

[54] **PORTABLE DISPLAY DEVICE**

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[52] U.S. Cl. **211/178, 40/125 H**

[51] Int. Cl. **A47f 5/10**

[58] Field of Search 211/178 R, 177, 21, 38, 85, 211/104, 105, 118, 130, 132, 149, 167; 40/125 H, 124, 1; 248/166, 435, 423, 188.5, 157; 312/257 R

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Primary Examiner—Ramon S. Britts

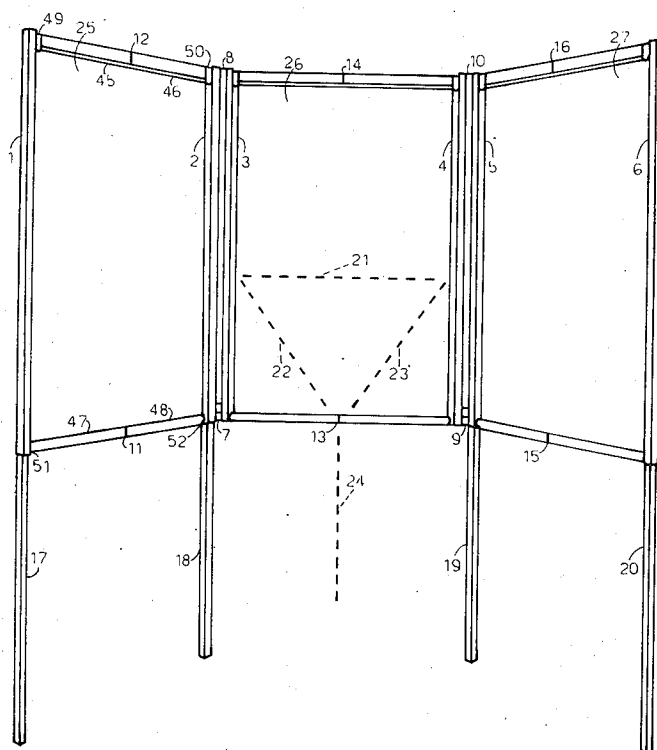
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[57] **ABSTRACT**

A portable display device comprising collapsible frame members which open into a series of rectangles for receiving rectangular panels and extendible legs. Refinements to permit collapsing into a small compact form for easy transportation and with aids to quick and easy set up into a strong and stable display device. Additional features turn the device into a compact still picture or movie theatre.

Portable display devices have been available in the past but they leave much to be desired when it comes to true portability, versatility and ease of setting up. They have not folded as compactly as is possible with the present invention; they have not been as versatile in the configurations possible when set up; nor have they been so easy to set up on location.

9 Claims, 11 Drawing Figures



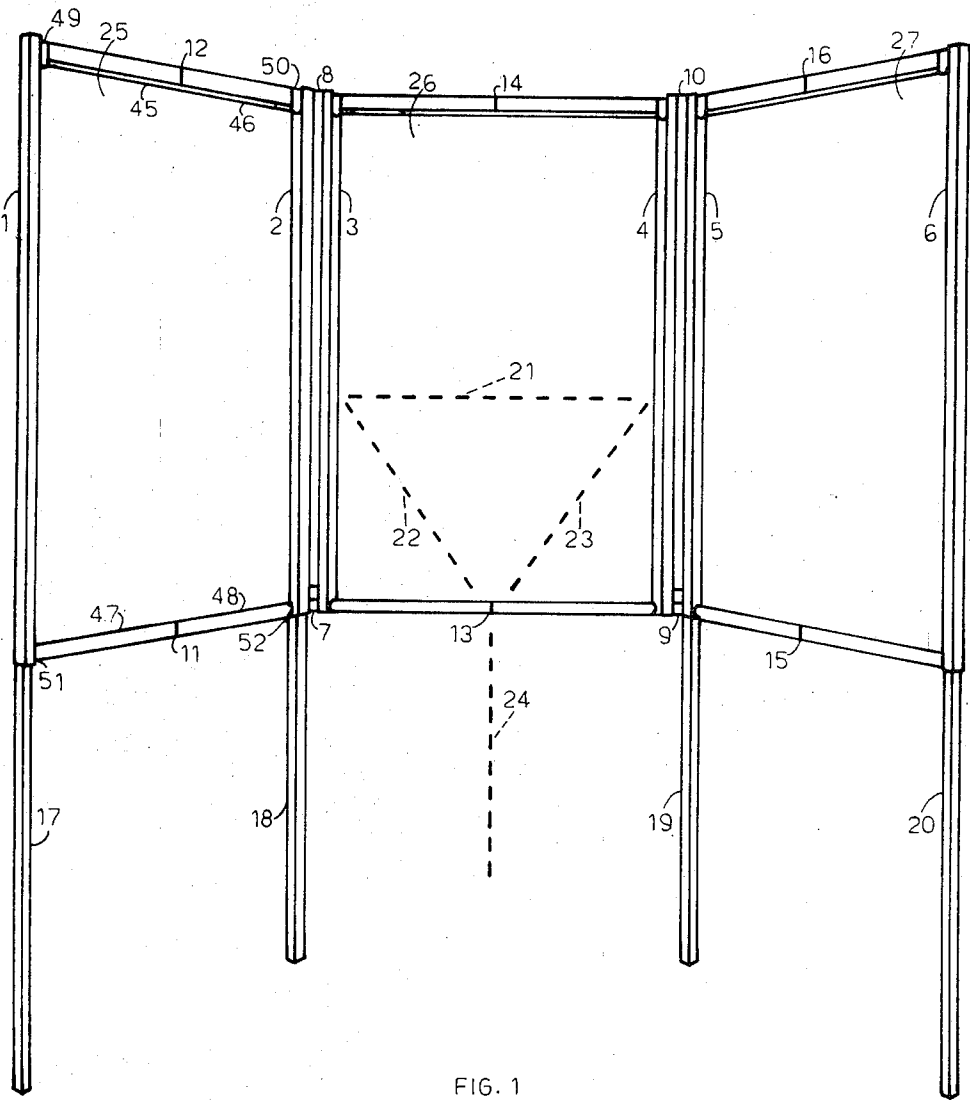


FIG. 1

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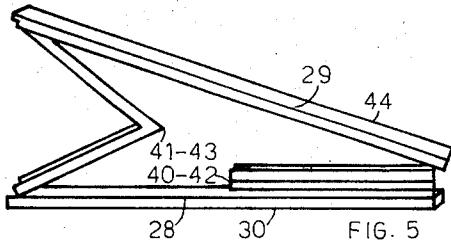


FIG. 5

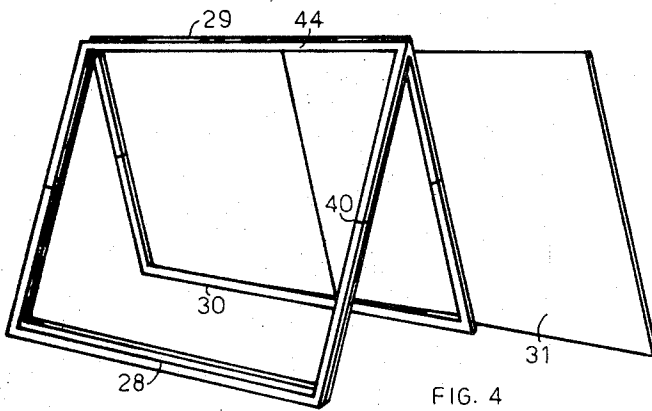


FIG. 4

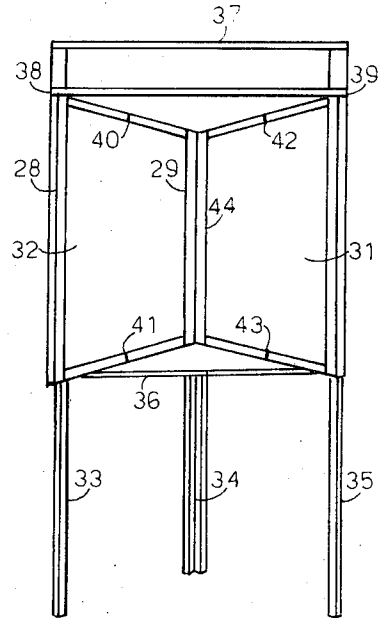


FIG. 2

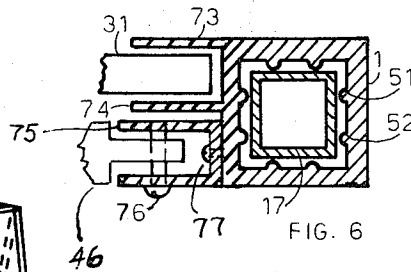


FIG. 6

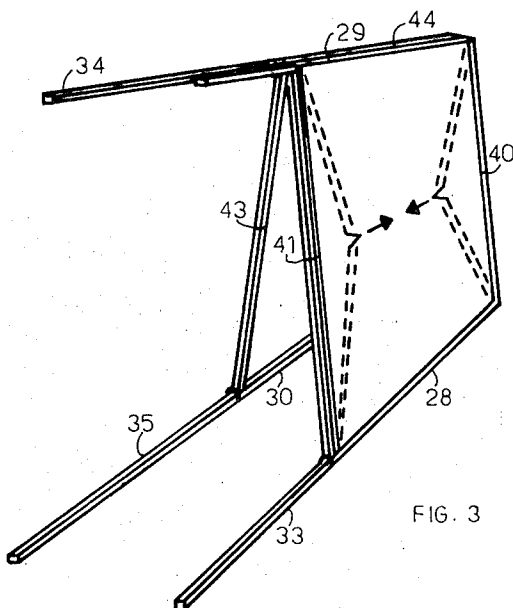


FIG. 3

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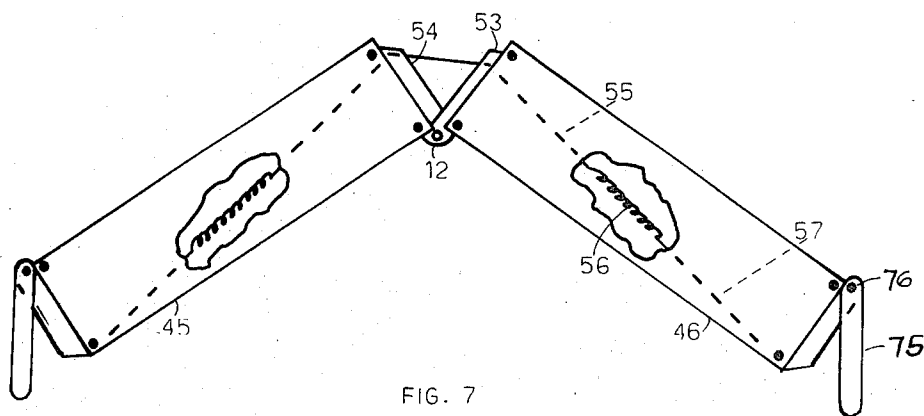


FIG. 7

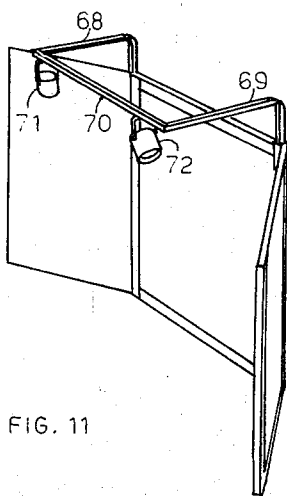


FIG. 11

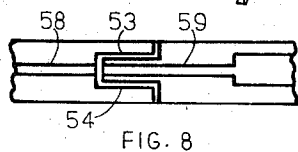


FIG. 8

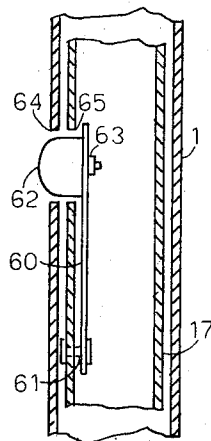


FIG. 9

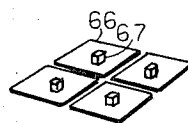


FIG. 10

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PORTABLE DISPLAY DEVICE

SUMMARY

In accordance with the present invention a portable display device comprises a plurality of large rectangular frames for receiving rectangular panels, extendible legs, a main shelf, an auxiliary shelf, a sign mounting and other accessories. The rectangular frame is hinged along upper and lower horizontal members in such a manner as to fold inwardly making a small, very compact package for carrying (with the legs pushed into the vertical frame members). The abutting vertical frame members are double-jointed hinged to fold backward or forward as desired. The folding horizontal frame members are spring loaded so that as the frame is unfolded these horizontal frame members spring into straightened members. The horizontal frame member hinges have tongue and groove parts so that when in a straight line, the horizontal frame members become laterally rigid.

The extendible legs are formed of rectangular extruded aluminum tubing and fit snugly into the vertical frame members. The vertical frame members are also rectangular extruded aluminum tubing and are provided with internal ribs. These internal ribs form tracks for the legs and they allow air to enter as the legs are moved in or out preventing a vacuum or compression effect which would slow the operation. The legs carry spring loaded buttons which mate with holes in the vertical members providing locking of the legs in extended position. With the legs withdrawn the display device is adapted to sit on a desk or table.

Various adaptors and accessories are provided. A main shelf is provided to span the display at the bottom edge of the main frame. A sign holder mounts along the top of the main frame. An auxiliary shelf fits in the rear of the open display for holding a movie or still picture projector and a screen for the projection is available. Many configurations are possible employing two, three, four or more of the rectangular panels. A floor pad permits use on soft or yielding surfaces. Lamp brackets provide an illuminated display. Various accessories provide means for turning the display into a permanent display of fixed configuration.

The hollow rectangular vertical members permit ready and stable mounting of signs, lights and other accessories. Once mounted, the rectangular section prevents turning so that once located in the desired position, movement is prevented.

In the drawing:

FIG. 1 is a general view of an assembled three panel display device in accordance with the present invention.

FIG. 2 is an assembled two panel display including a shelf and a sign holder.

FIG. 3 is the two panel display at the start of the folding operation.

FIG. 4 is the two panel display in a further stage of folding.

FIG. 5 is the two panel display nearly completely folded for carrying.

FIG. 6 is a cross-section taken through an upright frame member carrying a leg.

FIG. 7 is a side view of a horizontal member partly collapsed to show the spring loading.

FIG. 8 is a top view of the hinge used in the horizontal member to show its interlocking parts.

FIG. 9 is a cross-sectional view through an upright and a leg showing the button which locks the leg in position.

FIG. 10 is a foot pad for receiving a leg to provide a good support on a soft surface such as on a thick rug.

FIG. 11 is a view of accessory lamps mounted on the vertical members.

FIG. 1 shows a three panel display in accordance with the present invention. The main frame comprises the rectangular tubular vertical or upright members 1, 2, 3, 4, 5 and 6 joined together by six horizontal members 45, 46, 47, 48 and so on. These horizontal members are hinged to fold inwardly toward the centers of the rectangles at 11, 12, 13, 14, 15 and 16 (see FIGS. 3 and 5). The three rectangular areas defined by the vertical and horizontal members are provided with rectangular panels 25, 26 and 27 (see also FIG. 4). A shelf may be attached in the rear as suggested by the dash lines 21, 22, 23 supported by leg 24. The horizontal members are hinged at each end 49, 50, 51, 52 and so on to permit the inward folding at the centers. Legs 17, 18, 19 and 20 are provided formed of rectangular tubular extrusions so that they slide within the upright members and are locked in place by a spring loaded button (see also FIGS. 6 and 9). The horizontal members are spring loaded so that they tend to straighten (see also FIG. 7) and the center and end hinges are tongue and groove for lateral rigidity when in place (see FIG. 8).

The display folds into a compact and solid rectangular package when knocked-down (see FIG. 5). The legs slide back into the uprights; the horizontal members fold inwardly and the whole knocked-down package is compacted, solid and easy to transport. Also, setting up the display from the knocked-down form is very quick and easy. When released, the horizontal members straighten themselves to form the rectangles, the legs are pulled out and locked and the display is set in a vertical position with its several folds in the desired configuration. The rectangles formed by the vertical and horizontal members are channelled to receive and hold rectangular flat back-boards (see FIG. 4).

The flexibility of configuration is substantially enhanced by double-jointed hinges between adjacent uprights which permit 360 degree rotation of one back panel with respect to the next adjacent back panel. Thus, the two, three or more upright panels may be arranged in any desired geometrical configuration from completely folded in one direction around to completely folded in the reverse direction.

FIGS. 3, 4 and 5 show various stages through which a two panel display is programmed to disassemble and fold into a compact configuration for carrying. As shown in FIG. 3, leg members 33, 34 and 35 are pushed into upright members 28, 29 and 30 respectively. The horizontal members 40, 41 and 43 hinge at centers and ends (suggested by the dotted lines and two arrows). With the legs pushed in, the rectangular panels, as 31 in FIG. 4, may be withdrawn. With these panels removed, the upright and vertical members can be folded into a compact rectangular package by completing the folding shown in progress in FIG. 5.

FIG. 6 is a cross-sectional view of an upright frame member and leg. The upright frame member 1 is of a rectangular (preferably square) cross-section and is hollow with internal ribs such as 51 and 52 in pairs along all four inside surfaces. Leg member 17 fits inside

these ribs which form tracks for guiding the legs into or out of the frame member. Not only do the ribs provide low friction guides for the legs but they also permit air to move in or out of the frame member preventing air lock as the legs are moved in or out. Along one face of frame member 1 a channel 73-74 is formed to serve as a guide for holding panel 31. Adjacent to this channel the end of the hinge 75 (see also FIG. 7) is fastened as by bolt 77 and the body 46 of the horizontal member is pivoted on bolt 76. Both legs and vertical frame members may be formed by extruding aluminum through a properly formed extrusion die.

FIG. 7 is a side view of one of the hinged horizontal members. The horizontal member comprises two substantially equal members 45 and 46 hinged at 12 and also adapted to hinge with the vertical members as described above in connection with FIG. 6. In order to cause the horizontal members to be self-aligning during the set-up process, tension is provided between opposite ends of members 45 and 46 by spring loaded wires passing over a channel in the tops of interlocking hinge members 53 and 54. Wires 56 and 57 tensioned by spring 56 is located inside member 46 and a similar wire and spring completes the path inside member 45.

FIG. 8 shows how hinge members 53 and 54 interlock when the horizontal member is fully extended. This view also shows channels 58 and 59 for carrying the tensioning wires.

FIG. 9 is a detail of the leg 17 and frame member 1 in cross-section showing how the leg is locked at a predetermined extended position by means of button 62 secured to spring 60 as by nut 63. Spring 60 is mounted on leg 17 as by rivet 61 and serves to force position locating button 62 through hole 65 in leg 17 into hole 64 in frame 1. To unlock button 62 is merely pushed in until it clears hole 64.

FIG. 10 shows four leg pads each comprising a flat base 66 and a socket 67 for receiving a leg. These leg pads provide a firm base for the display when it is erected on a yielding surface such as a deep pile rug or in sand or the like.

FIG. 11 shows how accessories such as lamps 71 and 72 may be readily mounted on the display as by frame 68, 69 and 70 which includes downwardly projecting arms 68 and 69 which fit into the tops of the hollow upright members.

I claim:

1. In a folding display device, the combination of; a plurality of rectangular frames; each of said frames comprising two straight side members and top and bottom hinged members; wherein abutting side members are hinged to each

other;

wherein said top and bottom members are hinged to said side members and have center hinges to permit the inward folding of said top and bottom members of each of said frames toward one another;

wherein said side members are hollow;

wherein said side members are provided with longitudinal channel means at the inner edges thereof for receiving rectangular display panels;

leg means retractable into said side members; and means for maintaining said leg means in an extended position.

2. A folding display device as set forth in claim 1, and including;

longitudinal spring means within said top and bottom members adopted to force said members into a straight relationship.

3. A folding display device as set forth in claim 1, and including;

rib means for guiding said leg means and allowing movement of air within the side members to prevent air-locking of said legs within said side members.

4. A folding display device as set forth in claim 1, and including;

wherein said hinges on said abutting members are double-jointed to permit any angular relationship between adjacent frames.

5. A folding display device as set forth in claim 1, and including;

a spring loaded stop means attached to each of said legs for mating with openings in said side members to position said legs at predetermined extended positions.

6. A folding display device as set forth in claim 1, and including;

lamp bracket means mountable in the upper ends of said side members.

7. A folding display device as set forth in claim 1, and including;

foot pad means for receiving the lower ends of said legs.

8. A folding display device as set forth in claim 1, and including;

rectangular display panels for mounting in said channel means of said side members.

9. A folding display device as set forth in claim 1, and including;

shelf means for mounting across extended bottom members.

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