United States Patent

Keeler, II

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[54] SHELVING SUPPORTS

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[52] **U.S. Cl.** **248/188,** 108/101, 211/148

[51] **Int. Cl.** **A47b 57/06**

[58] **Field of Search** .....248/188, 188 F, 235; 287/20; 108/15, 150, 59, 101; 211/182, 177, 148, 134; 16/2

[56] **References Cited**

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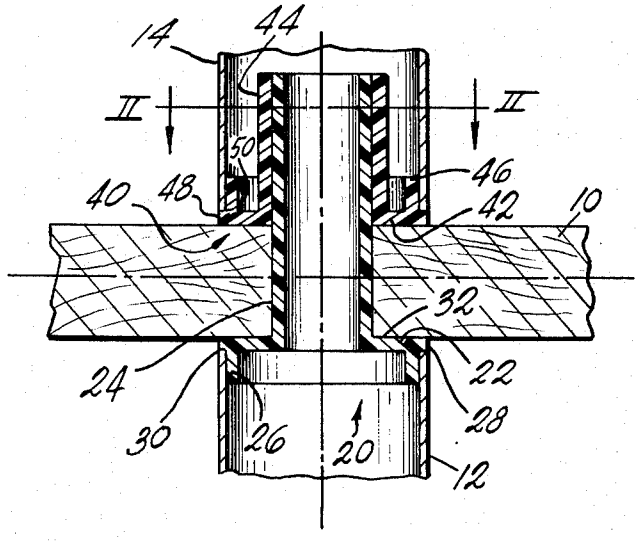
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[57] **ABSTRACT**

Supporting apparatus and method of assembly of the same for shelves, the apparatus featuring a cylindrical male bushing the neck of which mates with a circular hole in the shelf and with a cylindrical female bushing. Both bushings have a shoulder and a flange extending outwardly therefrom which allow the bushings to abut and support or be supported by steel tubes comprising the main legs of the shelving.

11 Claims, 5 Drawing Figures



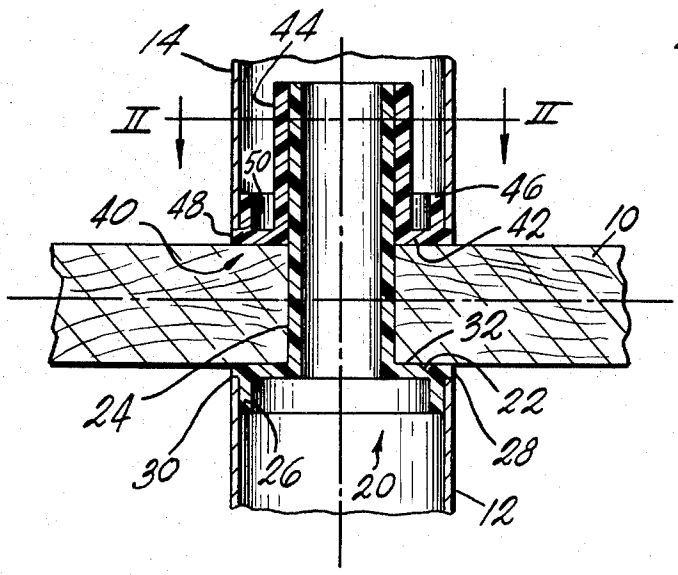


FIG. 1

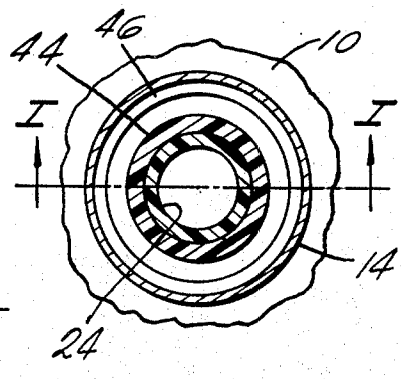


FIG. 2

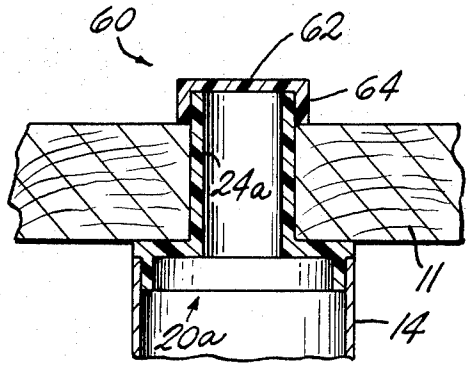


FIG. 3

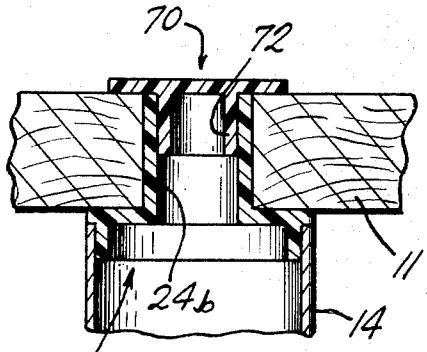


FIG. 4

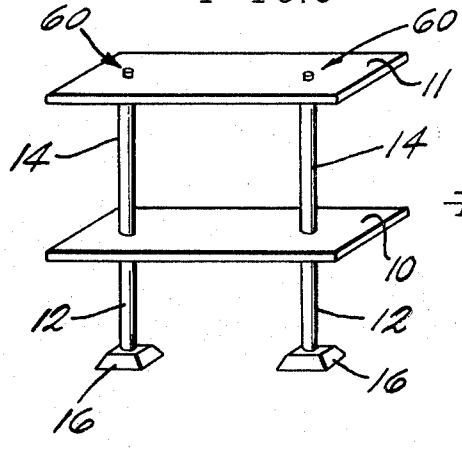


FIG. 5

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SHELVING SUPPORTS

BACKGROUND OF THE INVENTION

In the field of shelving, which includes bookshelves and the like, there is a need for supporting apparatus involving a minimum number of parts which can be utilized to assemble any type of shelving with a minimum amount of work, which apparatus is readily disassembled to facilitate moving and storing the shelves. Previously, supporting apparatus for free-standing shelves which are readily assembled and disassembled has been developed and constructed, but such constructions have been generally characterized by a complexity which limits the supporting apparatus to shelves constructed particularly for that particular supporting apparatus. An example of such a construction is disclosed in U.S. Pat. No. 2,748,954. For example, the shelves **13** disclosed in that patent require a rectangular hole with four openings **14** spaced uniformly around the hole.

SUMMARY OF THE INVENTION

The invention relates to supporting apparatus for shelves such as bookshelves. Specifically, the invention provides a supporting apparatus comprising a minimum number of parts which can be utilized with any shelving material of any kind, rather than just for shelving constructed specifically for the supporting apparatus of the invention. Also, a novel method of assembly is provided.

More specifically, the invention provides supporting apparatus for a shelving arrangement having at least one shelf with at least one hole therein; the apparatus comprising two cooperating elongated members each having a base and at least one neck extending from the base, a portion of the neck of one of the members having exterior dimensions which correspond to the dimensions of the hole, a portion of the neck of the other of the members having matching dimensions so as to mate with the neck of the one member. Means are also provided for holding the base of one of the members in contact with the bottom surface of the shelf. The holding means includes at least two tubes and means on at least one of the members for accommodating in a supporting relationship one of the tubes spaced away from the neck of the one member.

Accordingly, it is an object of the invention to provide supporting apparatus for shelving which is of simple construction involving a minimum number of parts, and yet is useable with any type of shelving.

It is another object of the invention to provide supporting apparatus of the above character wherein the parts are easily assembled and disassembled without using permanent attaching means.

It is a further object of the invention to provide supporting apparatus of the above character wherein at least some of the parts are interchangeable.

It is a related object of the invention to provide a supporting apparatus of the above character which makes the shelving free-standing.

It is still another object of the invention to provide supporting apparatus of the above character which is inexpensive to manufacture.

Other objects and advantages will become apparent upon reference to the following drawings and detailed discussion.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary sectional view through a portion of the supporting apparatus of the invention, taken generally along the line I—I of FIG. **2**;

FIG. **2** is a fragmentary sectional view taken along the line II—II of FIG. **1**;

FIG. **3** is a fragmentary sectional view similar to FIG. **1** but illustrating the supporting apparatus for the top shelf;

FIG. **4** is a fragmentary sectional view similar to FIG. **3** but illustrating an alternate embodiment thereof; and

FIG. **5** is a perspective view illustrating shelves which have been assembled utilizing the supporting apparatus of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The invention concerns supporting apparatus for shelving **10** and **11** of the type utilized in bookcases or for any other purpose. Referring to FIG. **5**, the shelves **10** and **11** can be arranged to be free-standing, tubes **12** and **14** being utilized to support the lower shelf **10** on base plates **16** and the upper shelf **11** upon the lower shelf, respectively.

Referring now to FIG. **1**, the tube **12** supports an elongated male member such as a bushing **20** which has a base **22** from which extends a neck portion **24**. The exterior diameter of the neck **24** matches the diameter of the opening formed in the shelf **10**, the diameter of the base **22** being considerably larger than that of the opening. A shoulder **26** extends from the base **22** in a direction opposite to the direction of extension of the neck portion **24**, the shoulder **26** thus being spaced from the neck. A flange or rim **28** further extends from the shoulder **26** outwardly a distance sufficient to cause the end **30** of the tube **12** to butt against the flange when assembled. In this manner, the bushing **20** is supported on the end **30** of the tube **12**. Such support of the bushing **20** causes the surface **32** of the base **22** to be pressed in contact with, in this case, the bottom surface of the shelf **10**.

To complete the supporting apparatus, an elongated female member such as a bushing **40** is provided, having a base **42** and a neck portion **44** extending therefrom. The interior diameter of the neck portion **44** provides a socket which matches or is approximately equal to the exterior diameter of the neck **24** so as to mate therewith. A shoulder **46** spaced from the neck portion **44** extends from the base **42** in the same direction as the extension of the neck portion **44**. A flange or rim **48** extends outwardly from the shoulder **46** as in the case with the male bushing, the extension being sufficient to cause the end **50** of the tubing **14** to abut thereagainst, when assembled. It will be readily apparent that the interior diameter of the tubes **12** and **14** equals the exterior diameter of the shoulders **26** and **46**, respectively, so as to snugly fit against the tubes. Also, the exterior diameter of the shoulders **26** and **46** are approximately equal, so as to allow the tubes **12** and **14** to be interchangeable and to allow the tubes to be installed with either end in position.

For ease in assembly, the neck portions **24** and **44**, the shoulders **26** and **46**, and the shelf opening are preferably cylindrical.

Referring now to FIGS. **3** and **4**, the supporting apparatus for the top shelf **11** requires modification in view of the fact that no additional tubing extends thereabove. Parts in FIGS. **3** and **4** similar to those previously described bear the same reference numeral to which the distinguishing suffixes "*a*" and "*b*" have been added, respectively. Thus, referring to FIG. **3**, the tube **14** supports a male bushing **20***a* which is identical with the bushing **20** except that the neck portion **24***a* is reduced in height. In contrast with the previous embodiment, the female bushing in this case comprises a cover cap **60** having a base **62** and a neck portion **64**, the interior diameter of which matches or is approximately equal to the exterior diameter of the neck portion **24***a*.

Turning now to FIG. **4**, still another embodiment of the supporting apparatus for the top shelf **11** is illustrated. Thus, the tube **14** supports a male bushing **20***b* which is identical with the bushing **20***a* except that the neck portion **24***b* has been reduced even further in height so as to not extend above the top surface of the shelf **11**. The cover in this embodiment is a cap **70** which functions as a male bushing with respect to the bushing **20***b* in view of the neck portion **72** which has exterior diameters which match the interior diameters of the neck portion **24***b*.

In all of the above embodiments, the bushings are preferably formed from ABS (acrylonitrile-butadiene-

styrene) plastic, while the tubes **12** and **14** are steel tubing. The use of such plastic allows the bushings to be inexpensively formed such as by molding. As will be apparent from the discussion hereinafter, the shelves **10** and **11** can be any material.

ASSEMBLY

The shelving which is to be supported is assembled by utilizing the invention in the following manner: A circular opening is drilled or otherwise formed in the shelves **10** and **11** to match the exterior diameter of the necks of the male bushings. The tubes **12** are then placed in an upright position into or upon the bases **16** and attached thereto in a conventional manner. Next, the neck portion of the male bushing **20** is inserted through the opening drilled or formed in the shelf **10**, the bushing being insertable either from the bottom or the top. If inserted from the bottom, the bushing **20** can be either mounted in the tube **14** or the shelf **11** first, and then slipped into the other (the shelf or the tube, respectively). The female bushing **40** is slipped over the neck portion **24** of the bushing **20** so as to mate therewith, and the corresponding tube, generally tube **14**, is inserted over its shoulders **46**. It will be readily apparent that if the male bushing is placed on top with the female bushing underneath, then in that case the female bushing is supported by the tube **12** while the male bushing supports the tube **14**. Because the neck portions and the shoulders of the bushings, as well as the tubes, are cylindrical, there is no significance in any particular rotational position of the bushings. The remainder of the assembly is accomplished by repeating the process for the other side of the shelf **10** utilizing the other tubes **12** and **14**, and then mounting shelf **11** thereabove. The latter is accomplished by positioning the bushings **20***a* or **20***b* either in the tubes **14** or in the shelf **11**, and then mounting the other (shelf or the tubes) with respect to the bushing. The cap **60** or **70** which mates with the bushing **20***a* or **20***b* completes the process.

It will be readily appreciated from the foregoing that the assembly is readily accomplished due to the minimum number of parts involved, namely two bushings and tubes. The male-female connection greatly simplifies this assembly. Because of the use of the flanges which extend from the shoulders to abut against the ends of the tube, the entire arrangement is self-supporting without the use of glue or nails, the latter of which greatly complicates the assembly. Furthermore, the assembly of the supporting apparatus can be utilized with any shelving **10** or **11**, due to the use of a simple circular opening in the shelf and the use of a matching cylindrical neck portion on the male bushing. A final advantage obtainable from this construction is that the supporting apparatus can be readily disassembled simply by reversing the above steps. The lack of nails and glue in the construction makes disassembly an easy process.

Although the invention has been described in connection with preferred embodiments, it will be readily appreciated that equivalent alternative embodiments can be constructed. For example, the supporting apparatus need not be circular or cylindrical in shape. Rather, any shape tubings, neck portions, shoulders, and shelf holes can be utilized provided they are of matching shapes. Also, any number of vertically assembled shelves can be assembled and supported by the apparatus of the invention. Accordingly, it is intended that the invention cover these equivalent embodiments as well unless the following claims by their express language state otherwise.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. Supporting apparatus for a shelving arrangement having at least one shelf with at least one hole therein; said apparatus comprising at least one male member having an elongated tubular neck portion, the exterior dimensions of said male neck portion corresponding to those of the hole; at least one female member having a corresponding elongated tubular neck portion, the interior dimensions of said female neck portion matching said exterior dimensions of said male member; said female member being force fitted over the elongated tubular neck portion of said male member such that said shelf is held normal to the longitudinal axis of, and between, said male and female members; and accommodating means including a shoulder on at least one of said members, the exterior dimensions of said shoulder matching the interior dimension of said tube, said shoulder including an annular flange extending between said shelf and the end of said tube such that said tube end abuts said flange thereby holding said member including said shoulder and said flange securely against said shelf.

2. The apparatus as defined in claim **1**, wherein the hole is circular and said neck portions are cylindrical.

3. Supporting apparatus for a shelving arrangement having at least one shelf with at least one hole therein; said apparatus comprising at least one male member having an elongated tubular neck portion, the exterior dimensions of said male neck portion corresponding to those of the hole; at least one female member having a corresponding elongated tubular neck portion with open ends, the interior dimensions of said female neck portion matching said exterior dimensions of said male member; said female member being force fitted over the elongated, tubular neck portion of said male member such that said shelf is held normal to the longitudinal axis of, and between, said male and female members; at least one tube; means on at least one of said members radially spaced from said neck portion for accommodating in a supporting relationship said tube, said supporting apparatus further including a second tube means, said accommodating means including a shoulder on each member the exterior dimensions of which match the interior dimensions of said tubes.

4. The apparatus as defined in claim **3**, wherein each of said members include a base, said shoulder and said neck for said each member extending therefrom.

5. The apparatus as defined in claim **4**, wherein said shoulder and said neck portion of said female member extend in the same direction from said base.

6. The apparatus as defined in claim **4**, wherein said shoulder and said neck portion of said male member extend from said base in opposite directions.

7. The apparatus as defined in claim **3**, wherein said shoulder dimensions and said tube dimensions are the same for all of said members and of said tubes, respectively.

8. The apparatus as defined in claim **3**, and further including a flange extending outwardly from said shoulder a distance sufficient to abut against the end of any of said tubes when said any tube and said each member are assembled together.

9. The apparatus as defined in claim **3**, wherein said tubes and said shoulders are cylindrical.

10. The apparatus as defined in claim **9**, wherein the hole is circular and said neck portions are cylindrical.

11. Supporting apparatus for a shelving arrangement having at least one shelf with at least one hole therein; said apparatus comprising at least two plastic members each having a base and at least one elongated tubular neck extending from said base; a portion of said one neck of one of said members having exterior dimensions which correspond to the dimensions of the hole, a portion of said one neck of the other of said members having matching dimensions so as to mate by force fitting with said one neck of said one member; and accommodating means including a shoulder on at least one of said members, the exterior dimensions of said shoulder matching the interior dimension of said tube, said shoulder including an annular flange extending between said shelf and the end of said tube such that said tube end abuts said flange thereby holding said member including said shoulder and said flange securely against said shelf.

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