United States Patent [19]

Horowitz et al.

[11] **3,836,009**

[45] **Sept. 17, 1974**

[54] **SHELVING SYSTEM HAVING WALL-MOUNTED FIXTURES**

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[22] Filed: **Feb. 23, 1973**

[21] Appl. No.: **335,138**

[52] **U.S. Cl.** **211/90,** 108/152, 248/235

[51] **Int. Cl.** **A47f 5/08**

[58] **Field of Search** ..... 211/90, 87, 75; 108/152, 108/42, 111; 248/235; 52/753 E, 753 D, 753 C, 753 R, 585; 312/140, 140.3

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Primary Examiner—Ramon S. Britts

[57] **ABSTRACT**

A shelving system formed by fixtures adapted to support both horizontal shelf pieces and vertical partition or divider pieces to make possible the erection of an assembly of open-ended shelves and enclosures in a variety of interesting and useful structural patterns. The fixtures are attachable to a wall at selected positions to provide support for the pieces. Each fixture is constituted by a flat mounting plate from which four cantilever arms project in an array defining a cruciform socket having a horizontal branch intersected by a vertical branch. Shelves are set up by bridging pieces between horizontally spaced fixtures, the ends of the pieces being received in the horizontal branches of the socket. Enclosures are formed by extending pieces between vertically spaced fixtures, the ends of the pieces being received in the vertical branches of the socket, the vertical pieces cooperating with horizontal pieces to define an enclosure.

4 Claims, 5 Drawing Figures

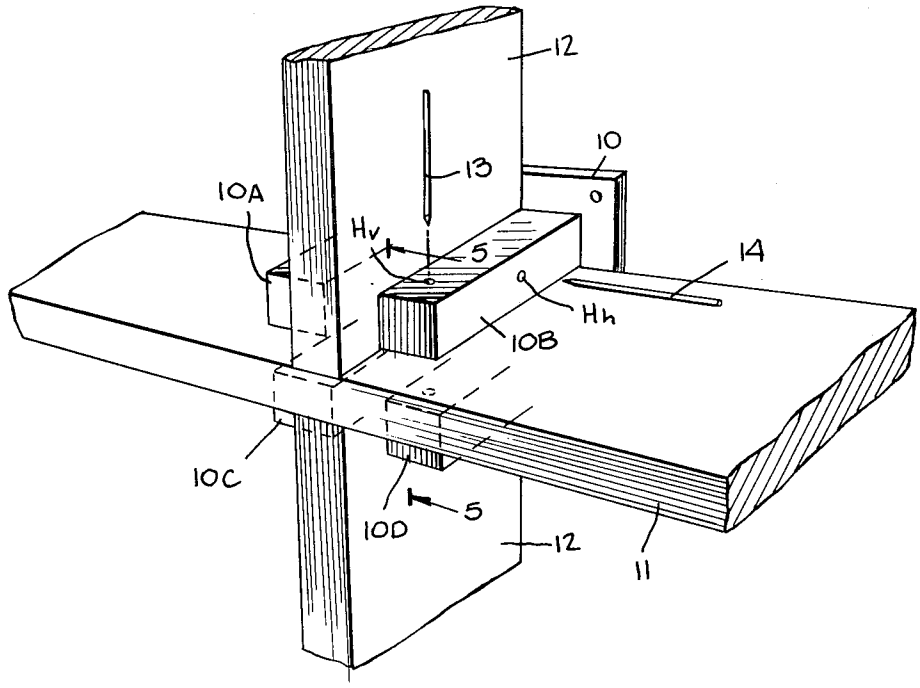


Fig. 1.

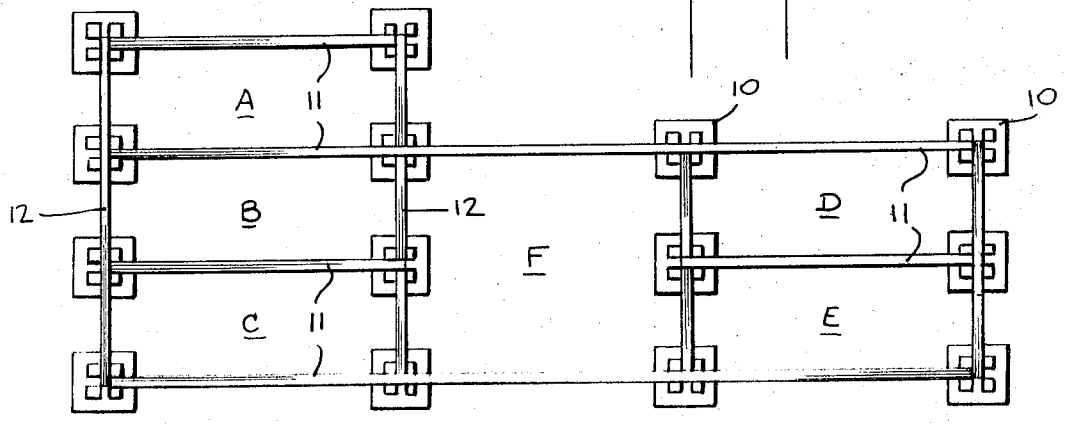
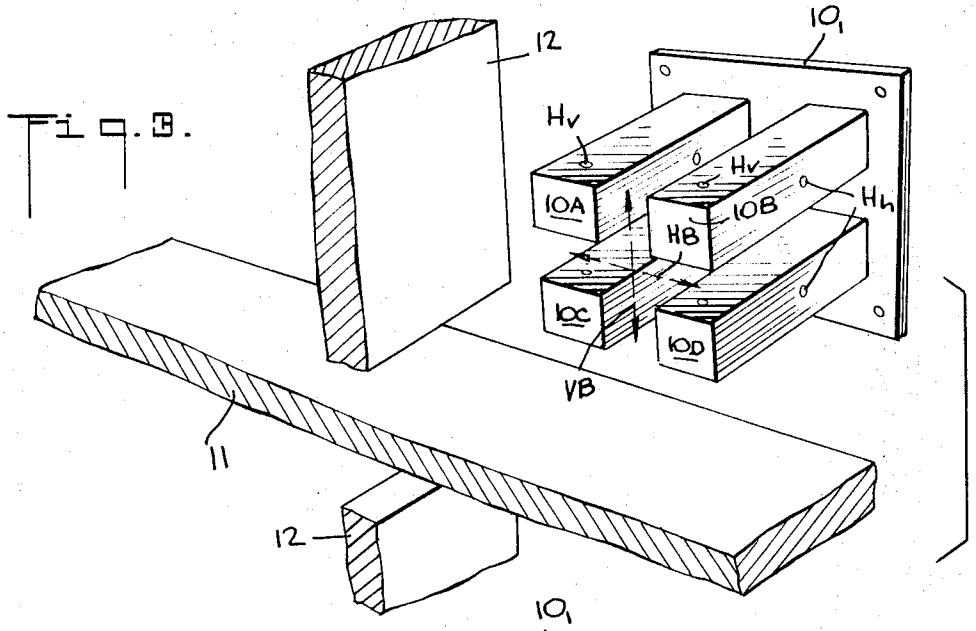


Fig. 3.



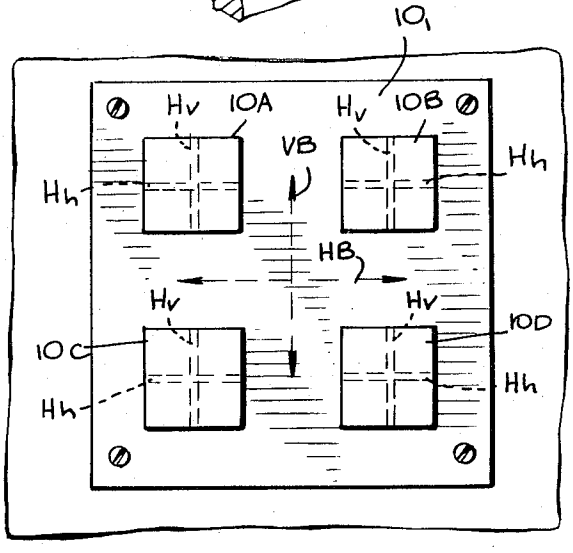


Fig. 2.

Fig. 4.

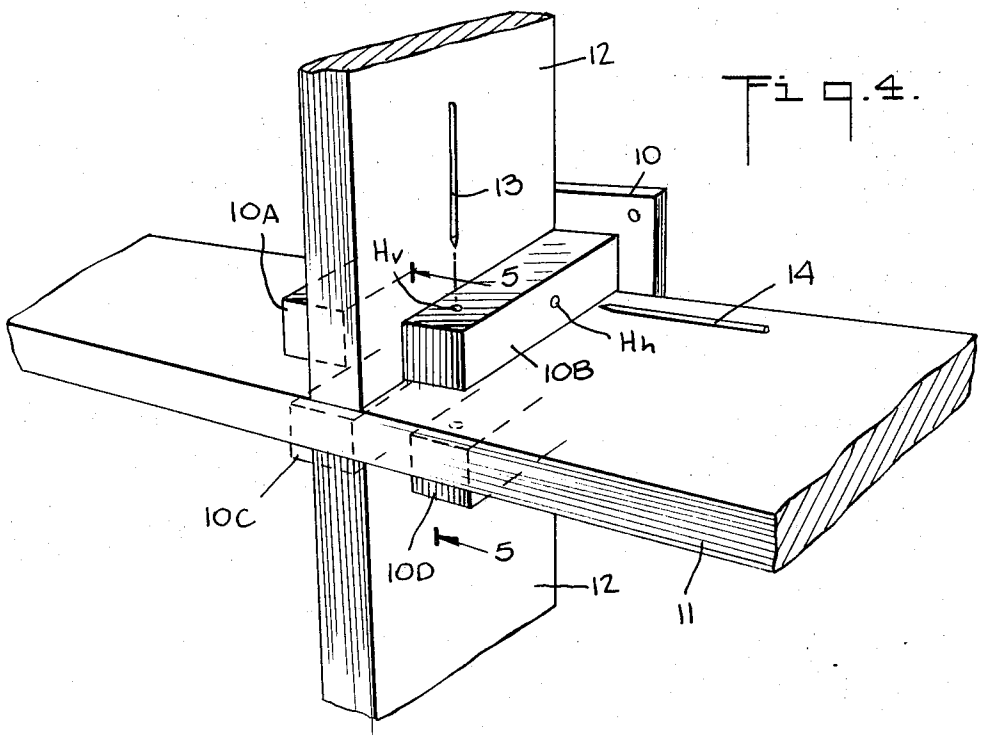
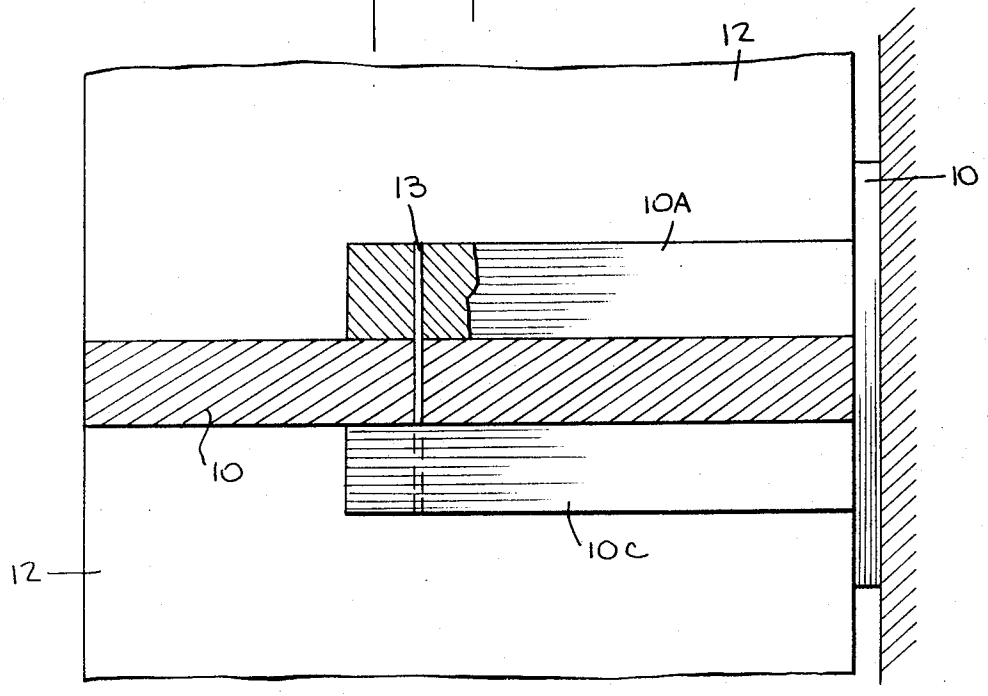


Fig. 5.



SHELVING SYSTEM HAVING WALL-MOUNTED FIXTURES

BACKGROUND OF INVENTION

This invention relates generally to shelf-structures for the storage and display of books, phonograph records and other objects, and more particularly to a shelving system formed by wall-mounted fixtures adapted to support both horizontal shelves and vertical dividers to make possible the erection of an assembly of open-shelves and enclosures and articles of furniture in a broad range of structural patterns.

In its most basic form, a wall1-mounted shelf is composed of a piece of wood or other shelving material supported by one or more brackets attached to the wall. Multiple-tier shelves are made simply by mounting a series of basic shelf structures, one above the other. In order to facilitate the erection of multiple-tier shelf structures, it is known to provide vertical tracks which are attachable to the wall at spaced positions and are adapted to anchor brackets serving to support shelves. In this arrangement, the brackets may be connected to the track at any point therealong so that one is able to vary the space between the shelves to suit particular needs and also to lend decorative interest to the structure.

The advantage of a track and bracket shelf arrangement is that it can be set up by the non-professional or "do-it-yourself" householder. But one difficulty with this arrangement is that the shelves are necessarily open-ended. When, therefore, the shelves are used to support books, phonograph records or other objects which cannot stand without end support, it becomes necessary to provide book-ends or other means for this purpose which are often insecure and unsightly. Also the storage possibilities of open-ended shelves are limited, for one cannot enclose a shelf to protectively house bottles and other fragile objects.

It is for this reason that shelving systems have been developed in which a large backing panel is provided which is attachable to the wall, the panel having sockets or equivalent means to receive plugs, pegs or other connecting elements extending from the rear of boxes, bracketed shelves and other components which may be hooked onto the backing panel. Such systems have the advantage of permitting the user to erect a storage and display assembly in which boxes and cabinets are combined with shelves and other components in a variety of interesting patterns. However, a shelving system of this type is quite costly and generally requires a professional installation.

SUMMARY OF INVENTION

In view of the foregoing, the main object of this invention is to provide a shelving system formed by wall-mounting fixtures adapted to support both horizontal shelves and vertical partitions or dividers to make possible the erection of an assembly of open-ended shelves and enclosures in a variety of interesting and useful patterns.

A significant advantage of this invention resides in the fact that the shelving system formed by the fixtures, shelves and dividers can readily be set up without the need for specialized skills. Also once the fixtures are mounted in place, it becomes possible to alter the assembly pattern without removing or shifting the position of the fixtures, for the same array of installed fixtures permits a range of different configurations.

More specifically, it is an object of the invention to provide a wall-mounted fixture composed of four cantilever arms which define a cruciform socket for accomodating and supporting both vertical and horizontal pieces.

Also, an object of the invention is to provide a shelving system in which the shelves and dividers are locked to the fixtures by removable pins, whereby shelves and dividers may be readily secured to fixtures or withdrawn thereform.

Briefly stated these objects are attained in a shelving system composed of a plurality of fixtures which are attachable to a wall at selected positions to afford support for horizontal shelf pieces and vertical divider pieces in any desired pattern. Each fixture is constituted by a flat mounting plate from which four cantilever arms are projected, the arms being disposed symmetrically to define a cruciform socket having a horizontal branch intersected by a vertical branch.

Shelves are formed by bridging piece between horizontally-spaced fixtures, the ends of these pieces being received in the horizontal branches of the sockets and being locked therein by pins passing through vertical openings in the associated arms. Enclosures are formed by extending pieces between vertically-spaced fixtures, the ends thereof being received in the vertical branches of the sockets and being locked therein by pins passing through horizontal openings in the related arms, the vertical pieces cooperating with the horizontal pieces to create a rectangular enclosure.

OUTLINE OF DRAWINGS

For a better understanding of the invention as well as other objects and further features thereof, reference is made to the following detailed description to be read in conjunction with the accompanying drawings, wherein:

FIG. **1** is an elevational view of one example of a wall-mounted structure employing fixtures and vertical and horizontal pieces in a system in accordance with the invention;

FIG. **2** is a plan view of a fixture;

FIG. **3** is a perspective view of a fixture in juxtaposition to vertical and horizontal pieces;

FIG. **4** is a perspective view of the same fixture with the vertical and horizontal pieces locked thereto;

FIG. **5** is a section taken in the plane indicated by line **5—5** in FIG. **4.**

DESCRIPTION OF INVENTION

Referring now to FIG. **1,** there is shown one possible structure created by a shelving system in accordance with the invention. The system is composed of wall-mounted fixtures, generally designated by numeral **10,** horizontal shelf piece **11** and vertical divider or partition pieces **12.**

In the assembly shown, the placement of shelves and dividers is such as to create five small enclosures A, B, C, D and E and a large enclosure F, each enclosure being formed by horizontal shelf pieces cooperating with divider pieces. Thus, enclosures A, B and C form a three-tier open cabinet, and enclosures D and E, a two-tier open cabinet. Shelf **11** above enclosure A is open-ended, shelf S_2 above enclosure F is closed at one end, and shelf S_3 above enclosure D is open-ended.

It will be appreciated that the arrangement shown in FIG. 1 is but one of many assembly patterns that may be erected by means of the fixtures and pieces, and that the structure can be expanded simply by installing more fixtures to accomodate additional shelf and divided pieces.

Referring now to FIGS. 2 and 3, we shall consider the structure of a fixture 10. It will be seen that the fixture is constituted by a square mounting plate 10, having bores at all four corners to admit screws or other fastening elements to secure the plate to a wall. Or the bores may be placed at positions intermediate the corners so that they are concealed by the pieces. Projecting from the plate is a symmetrical array of four identical cantilever arms 10A, 10B, 10C and 10D having a square cross-section. The spacing between the upper pair of arms 10A and 10B is equal to the spacing between the lower pair of arms 10C and 10D and is also equal to the spacing between arms 10A and 10C and the spacing between arms 10B and 10D. These spaces define a cruciform socket having a horizontal branch HB intersected by a vertical branch VB.

The fixtures may be fabricated of aluminum or other metal, the arms being hollow to further reduce the weight and cost of the fixture. Or the fixture may be molded or otherwise formed of a suitable synthetic plastic material of high strength, such as nylon having high impact strength, polycarbonate or reinforced fiberglass.

FIG. 3 illustrates the manner in which the fixture receives the pieces associated therewith. It will be seen that the shelf piece 11 has a thickness which matches the thickness of the horizontal branch HB of the cruciform socket so that it fits neatly therein between the two pairs of arms 10A–10C and 10B–10D.

In practice, the shelf may be formed of two pieces rather than one piece, in which event the end of one piece is received between one pair of arms and the end of the other piece by the other pair of arms.

Divider pieces 12 are received in the vertical branch VB, the upper piece being received between the pair of arms 10A–10B and the lower piece between the pair of arms 10C–10D. Thus the four arms of the fixture engage the ends of the pieces on either side thereof. It is not essential that the pieces be locked or pinned to the fixture since the pieces are not free to move in any direction other than in the axial direction or outwardly from the wall. However, it may be desirable to prevent any movement of the pieces, and for this purpose the upper arms 10A and 10B are provided with vertical holes H_v and horizontal holes H_h, and the lower arms 10C and 10D are provided with vertical holes H_v and horizontal holes H_h.

As shown in FIGS. 4 and 5, the shelf piece 11 is locked to the fixture 10 by means of removable pins 13 which pass through the vertical holes in arms 10A and 10B into openings in the shelf piece in registration therewith, the pins terminating in arms 10C and 10D. Pins are preferred to screws to facilitate insertion or removal without tools. Pins 14, going into the horizontal holes H_h in arm 10B and terminating in arm 10A as well as in arm 10D and terminating in arm 10C, serve to lock the vertical pieces 12 to the fixture.

In practice, the system may be furnished in the form of a kit, with a large number of fixtures and pre-cut pieces of wood, plastic, arcylic or any other suitable form of shelf and divider material. With a kit, the do-it-yourself householder may design and erect an assembly of enclosures and shelves on a wall to suit his personal taste and requirements. In the case of aluminum fixtures, the fixtures may be anodized in a variety of colors to further enhance the decorative possibilities of the assembly. Also, fixtures may be mounted at aligned positions on the floor and ceiling with divider plates extending therebetween to form room partitions. Or fixtures may be mounted at aligned positions on opposing walls with pieces extended therebetween to create benches and other forms of furniture. In other words, the fixtures are mountable not only on one wall of a room, but on any mounting surface therein, so that pieces may be extended across a wall, between walls and between the floor and ceiling. The fixture, therefore, functions as a universal mounting element.

While there have been shown and described preferred embodiments of a shelving system having wall-mounted fixtures, it will be appreciated that many changes and modifications may be made therein without, however, departing from the essential spirit thereof.

We claim:

1. A vertical shelving system mountable on a wall and comprising:

A. a plurality of fixtures each formed by a wall-attachable mounting plate having four rigid cantilever arms projecting therefrom at equi-spaced positions to define a cruciform socket having a horizontal branch intersected by a vertical branch, said arms each having a square cross-section of substantially uniform size defining relatively broad supporting surfaces, said mounting plate extending laterally beyond said arms and including means for attaching said plate to the wall.

B. shelf and divider pieces, said shelf pieces being bridgeable between horizontally-spaced fixtures, the ends thereof being received in said horizontal branches, said divider pieces extending between vertically-spaced sections, the ends thereof being receivable in said vertical branches;

C. each of the arms of said fixture having vertically extending bores therethrough receiving pins locking said shelf pieces to said fixture and having horizontally-extending bores therethrough receiving pins locking said divider pieces to said fixture.

2. A system as set forth in claim 1 wherein said mounting plate has a square form whose corners have openings to admit wall fastening elements.

3. A system as set forth in claim 1 wherein said arms are hollow.

4. A wall-attachable fixture for a shelving system, said fixture comprising a mounting plate from which project four rigid cantilever arms at equi-spaced positions defining a cruciform socket having a horizontal branch intersected by a vertical branch, said arms each having a square cross-section of substantially uniform size defining relatively broad supporting surfaces, said horizontal and vertical branches being dimensioned to receive shelf and divider pieces, respectively, said arms having vertically-extending bores therethrough to receive pins for locking said shelf pieces to said fixture and horizontally-extending bores therethrough to receive pins for locking said divider pieces to said fixture, said mounting plate extending laterally beyond said arms and including means for attaching said plate to a wall.

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