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(54) **BOARD MOUNTING TO SUPPORT SYSTEM**

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(57) **ABSTRACT**

A board mounting system comprises an elongated board, a pair of end caps for capping opposite ends of the board and a support for supporting the board. The end cap provides a decorative end-cap for finishing the board and secure the board with the support.

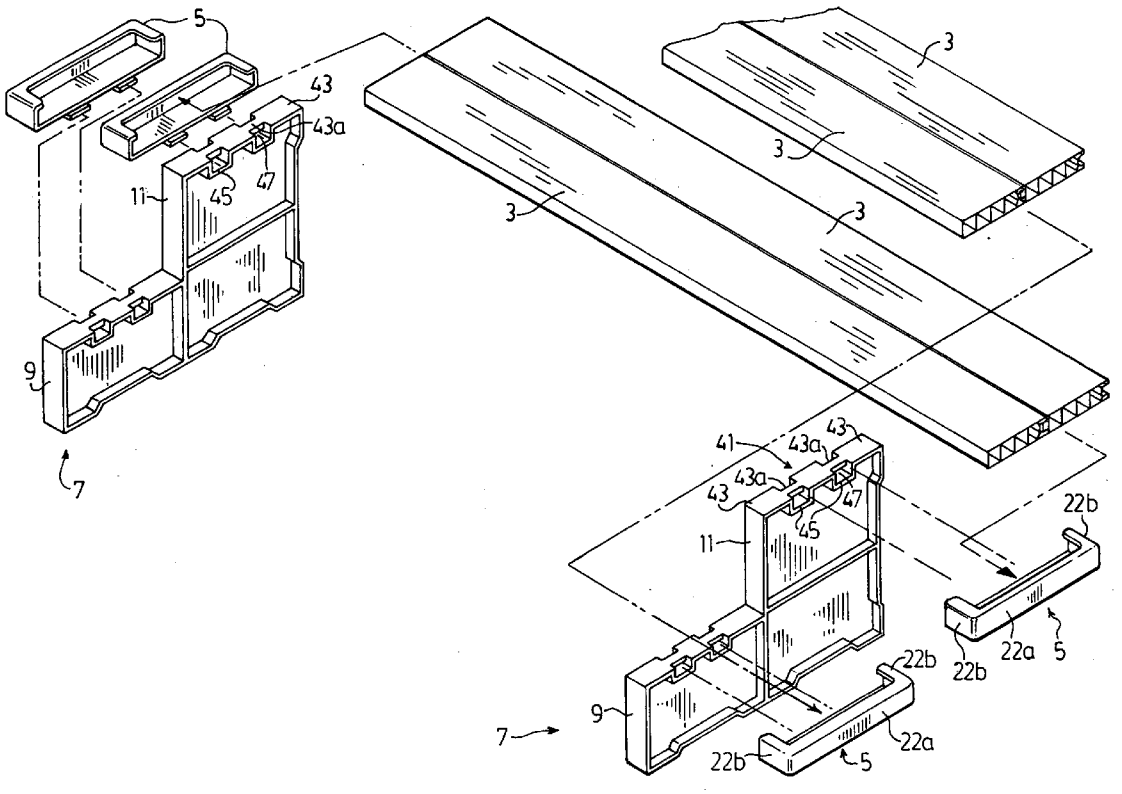
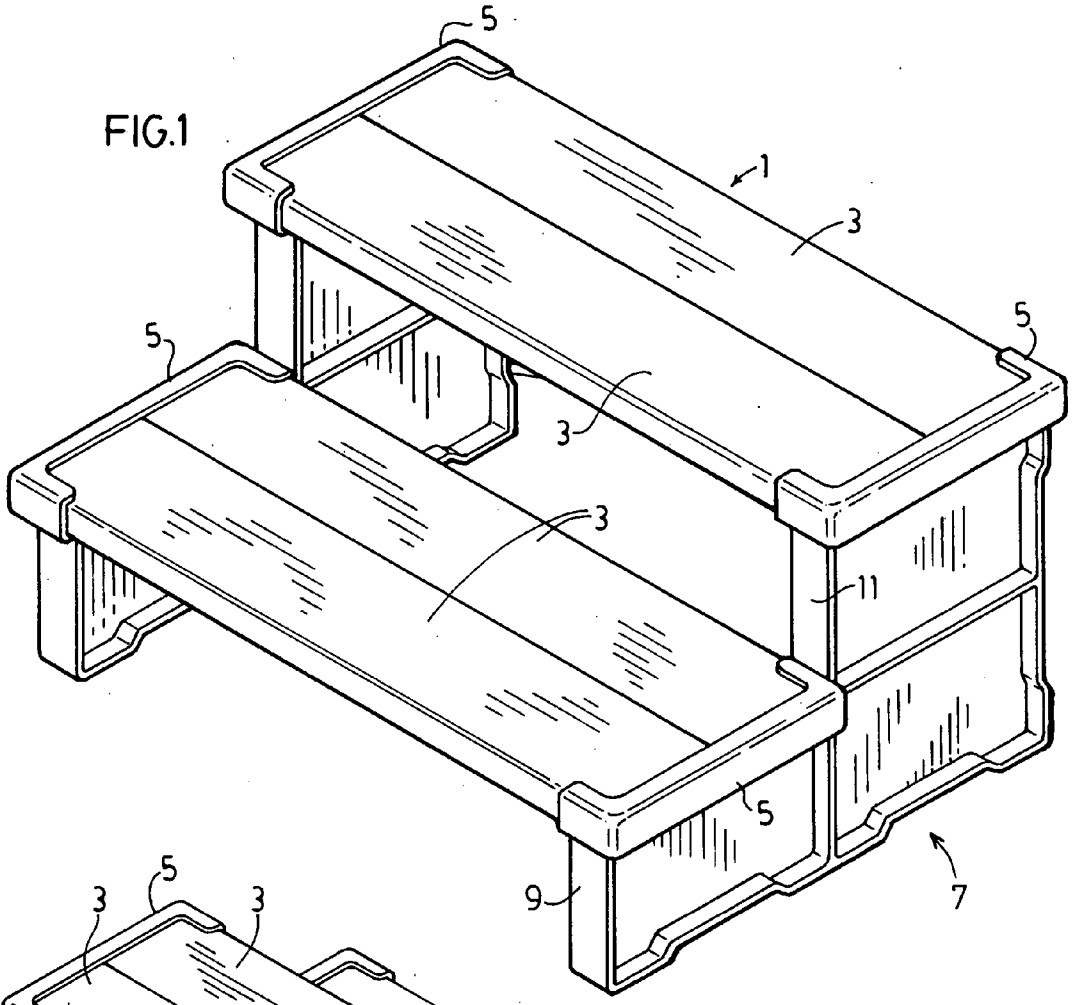


FIG.1



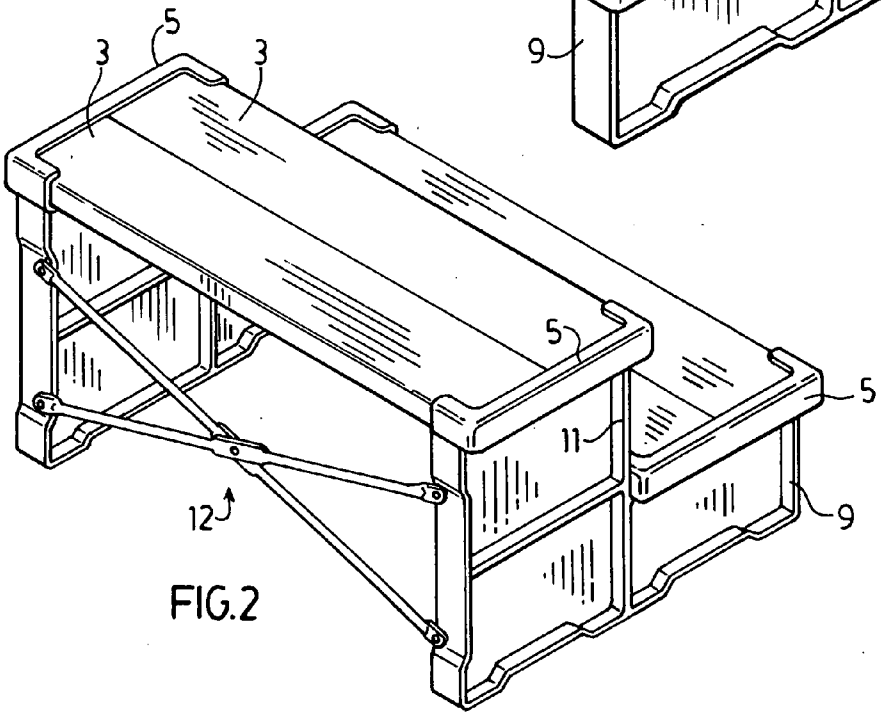
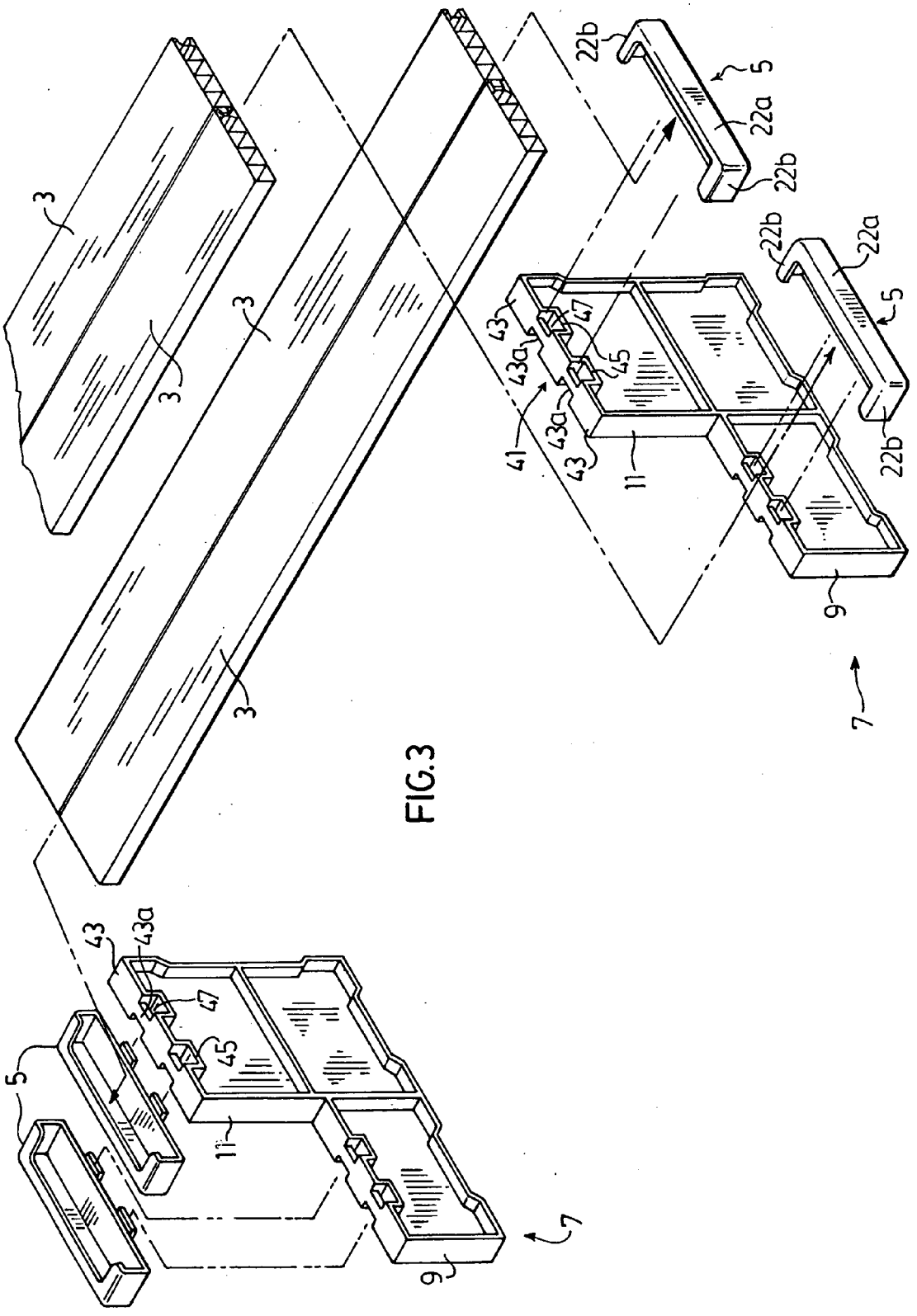


FIG.2


3
3
3
3
22b
22a
22b
5
22b
22a
5
22b
43
43a
47
45
41
43a
43
11
9
7
43
43a
47
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9
7

FIG.3

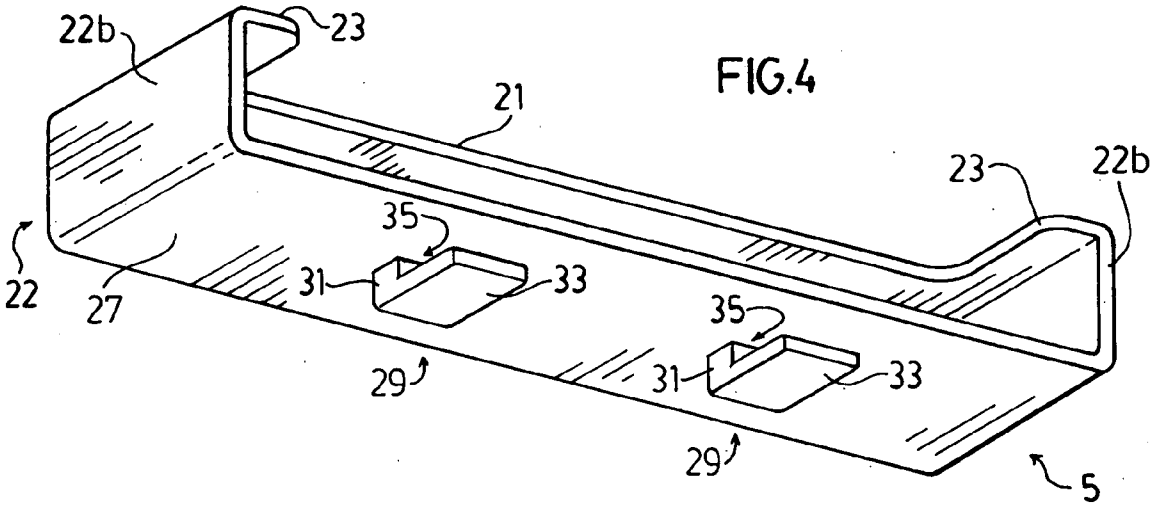


FIG.4

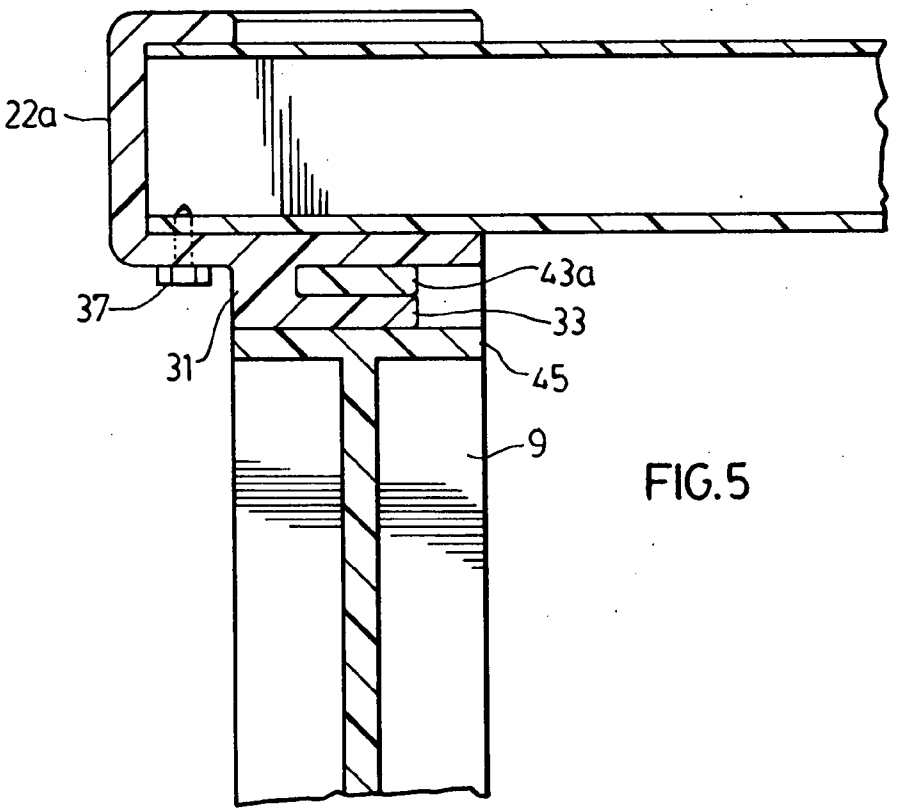


FIG.5

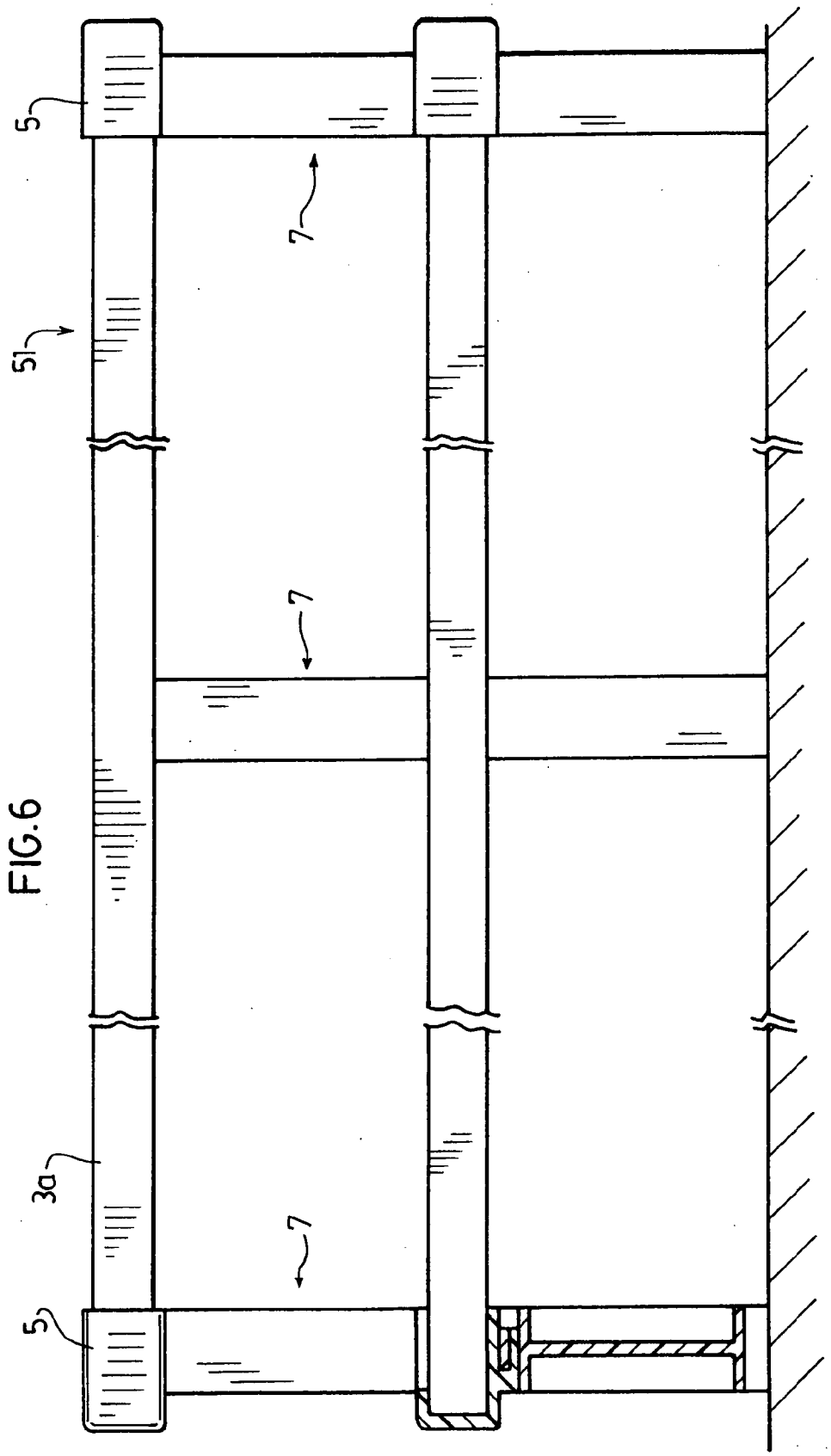
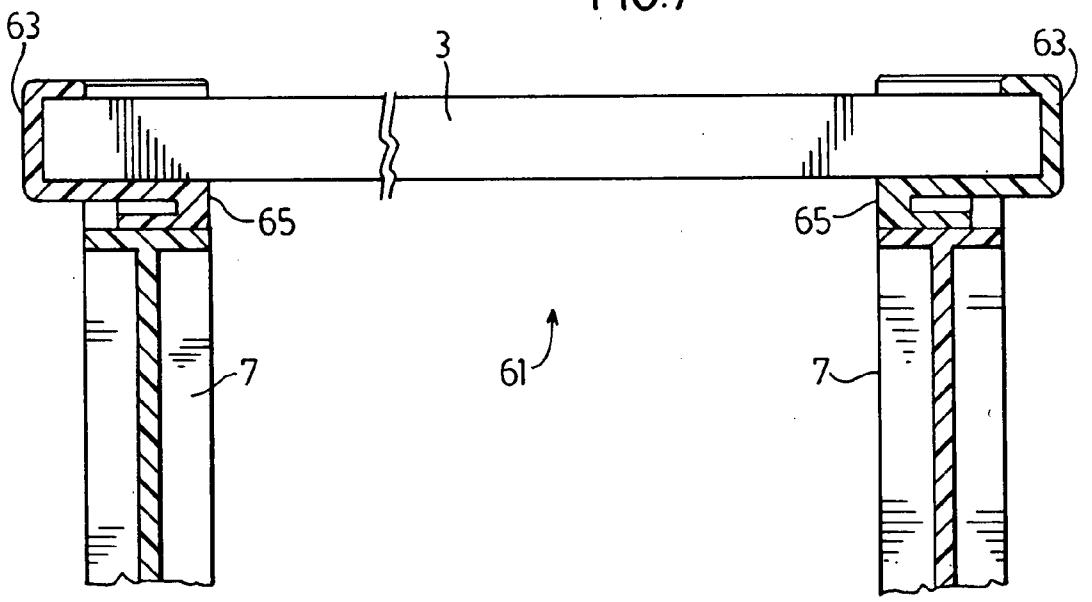


FIG.6

FIG.7



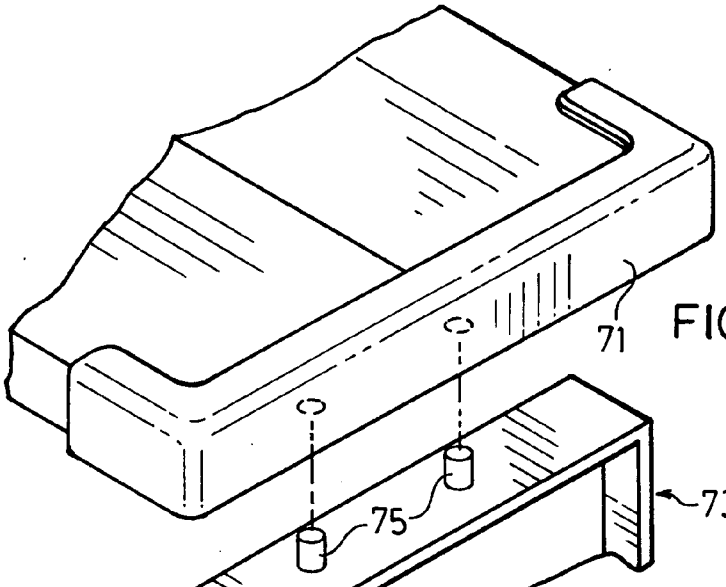


FIG.8

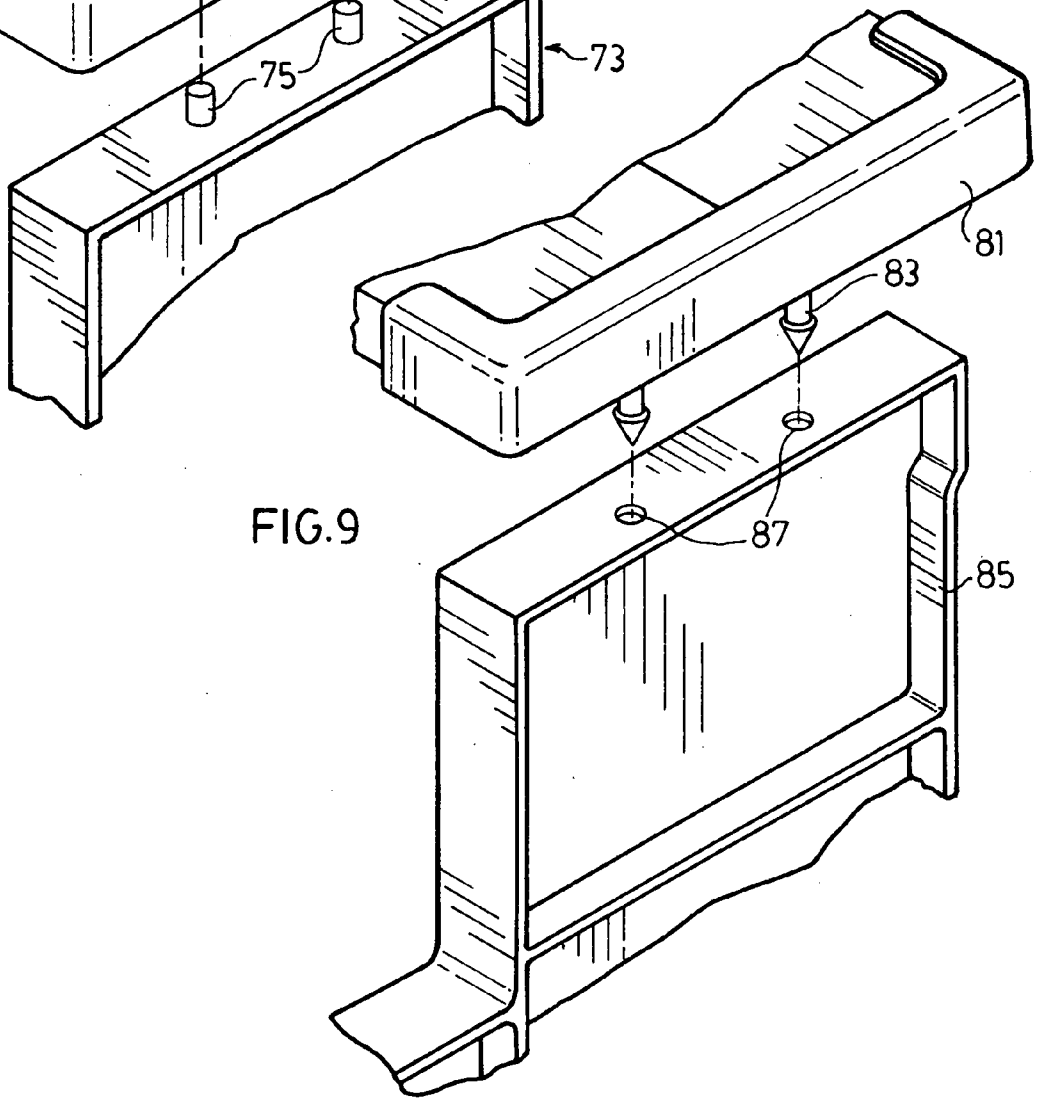


FIG.9

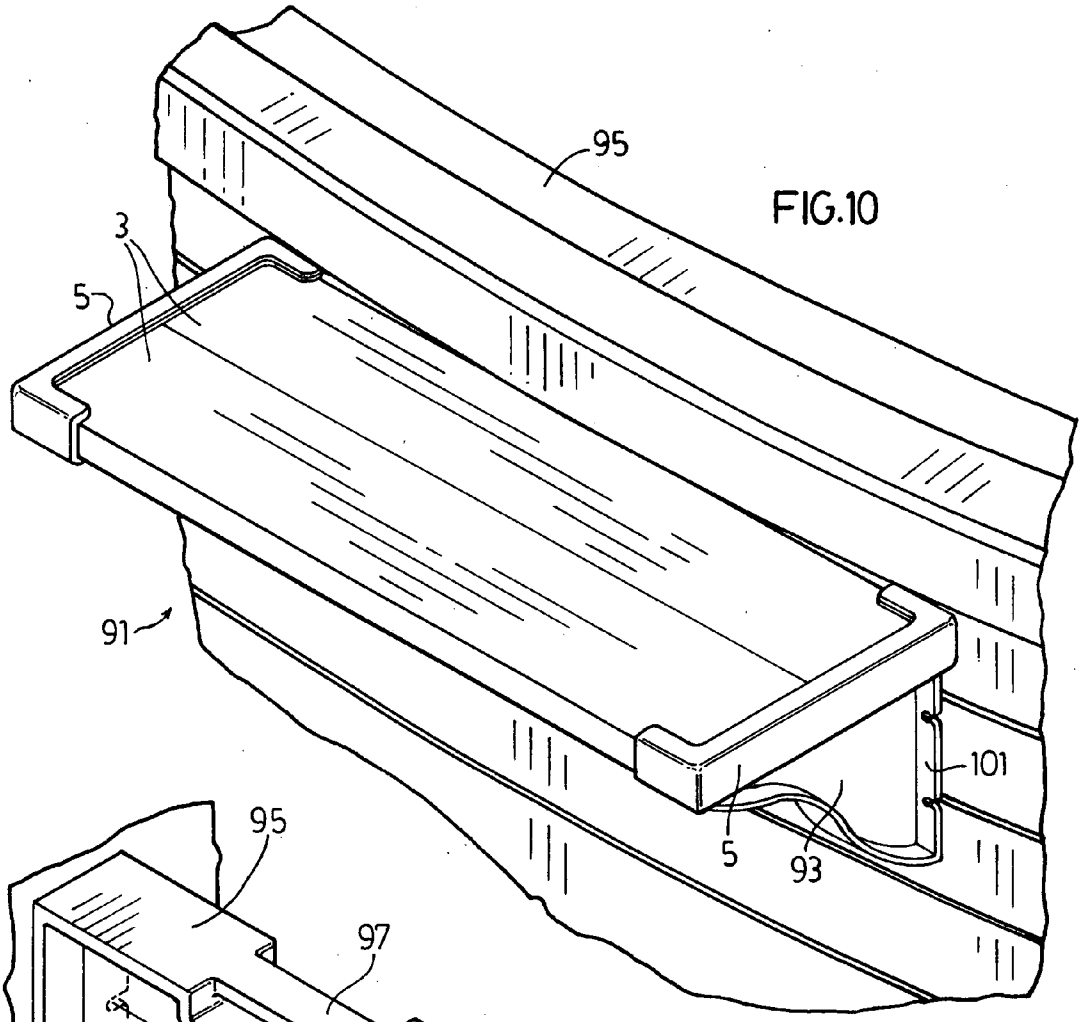


FIG.10

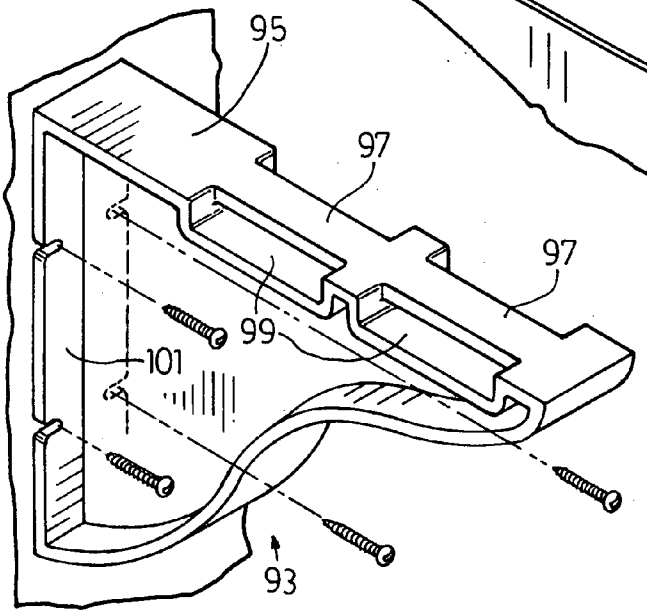


FIG.11

FIG.12

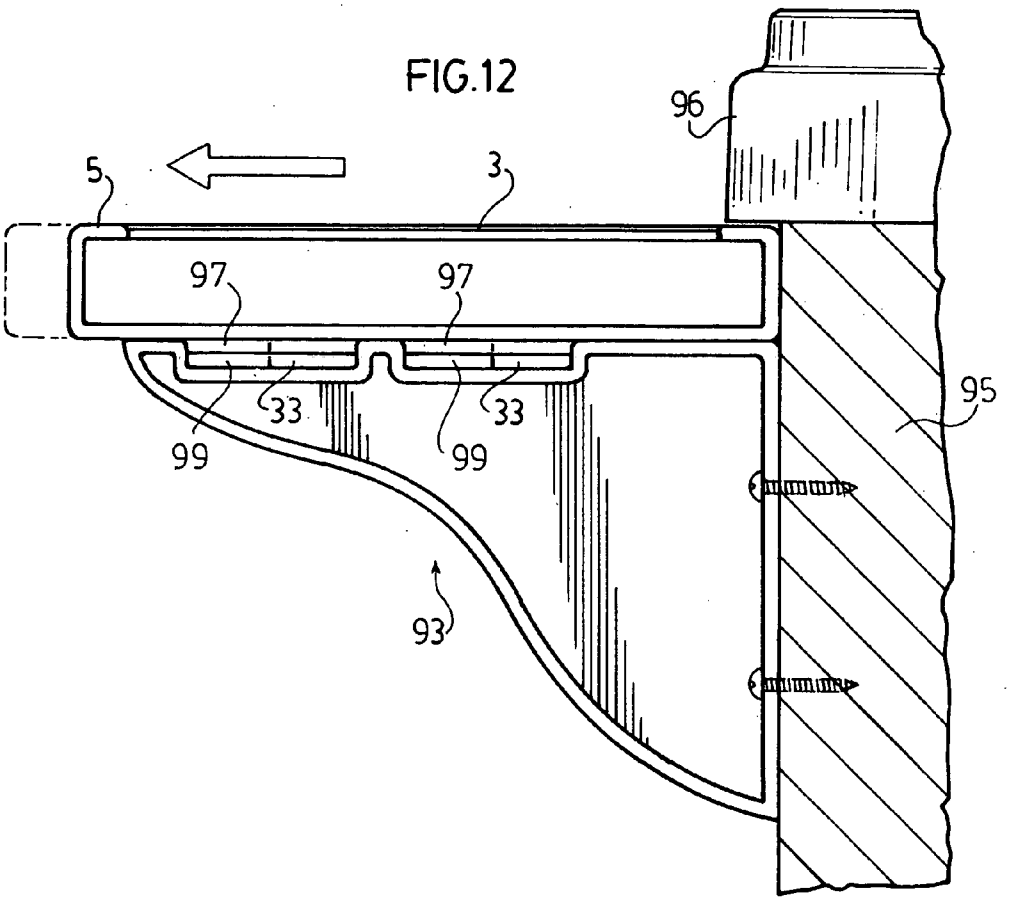
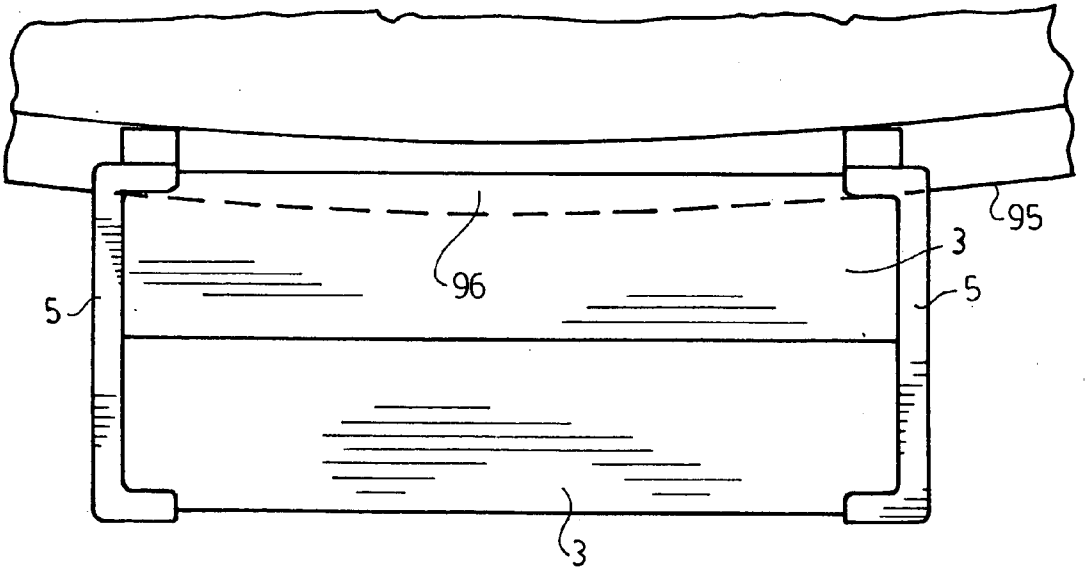


FIG.13



BOARD MOUNTING TO SUPPORT SYSTEM

FIELD OF THE INVENTION

[0001] The present invention relates to a board mounting system and in particular a system in which one or more resin boards are mounted to a support for the boards.

BACKGROUND OF THE INVENTION

[0002] In the past, a conventional board has had a wooden construction. Wooden boards are mounted to support stringers or the like by nails or screws passing through the boards into the support.

[0003] In order to make a conventional set of wooden stairs, a wooden riser assembly is first constructed and then the horizontal tread boards are nailed or screwed to the riser construction.

[0004] With the prior art construction as described above even if the stair assembly is small for portability purposes it is still relatively heavy and awkward to move around. Furthermore, the wood used in the stair assembly is subject to deterioration. If one or more of the components of the assembly does deteriorate this generally necessitates a replacement of the entire assembly. The reason for this is that the screws or nails used to put the assembly together are relatively permanent making it awkward to remove the damaged component. If the damaged component is for example a stair tread and the screw or nail used to hold the tread to the riser is removed the riser may not stand up to a further screw or nail getting embedded in its surface to receive a new tread. If the old screw or nail hole is used to refit the tread it may not have sufficient positive hold to keep the assembly together. On the other hand, if a new hole penetrates the riser assembly it may cause a cracking of the wood material which has already been weakened by the existing hole.

SUMMARY OF THE PRESENT INVENTION

[0005] The present invention provides a board mounting system in which at least one board is secured to a board support by novel means according to the present invention. That novel means is in the form of board end caps which not only provide decorative finishing for the opposite ends of the board but which also provide a securing element which cooperates between the board and the support for securing the entire assembly together.

[0006] Through the provision of the end caps described above, the present invention is designed to take advantage of the most up to date materials now available in the marketplace for forming a board mounting system. According to a preferred embodiment of the invention the board itself has a generally hollow resin construction made in an extrusion process. The board is cut from a longer length of a resin extrusion leaving the board with substantially open unfinished ends.

[0007] The end caps, which also preferably have a resin construction, provide the board ends with a finished appearance and further include securing means, which cooperates, with securing means on the actual support. The end caps after fitting with the opposite ends of the board then secure to the board support for locking the entire assembly together.

[0008] As will be appreciated, a board mounting system when made in accordance with the preferred embodiment as described immediately above is relatively light in weight, is extremely weather proof and can be readily assembled, disassembled and then reassembled should repair or maintenance to the system be required.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The above as well as other advantages and features of the present invention will be described in greater detail according to the preferred embodiments of the present invention in which;

[0010] **FIG. 1** is perspective view looking down on a board mounting system used for forming portable steps in accordance with a preferred embodiment of the present invention;

[0011] **FIG. 2** is a rear perspective view of the portable steps shown in **FIG. 1**;

[0012] **FIG. 3** is an exploded perspective view of the components of the assembly of **FIGS. 1 and 2**;

[0013] **FIG. 4** is an enlarged perspective view of one of the board end caps from the assembly of **FIGS. 1 through 3**;

[0014] **FIG. 5** is an enlarged sectional view showing the mounting of the end cap of **FIG. 2** after being fitted to the board end to one of the riser supports of the assembly of **FIGS. 1 and 2**;

[0015] **FIG. 6** is a front view showing a partial section of the mounting of the lower tread to the riser of the assembly of **FIGS. 1 and 2**;

[0016] **FIG. 7** is a partially sectioned view of the mounting of a stair tread to a riser according to a further preferred embodiment of the present invention;

[0017] **FIGS. 8 and 9** are enlarged perspective views showing end caps for fitting boards to stair risers according to yet further preferred embodiments of the present invention;

[0018] **FIG. 10** is a perspective view of a board mounting system wherein that system comprises a tray mounted to the side surface of the support for the tray according to yet another preferred embodiment of the invention;

[0019] **FIG. 11** is an enlarged perspective view showing one of the supports for the tray of **FIG. 10**;

[0020] **FIG. 12** is a sectional view through the tray of **FIG. 10** looking from the end of the tray; and

[0021] **FIG. 13** is a top view of the tray mounting system of **FIG. 10**.

DETAILED DESCRIPTION ACCORDING TO THE PREFERRED EMBODIMENTS OF THE PRESENT INVENTION IN WHICH

[0022] **FIG. 1** shows in accordance with a preferred embodiment a set of portable stairs generally indicated at **1**. These stairs can have many different applications only one of which is for use with a portable spa. The stairs which are strong but light in weight and also extremely weather resistant are at a height that they can be placed against the

sidewall of the spa. Obviously, they can be placed at any desired location along the spa wall and provide easy in and out access to the spa.

[0023] Turning now to the construction of stairs **1**, they comprise a plurality of boards **3** with a pair of the boards being held side by side with one another by end caps **5**. The assembly of the boards and the end caps comprise an individual stair tread. In the **FIG. 1** embodiment there are two stair treads shown and these stair treads are mounted to a stair riser generally indicated at **7**. The stair riser comprises a first riser portion **9** at the front lower level of the stairs and a second higher riser portion **11** to the rear of the stairs.

[0024] As is well shown in the **FIG. 3** exploded view, there are two of the risers **7** one located to the opposite ends of the stair tread. As will be described later in greater detail the stair risers are, on their own, not stable in an upright position but when assembled with the overall set of stairs **1** they are held upright by the stair treads. The assembly is then reinforced with a back bracing generally indicated at **12**. The back bracing is best seen in **FIG. 2** of the drawings.

[0025] Turning more specifically to **FIGS. 3 and 4** of the drawings each of the individual boards **3** in this preferred embodiment has a resin construction. The boards are all identical. They are all formed in an extrusion process and each board is cut from a longer length of continuously extruded material. As will be seen in **FIG. 3** each board prior to mounting to the stairs has a substantially hollow interior construction. The boards as are known in the extrusion industry comprise a plurality of open cells with spaced apart vertical interior walls which provide load bearing support for the boards.

[0026] As can be appreciated by the above description and by a review of **FIG. 3** the boards although capable of supporting the weight of a person standing on them are extremely light weight compared to for example, a conventional wooden board. Furthermore, they are much more durable and long lasting.

[0027] As is also known in the extrusion industry, the boards may be provided with a top surface embossing so that they are relatively slip resistant. This is extremely beneficial when the boards are used in the spa application as earlier noted. The particular resin material used to form each board is one which has outdoor weathering resistance with relatively little expansion and contraction under extreme weather changes. Such resins are well known to those skilled in the art.

[0028] The end caps **5** best seen in **FIG. 4** of the drawing are also preferably made of a resin material. They are best formed in a molding process. Unlike the boards the end caps have a solid more rigid construction. This construction is well suited to perform the various different functions achieved by the end caps. Specifically, the end caps provide a side by side trapping of adjacent boards **3**. They also provide a decorative end finishing for the otherwise open end of the boards. As a further and particularly important feature they provide a mounting means for mounting the boards to the risers.

[0029] As shown in **FIG. 4** of the drawings, each of the end caps has substantially U shaped channel construction. This channel construction is formed by a sidewall generally indicated at **22**. This sidewall includes a main wall portion **22***a* and shorter wall portions **22***b* extending at right angles to wall portion **22***a*. As seen for example, in **FIGS. 1, 2** and **5** of the drawings wall portion **22***a* spans and covers the aligned open ends of adjacent boards to one end of each stair tread. The wall portions **22***b* wrap around the outer sidewalls of the side by side boards.

[0030] Also provided in the U shaped channel construction of end cap **5** is a top lip **21** and a bottom wall **27**. The top lip **21** locates over the top surface of the two boards **3** while the bottom wall **27** is positioned over the bottom surface of the two boards for each end cap at each end of the stair tread.

[0031] The above combination of fittings provide an extremely effective covering and trapping for the side by side boards at each end of the stair tread.

[0032] As will be seen from **FIG. 4** of the drawings the bottom wall **27** of end cap **5** has a greater front to back depth than then top lip **21**. This increased depth is needed for a number of reasons. Firstly, the bottom wall **27** provides a forming location for a pair of L shaped clip members **29**. Each of these clip members includes a vertical leg portion **31** and a longer horizontal leg portion **33**. Horizontal leg portion **33** is spaced from the bottom wall by a gap or recess **35**.

[0033] The bottom wall **35** also provides a mounting location for mechanical fasteners **37** which thread up through the bottom wall and into the board material near the end of each of the boards as to be described later in detail.

[0034] Each of the stair risers **7** also preferably has a molded resin construction. Risers **7** in the preferred embodiment are made from the same or similar solid rigid formulation as that used in forming the end caps **5**. As such, each of the risers is light in weight while being extremely sturdy.

[0035] Each of the riser sections **9** and **11** have an identical top surface indicated at **41** with respect to riser section **11**. This top surface comprises a flat top wall **43** with thinner top wall portions **43***a*. U shaped wall portions **45** extend down from the main top wall beneath thinner wall portions **43***a*. This leaves a gap **47** directly below wall portions **43***a*.

[0036] The somewhat corrugated shaping of the overall top surface **41** as described immediately above makes it extremely rigid and durable.

[0037] As earlier described, each of the end caps **5** is provided on its bottom wall with clip **29**. The horizontal leg **33** of this clip slides beneath thinned wall portion **43***a* on the top surface of the riser. Wall portion **43***a* fits into the gap **35** of clip **29**.

[0038] In mounting each of the treads to each riser section the two boards **3** are placed side by side with one another. An end cap **5** is fitted over the aligned ends of the boards at each end of the tread. While fitting the end caps over the boards clips **29** on the bottoms of the end caps are slid into the clip receptors formed by wall portions **43***a* and gaps **47** on the top of the riser. From here the mechanical fastening elements **37** typically in the form of self tapping screws are fitted up through the bottom wall of the screws into the end caps into the boards. The under surface mounting of the end caps ensures that the screws are hidden during normal use of the stairs.

[0039] As will be appreciated from the description above the end caps provide a male to female interlock of the boards with the risers. The fitting of the mechanical fasteners **37** into the fixed length boards prevents the interlock between the end caps and the risers from separating i.e., prevents the end caps from pulling laterally off of the riser.

[0040] In the event that any of the above described components in the way of a board, an end cap or a riser should need replacement then it is simply a matter of removing the mechanical fasteners. This then allows the end caps to be pulled out of position for dismantling the entire assembly.

[0041] After the stairs have been built in the manner described above the bracing element **12** is fitted to the back of the riser section **11**. This prevents the taller riser legs from tilting inwardly or splaying outwardly beneath the stair tread. With this overall construction the set of stairs **1** shown in **FIGS. 1 and 2** is extremely stable.

[0042] **FIG. 6** of the drawings shows a slightly modified stair assembly generally indicated at **51**. This stair assembly is substantially the same as stair assembly **1**. The only difference between the two stair assemblies is that the assembly of **FIG. 6** uses longer boards **3***a*. The riser **7** to each end of the assemblies are identical as are the end caps **5**. However, when working with the longer boards **3***a* assembly **51** of **FIG. 6** includes an additional center riser **7**. This center riser provides support against downward bending of the boards.

[0043] The center riser **7** is identical to the earlier described end risers **7**. However, rather than securing to the boards by means of end caps mechanical fasteners preferably in the way of a self tapping screw are screwed directly up through the top wall **43** of each tier of the riser into the boards for each riser section.

[0044] **FIG. 7** shows a riser section **61** which is only slightly different from what has already been described. The actual riser supports **7** are identical to the earlier described risers. The boards **3** are also identical. However, the end caps **63** shown in **FIG. 7** are slightly different from end caps **5**. More specifically, end cap **63** include bottom clips **65** which face outwardly of the end caps in contrast to the earlier described inwardly facing clips **29**. The clips **65** still slide over the small diameter top wall portions **43***a* of risers **7**. However, they slide from the inside outwardly rather than from the outside inwardly as found in the earlier embodiment. When the entire stair assembly of **FIG. 7** is in its final form including the bracing **12** the bracing prevents the two spaced apart risers from separating away from one another. This in turn maintains the interlock of the end caps with the risers. As such, no further mechanical securing elements such as mechanical fasteners **37** are needed to prevent riser assembly **61** from dismantling without first taking off the bracing **12**.

[0045] **FIGS. 8 and 9** of the drawings show slightly different interconnections for end caps to risers according to further preferred features of the invention. In **FIG. 8** end cap **71** which fits to board **3** in the identical manner to that earlier described includes bottom opening **72**. Riser **73** includes upwardly projecting posts **75**. These posts fit into the under surface openings in the end cap. The interlocking of the post with the end caps prevents lateral shifting of the end caps relative to the riser. Separate mechanical fastening elements may be used to prevent vertical separation of the end caps from the riser.

[0046] In **FIG. 9** end cap **81** includes downwardly extending posts **83**. These posts have barb shaped heads as seen in **FIG. 9**.

[0047] Riser **85** includes top openings **87**. The barb shaped posts **83** of end cap **81** press down and lock into the openings **87** in the riser.

[0048] The **FIG. 9** set up again has horizontal interlock between the end caps and the riser. The barb shaping of the posts **83** further provides a vertical separation interlock of the end caps from the riser. This vertical interlock is more than sufficient to hold the assembly together if the stairs are picked up by the treads. The vertical interlock can however be separated by deliberately placing some type of a prying tool between the end cap and the top of the riser.

[0049] In each of the assemblies described above the board mounting system is in the form of a portable set of stairs. **FIGS. 10 through 13** show a further board mounting system generally indicated at **91**. In this board mounting system which forms a portable tray boards **3** are once again held side to side with one another by end caps **5**. The end caps mount the boards to a pair of board supports **93**. Board supports **93** include vertical flanges **101** which secure to a support surface **95**.

[0050] In this embodiment the support surface is the sidewall of the earlier referred to portable spa.

[0051] The portable spa itself is likely to have a circular configuration. It may well include a protruding lip **96** as shown in **FIG. 13**. In order to have the tray formed by the boards **3** adjustable to match to the curve surface of the spa the supports **93** have a specially designed top surface **95**. This top surface includes thin surface regions **97** with underlying gaps **99**. The horizontal legs **33** of the clips **29** on the under surface of end caps **5** fit over surface regions **97** into the gaps **99**. However, surface regions **97** and the gaps **99** are elongated relative to the clip legs **33**. As such, the clips are laterally adjustable relative to supports **93**. This allows the tray formed by the encapsulated boards to be shifted inwardly and outwardly relative to the sidewall lip **96**. The laterally adjustable positioning of the tray enables it to be positioned such that the maximum surface area of the tray is exposed below the lip without leaving a gap between the lip and the tray.

[0052] As to be appreciated from the description above numerous different types of supports for receiving the boards and end caps can be used in accordance with the present invention. The key to the invention lies in the fact that the end caps which can be used with either a single board or multiple boards provide a finishing element for the one or more boards and also provide a means of connecting the board or boards to the board support.

[0053] Although various preferred embodiments of the present invention have been described in detail, it will be appreciated by those skilled in the art that variations may be made without departing from the spirit of the invention or the scope of the appended claims.

The Embodiments of the Invention in which an exclusive property of privilege is claimed are defined as follows:

1. A board mounting system comprising an elongated board, a pair of end caps for capping opposite ends of said board and a support for supporting the board, said end caps

providing a decorative end finishing for the board and having securing means which secures to and mounts the board with the support.

2. A board mounting system as claimed in claim 1 wherein the end caps and the support have cooperating male to female interlocks for securing the end caps and the board to the support.

3. A board mounting system as claimed in claim 1 wherein the end caps fit across and wrap around the opposite ends of the board.

4. A board mounting system as claimed in claim 3 wherein the end caps include a main center section and shorter arm sections projecting at right angles to said main center section, all of said sections including top and bottom lips which locate to top and bottom sides of the board.

5. A board mounting system as claimed in claim 4 wherein said board has an extruded plastic construction and is a cut section from a longer length of extruded board, the opposing ends of said cut section being substantially open and being covered by said end caps.

6. A board mounting system as claimed in claim 1 wherein said support holds the board in a ground elevated position.

7. A board mounting system as claimed in claim 6 wherein said support comprises a stair riser.

8. A board mounting system comprising at least two elongated boards, a pair of end caps, said end caps extending across and wrapping around opposite ends of said boards to hold the boards together as a unit parallel with one another, and a support for supporting the boards, said end caps providing a decorative end finishing for the boards and having securing means which secures to and mounts said boards with the support.

9. A board mounting system as claimed in claim 8 wherein each of said end caps is of a U shape and has a channel construction with top and bottom lips to upper and lower sides of the channel construction.

10. A board mounting system as claimed in claim 9 wherein said end caps hold said boards edge to edge with one another.

11. A board mounting system as claimed in claim 8 wherein said end caps and said support have cooperating male to female interlocks which slide together to mount the end caps to the support, the end caps being attached to the boards which prevents to end caps from releasing from the support.

12. A board mounting system as claimed in claim 8 wherein said support is secured to a curved surface of an object, said end caps being adjustable laterally of said support to adjust positioning of said boards relative to said curved surface.

13. A board mounting system as claimed in claim 12 wherein said end caps are secured to said support by cooperating male and female interlock parts, the female interlock parts being enlarged in a horizontal plane relative to the male interlock parts to allow a lateral shifting of the male interlock parts within the female interlock parts.

14. Portable stairs comprising riser means and stair treads which secure to said riser means, each of said stair treads comprising at least one elongated board and a pair of end caps which cap opposite ends of said board and which mount said board to said riser means.

15. Portable stairs as claimed in claim 13 wherein said riser means comprises a pair of risers one at each of the opposite ends of the board and held in an upright position by securing to said end caps.

16. Portable stairs as claimed in claim 13 wherein each of said stair treads comprises a pair of said boards held side by side with one another by said end caps.

17. Portable stairs as claimed in claim 15 wherein each of said boards has an extruded resin construction, each board being substantially hollow and open at the opposite ends thereof, said end caps providing a decorative covering cap over the opposite ends of said boards.

18. Portable stairs as claimed in claim 16 wherein said end caps have a plastic molded construction.

19. Portable stairs as claimed in claim 17 wherein each end cap comprises a generally U shaped channel.

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