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Fleck

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[54] **SYSTEM FOR CONNECTING WIRE SHELF UNITS END-TO-END**

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[52] **U.S. Cl.** ..... **108/64,** 211/182, 108/111, 287/103 R

[51] **Int. Cl.** **A47b 57/00**

[58] **Field of Search** ..... 108/111, 114, 64; 211/148, 181, 182, 177; 24/201 A, 230 TC; 52/726; 287/2, 103, 20.927, 20.926, 20.924; 16/87.4, 87.6

[56] **References Cited**

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956,991	4/1964	Great Britain	287/2

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[57] **ABSTRACT**

Wire shelves include elongated front and rear rails in the form of C-shaped channels. Each rail includes an outer vertical wall which is provided with an opening adjacent each end. An elongated clip with an anchor pad at one end is received within axially aligned channels of two shelves desired to be connected together end-to-end. The anchor pad locks into an end aperture of one rail and extends into the channel of the associated rail of a second shelf to hold the shelves in place while an end frame and leg assembly are assembled to the second shelf. A single bolt then connects all the parts together, including the horizontal clip, at the end aperture of the second shelf to form a rigid connection supported by only a single leg assembly.

5 Claims, 4 Drawing Figures

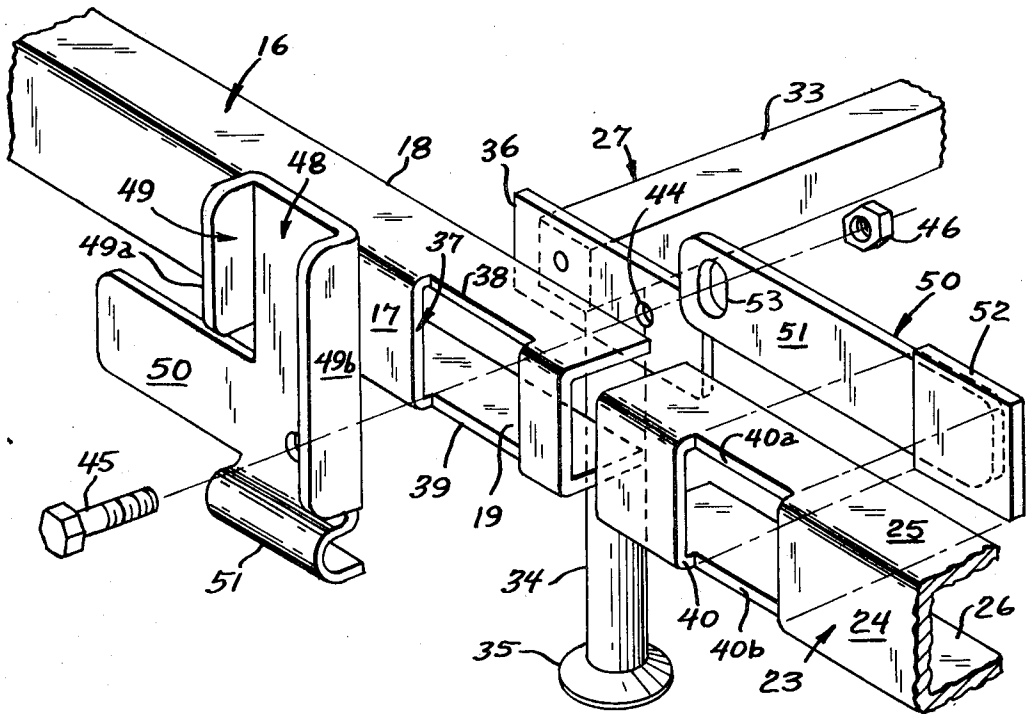


Fig. 1

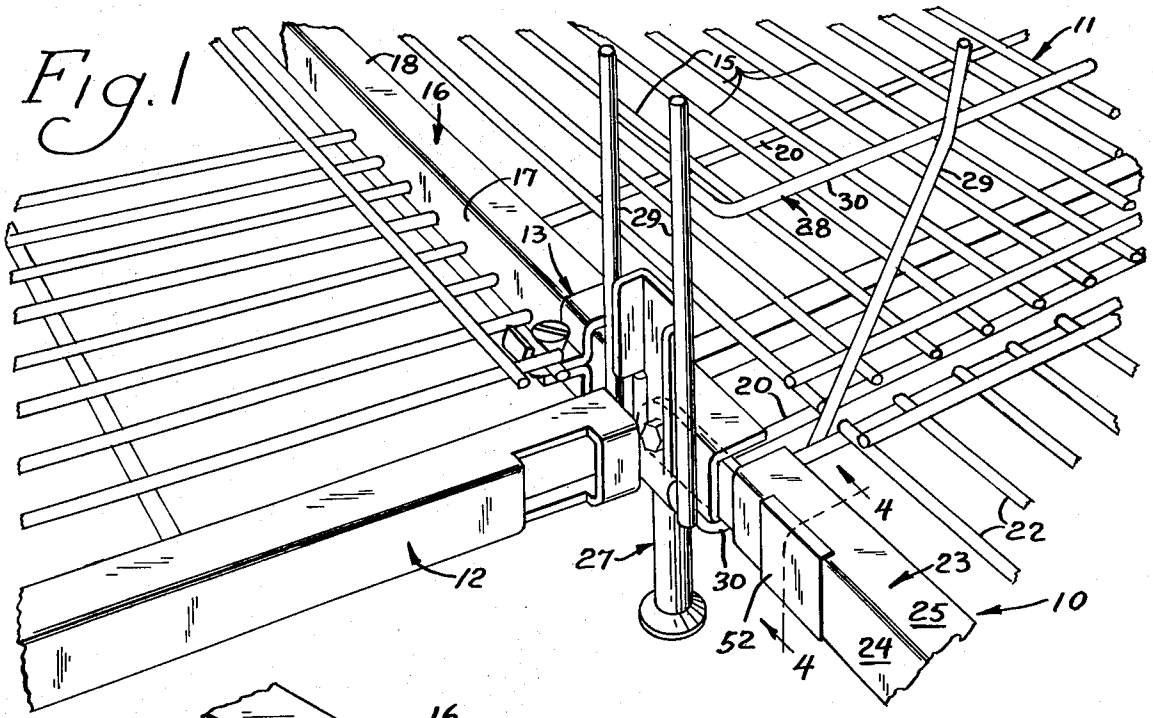


Fig. 2

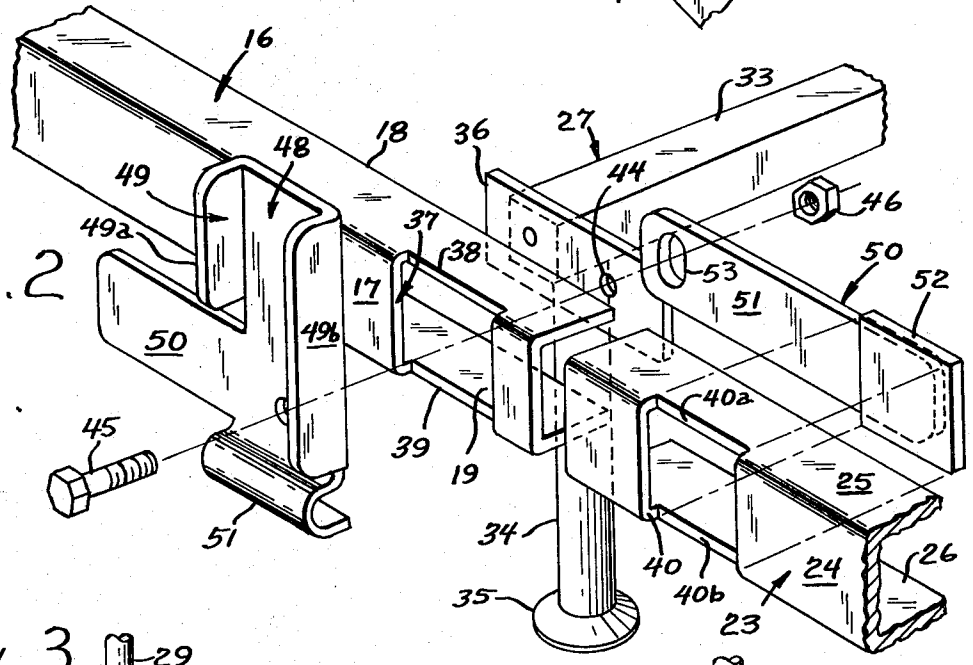


Fig. 3

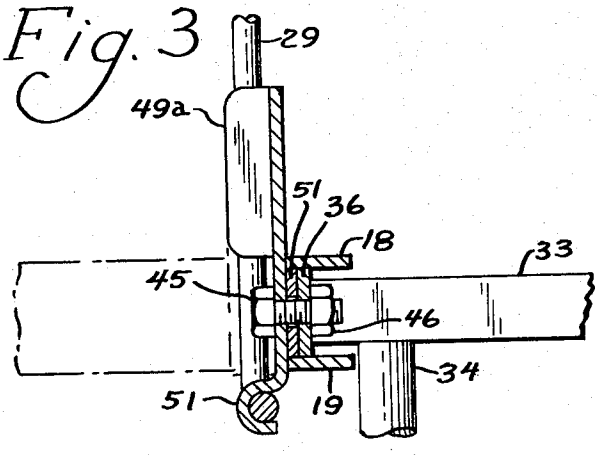
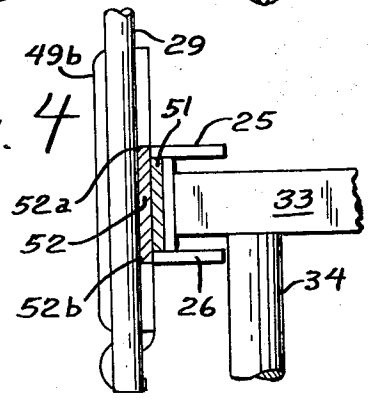


Fig. 4



SYSTEM FOR CONNECTING WIRE SHELF UNITS END-TO-END

BACKGROUND AND SUMMARY

The present invention relates to a system for connecting wire shelf units end-to-end. Wire shelf units of the type with which the present invention is concerned may be used to provide shelving for institutions such as hospitals and the like. It is desirable from the point of view of achieving the economies of mass production to have a limited number of basic system elements, yet achieve a maximum of different configurations so that the same basic units may fulfill the needs of different situations.

One of the requirements for such shelving units is to connect the shelves end-to-end in achieving a unitary shelf longer than any of the individual shelf units. In making an end-to-end connection of this type, shelf systems which are commercially available generally require a complete end unit for each set of adjacent shelves. Thus, two end frames and two leg assemblies are used for a single connection. The end frames or uprights of the adjacent units are then banded or clamped together to effect a rigid connection between the two shelving units.

One of the important features of the present invention is that it eliminates one end frame and one leg assembly, yet still achieves a rigid connection between adjacent shelf units. The wire shelves of the present invention include elongated front and rear rails in the form of C-shaped channels which face the longitudinal center of the shelf. Each rail is provided with an opening adjacent each end. These end openings are generally rectangular, and they are located in the vertical outer wall of the rail. They extend to a limited extent into the upper and lower horizontal walls of each rail so as to provide an obstruction-free vertical throughput.

An elongated clip with an anchor pad at one end is received within axially aligned side rails of two shelves desired to be connected together end-to-end. The anchor pad locks into an end aperture of one rail, and it extends into the channel of the associated rail of a second shelf, thereby holding the first shelf in place while an end clip, upright frame and leg assembly are assembled to the second shelf. A single bolt then connects all of the parts together, including the clip, at the end aperture of the second shelf to form a rigid connection between the two shelf units. Thus, the only connection between adjacent shelves is by means of the horizontal clip, thereby eliminating the need for a second end frame and leg assembly.

By using the same end aperture either for receiving an anchor pad of a connecting clip or for fastening a leg assembly and upright frame, the shelf units may be connected together from either direction, thereby rendering the units interchangeable and achieving flexibility in use. In addition, the shelf units of the present invention are connected together with greater facility than has been achieved in the past because the connection at each shelf edge is achieved only through a single bolt. Since the horizontal end clip is locked to one shelf and temporarily held in the channel of the other during assembly, assembly time is further minimized by eliminating any pre-assembly to one unit other than attaching the horizontal end clip.

Other features and advantages of the present invention will be apparent to persons skilled in the art from the following detailed description of a preferred embodiment accompanied by the attached drawing wherein identical reference numerals will refer to like parts in their various views.

THE DRAWING

FIG. **1** is an upper perspective view showing two shelf units connected end-to-end according to the present invention;

FIG. **2** is a detailed view of a connection between adjacent shelves incorporating the present invention and with the parts in exploded relation;

FIG. **3** is a vertical cross section view taken through the connection of the clip to one shelving unit; and

FIG. **4** is a vertical cross section view taken through the connection of the end clip to the other shelving unit, as indicated by the sight line **4—4** in FIG. **1**.

DETAILED DESCRIPTION

Referring first to FIG. **1**, there are shown portions of three separate shelves, generally designated respectively by reference numerals **10, 11** and **12.** The shelf units **10** and **11** are connected end-to-end, as will be more fully disclosed below; and the shelf units **11** and **12** are connected in transverse orientation, as might be used in providing shelving in a corner of a room. The shelf units **11** and **12** are connected by means of a pair of clamps, one of which is shown in FIG. **1** and generally designated **13.** Additional details regarding the clamp **13** may be found in the copending, co-owned application entitled "Clamp Assembly for Supporting Wire Shelf," Ser. No. 212,488, filed Dec. 27, 1971.

Each of the shelves **10–12** is of the type generally referred to in the trade as a wire shelf. These shelves are similar to each other, so that only the shelf **11** need be described in further detail for complete understanding of the invention.

Turning then to the shelf **11,** it includes a plurality of elongated horizontal rods **15** which are all parallel to each other and spaced laterally a predetermined distance. At each longitudinal edge of the shelf **11,** there is a rail, only one of which is shown in FIG. **1** and designated generally by reference numeral **16.** The rails have the general shape of a C when viewed in vertical transverse section so as to form a channel; and the open portions of these channels face the longitudinal center of the shelf unit **11**—that is, they face each other. The channel **16** includes an outer vertical wall **17** and upper and lower horizontal walls **18** and **19** (the lower horizontal wall **19** being best seen in FIGS. **2** and **3**). The wires **15** are secured together and to the end rails by means of transverse rods **20** to which they are welded. The distal ends of the transverse rods **20** are then welded to the underside of the upper wall **18** of the end rails.

The shelf **10** is similarly provided with elongated rods or wires **22** and side rails or channels, one of which is designated generally by reference numeral **23** and includes a vertical outer wall **24** and upper and lower horizontal walls connected thereto designated respectively **25** and **26** (FIG. **2**).

The end of the shelf **11** is supported by means of a leg unit generally designated **27,** and it is provided with an end upright frame, generally designated **28,** which is formed from a plurality of upright rods **29** and horizon-

tal rods **30** welded together to form a rigid end frame. An upper shelf assembly may be connected, if desired, to the end frame **28** in a manner more fully described in co-owned U.S. Pat. No. 3,589,746 of Inglis, et al, entitled "Wire Shelf Cart." Although this patent discloses a cart, superposed shelves may be connected together in a manner disclosed therein.

Turning now to FIG. **2**, the end leg assembly **27** may be seen to include a transverse horizontal bar **33** having a generally square cross section and preferably being tubular, although these are not critical limitations. At each end of the horizontal bar **33**, an upright tubular leg is welded to the underside, one of these legs being shown in FIG. **2** and designated by reference numeral **34**. The lower end of the leg **34** is provided with an adjustable foot **35** for engaging the floor and supporting the unit.

The end of the bar **33** projects slightly beyond the leg **34** and is provided with a horizontally extending plate **36** which fits into the open channel of the side rail **16**. The side rail **16** is provided with an aperture **37** formed adjacent the end thereof and in the vertical wall **17**. The aperture **37** also extends to a limited extent into the upper and lower walls **18** and **19** of the channel **16**, as indicated respectively at **38** and **39**— thus providing a vertical throughput or obstruction-free slot. A similar end aperture is provided at the other end of the side rail **16**, and each side rail of each shelf is provided with an end aperture similar to the aperture **37**. The end aperture for the side rail **24** is designated **40** in FIG. **2**.

The plate **26** of the leg assembly **27** extends within the channel formed by the side rail **16** and alongside of the aperture **37**. The plate **36** is provided with a clearance aperture **44** for receiving a bolt **45** which, together with a nut **46**, holds the assembled parts together, as will be more fully understood presently.

The upright frame unit **28** is secured to the end of the shelf by means of a clip generally designated by reference numeral **48**. The clip **48** includes an upper separator portion generally designated **49**, a laterally extending tongue **50** and a lower clamp or hook portion **51**. The tongue **50** fits into the aperture **37** of the side rail **16** and stabilizes the clip **48** against rotational motion when the clip is assembled to the shelf. The upper separator **49** includes outwardly extending flanges **49a** and **49b** for separating two vertical end rods **29** of the end frame **28**; and the lower clamp **51** receives a turned portion of the lower horizontal rod **30** of the end frame **28** to which the vertical rods **29** are welded. More details of the clip **58** and the manner in which it rigidly connects the upright end frame **28** to the shelf can be found in the above-mentioned patent.

A horizontally-extending clip generally designated by reference numeral **50** in FIG. **2** includes a strut portion **51** and an enlarged anchor pad **52** welded to one end thereof. At the other end of the strut **51** there is an aperture **53** which is elongated in a vertical direction and designed to receive the bolt **45**. The anchor pad **52** is received within the end aperture **40** of the end rail **23** of the shelf **10**, as best seen in FIG. **1**. The anchor pad **52** extends above and below the strut **51** so that when it is received within the end aperture **40** of the side rail **23**, the upper and lower edges thereof (designated respectively **52*a*** and **52*b*** in FIG. **4**), will engage the upper and lower edges respectively of the end aperture **40** (designated **40*a*** and **40*b*** respectively in FIG. **2**). These ends **40*a*** and **40*b*** are formed respectively in the horizontal walls **25, 26** of the end rail **23**. Thus, the horizontal clip **50** will be locked into position as long as it extends parallel to the vertical walls of the aligned end rails **16, 23** and is placed against the inner surface of these vertical walls. The height of the strut **51** of the horizontal clip **50** is slightly less than the separation between the upper and lower walls of a side rail so that when it is received within the channels of two aligned side rails, the two rails cannot be bent in a vertical plane at the juncture. This further assists in transmitting load from the shelf **10** having no leg assembly to the supported shelf **11**.

In erecting adjacent shelving units such as the ones illustrated, the horizontal clip **50** is first assembled to the side rail **23** of the shelving unit **10** by inserting the strut **51** through the end aperture **40** of the side rail **23**. When the strut **51** is fully inserted, the anchor pad **52** will become locked in the aperture **40** with the upper and lower edges **52*a*** and **52*b*** engaging the upper and lower ends **40*a*** and **40*b*** of the slot **40**. The strut **51** will then extend axially of the end rail **23**. In this position, the distal end of the strut **50** may easily be placed into the channel of the end rail **16** of the shelf **11** to hold the two end rails **16, 23** in axial alignment. A similar end clip would, of course, be used to hold the two opposite end rails of these two shelving units in similar alignment.

The end frame **28** is then assembled to the shelf **11** by means of the clip **48** in a manner already explained; and the leg assembly **27** is then assembled to the shelf **11** by inserting the end plate **36** into the trough of the end rail **16**. It will be observed that the end plate **36** of the leg assembly is located between the clip **48** and the strut **51** of the horizontal clip **50**.

The aperture **44** of the end plate **36** and the aperture **53** of the horizontal clip **50** are then aligned with the aperture above the hook **51** of the side clip **48**; and the bolt **45** is passed through all of the aligned aperture and is secured by means of the nut **46**. The assembly of adjacent wire shelf units has been found to be greatly facilitated with the present invention because a single bolt fastens together all of the elements, including a leg assembly, end frame, and horizontal clip for supporting an adjacent shelf. Further, the horizontal clip, as already mentioned, holds one shelf in position without being bolted to the end frame while the shelving is being erected, leaving the complete assembly until the single bolt is installed and further reducing assembly time by eliminating pre-assembly of anything other than the horizontal clip to that shelf.

In addition, the present invention requires only a single end frame and leg unit for interconnecting adjacent shelving units, and the shelving units may be assembled either right-to-left or left-to-right because of the interchangeability of elements.

Having thus described a preferred embodiment of the invention, persons skilled in the art will be able to modify certain of the structure which has been described and to substitute equivalent elements for those disclosed while continuing to practice the principle of the invention; and it is, therefore, intended that all such modifications and substitutions be covered as they are embraced within the spirit and scope of the appended claims.

I claim:

1. A system for connecting wire shelf units end-to-end comprising: longitudinal side rails extending along

the edge of each of first and second wire shelves; means providing a side wall aperture adjacent the end of each of said side rails; a horizontal clip including an anchor pad and an elongated strut, said strut being adapted to pass through the aperture of said side rail of said first shelf and thence be received in said side rail of said second shelf, said anchor pad being larger than said aperture of said side rail of said first shelf and being dimensioned so as to become locked to said side rail of said first shelf when said strut has been thus inserted, said strut extending into axially aligned side rails thereby holding the same in place; and means for rigidly connecting the distal end of said strut to said side rail of said second shelf unit adjacent the aperture thereof.

2. The system of claim **1** wherein each of said side rails is a generally C-shaped channel having an outer vertical side wall and inwardly depending upper and lower horizontal walls, said side wall aperture thereof extending through said vertical wall and to a limited extent into said horizontal walls to define an obstruction-free vertical throughput to receive said anchor pad; said anchor pad of said horizontal clip having a generally rectilinear shape and conforming to the outer vertical wall of a side rail in which said strut is inserted whereby said pad cannot pass through said aperture of said side rail of said first shelf.

3. The system of claim **2** wherein said strut of said horizontal clip has a height dimensioned to fit within the trough of two axially aligned side rails to prevent bending said side rails relative to each other when said strut is inserted into adjacent, aligned rails.

4. The system of claim **1** further comprising a leg assembly having an end vertical side plate; and a side clip adapted to mount a wire end frame to said second shelf; said end clip, said vertical end plate of said leg assembly, and said horizontal clip all defining apertures adapted to be aligned relative to said aperture of said side rail of said second shelf; and bolt means adapted to pass through said aligned apertures and to secure all of said elements to said side rail of said second shelf.

5. In a system for connecting first and second wire shelves end-to-end, the combination comprising: elongated side rails on each side of each shelf, each side rail having a C-shaped cross section and providing an aperture adjacent each end thereof, said C-shape providing an open channel including a vertical side wall and upper and lower horizontal walls depending therefrom and opening toward the longitudinal center of an associated shelf, said aperture being formed in the vertical side wall of each side rail and extending to a limited degree into the associated horizontal walls thereof to define a vertical throughput; horizontal clip means including a rectilinear anchor pad and an elongated strut member, the height of said strut member being slightly less than the spacing between said horizontal walls of said channels; whereby when said channels are axially aligned, said horizontal clip may be pre-assembled to adjacent end rails to said first and second shelves whereby the strut thereof is received within each channel and prevents relative bending between said side rails and said anchor pad firmly locks into an end aperture of said first shelf; a leg assembly having an end plate at each end thereof adapted to be received in an associated end rail of said first shelf; an upright end frame including clip means; and bolt means for attaching one end clip of said upright end frame, the distal end of said strut of said horizontal clip, and one end plate of said leg assembly to the side rail of said second shelf adjacent the end aperture thereof.

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