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Eickhof

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(54) **CONCEALED MOUNTING SYSTEM FOR COLUMBARIUM SHUTTERS AND THE LIKE**

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(73) Assignee: **Eickhof Columbaria, Inc.**, Crookston, MN (US)

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E04H 13/00 (2006.01)

(52) **U.S. Cl.** **52/134**; 52/128; 52/133; 52/136; 52/139; 52/483.1; 52/510; 52/511; 52/513

(58) **Field of Classification Search** 52/128, 52/133, 134, 136, 139, 483.1, 510, 511, 513; 312/265.5, 265.6, 140, 245
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,300,173	A		4/1919	Kennedy
1,691,568	A		11/1928	Gorman
2,814,942	A		12/1957	Sinner et al.
3,319,983	A		5/1967	Zibell
3,342,005	A		9/1967	Rickards et al.
3,350,830	A		11/1967	Smith, Jr. et al.
3,465,996	A		9/1969	Von Wedel
3,550,337	A		12/1970	Lorenz
3,561,182	A	*	2/1971	Madl 52/479
3,621,635	A		11/1971	De Lange
3,778,942	A		12/1973	Bondi
3,834,099	A		9/1974	Haeussler
3,888,055	A	*	6/1975	Gallo 52/98
3,897,663	A		8/1975	Gaul
3,905,169	A		9/1975	Gallo
3,990,199	A		11/1976	Gallo
4,020,610	A		5/1977	Alexander
4,064,664	A		12/1977	Gaul
4,292,779	A		10/1981	Landheer
4,523,413	A		6/1985	Koppenberg
4,644,711	A	*	2/1987	Eickhof 52/127.11

(Continued)

OTHER PUBLICATIONS

Eickhof Columbaria Inc; Eickhof Design Manual for Custom Built Columbaria; Jan. 1, 2009; pp. 1-63.

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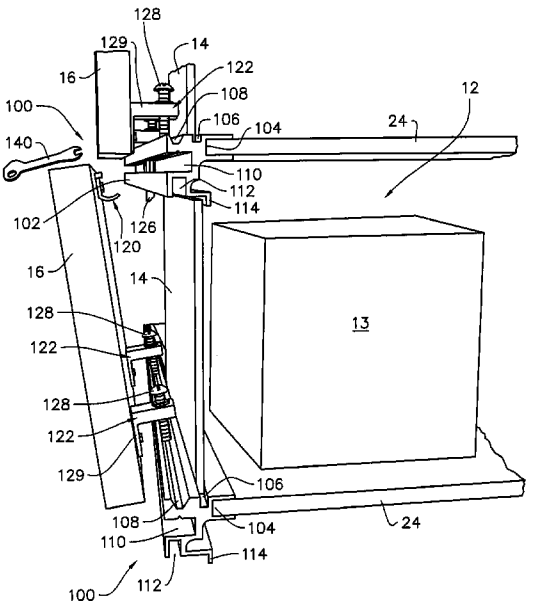
(57) **ABSTRACT**

A concealed mounting system for columbarium shutters and the like. The mounting system includes a top clip and bottom hangers secured to a back side of the shutter. Vertically spaced upper and lower tracks are disposed behind the shutter at its upper end and a lower end. Each track includes a forwardly extending channel and a downwardly extending channel. A locking screw is received within apertures disposed substantially perpendicular to the forwardly extending channel. A nut threadably receives the locking screw and is disposed in the forwardly extending channel, whereby upon rotation of the nut, the locking screw is caused to move vertically with respect to a bottom edge of the upper track for engagement and disengagement with the top clip. The bottom hangers are operably supported by the lower track.

13 Claims, 7 Drawing Sheets



U.S. PATENT DOCUMENTS

5,195,812	A *	3/1993	Eickhof	312/257.1
5,477,594	A	12/1995	LePage	
D395,121	S	6/1998	Eickhof	
5,802,781	A	9/1998	Eickhof	
5,979,124	A	11/1999	Branan	
6,513,352	B1	2/2003	Mainville	
6,564,514	B1	5/2003	Rickards	
7,043,884	B2	5/2006	Moreno	
7,108,141	B2	9/2006	Gonzalex-Rivera	
2005/0005557	A1	1/2005	Bartman et al.	

* cited by examiner

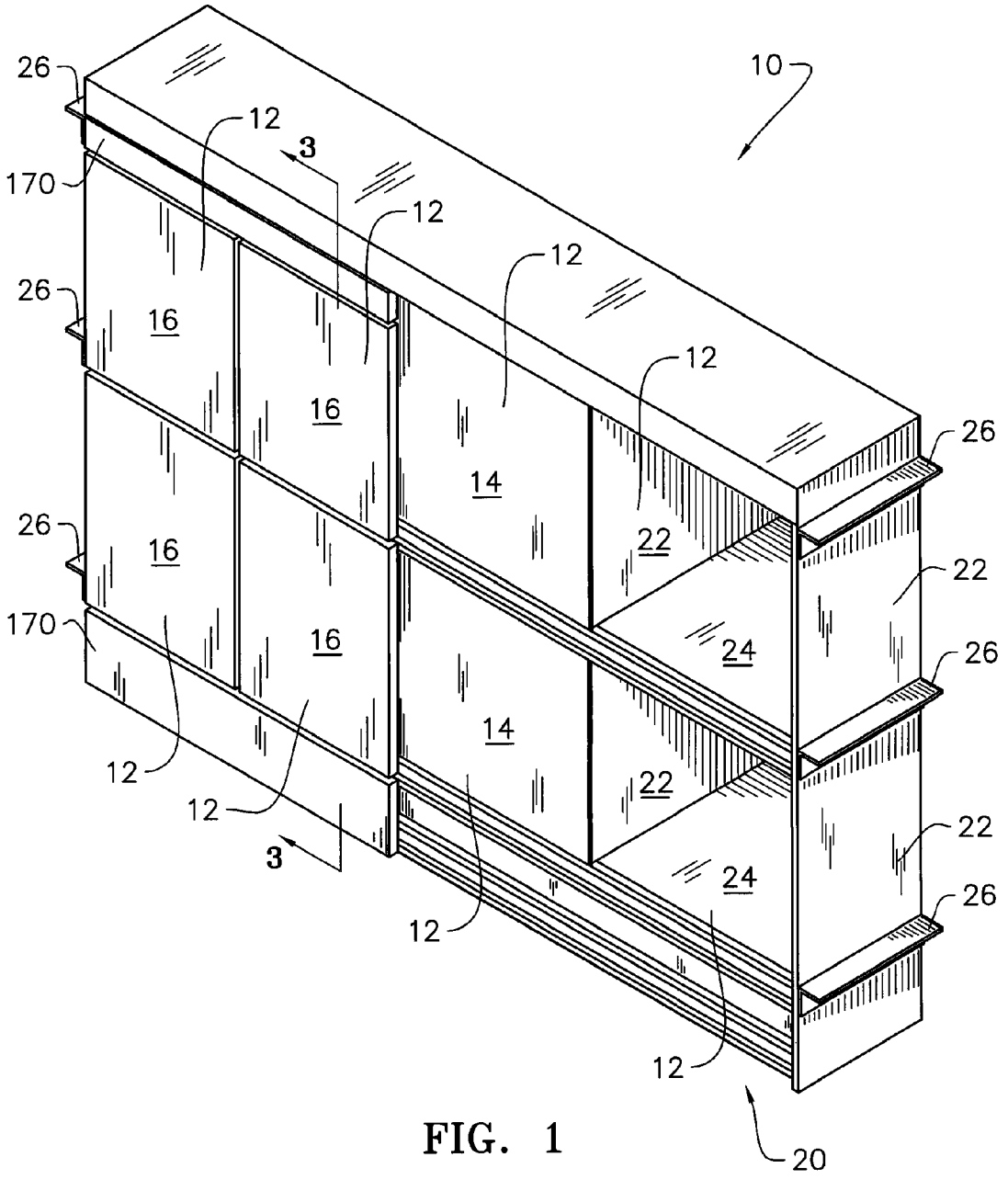

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FIG. 1

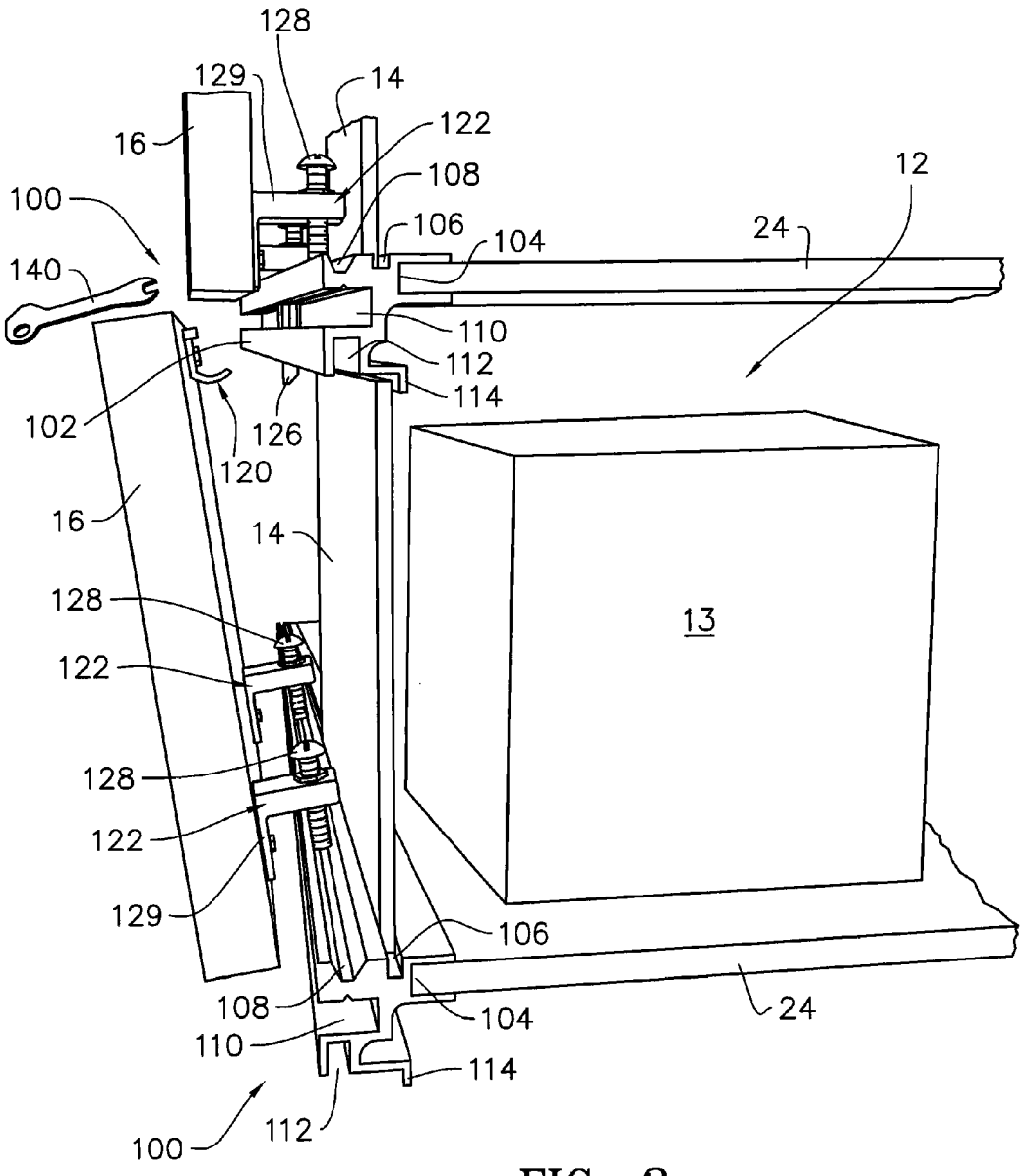
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FIG. 2

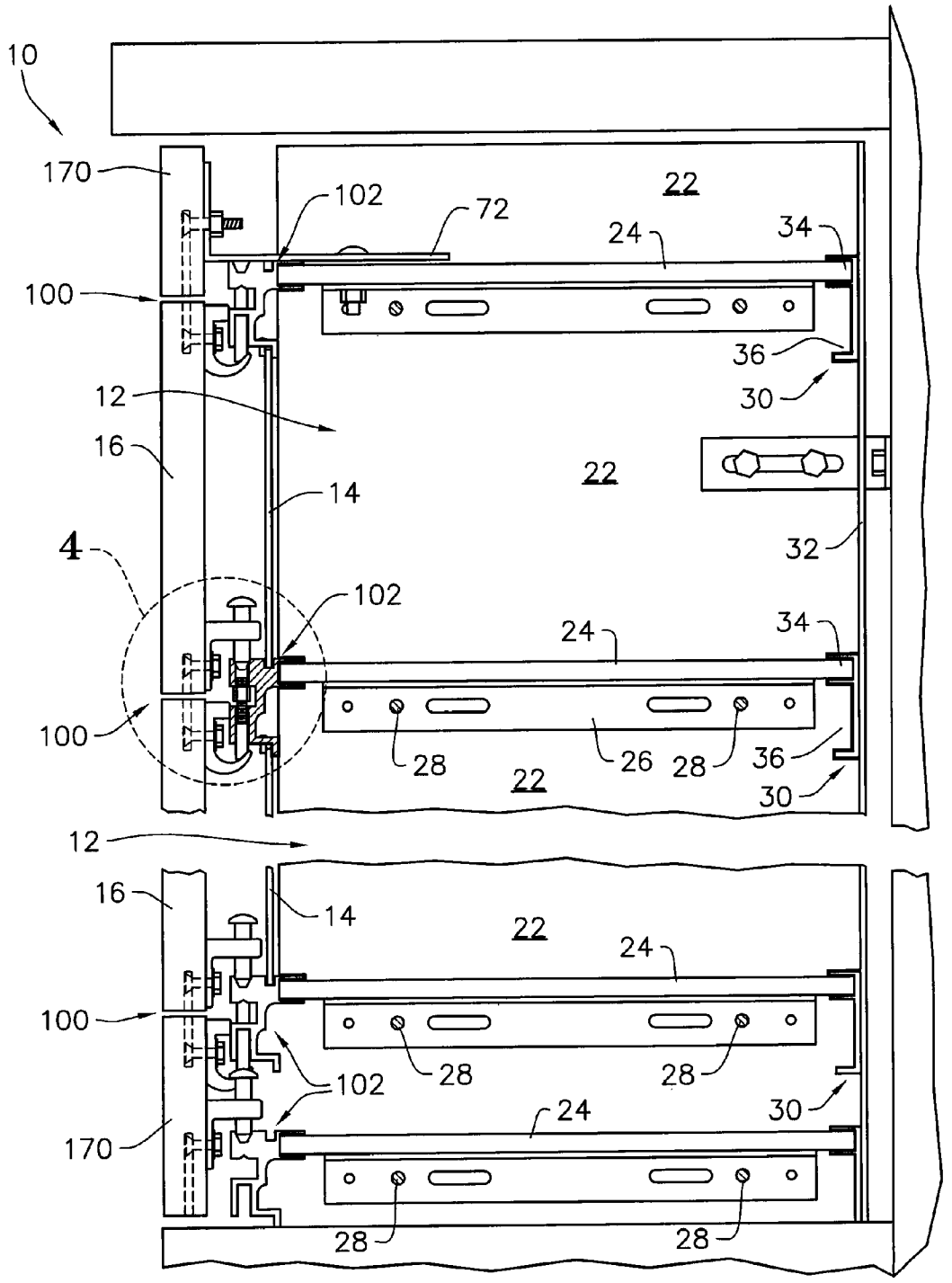
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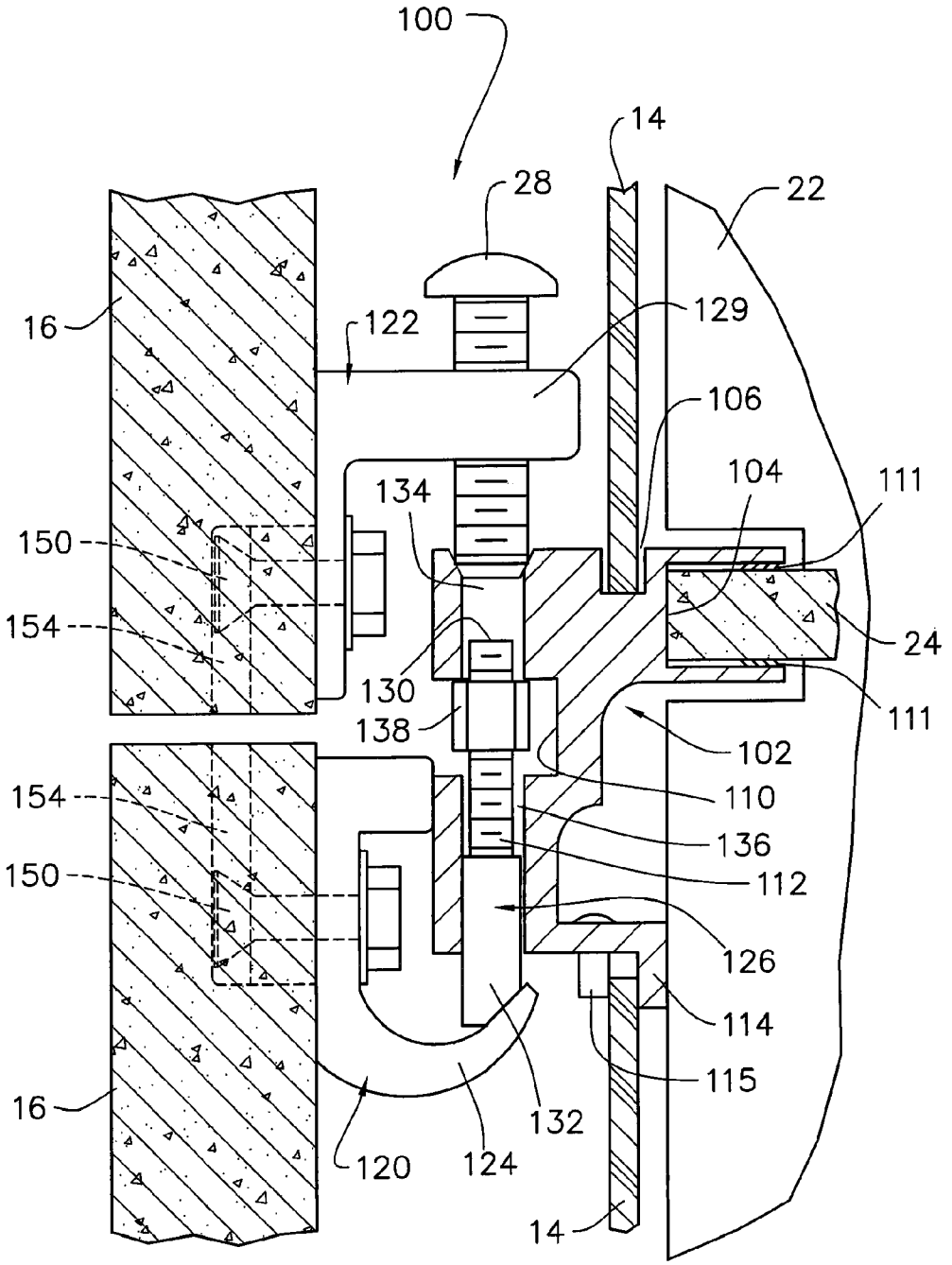
FIG. 3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16
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FIG. 4

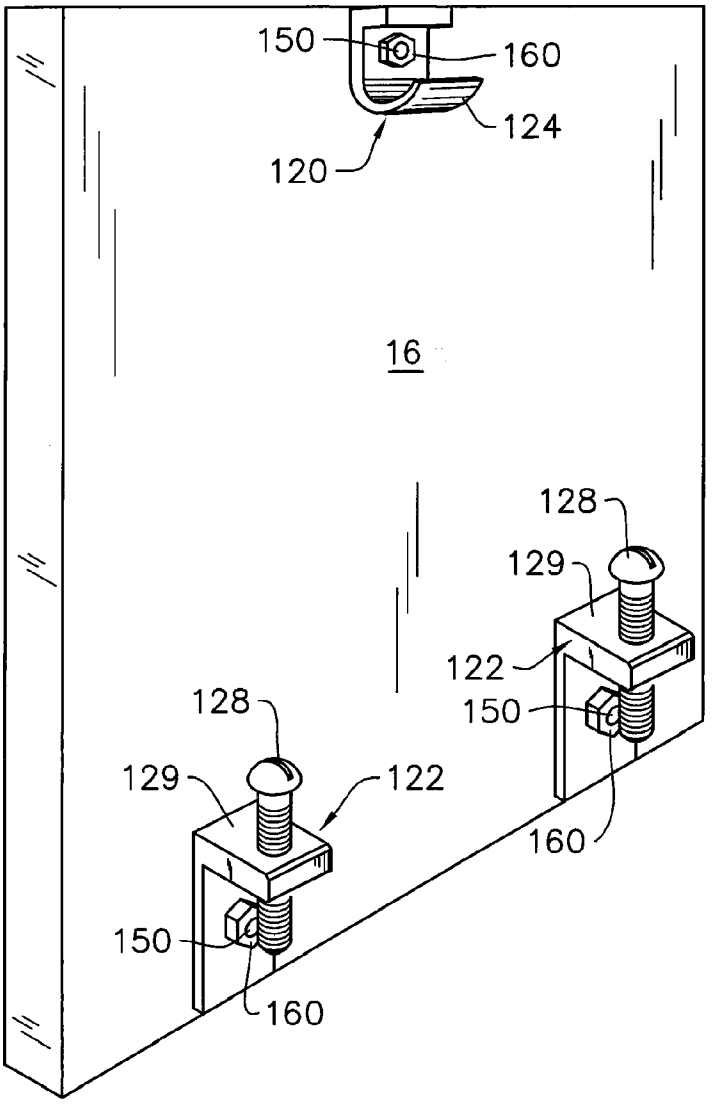

FIG. 5

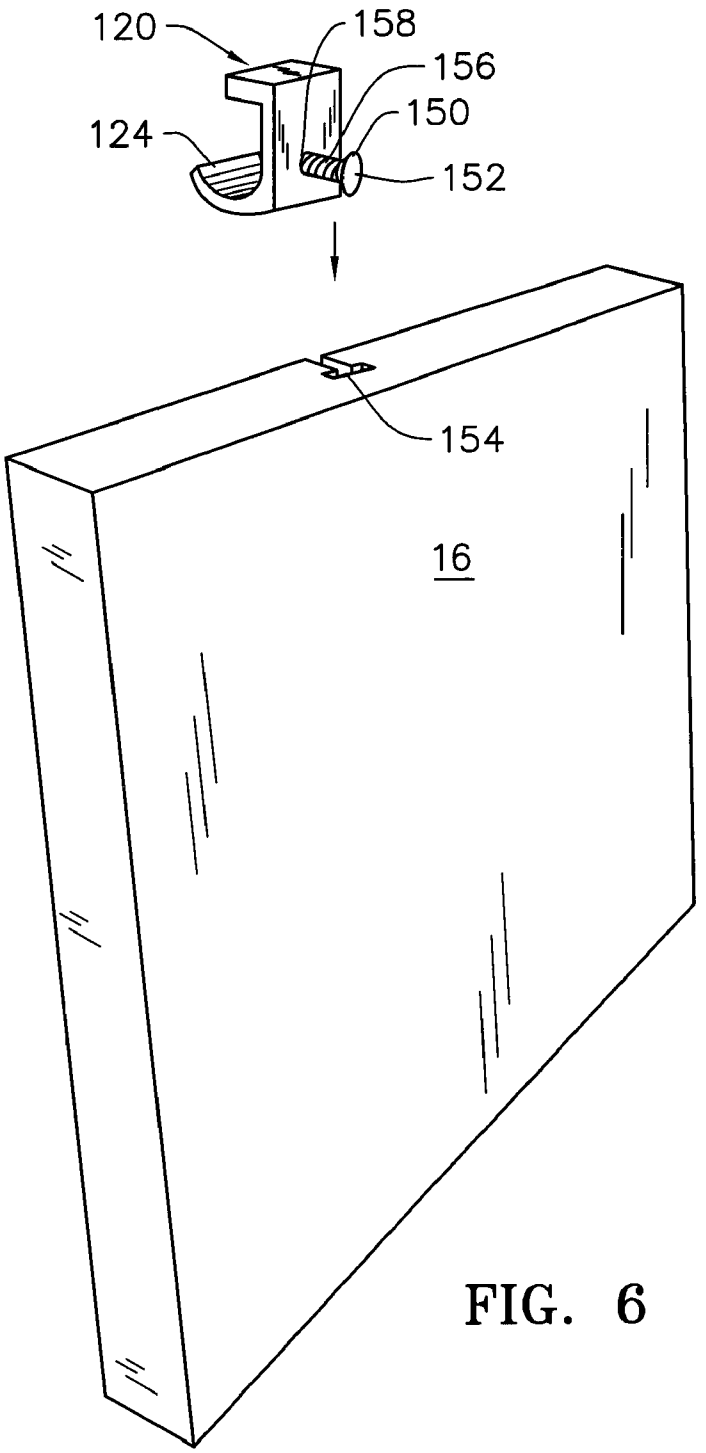

FIG. 6

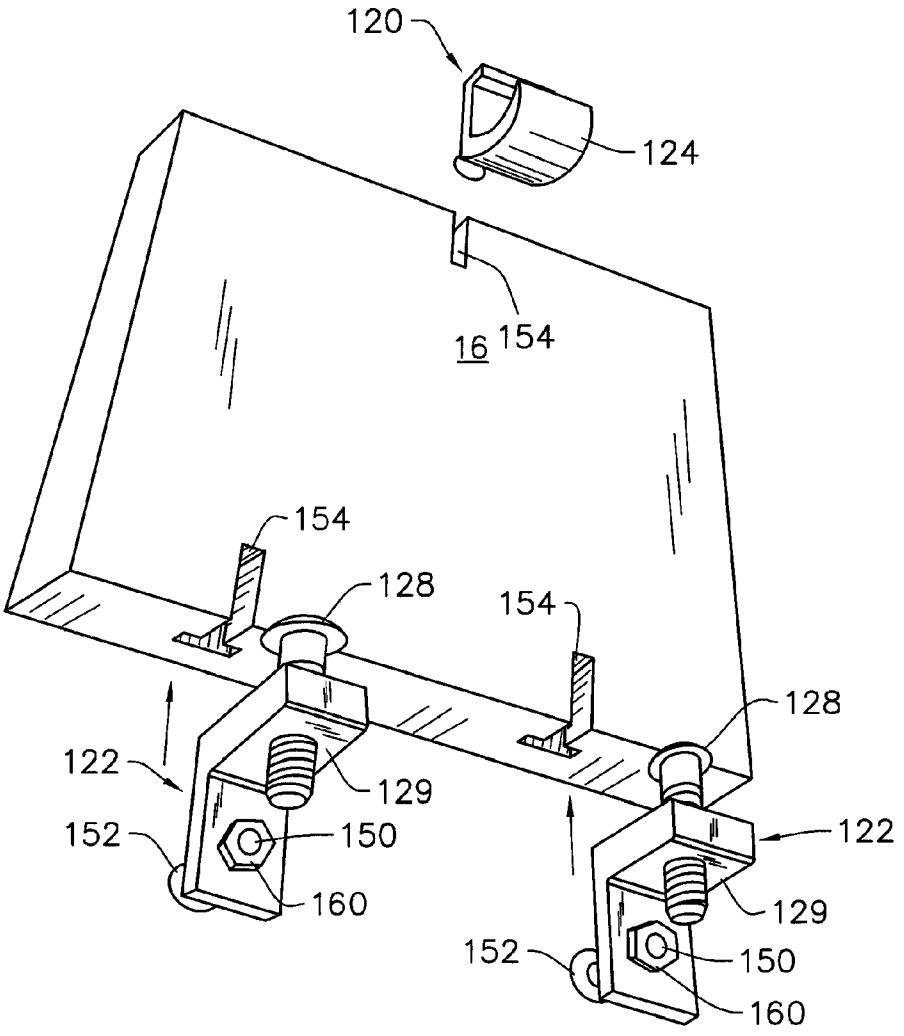
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FIG. 7

CONCEALED MOUNTING SYSTEM FOR COLUMBARIUM SHUTTERS AND THE LIKE

BACKGROUND

Stone shutters are removably secured to columbarium structures by a mounting system that is preferably substantially concealed or substantially hidden from view so as not to detract from the appearance of the stone and the reverent atmosphere of the columbarium. The concealed mounting system must resist corrosion and it must securely hold the shutters in position despite extreme temperature swings and countless freeze-thaw cycles for season-after-season and year-after-year, for decades, if not centuries. In addition, the mounting system must permit the shutters to be relatively easily removed and replaced even after years or decades of being exposed to the elements.

U.S. Pat. No. 4,6108,711 to Eickhof discloses one type of concealed shutter mounting system that meets all of the foregoing challenges. Variations of the Eickhof '711 concealed shutter mounting system have achieved significant commercial success in the columbarium industry. However, a simpler and more cost effective concealed fastener system is needed in view of the recent trend away from using large 24"×24" stone panels and toward the use of 8"×8" individual niche shutters. The terms shutter, panel, slab and facing stone are used interchangeably throughout this specification.

A standard columbarium niche is 8"×8". Until relatively recently, it was common to use 24"×24" stone slabs with false joints cut into the finish face of the stone slab to simulate nine 8"×8" individual niche shutters. Each of the nine 8"×8" spaces on the large panel is typically engraved with a the name, birth year and death year of the deceased person whose urn resides behind that 8"×8" space. Thus, each time an urn is to be placed into one of the nine niches, or each time one of the nine niches is to be engraved, the entire 24"×24" stone panel has to be removed and then replaced. A typical 24"×24" stone panel weighs about sixty pounds. Because of the potential for misspelling of names or errors in the birth or death dates during each time the panel is engraved, it is not uncommon to have to discard and replace an entire panel due to a single mistake made when engraving one of the nine niches. Accordingly, it should be appreciated that large panels are not only difficult to handle by a single person due to their size and weight, but the use of large panels can be expensive if the panels need to be replaced due to engraving errors.

As a result of the foregoing concerns with the use of 24"×24" panels, a relatively recent trend in the columbarium industry is to use 8"×8" individual niche panels. These smaller panels are easier to handle during initial installation and when they need to be subsequently removed for engraving or when placing an urn within the niche. If there is ever an engraving error, only the single 8"×8" panel needs to be replaced instead of the entire 24"×24" panel. It should be appreciated, however, that when going from one large panel to nine smaller individual panels, all other things being equal, the amount of individual hardware pieces required to mount the panels will necessarily increase as will the amount of material costs and labor costs associated with the initial assembly of the panels and the initial mounting of the panels.

Accordingly, there is a need in the industry for a universal concealed mounting system capable of use with virtually any size columbarium shutters, but which has fewer pieces and is quicker and easier to assemble and install then currently available mounting systems in order to reduce material costs and labor costs so that even the use of smaller individual 8"×8" shutters is at least as cost effective as using larger 24"×24" panels mounted with currently available mounting systems.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a columbarium comprising a plurality of niches, wherein some of the niches are open, some are shown with inner closure panels disposed over the front opening, and other niches are shown with shutters mounted utilizing an embodiment of the concealed mounting system of the present invention.

FIG. **2** is partial side perspective view of the columbarium of FIG. **1** showing a detailed view of the preferred embodiment of the concealed fastener system.

FIG. **3** is a cross-sectional view of the columbarium of FIG. **1** as viewed along lines **3-3**.

FIG. **4** is an enlarged view of the area circled in FIG. **3** showing the preferred embodiment of the concealed fastener system.

FIG. **5** is a rear perspective view of a shutter illustrating the hardware fastened to the back side of the shutter.

FIG. **6** is a top front perspective view of the shutter of FIG. **5** illustrating slots fabricated into the back side of the shutter to receive the anchors.

FIG. **7** is a bottom rear perspective view of the shutter of FIG. **5** illustrating slots fabricated into the back side of the shutter to receive the anchors.

DESCRIPTION

Referring now to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, FIG. **1** is a perspective view of a columbarium **10** comprising a plurality of niches **12** within which one or more urns **13** (FIG. **2**) may be placed. Some of the niches are shown open, some are shown with inner closure panels **14** disposed over the niche opening, and other niches **12** are shown with shutters or facing stones **16** secured over the closure panels **14** utilizing a concealed fastener system **100** as described in detail later.

The columbarium **10** preferably comprises a framework **20** of horizontally spaced, vertical, planar risers **22** and vertically spaced, horizontal, planar shelves **24**. As disclosed in U.S. Pat. No. 5,195,812 to Eickhof, which is incorporated herein in its entirety by reference, shelf brackets **26** and tie rods **28** (FIG. **3**) secure the vertical risers **22** and horizontal shelves **24** in spaced relation to define a grid of a plurality of niches **12**. As best illustrated in FIG. **3**, back rails **30** are preferably secured by connectors to a back panel **32** covering the back side of the framework **20**.

The back rail **30** is preferably an E-shaped extrusion, forming forwardly extending upper and lower channels **34**, **36**. The upper channel **34** is preferably sized to frictionally receive the back edge of the shelf **24**. Serrations or ridges (not shown) may be formed in the legs of the upper channel **34** for improved frictional engagement with the shelf edge. The framework **20** is typically secured to a wall or other structure with brackets and anchors or other connectors in a conventional manner.

A preferred embodiment of the concealed mounting system **100** is best illustrated in FIGS. **2-4**. The concealed mounting system **100** includes a front track **102** that cooperates with hardware (discussed later) secured to the back side of the shutters **16**. The preferred embodiment of the front track **102** includes a rearwardly extending channel **104**, a top slot **106**, a top groove **108**, a forwardly extending channel **110**, a down-

wardly extending channel **112** and an L-shaped flange **114**. The rearwardly extending channel **104** is preferably sized to frictionally receive the front edge of the horizontal shelf **24**. Serrations or ridges **111** (FIG. **4**) may be formed in the upper channel **104** for improved frictional engagement with the shelf edge. As best illustrated in FIG. **3**, when two front tracks **102** are disposed in vertical spaced relation, the top slot **106** of the lower front track **102** and the L-shaped flange **114** of the upper front track **102** receive and support the inner closure panels **14**. As best illustrated in FIG. **4**, the inner closure panels **14** are retained against the L-shaped flange preferably by spring-loaded pegs **115** or other suitable retention means spaced along the L-shaped flange **114**.

Referring to FIGS. **2-5**, preferably secured to the back side of the shutters **16** is an upper clip **120** and two lower support hangers **122**. The upper clip **120** preferably includes an upwardly curving hook **124** that receives and is engaged by a vertically adjustable locking screw **126** (FIG. **4**) that adjustably extends downwardly from the downwardly extending channel **112** (described in greater detail later). The locking screws **126** are preferably spaced along the length of the front tracks **102** at approximately the horizontal midpoint of each niche **12**. The lower support hangers **122** preferably include downwardly extending, vertically adjustable threaded studs **128** threadably received by angle brackets **129**. The bottom ends of the studs **128** rest within the top groove **108** vertically supporting the shutter **16**. Thus it should be appreciated that by threadably adjusting the locking screw **126** and the threaded studs **128**, the vertical height of the shutter **16** may be adjusted horizontally and leveled to ensure uniform gaps between adjacent shutters covering adjacent niches **12** for a more pleasing aesthetic appearance.

With reference to FIGS. **2** and **4**, the locking screw **126** preferably includes a threaded upper shaft **130** and a rectangular lower shaft **132**. The threaded upper shaft **130** passes through apertures **134**, **136** extending through both the top groove **108** and the downwardly extending channel **112**, respectively. The threaded upper shaft **130** is threadably received by a nut **138** disposed within the forwardly extending channel **110**. The nut **138** is larger than the diameter of the apertures **134**, **136** such that the locking screw **126** is vertically supported within the forwardly extending channel **110** by the nut **138**. The width of the rectangular lower shaft **132** of the locking screw is preferably only slightly less than the width between the legs of the downwardly extending channel **112** such that rectangular lower shaft **132** prevents the locking screw **126** from rotating within the channel **112**. As illustrated in FIGS. **2** and **4**, the nut **138** is accessible for rotation by an open end wrench **140** (FIG. **2**) inserted in the gap between vertically adjacent shutters **16**. It should be appreciated that because the cooperation of the rectangular lower shaft **132** within the downwardly extending channel **112** prevents the locking screw **126** from rotating, upon turning the nut **138** clockwise using the wrench **140**, the locking screw **126** is caused to move downwardly allowing the end of the rectangular lower shaft **132** to engage the upwardly curving hook **124** of the upper clip **122**. Likewise, by rotating the nut **138** counter-clockwise using the wrench **140**, the locking screw **126** is caused to move upwardly thereby disengaging the end of the rectangular lower shaft **132** from the upper clip **122** and allowing the shutter **16** to be easily removed for access to the niche **12**. The end of the rectangular lower shaft **132** is preferably beveled to better mate with the upwardly curving hook **124**.

It should be appreciated that the mounting system **100** allows more versatility than current shutter mounting systems due to the top slot **106**, top groove **108** and channels **110**, **112**, **104** extending the full length of the track **102**. Thus, the locking screws **126** can be positioned anywhere along length of the track **102** simply by drilling a hole in the desired location through the forwardly extending and downwardly extending channels **110**, **112** thereby allowing the clips **120** and hangers **122** on the back of the shutters **16** to have varying positions between adjacent shutters. This versatility will permit different sized niche fronts to be used along the columbarium wall thereby avoiding the post-office-box look that is often created when an entire columbarium wall comprises a grid of 8"×8" shutters. For example, the mounting system **100** will easily allow 8"×8" single niche shutters to be positioned adjacent 8" high×16" wide shutters or vertical 16" high×8" wide shutters or even 24"×24" panels as desired. Accordingly, the mounting system **100** will allow more versatility in the configuration of niche fronts to create embellishments and introduce more and different types of stone mosaic patterns.

The upper clip **120** and lower hangers **122** are preferably secured to the back side of the shutters **16** with threaded anchors **150**. In the preferred embodiment, the heads **152** of the threaded anchors **150** are received within inverted T-shaped slots **154** with the threaded shaft **156** projecting from the face of the stone. The inverted T-shaped slots **154** are preferably formed into the edges of the shutters using the apparatus and methods such as disclosed in U.S. Pat. No. 4,020,610, which is incorporated herein in its entirety by reference. The projecting threaded shafts **156** extend through apertures **158** in the clips and hangers **120**, **122**. Nuts **160** are threaded onto the projecting threaded shafts and are preferably tightened to approximately 95 in-pounds of torque to securely attach the clips and hangers **122** in place and to prevent their rotation.

Referring to FIG. **3**, filler panels **170**, such as soffit panels and bottom panels, may also be mounted using the concealed mounting system **100** where there is adequate space for the front track **102** and where the filler panels **170** are sufficiently large for mounting the clips and hangers **120**, **122**. If space does not permit for utilizing the concealed mounting system **100**, the anchors **150** may still be secured to the back sides of the filler panels **170** using the T-shaped slots **154** to permit the panels to be bolted to an angle **172** or other suitable bracket.

The front track **112**, back rail **30**, anchors **150**, clips **120**, hangers **122**, threaded studs **128**, locking screws **126**, brackets **26** and tie rods **28** are all preferably constructed of corrosion resistant materials, such as brass, stainless steel, aluminum or any other suitable material capable of supporting the loads anticipated for the structure and withstanding extreme environmental conditions. Similarly the risers **22**, shelves **24**, closure panels **14** and back panels **34** are preferably constructed of rigid, durable, weather resistant and corrosion resistant materials, such as cement fiberboard, plastic, aluminum or any other suitable materials capable of supporting the loads and environmental conditions anticipated for the structure as disclosed in U.S. Pat. No. 5,195,812 to Eickhof.

It should be appreciated that the mounting system **100** may have application outside the internment industry where a concealed mounting system is desired for security or aesthetic reasons. For example, the mounting system **100** may be used in building structures that require removable wall panels. Another application may be for removably securing protective panels over windows of buildings or houses for protection from hurricanes or high winds. Other applications may include the commercial sign industry where a concealed hardware is desirable to deter vandals and allow easy change-out of signs, advertisements, tenant directories, etc.

The foregoing description is presented to enable one of ordinary skill in the art to make and use the invention and is

provided in the context of a patent application and its requirements. Various modifications to the preferred embodiment of the apparatus, and the general principles and features of the system and methods described herein will be readily apparent to those of skill in the art. Thus, the present invention is not to be limited to the embodiments of the apparatus, system and methods described above and illustrated in the drawing figures, but is to be accorded the widest scope consistent with the spirit and scope of the appended claims.

The invention claimed is:

1. A columbarium, comprising:

a framework of horizontally spaced, vertical, planar risers and vertically spaced, horizontal, planar shelves, said framework of spaced vertical risers and horizontal shelves defining a plurality of horizontally and vertically spaced niches;

a plurality of elongated front tracks extending along at least a portion of each horizontal shelf, thereby providing an upper front track and a lower front track proximate a top and bottom of each of said niches, each of said front tracks having a forwardly extending elongated channel and a downwardly extending elongated channel;

a plurality of shutters disposed over said plurality of niches, each shutter having a top clip and bottom hangers secured to a back side thereof, said top clip engaged by a vertically adjustable lock screw threadably extendable from said downwardly extending channel of said upper front track, said bottom hangers operably supported by said lower front track.

2. The columbarium of claim **1** wherein each of said plurality of shutters is approximately the size of each of said niches, whereby said shutters are arranged in horizontal rows and vertical columns corresponding to said horizontally and vertically-said spaced niches.

3. The columbarium of claim **1** wherein said plurality of shutters include a first size shutter and a second size shutter, said first size shutter having a size approximately the size of a single one of said plurality of niches, said second size shutter having a size approximately the size of at least two-adjacent shutters.

4. The columbarium of claim **3** wherein said at least two adjacent shutters include horizontally adjacent shutters and vertically adjacent shutters.

5. The columbarium of claim **3** wherein said first size shutters and said second size shutters are combined and arranged in a pattern.

6. The columbarium of claim **1** wherein said framework includes horizontal tie rods extending substantially parallel with said shelves and substantially perpendicular to said risers, said tie rod ends received by shelf brackets extending substantially parallel with said risers and substantially perpendicular to said shelves.

7. The columbarium of claim **1** wherein said risers and shelves comprise cement fiberboard.

8. The columbarium of claim **1** wherein said risers and shelves comprise plastic.

9. The columbarium of claim **1** wherein said risers and shelves comprise aluminum.

10. The columbarium of claim **1** wherein each of said front tracks further include a top groove and said bottom hangers include threadably adjustable studs, wherein a bottom end of said studs are received within said top groove of said lower front track.

11. The columbarium of claim **1** wherein each of said front tracks further includes a rearwardly extending elongated horizontal channel to receive a front edge of said horizontal shelves of said horizontally spaced niches.

12. The columbarium of claim **1** wherein each of said front tracks further includes a top slot and a downwardly extending L-shaped flange in substantial alignment with said top slot, wherein a bottom edge of an inner closure panel is received within said top slot of said lower front track and a top edge of said inner closure panel is received by said downwardly extending L-shaped flange of said upper front track.

13. A columbarium, comprising:

a framework of horizontally spaced, vertical, planar risers and vertically spaced, horizontal, planar shelves, said framework of spaced vertical risers and horizontal shelves defining a plurality of niches arranged in horizontal rows and vertical columns;

a plurality of front tracks extending along at least a portion of each horizontal shelf, thereby providing an upper front track and a lower front track proximate a top and bottom of each niche, each of said front tracks having a forwardly extending channel and a downwardly extending channel;

a plurality of shutters disposed over said plurality of niches, each shutter having a top clip and bottom hangers secured to a back side thereof, said top clip engaged by a vertically adjustable lock screw threadably extendable from said downwardly extending channel of said upper front track, said bottom hangers operably supported by said lower front track;

wherein each of said front tracks further includes a top slot and a downwardly extending L-shaped flange in substantial alignment with said top slot, wherein a bottom edge of an inner closure panel is received within said top slot of said lower' front track and a top edge of said inner closure panel is received by said downwardly extending L-shaped flange of said upper front track.

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.	: 8,122,650 B2
APPLICATION NO.	: 12/476529
DATED	: February 28, 2012
INVENTOR(S)	: Paul M. Eickhof

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Specifications:

Column 1, line 18, "U.S. Pat. No. 4,6108,711" should be changed to --U.S. Pat. No. 4,644,711--

Signed and Sealed this
Thirtieth Day of April, 2013

Teresa Stanek Rea
Acting Director of the United States Patent and Trademark Office