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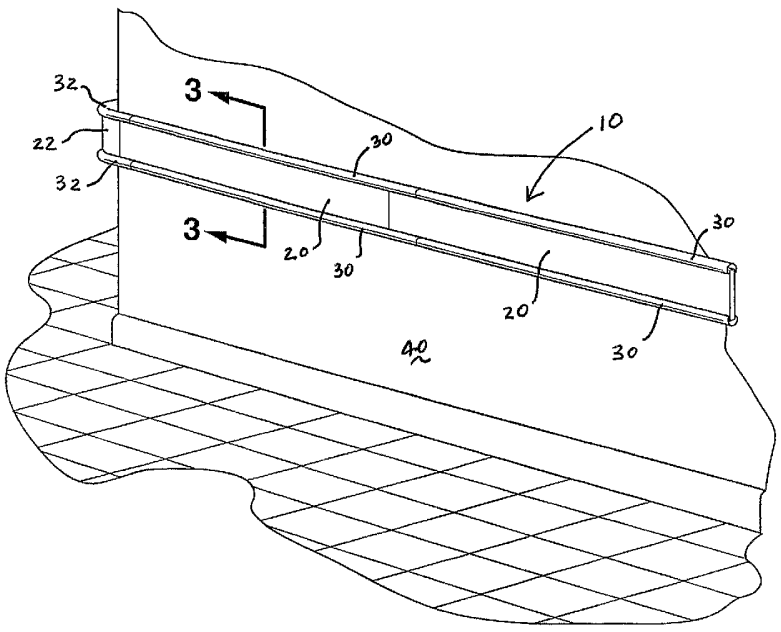

(57) **Abstract:** A handrail assembly is provided which may be attached to a wall or stairwell using conventional mounting hardware. The handrail consists of a substantially flat panel having a series of grooves on opposite sides of an upper edge and a lower edge of the panel. Within the respective oppositely spaced grooves, a thermoplastic extruded slit tube is inserted into the grooves providing a curved gripping portion of a handrail. The substantially flat panel has exterior surfaces of a thermoplastic polymer, thereby providing a handrail assembly having outer surfaces of a damage resistant, easily repair, long wearing polymer.

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HANDRAIL ASSEMBLY

RELATED APPLICATIONS

This application claims the benefit of US Application Serial Number 60/683,012 filed on May 20, 2005 and entitled, "Handrail Assembly," and U.S. utility application entitled "Handrail Assembly", Attorney Docket No. DUR-18, filed on May 17, 2006, both of which are incorporated herein by reference.

FIELD OF THE INVENTION

This invention is directed towards handrail assemblies for use in hallways, stairways, and similar locations.

BACKGROUND OF THE INVENTION

There is enormous variety of various types and materials from which handrails may be constructed. It is well known to use metal tubing which is mounted a spaced distance from a wall for handrails. Similarly, wooden handrails may also be attached to a wall as a handrail.

While handrails have a very functional purpose, there is still a desire to provide a functional yet aesthetic product. To this end, metal handrails may be painted to achieve any desired color. However, handrails are subject to accelerated wear in high traffic areas and require increased maintenance with respect to touch up painting and repair. Similarly, wooden handrails can be stained in a limited number of finishes or painted in a variety of colors. However, high wear areas will result in an ongoing need for periodic maintenance as the finish is compromised by high traffic usage. Further, handrails positioned in high traffic areas often are damaged by deliveries of furniture, supplies, and various moving activities.

Accordingly, there remains a need in the art for economical handrail systems that can be supplied in a variety of colors and finishes and which exhibit superior durability in terms of finish and wear compared to conventional metal or wood handrails.

SUMMARY OF THE INVENTION

It is an aspect of at least one embodiment of the present invention to provide for a handrail assembly system comprising a substantially flat panel having a first pair of grooves defined on opposite sides of the panel and extending an equidistance from an upper edge of the panel; a second pair of grooves positioned on opposite sides of the panel and positioned an equidistance from a lower edge of the panel; a first arcuate sleeve adapted for placement within the first pair of grooves; a second arcuate sleeve adapted for placement within the second pair of grooves; wherein when the sleeves are positioned in the panel a handrail is provided.

It is an additional aspect of at least one embodiment of the present invention to provide for a handrail assembly in which an extruded thermoplastic tube is positioned along an upper surface of a handrail assembly, the extruded tube providing the surface which is gripped by an individual when the handrail is used.

It is an additional aspect of at least one embodiment of the present invention to provide for a curved panel having thermoplastic exterior surfaces and having an upper and a lower respective first and second extruded tube having a curvature adapted for engaging the curved panel within a respective pair of opposing grooves.

These and other objects of the present invention are provided by a handrail assembly system comprising a substantially flat panel having a first pair of grooves defined on opposite sides of the panel and extending an equidistance from an upper edge of the panel; a second pair of grooves positioned on opposite sides of the panel and positioned an equidistance from a lower edge of the panel; a first arcuate sleeve adapted for placement within the first pair of grooves; a second arcuate sleeve adapted for placement within the second pair of grooves; wherein when the sleeves are positioned in the panel, a handrail is provided.

A further aspect of the present invention resides in a handrail assembly that includes a panel with a face. The panel defines a pair of grooves on opposite sides of the panel. A sleeve engages the panel and is at least partially disposed within at least a portion of both of the grooves. A mounting post is present and engages the panel. The mounting post is configured for

spacing the panel and the sleeve from an object to which the mounting post is attached.

A further aspect of the present invention exists in a handrail assembly as immediately discussed in which the panel defines a second pair of grooves on opposite sides of the panel. A second sleeve is present and engages the panel. The second sleeve is at least partially disposed within at least a portion of both of the second grooves.

An additional aspect exists in a handrail assembly as discussed above in which the panel is made of particle board. In a further exemplary embodiment, the panel may additionally be made at least partially of a thermoplastic polymer laminate that engages the particle board and forms the face.

An additional aspect of the present invention resides in a handrail assembly that has a plurality of panels. Each of the panels has a face. A plurality of sleeves are present and engage the panels so that at least one of the sleeves engage at least two of the panels. The sleeves engage the panels so as to at least partially cover the tops and bottoms of the panels.

An further aspect exists in a handrail assembly as immediately discussed in which the panels define a first pair of grooves on opposite sides of the panels. At least one of the sleeves is at least partially disposed within at least a portion of both of the first pair of grooves. The panels also define a second pair of grooves on opposite sides of the panels. At least one of the sleeves is at least partially disposed within at least a portion of both of the second pair of grooves.

An additional exemplary embodiment of the present invention resides in a handrail assembly that has a substantially flat panel. The panel defines a first pair of grooves on opposite sides of the panel that extend equidistance from an upper edge of the panel. The panel defines a second pair of grooves positioned on opposite sides of the panel that extend equidistance from a lower edge of the panel. A first arcuate sleeve is present and is adapted for placement within the first pair of grooves. A second arcuate sleeve is also present and is adapted for placement within the second pair of grooves. A handrail is provided once the sleeves are positioned in the panel.

An additional aspect of the present invention resides in a handrail assembly as immediately discussed in which the first and second arcuate sleeves engage the panel and extend beyond a side edge of the panel.

BRIEF DESCRIPTION OF THE DRAWINGS

A fully enabling disclosure of the present invention, including the best mode thereof to one of ordinary skill in the art, is set forth more particularly in the remainder of the specification, including reference to the accompanying drawings.

Figure 1 is a perspective view of a handrail according to the present invention as seen installed along an interior hallway.

Figure 2 is an exploded view of an embodiment showing the components of the handrail as seen in partially assembled subunits.

Figure 3 is a sectional view taken along line 3-3 of Figure 1.

Figure 4 is an exploded view of an end section of a handrail component piece.

Figure 5 is a view similar to Figure 4 showing component parts assembled and positioned onto the handrail.

Figure 6 illustrates the handrail of the present invention modified for traversing a curved portion of a stairwell.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference will now be made in detail to the embodiments of the invention, one or more examples of which are set forth below. Each example is provided by way of explanation of the invention, not limitation of the invention. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment can be used on another embodiment to yield a still further embodiment. Thus, it is intended that the present invention cover such modifications and variations as come within the scope of the appended claims and their equivalents. Other objects, features, and aspects of the present invention are disclosed in the following detailed

description. It is to be understood by one of ordinary skill in the art that the present discussion is a description of exemplary embodiments only and is not intended as limiting the broader aspects of the present invention, which broader aspects are embodied in the exemplary constructions.

In describing the various figures herein, the same reference numbers are used throughout to describe the same material, apparatus, or process pathway. To avoid redundancy, detailed descriptions of much of the apparatus once described in relation to a figure is not repeated in the descriptions of subsequent figures, although such apparatus or process is labeled with the same reference numbers.

As seen in reference to Figures 1 and 2, the handrail assembly 10 is seen which is formed from a plurality of substantially flat panels 20 upon which curved rail members 30 may be attached. As seen in the referenced figures, curved portions 22 and 32 may be provided to accommodate corners and corridor bends as well as variations needed for stairwells as seen in reference to Figure 6.

As seen in reference to Figure 3, wall 40 may have a mounting post 50 secured thereto using any number of conventional fasteners. Likewise, mounting post 50 may be of any conventional design which is compatible for attaching a handrail of the type and materials as described below.

The component panels 20 and 22 of a handrail as best seen in reference to Figures 4 through 6 have a core portion of a compressed wood product such as particle board. The exterior portions of the core particle board have then applied to the exterior surface thermoplastic polymer laminates 25 such as PVC. The PVC panels have a thickness of about 1 to about 3 mm and may be applied with conventional adhesives to the front and rear surfaces of the board 20. Additionally, banding techniques may be used to apply thermoplastic strips 26 to the respective top, bottom, and edge walls of the board 20.

Both a front surface and a rear surface of board 20 have a pair of grooves 24 which are defined within the surface of board 20. As seen in reference to Figures 3 through 5, the grooves 24 are positioned equi-distance from the respective top and bottom edges along both the front and rear

surfaces of the board. In this manner, a slit piece of polymer tubing 30 may be slid into position along and within grooves 24.

The slit tubing 30 and 32 defines a slit having a width which essentially corresponds to the thickness of the board as measured between the oppositely spaced grooves defined along the front and rear surfaces of board 20 or curved board 22. The slit tubes 30 and 32 have sufficient stiffness such that it is extremely difficult to remove tubing 30 or 32 except by sliding the tubing along an end portion of the handrail. In this manner, it is extremely difficult to snap off or correspondingly to snap on the tubing, thereby preventing removal of the tubing once installed on a handrail.

Various exemplary embodiments exist in which the slit tubes 30 and 32 have an outer surface and an inner surface. The edge of the slit tubes 30 and 32 proximate to the slit in these members may be angled. In this manner, the outer surface extends circumferentially beyond the inner surface so that the edges of the slit tubes 30 and 32 are angled and in effect face in the general direction towards the interior of the slit tubes 30 and 32. The slit tubes 30 and 32 each have two such edges and all of the edges of the slit tubes 30 and 32 may be constructed in a like manner. The angled nature of the edges of slit tubes 30 and 32 function so as to more advantageously nest the slit tubes 30 and 32 into grooves 24 and effect a stronger hold between the slit tubes 30 and 32 and board 20. However, it is to be understood that in other embodiments that one or more of the edges of slit tubes 30 and 32 may be provided so that both the outer and inner surfaces extend circumferentially the same amount at the location of the edge or edges. Further, in other embodiments, the inner surface of the slit tubes 30 and 32 may extend circumferentially beyond the outer surface.

Both the tubing, thermoplastic sheets 25, and thermoplastic strips 26 used to cover the exterior surfaces of boards 20 and 22 are also extruded from polymers such as polyvinylchloride. It is known in the art that extruded sheets, tubing, and edge banding strips of polyvinylchloride may use various pigments to create color combinations including simulated wood grain, marbling, or other patterns extruded during the extrusion process. Since the pigments which make up the extruded article extend throughout the depth of the extruded sheets/tubing, the color and pigmented ornamentation runs the

entire depth of the sheet. Accordingly, minor surface abrasions, nicks, burns, or other flaws which may accumulate during use may be easily repaired. Simple techniques such as buffing with fine steel wool may be used to remove abrasions and restore the original appearance of the handrail.

Since the handrail may be supplied as a kit, it is possible to supply additional replacement places of both board and tubing such that a matching color variation may be supplied should more significant repairs be needed or to provide matching handrails exist as a result of remodeling.

As seen in reference to Figure 1 and Figure 6, curved board portions 22 and curved tube segments 32 may be provided to allow for turns along hallways as well stairwells. As illustrated in Figure 2, the board units 20 and tube members 30 do not need to have identical length. In fact, it is believe advantageous to have the tube members 30 meeting adjacent pieces of tubing in locations other than where adjacent pieces of board members 20 are engaged. While not separately illustrated, it is an aspect of one embodiment of the present invention to provide for tube members 30 in which adjacent portions of tubing have opposing, slightly different, dimensions so as to allow one length of tubing to interengage in a nested configuration with the adjacent tubing. This minimizes the prominence of the respective seams between tube members and provides for a smoother surface for the handrail.

While the preferred embodiment of the invention uses particle board as the core of the board 20 and 22, it is recognized that the extruded slit pipes 30 and 32 may be adapted for placement on other substrates including natural boards, metal panels, as well as other similar shaped support members which may be made out of plastic or other materials.

Although preferred embodiments of the invention have been described using specific terms, devices, and methods, such description is for illustrative purposes only. The words used are words of description rather than of limitation. It is to be understood that changes and variations may be made by those of ordinary skill in the art without departing from the spirit or the scope of the present invention which is set forth in the following claims. In addition, it should be understood that aspects of the various embodiments may be interchanged, both in whole, or in part. Therefore, the spirit and scope of the

appended claims should not be limited to the description of the preferred versions contained therein.

THAT WHICH IS CLAIMED:

1. A handrail assembly, comprising:

a panel having a face, said panel defining a pair of grooves on opposite sides of said panel;

a sleeve engaging said panel and at least partially disposed within at least a portion of both of said grooves; and

a mounting post engaging said panel, wherein said mounting post is configured for spacing said panel and said sleeve from an object to which said mounting post is attached.

2. The handrail assembly as in claim 1, wherein said panel defines a second pair of grooves on opposite sides of said panel, and further comprising a second sleeve engaging said panel and at least partially disposed within at least a portion of both of said second grooves.

3. The handrail assembly as in claim 1, wherein said sleeve has an arcuate cross-sectional shape and defines a slit, and wherein the outer surface of said sleeve extends circumferentially beyond the inner surface of said sleeve such that the edges defining said slit are angled.

4. The handrail assembly as in claim 1, wherein said face of said panel is flat.

5. The handrail assembly as in claim 1, wherein said face of said panel is curved, and wherein said sleeve is curved.

6. The handrail assembly as in claim 1, wherein said panel is made at least partially of particle board.

7. The handrail assembly as in claim 6, wherein said panel is made at least partially of a thermoplastic polymer laminate that engages said particle board and forms said face.

8. The handrail assembly as in claim 7, wherein said panel is made at least partially of thermoplastic strips that engage the top wall, bottom wall and at least one edge wall of said particle board.

9. The handrail assembly as in claim 1, wherein said sleeve defines a slit that has a width that is substantially the same as the width of said panel between said pair of grooves.

10. A handrail assembly, comprising:

a plurality of panels, wherein each of said panels has a face; and

a plurality of sleeves engaging said panels such that at least one of said sleeves engages at least two of said panels, wherein said sleeves engage said panels so as to at least partially cover the tops and bottoms of said panels.

11. The handrail assembly as in claim 10, wherein said panels define a first pair of grooves on opposite sides of said panels and wherein at least one of said sleeves is at least partially disposed within at least a portion of both of said first pair of grooves; and

wherein said panels define a second pair of grooves on opposite sides of said panels and wherein at least one of said sleeves is at least partially disposed within at least a portion of both of said second pair of grooves.

12. The handrail assembly as in claim 10, wherein said face of at least one of said panels is flat, and wherein said face of at least one of said panels is curved.

13. The handrail assembly as in claim 10, further comprising a plurality of mounting posts engaging said panels, wherein said mounting posts are configured for spacing said panels and said sleeves from an object to which said mounting posts are attached.

14. The handrail assembly as in claim 10, wherein said panels are made of particle board and a thermoplastic polymer laminate that engages said particle board and forms said face of said panels.

15. A handrail assembly, comprising:

a substantially flat panel defining a first pair of grooves on opposite sides of a panel and extending equidistance from an upper edge of said panel, said panel defining a second pair of grooves positioned on opposite sides of said panel and extending equidistance from a lower edge of said panel;

a first arcuate sleeve adapted for placement within said first pair of grooves; and

a second arcuate sleeve adapted for placement within said second pair of grooves;

wherein, when said sleeves are positioned in said panel a handrail is provided.

16. The handrail assembly as in claim 15, further comprising a mounting post that engages said panel, wherein said mounting post is configured for spacing said panel and said sleeves from an object to which said mounting post is attached.

17. The handrail assembly as in claim 15, wherein said first arcuate sleeve and said second arcuate sleeve engage said panel and extend beyond a side edge of said panel.

18. The handrail assembly as in claim 15, wherein said panel is made of particle board and a thermoplastic polymer laminate that engages said particle board.

19. The handrail assembly as in claim 15, wherein said first and second arcuate sleeves each defines a slit, and wherein the outer surfaces of said first and second arcuate sleeves extend circumferentially beyond the inner

surfaces of said first and second arcuate sleeves such that the edges defining said slits are angled.

20. The handrail assembly as in claim 15, wherein said first arcuate sleeve and said second arcuate sleeve each define a slit that has a width that is substantially the same as the width of said panel between said first pair of grooves and said second pair of grooves.

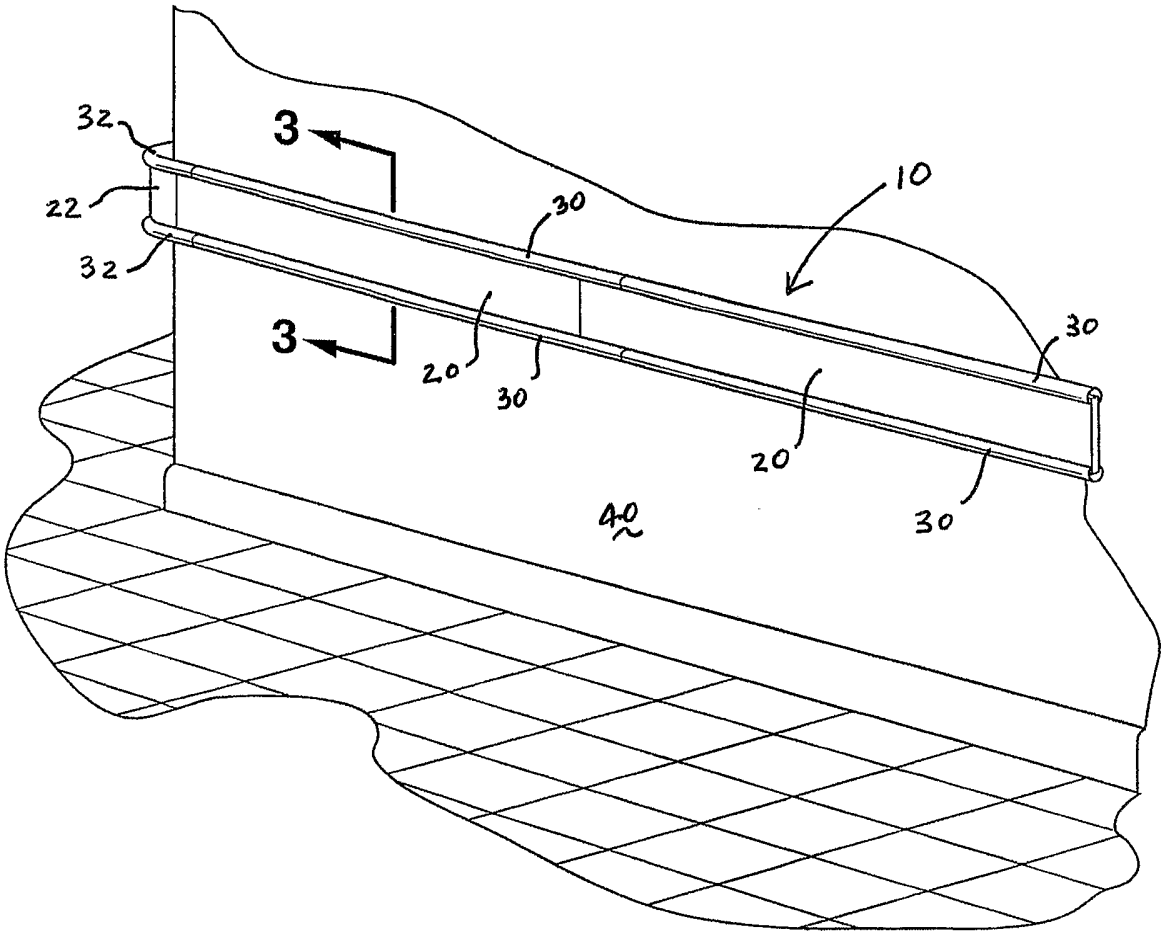
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FIG. 1

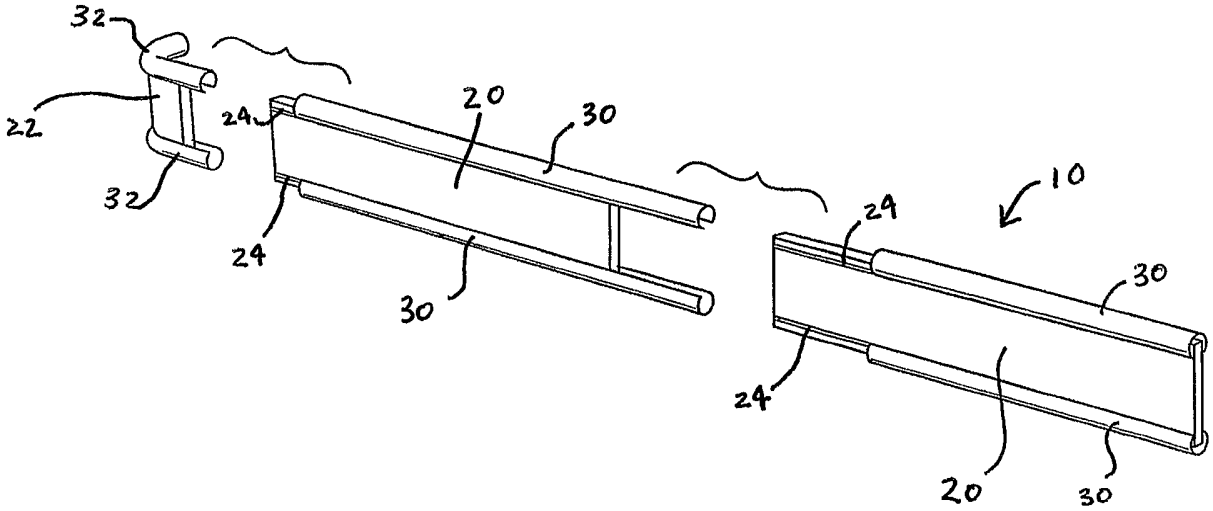
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FIG. 2

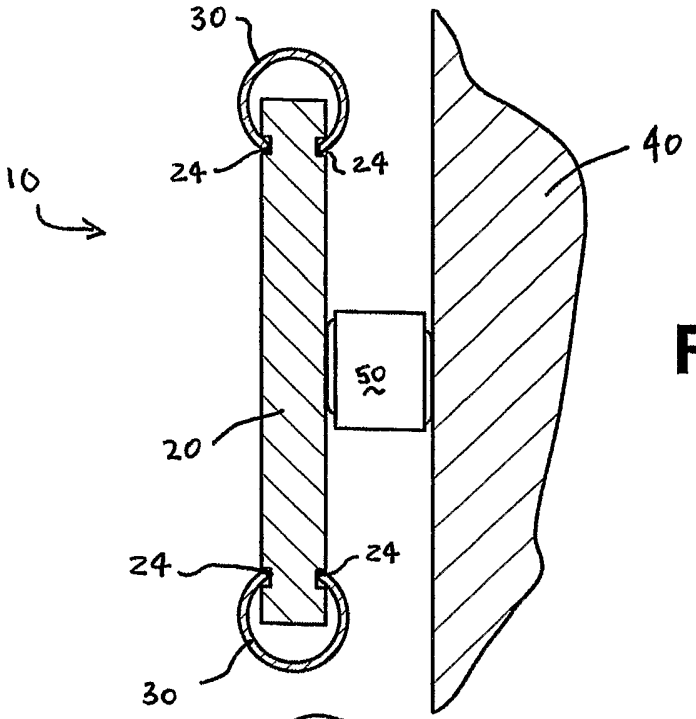

FIG. 3

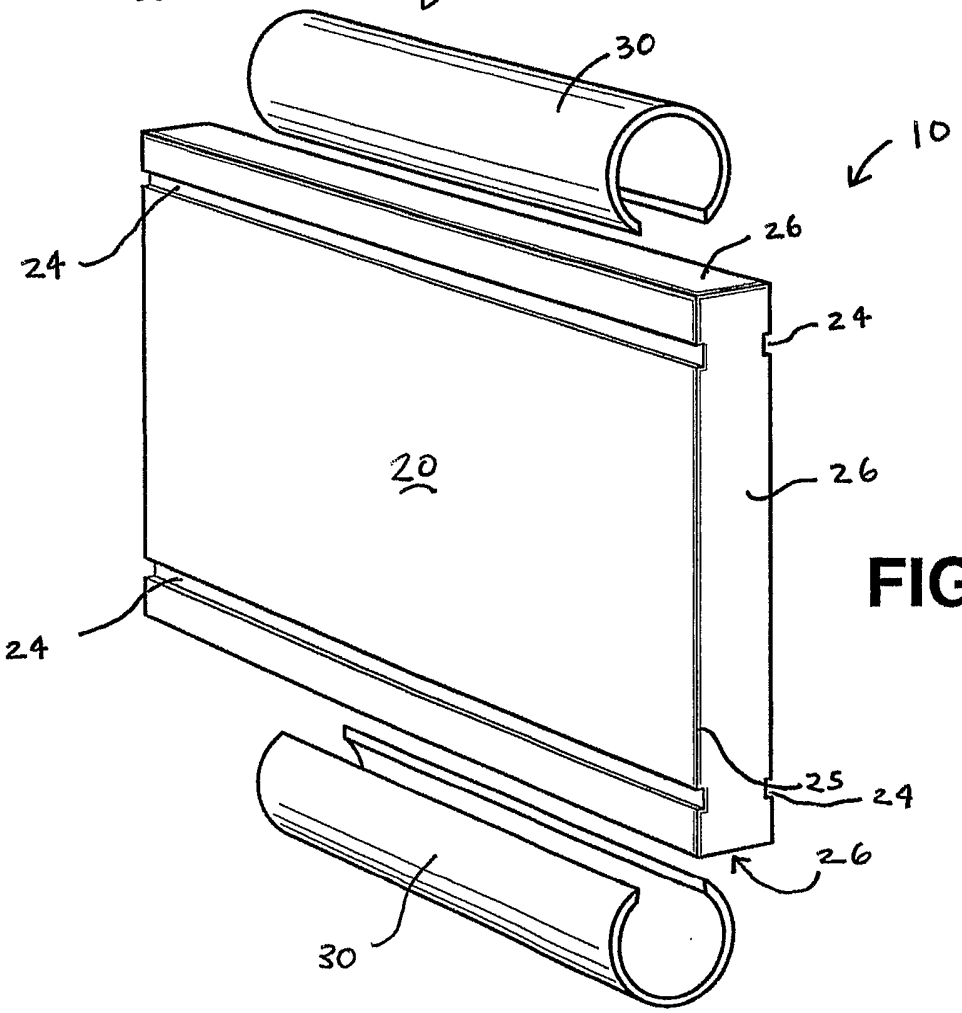

FIG. 4

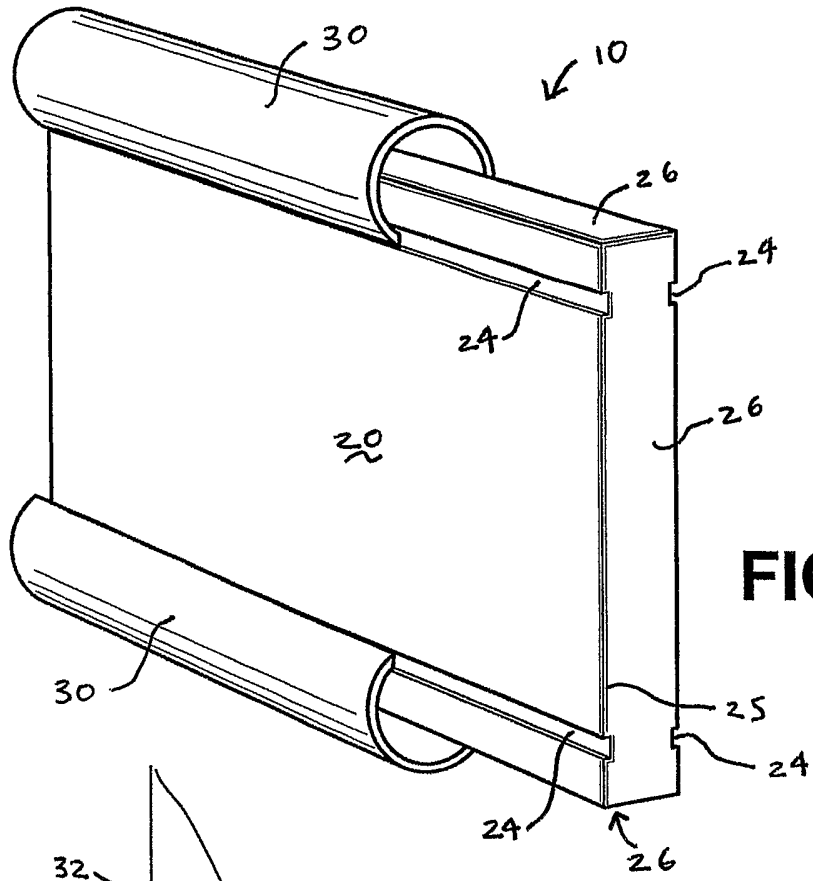

FIG. 5

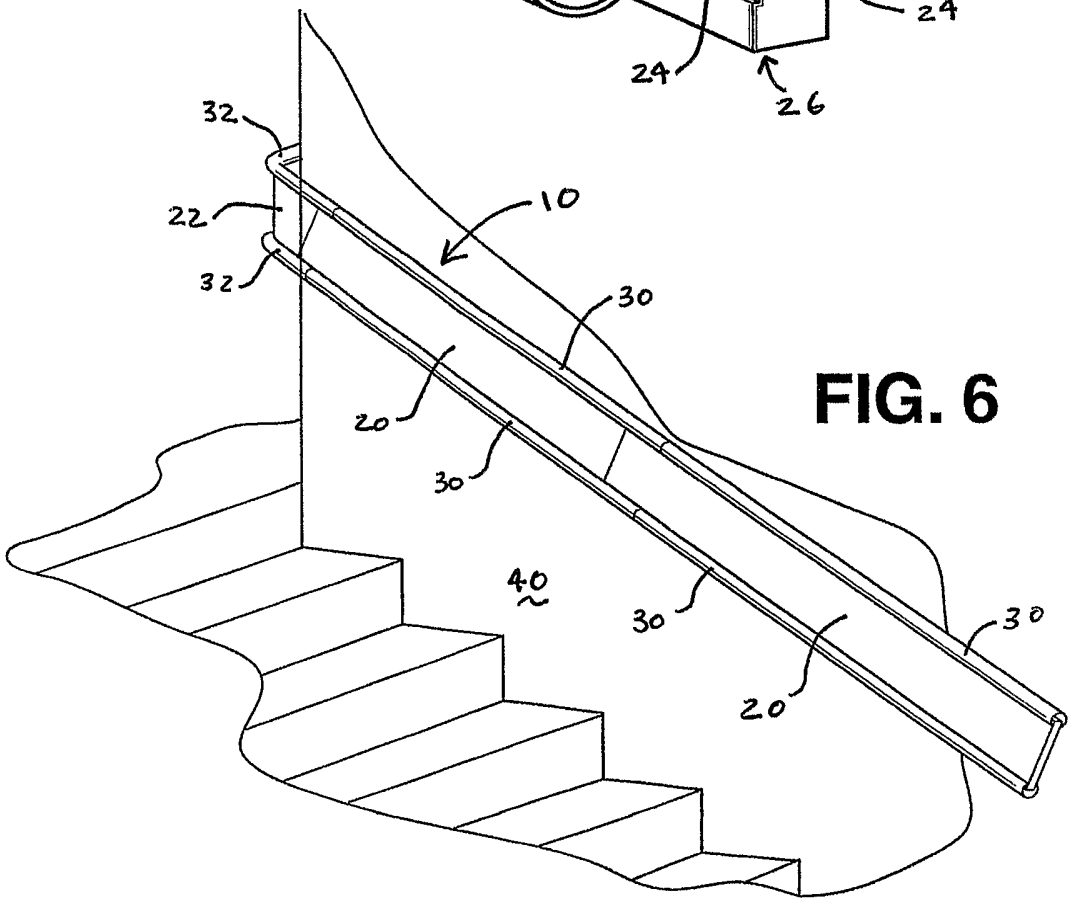

FIG. 6