate its ends the same distance as corresponding parts of the openings in the post and of a length less than and passing through the openings in the post and the connecting plate, the hook member lying at an acute angle to the sides of the post and the side portions of the connecting plate, the hook portions having inner wedging surfaces at acute angles to the shank and converging to a minimum spacing from the shank less than the combined thickness of the post and connecting plate to wedge the connecting plate and the post tightly togeher at two points spaced longitudinally of the post, each post being adapted to receive connecting plates at each side of its web whereby a series of connected shelving units can be formed.

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