

[54] **DISPLAY SCREEN FOR EXHIBITS AND THE LIKE**

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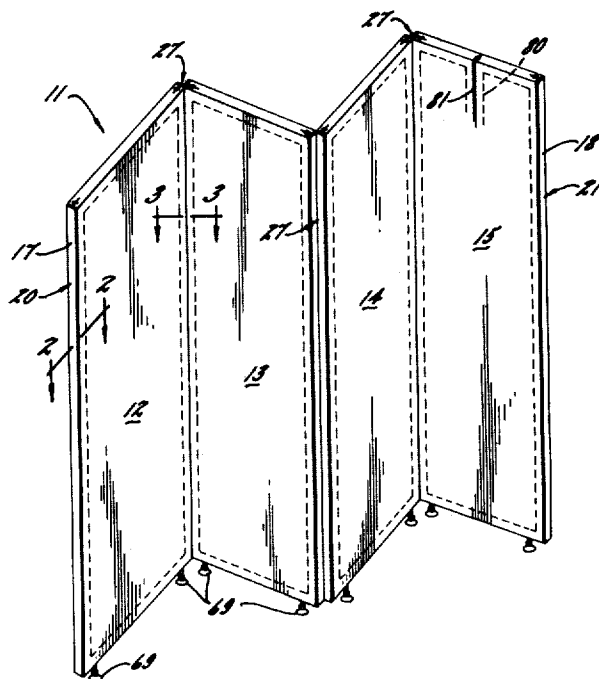
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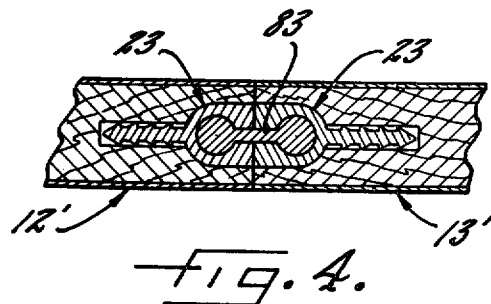
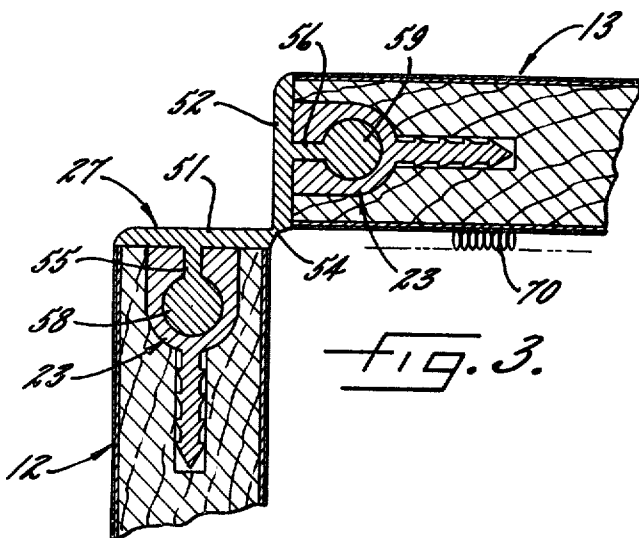
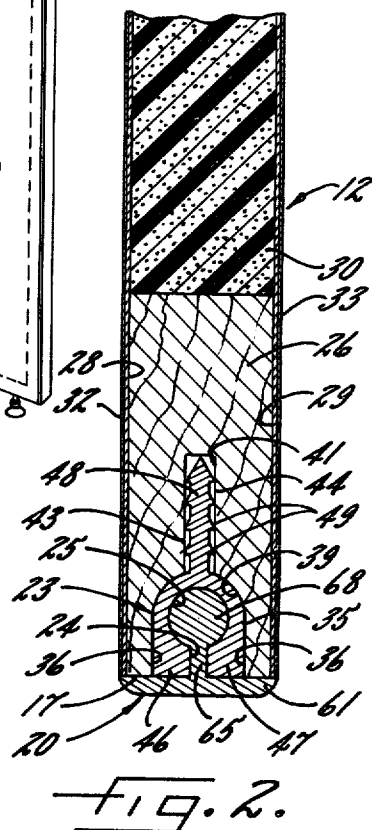
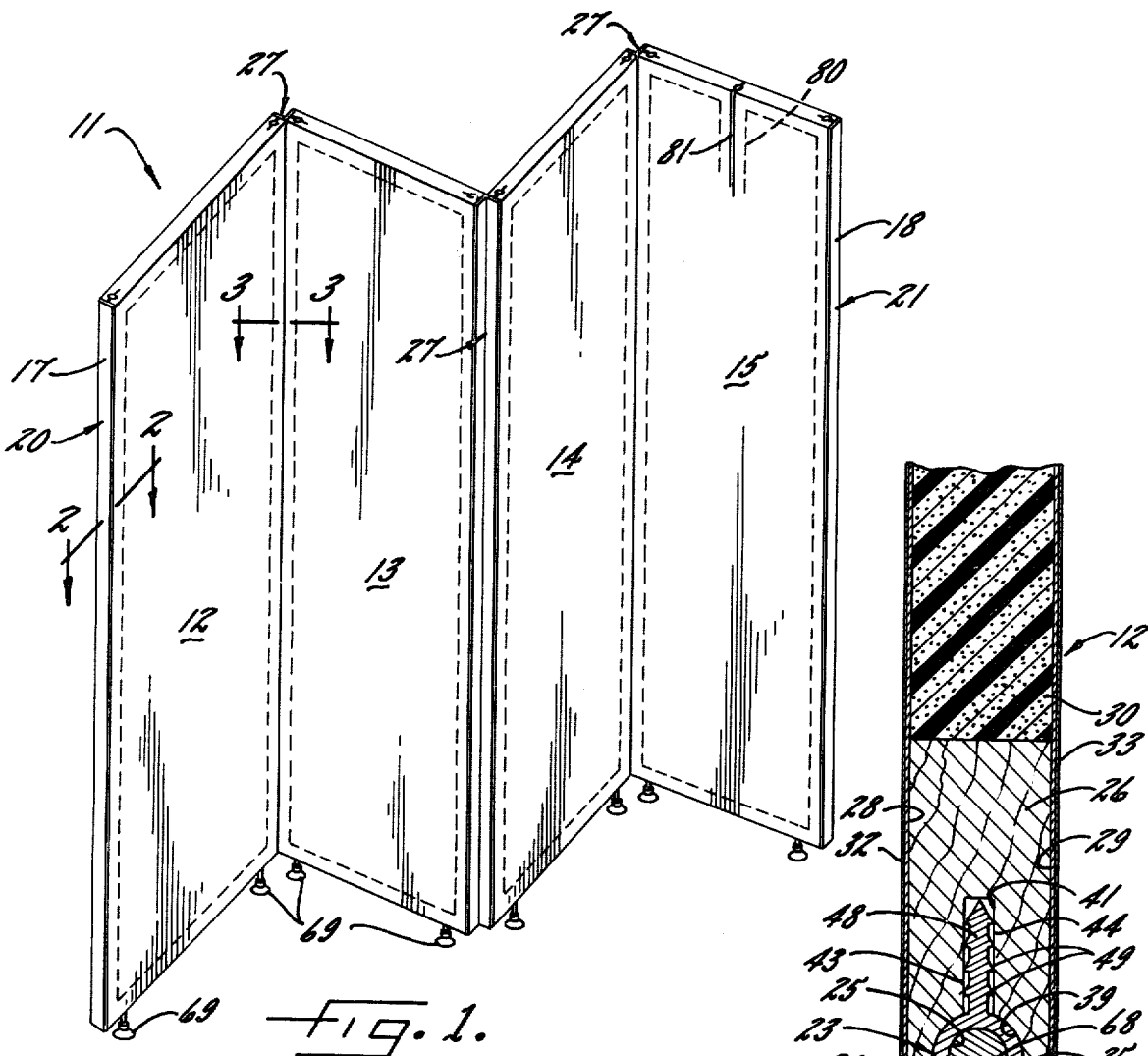
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[57] **ABSTRACT**

A portable, multiple panel, display screen for exhibit booths, classroom dividers, art gallery partitions, and the like comprises several individual detachable panels, each with recessed retainer grooves along their vertical edges. Replaceable one-piece hinges fit into adjoining retainer grooves to interconnect adjacent panels, and replaceable moulding strips fit into the terminal retainer grooves to provide a pleasing appearance at the screen edges. The panels are light in weight, and may be folded flat (with or without the hinges in place) for compact storage and shipment.

**6 Claims, 4 Drawing Figures**





## DISPLAY SCREEN FOR EXHIBITS AND THE LIKE

### BACKGROUND OF INVENTION

This invention relates to multiple panel display screens for use as permanent or temporary divider walls, and more particularly concerns the provision of lightweight, portable, display screens which are readily and economically assembled, disassembled, stored, and shipped. In another aspect, the invention provides components for such display screens.

In trade show exhibition booths, in school classrooms, and in art galleries, there is a need for portable divider walls or display screens. Particularly in the case of trade shows, the screen must accommodate differing booth sizes and shapes, and must be capable of arrangement to form peninsulas and islands, as well as broad flat surfaces, accordin-folded surfaces, and other structures required by the booth designer. Screens composed of multiple panels have long been used for these purposes, but in general require an unsatisfactory compromise between weight and durability, between design flexibility and ease of assembly and disassembly, and between flexibility and cost.

Accordingly, a principal object of the invention is to provide a multiple panel display screen which combines light weight, durability, design flexibility, and economy of purchase as well as assembly-disassembly time.

In addition, the booth designer often requires a display screen in which panels may be added or removed, or where adjacent panels may fold inwardly or outwardly. This can be accomplished in different ways, but the terminal edges of the resulting screen have an unfinished appearance. A further object is to provide a multi-panel screen where panels may be added or removed, where the screen may be folded in either direction, and where the terminal edges of the screen have a finished, permanent appearance.

A further object is to provide a multiple panel display screen having no protruding hardware such as hinges or the like, and particularly to provide such a screen which may be folded flat for shipment or storage without necessarily removing the hinge members.

Still another object is to provide a lightweight, durable, attractive, display screen where both sides of the screen may be visible to the public.

An overall object is to provide a lightweight, economical, display screen comprising a multiplicity of panels, which screen is readily assembled, disassembled, shipped, and stored. An ancillary object is to provide interchangeable hinge and edge moulding components for such screen, thereby permitting either of the vertical panel edges to be used as a hinge edge or as a terminal edge.

Other and more particular aims, objects, and advantages will be apparent as the description proceeds.

### SUMMARY OF THE INVENTION

Briefly, in accordance with the invention a multiple panel display screen is provided which comprises several individual detachable panels, each with recessed retainer grooves along their vertical edges. Replaceable one-piece hinges fit into adjoining retainer grooves to interconnect adjacent panels, and replaceable moulding strips fit into the terminal retainer grooves to provide a pleasing appearance at the screen edges.

According to the preferred panel construction, each panel comprises a generally rectangular wooden frame with a pair of thin ferrous metal sheets on the two broad opposite faces of the frame. A foamed plastic such as rigid foamed polyurethane fills the region between the sheets to provide a solid, sound-absorbing, structure. Retainer strips are embedded in the wood along substantially the entire length of two opposite vertical edges of the panel, the retainer strips each having a longitudinally extending access channel leading to a longitudinally extending undercut channel. Either a mating edge-moulding strip of a mating panel-joining hinge strip is replaceably inserted into the retainer strip to, as the case may be, provide a finished moulding at the terminal edges or a panel-joining hinge at intermediate edges of the display screen.

The panel desirably is coated with a laminated plastic material for enhanced appearance and durability. Depending on the customer's requirements, the plastic may be white, colored, patterned, wood-grain, or the like.

To provide a fully recessed attachment for replaceable hinges and edge moulding, the retainer strip is preferably fabricated of extruded plastic, generally Y-shaped in cross section. The lower portion is retained in a deep narrow groove cut into the panel edge, and is preferably serrated to secure the retainer strip in place. The broad upper portion of the Y is retained in a shallow wide groove in the panel edge.

To connect adjoining panels, a detachable plastic hinge strip is employed. In cross section, it comprises a pair of similar hinge members, each of generally T-shaped cross section, joined by a thin flexible bridge portion along adjacent edges of the T. Each of the hinge members includes a short central web and an integral bead, the webs being receivable in the access channels of the retainer strips and the beads being receivable in the undercut channels.

Similarly, to cover the terminal edges of a screen, a resilient plastic edge moulding strip is used. This has a generally T-shaped cross section, including a cross-strip and a central strip, the former being slightly convex. The central strip includes a short central web and an integral bead, the web and bead again being receivable in the retaining strip channel. An advantageous feature of the edge moulding strip is that the length of the short central strip can be slightly longer than the depth of the access channel in the retaining strip so that the cross strip is resiliently urged against the edge of the panel to provide a permanent-appearing edge.

### DESCRIPTION OF DRAWINGS

Other objects and advantages of the invention will become apparent from the detailed description below and upon reference to the drawings, in which:

FIG. 1 is a perspective showing a display screen composed of hinge-connected panels;

FIG. 2 is a sectional view, taken along plane 2—2 of FIG. 1, illustrating both the assembly of a panel and the insertion of an edge moulding strip at a terminal edge of the screen of FIG. 1;

FIG. 3 is a sectional view, taken along plane 3—3 of FIG. 1, illustrating a plastic hinge strip used to connect two adjoining panels, and

FIG. 4 is a sectional view of an alternate system for joining adjacent panels in a close-fitting abutment relation.

While the invention will be described in connection with a preferred embodiment, it will be understood that it is not intended to limit the invention to that embodiment. On the contrary, the intent is to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

### DETAILED DESCRIPTION

Referring first to FIG. 1, an assembled display screen 11 is composed essentially of a series of interconnected display panels 12, 13, 14, 15, folded accordion-wise to provide a self-supporting backboard structure. Ordinarily, each of the panels 12-15 is essentially identical, although one or more of the panels, in this case panel 15, has an auxiliary attachment for combining with still another panel, not shown.

As implied in FIG. 1, the screen 11 may be folded into a compact box-like assembly for convenient storage or shipment. Further, one or more of the panels 12-15 may be detached, or additional panels (not shown) added to the screen. Nonetheless, the vertical terminal edges 17, 18 of the screen 11 are faced with a finished moulding strip 20, 21.

This is accomplished, according to the invention, by providing recessed retainer strips 23 (FIGS. 2, 3) along substantially the entire vertical length of the edges of each panel, with each retainer strip 23 having a longitudinally extending access channel 24 and a longitudinally extending undercut channel 25, to receive a replaceable panel-joining hinge strip 27 (FIG. 3) to connect adjoining panels, or a replaceable edge moulding strip 20 (FIG. 2) to cover the terminal edges 17, 18 (FIG. 1).

The individual panels 12-15 may be of any convenient size, but it has been found desirable to standardize on panels two feet wide by eight feet high, and approximately one inch thick. The eight foot height provides a semi-permanent appearance, and yet is not so long as to offer problems in installation or shipment. Similarly, the width of approximately two feet permits the assembly of a variety of different backing wall shapes, such as accordion-folds, where a screen surface other than completely flat is desired.

Each of the panels 12-15, as shown in FIGS. 1 and 2, is framed by a wooden frame 26 extending around all four edges of the panel, and mortised or otherwise securely joined at the corners. A pair of thin structural sheets 28, 29, which may be of ferrous shim stock, are secured on the two broad opposite faces of the frame 26, and the interior region between the sheets is filled with a foamed plastic 30. Rigid polyurethane foam, either foamed-in-place or slab stock, is suitable for this purpose, as it combines a high strength-to-weight ratio with structural rigidity and unusually light weight.

For aesthetic as well as maintenance reasons, the structural sheets 28, 29 are advantageously covered by plastic laminate sheets 32, 33, respectively, usually glued in place. Depending upon the required color scheme of the display designer, the plastic sheets 32, 33 may be white, colored, patterned, woodgrain, simulated brick or stone, or the like.

As shown in FIGS. 2 and 3, the retainer strips 23 are recessed into a groove along substantially the entire length of the opposite vertical edges, e.g. edge 17, of each panel 12-15. The groove advantageously has a shallow wide upper portion 35, having relatively paral-

lel sidewalls 36 and a semi-circular bottom wall 39, and a deep narrow groove 41, with parallel sidewalls 43, 44, extending perpendicularly and centrally of the semi-circular bottom wall 39. The grooves are conveniently machine-cut or otherwise milled into the respective edges 17 of the panels.

Longitudinal retainer strips 23, fabricated of an extruded plastic such as a rigid polyurethane, are embedded in the wood frame 26 by insertion into the groove 36, 41. The retainer strips, in cross section, have a generally Y shape, with the upper branches 46, 47 closing at their extremities to define the longitudinal access channel 24 leading into the undercut channel 25, the latter desirably of circular cross section. The lower portion 48 has a series of longitudinal serrations 49 to act as barbs and thereby assist in securing the retainer strip 23 in its groove 36, 41. Adhesives, brads, etc. may be employed to supplement the securing effect of the serrations 49.

As is apparent from FIGS. 2, 3 the retainer strip 23 is embedded at or beneath the edge 17 of the panel, and completely fills the upper groove 36; it is neither intended nor desirable that the Y-like arms or extremities 46, 47 of the retainer strip 23 be free to flex outwardly. Thus, with a rigid plastic strip 23 filling the wide groove 36, an essentially inflexible undercut channel or recess 25 is provided along the entire length of each vertical panel edge 17.

When it is desired to interconnect two panels, such as panels 12, 13, a detachable plastic hinge strip 27 is employed. The strip 27 as best shown in FIG. 3, comprises a pair of similar hinge members 51, 52, each of generally T-shaped cross section. The T-members 51, 52 are integrally joined along adjacent edges of the T's by a continuous thin bridge portion 54 to form a flexible hinge area.

Each of the T-shaped members 51, 52 includes a leg composed of a short central web 55, 56, terminating with an integral bead 58, 59, the legs desirably, though not necessarily, being on the same side of the T members 51, 52. The legs comprising the webs 55 and 56 and the beads 58, 59 are so dimensioned to slide freely into the respective access channels 24 and undercut channels 25 of each retainer strip 23, and accordingly the length of the webs 55, 56 are at least as great as the depth of the access channel 24. Elements 55, 58 and 56, 59 are of "half-dumbbell" shape.

Because of the desirability of providing a durable hinge strip 27, the material used in its construction is advantageously a crystalline polypropylene homopolymer or copolymer. This material is relatively stiff, and consequently the T members 51, 52 tend to be inflexible. Accordingly, the members 51, 52 are best extruded so as to be generally flat, or only slightly convex, in cross section. However, it is sometimes desirable to extrude the members 51, 52 in a fairly deeply convex shape, making the members 51, 52 relatively thin so that the hinge 27 fits neatly and firmly over the entire edge 17 of the panels.

While the hinge 27 is shown in FIG. 3 as having only two hinge members, obviously the hinge may be so made as to include three, four, or even more such elements. Thus, a "screen" structure may be obtained with a series of vane-like panels radiating outward from a central area defined by the hinge.

At the terminal edges 17, 18 of the screen 11 (FIG. 1), instead of employing hinges a similarly designed re-

placeable edge moulding strip 20, 21 (see also FIG. 2) is used. Referring to FIG. 2, the moulding strip 20 has a cross section of T-shape, and includes a cross-strip 61 and a central strip including a short central web 65 and an integral bead 68, the latter desirably of circular cross section to conform with the undercut channel 25 in the retaining strip 23. As with the hinge strip 27, the web 65 and bead 68 are received, respectively, in the access channel 24 and the undercut channel 25 of the retaining strip by insertion into the channels at the top or bottom of a panel.

Because the moulding strips 20 are not subjected to the stresses of the hinge strips 27, it is desirable that the former be made of a softer, more resilient, plastic such as a vinyl, e.g. plasticized polyvinyl chloride. In this case, the short central web 65 is made slightly longer than the depth of the access channel 23, and the cross-strip 61 is extruded to have a convex cross section. Thus, when the web 65 and bead 68 are inserted in the channels, the cross strip 61 is flexed so as to be urged resiliently against the edge of the panel to afford a pleasing permanent-like moulding appearance.

As indicated in FIG. 1, each panel 12-15 may be provided with two or more adjustable leveling screws 69, threaded in the corner areas of the frame 26 (FIG. 2). Consequently, a screen 11 may be used on non-level floors without providing separate leveling devices.

Although the screen 11 of the invention has an almost permanent appearance, it nonetheless may readily be packed, shipped, and re-installed elsewhere simply by folding the hinges 27 to form an accordian-like flat package. There are no protruding hinges or other hardware, and consequently the disassembled screen 11 may be packed or wrapped without requiring special containers.

Moreover, should it be desired to change the number of panels 12-15 in a particular screen, it is only necessary to add or subtract the required panels, using additional or fewer hinge strips 27 to effect coupling between adjacent panels. The hinge strips 27 and the edge moulding strips 20 are readily attached and detached simply by threading their respective bead portions 58, 68 (FIGS. 2, 3, respectively) into the undercut channel 25, and the resulting screen has the permanent appearance of its predecessor.

Turning to FIG. 4, a system is shown for coupling adjacent panels 12', 13' in a close abutting relationship where it is either unnecessary or undesirable that the panels be free to move with respect to each other. In this regard, an extrusion 83 is employed, which has an essentially dumbbell-like cross-sectional configuration. One-half of the dumbbell is inserted into the facing retainer strips 23, and consequently to join the panels.

In addition, the structure as described above may be provided with various auxiliaries to accommodate different designs. For example, and as shown in FIG. 1, one of the panels 15 may be provided with an auxiliary longitudinal wooden frame member 80 for the purpose of attaching an additional panel at a central, rather than an edge, of the panel 15. In this case, the frame member 80 is provided with a longitudinal retainer strip 81 as described earlier.

If desired, the panels may be arranged side by side in an arcuate, as contrasted with a zig-zag, or accorded, configuration. This is done by simply withdrawing, inverting, and reinserting every second one of the hinge members.

While the term dumbbell and half-dumbbell are used for convenience herein, it will be understood that the ends of the dumbbell need not be perfectly circular and may be oval or faceted without departing from the invention.

Where the structural sheets 28, 29 are made of thin ferrous material display posters and the like may be secured by use of small, permanent magnets. However, thin structural sheets 28, 29 may, if desired, be made of aluminum, plastic or other strong membraneous material, in which case attachment may be made by adhesive patches or tape or equivalent. Where the material known as Velcro is used, Velcro eyes 70 (FIG. 3) may be adhesively attached to one or more surfaces of a panel. Alternatively, the panel may be covered with floc, light gauge carpeting, etc. The specific attaching means are of course exemplary and not intended to be exclusive.

With the construction as described above, the screens 11 have a versatility unmatched by other display screens. Posters or other graphic display may be attached by pressure-sensitive adhesives or by small magnets; Velcro eyes 70 may be used; the panels may be viewed from either side and the panels are easily maintained.

Thus it is apparent that there has been provided, according to the invention, portable display screens and components thereof which fully satisfy the aims, objects, and advantages set forth above.

I claim:

1. A multiple panel display screen comprising a plurality of panels hingedly joined together with detachable hinge strips and having moulding strips on the terminal edges of said screen, each of said panels comprising:

1. a rectangular wooden frame and a pair of thin structural sheets on the two broad opposite faces of said frame,
  - a. said frame having a pair of grooves along substantially the entire length of two opposite edges of said frame,
  - b. said grooves each having a shallow wide upper portion and a deep narrow portion,
2. extruded plastic retainer strips imbedded and secured in each of said grooves along substantially the entire length,
  - a. said retainer strips each having a longitudinally extending access channel leading to a longitudinally extending undercut channel,
3. adjoining edges of said panels being hingedly joined together with a removeable, extruded plastic, hinge strip comprising a pair of similar hinge members each of generally T-shaped cross section,
  - a. the top bar of said T being substantially the thickness of said panel, and being generally flat when said hinge strip is in said retainer strips,
  - b. said members being integrally joined by a thin bridge portion along adjacent edges of the T's,
  - c. each of said hinge members including a short central web and an integral bead,
  - d. the webs being receivable in the access channels of said extruded plastic retainer strips and the beads being receivable in said undercut channel, and
4. removeable, extruded plastic moulding strips covering external edges of said panel,

7

- a. said moulding strips being of generally T-shaped cross section and including a cross-strip and a central strip,
- b. the top bar of said T being substantially the thickness of said panel.
- c. the central strip including a short central web and an integral bead, and
- d. the web being receivable in said access channel and the bead being receivable in said undercut channel so that said cross strip is resiliently urged against the external edges of said panel to provide a permanent-appearing edge, said retainer strips and said moulding strip being interchange-

8

- able to provide for addition or removal of panels to said screen.
2. The screen of claim 1 including means for leveling each panel.
3. The screen of claim 1 wherein the lower portion of said retainer strip is longitudinally serrated.
4. The screen of claim 1 wherein said retainer strip is made of polypropylene.
5. The screen of claim 1 wherein said hinge strips are made of polypropylene.
6. The screen of claim 1 wherein said integral beads have a generally cylindrical cross section.

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