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(54) SHELF SUPPORT SYSTEM

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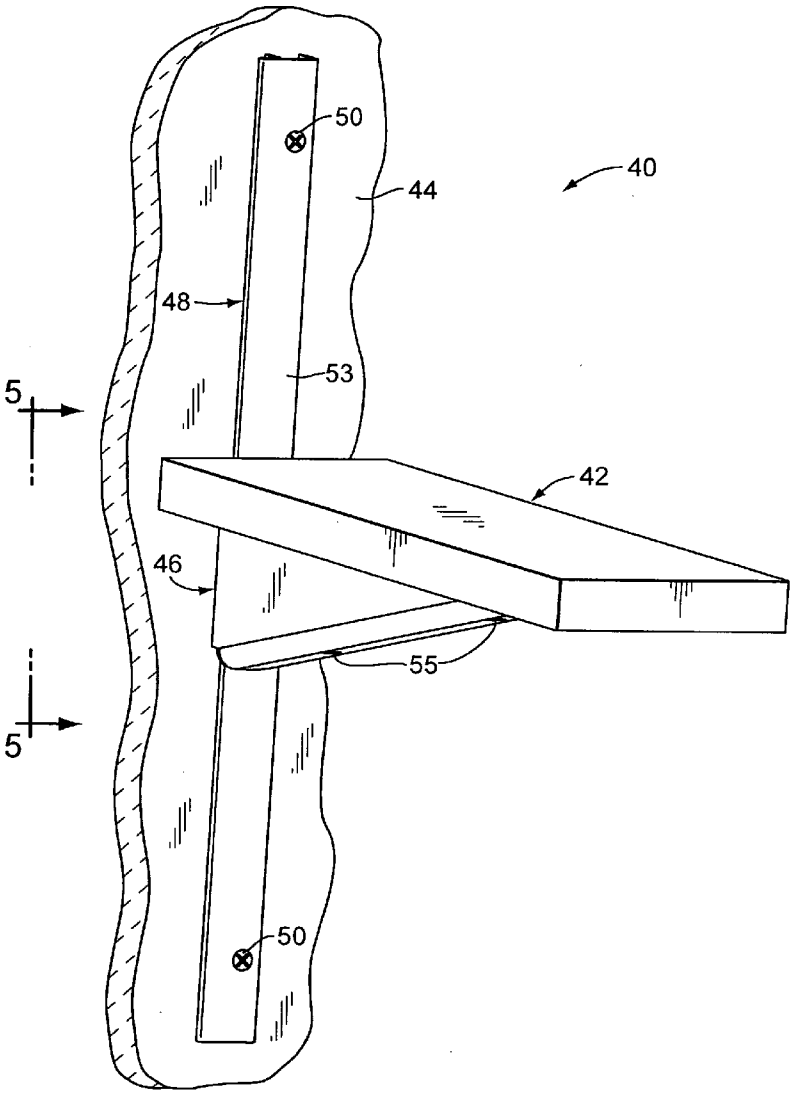
(57) **ABSTRACT**

A shelf support system is provided for supporting one or more shelves at selected elevations on a vertical surface. In one form of the system, a standard is provided with vertically spaced-apart slots which are concealed when the standard is viewed from the front. A shelf support is provided with an attachment portion for fitting into the slots of the standard. In another form of the system, a shelf support is adjustably mounted to a shelf retainer for clamping the shelf between the shelf support and shelf retainer, and the shelf retainer is in turn attached with screws to a hanger which includes an attachment portion for mounting to the slots in the standard on the wall. In another form of the system, the hanger is not used, and an attachment portion is provided at the rear end of the shelf support which is adjustably attached to the shelf retainer and which is mounted directly to the standard.



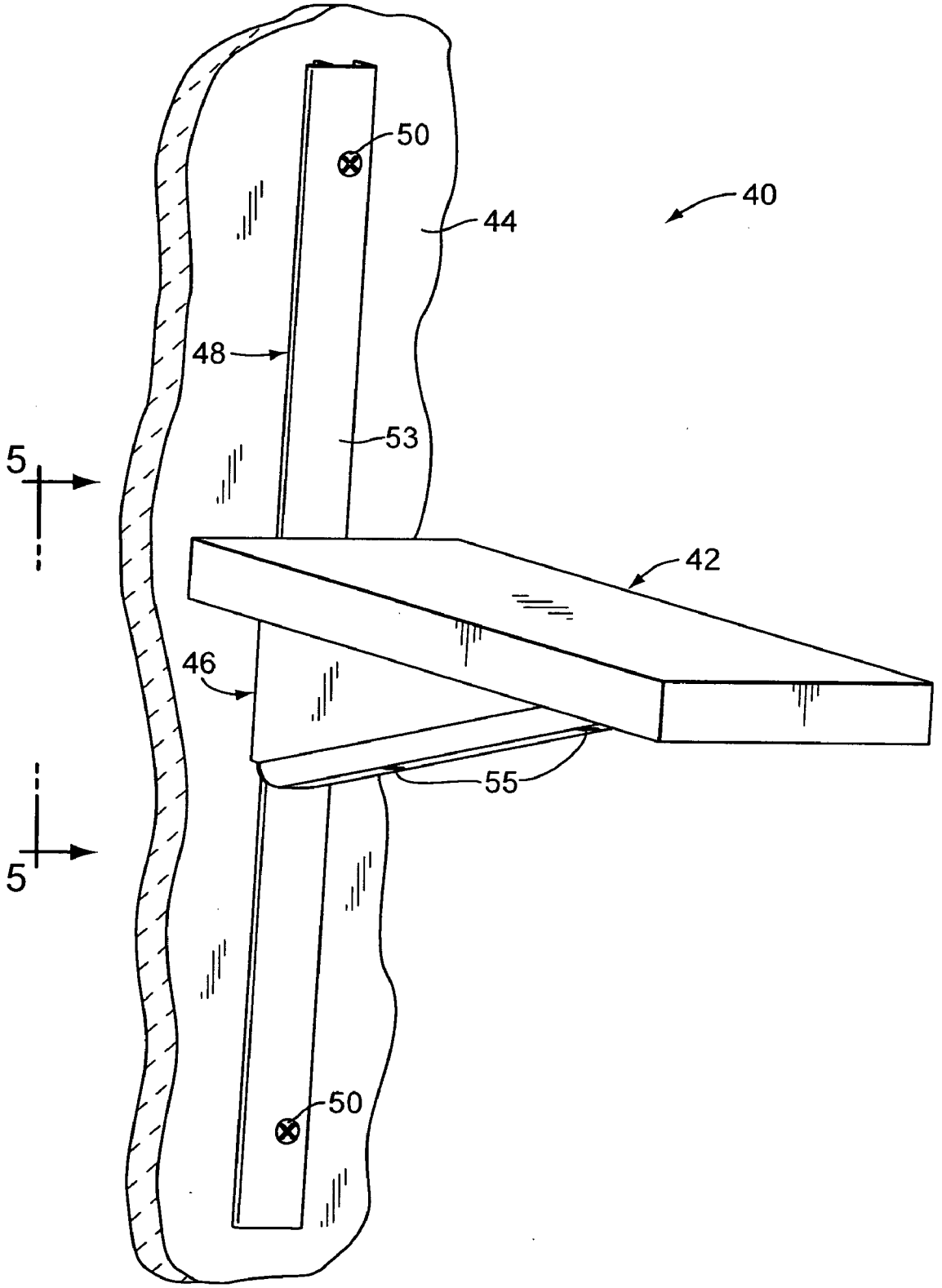


FIG. 1

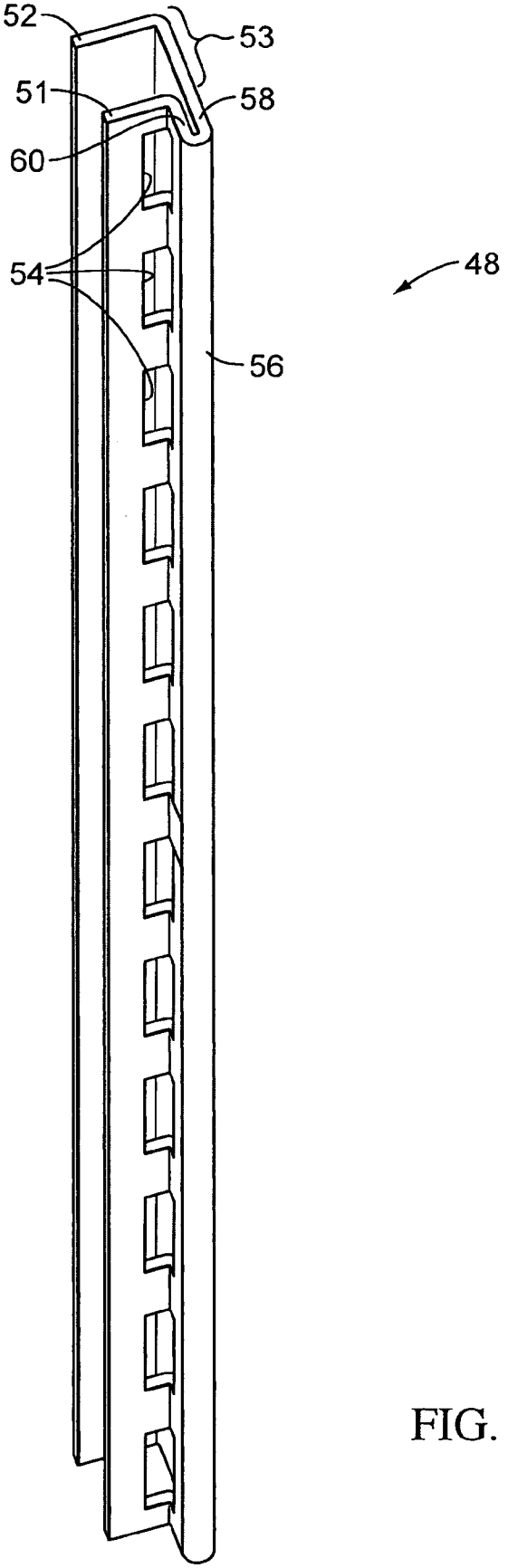


FIG. 2

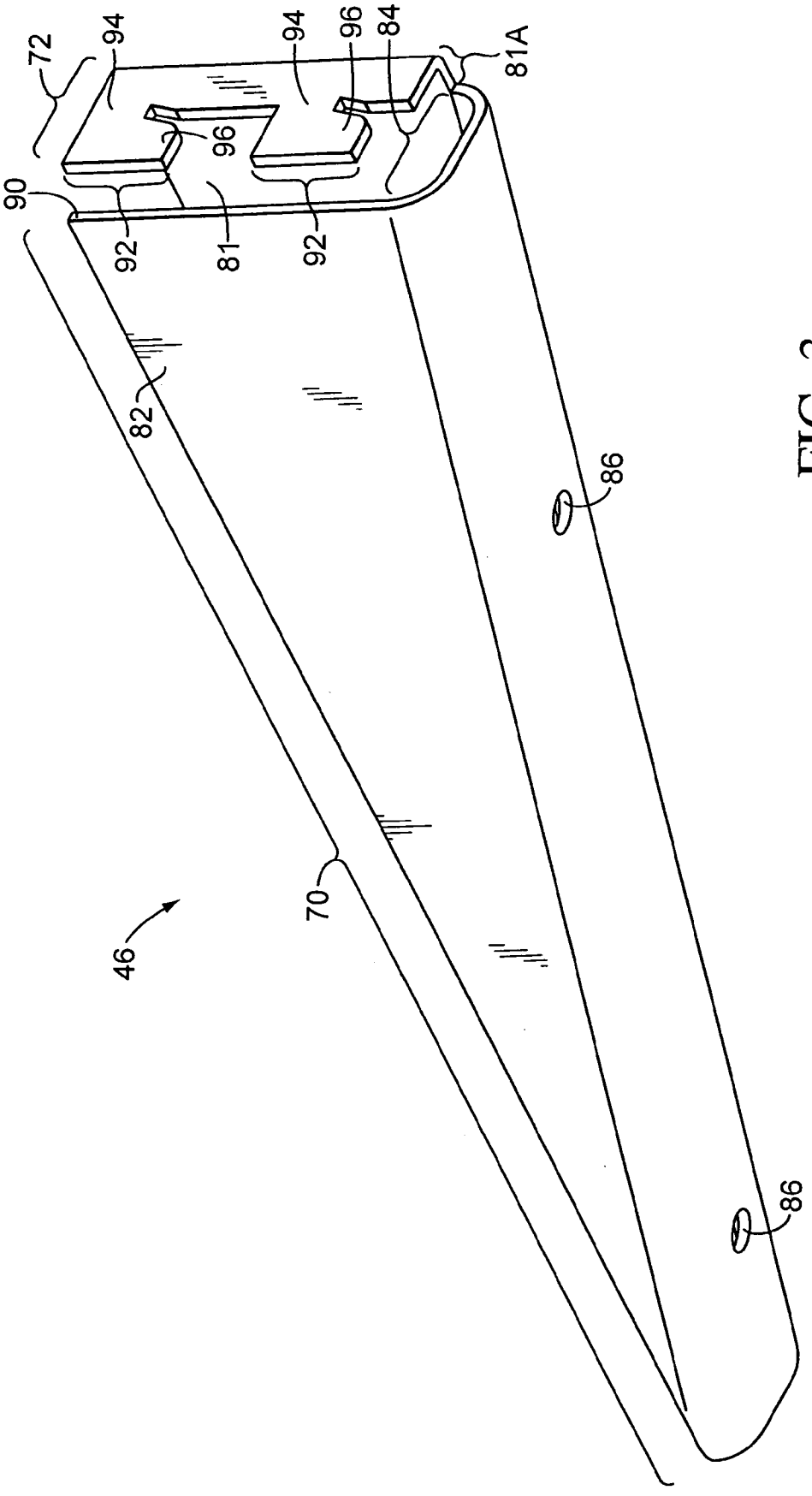
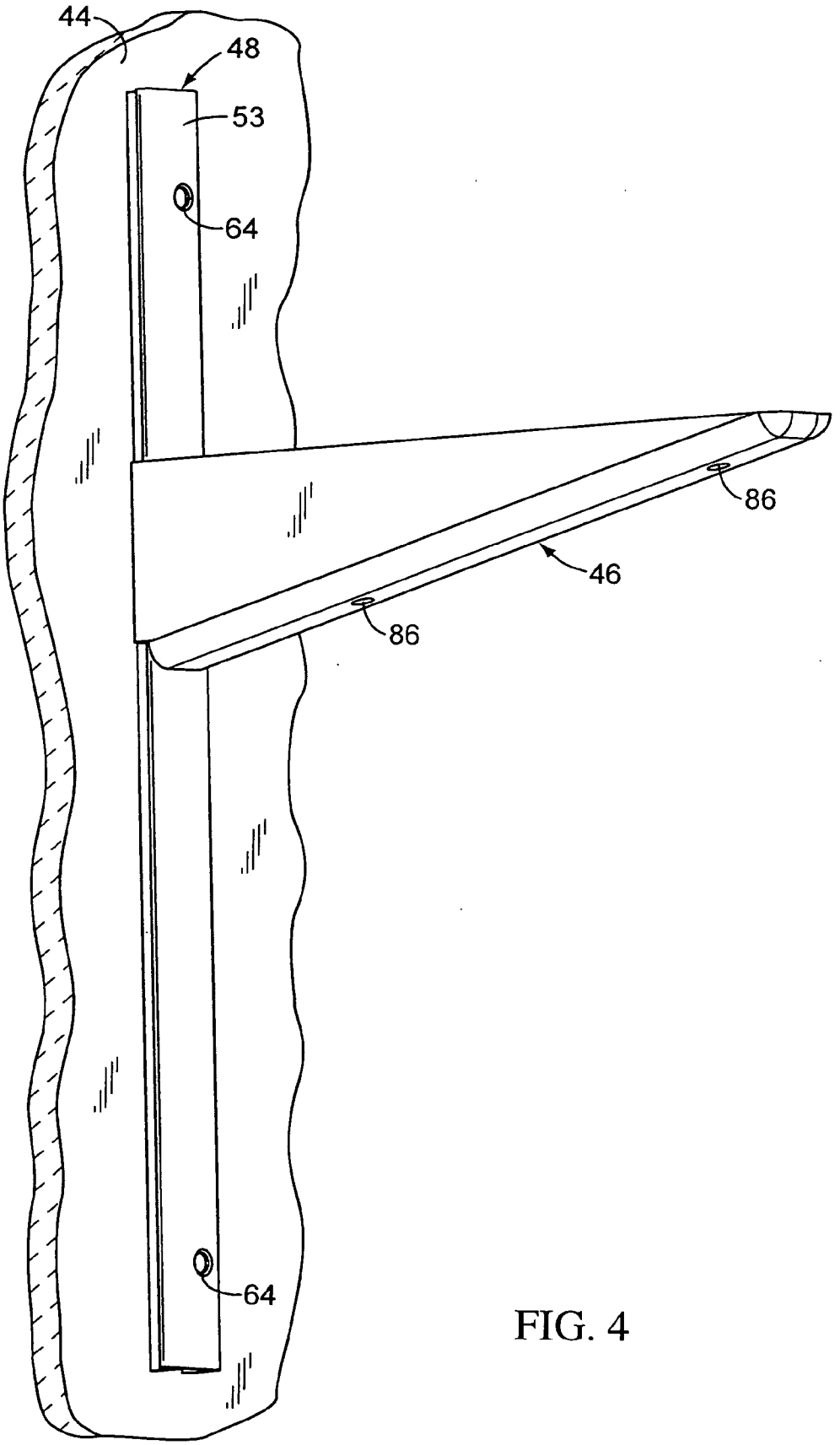


FIG. 3



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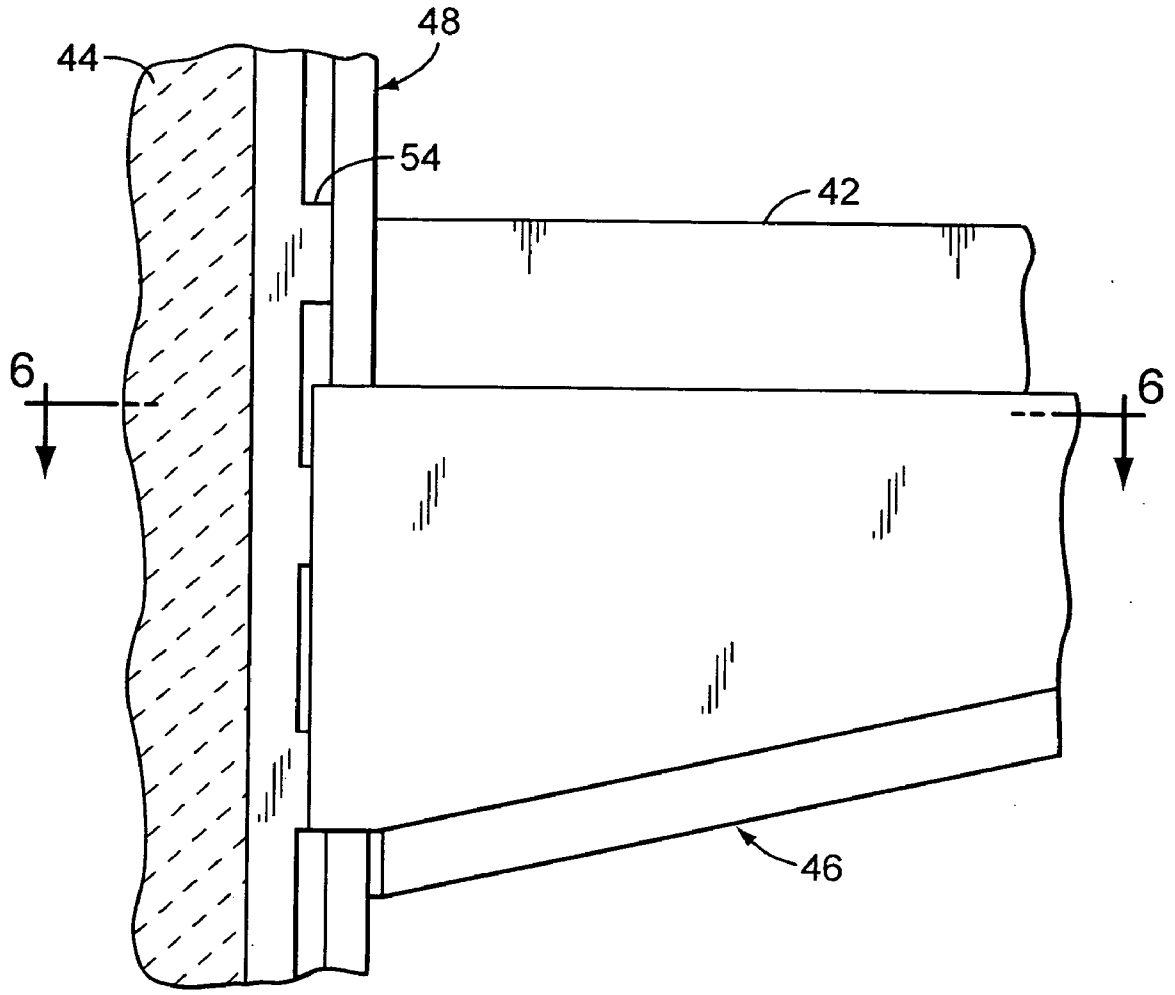

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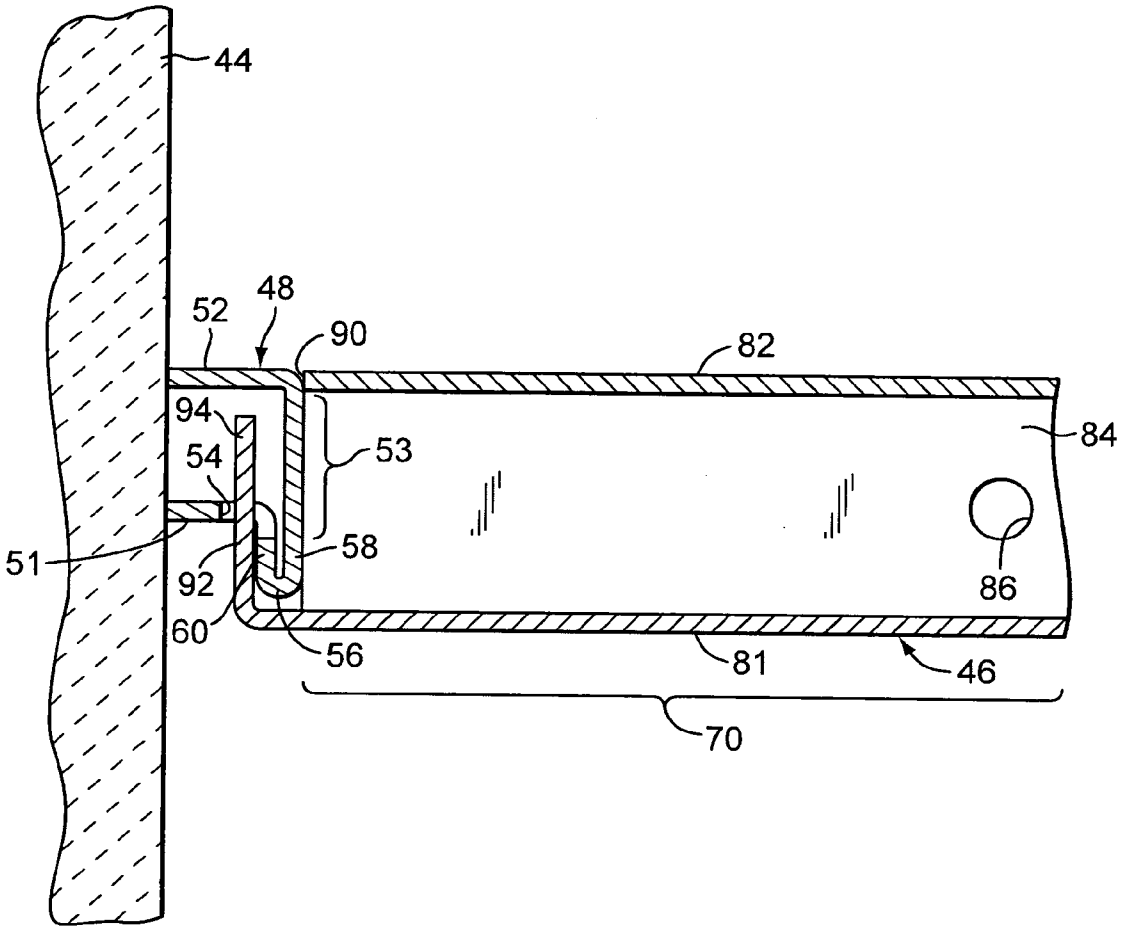


FIG. 6

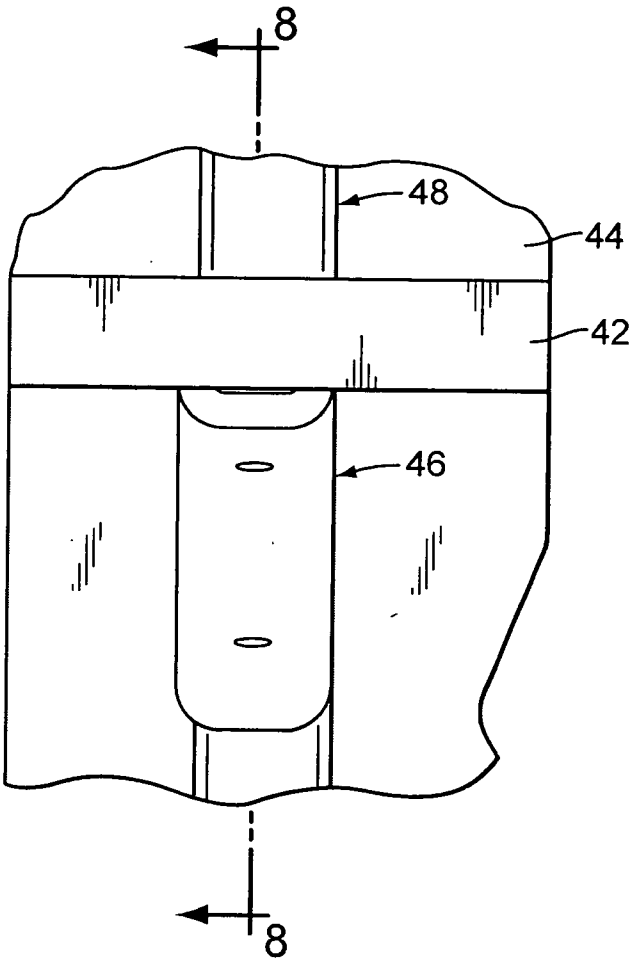
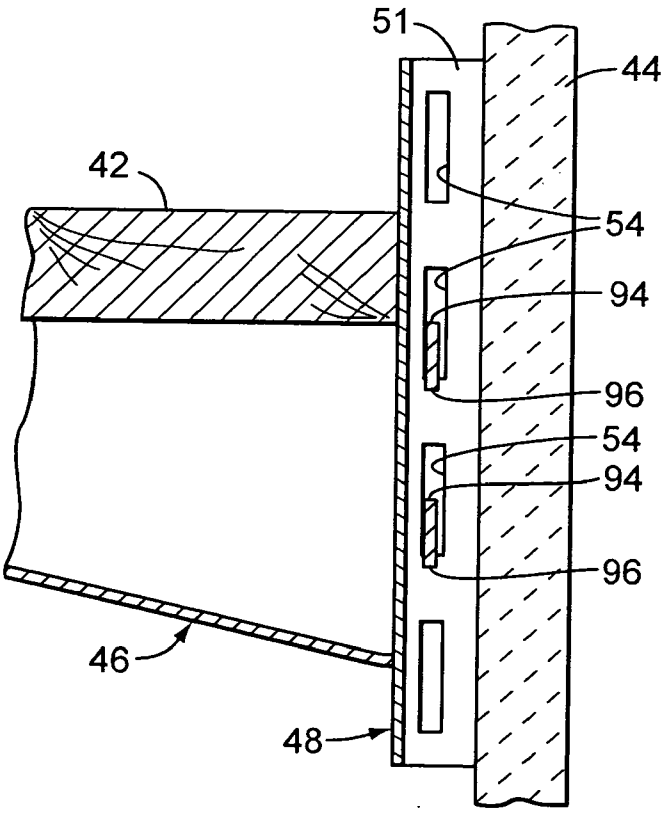


FIG. 7



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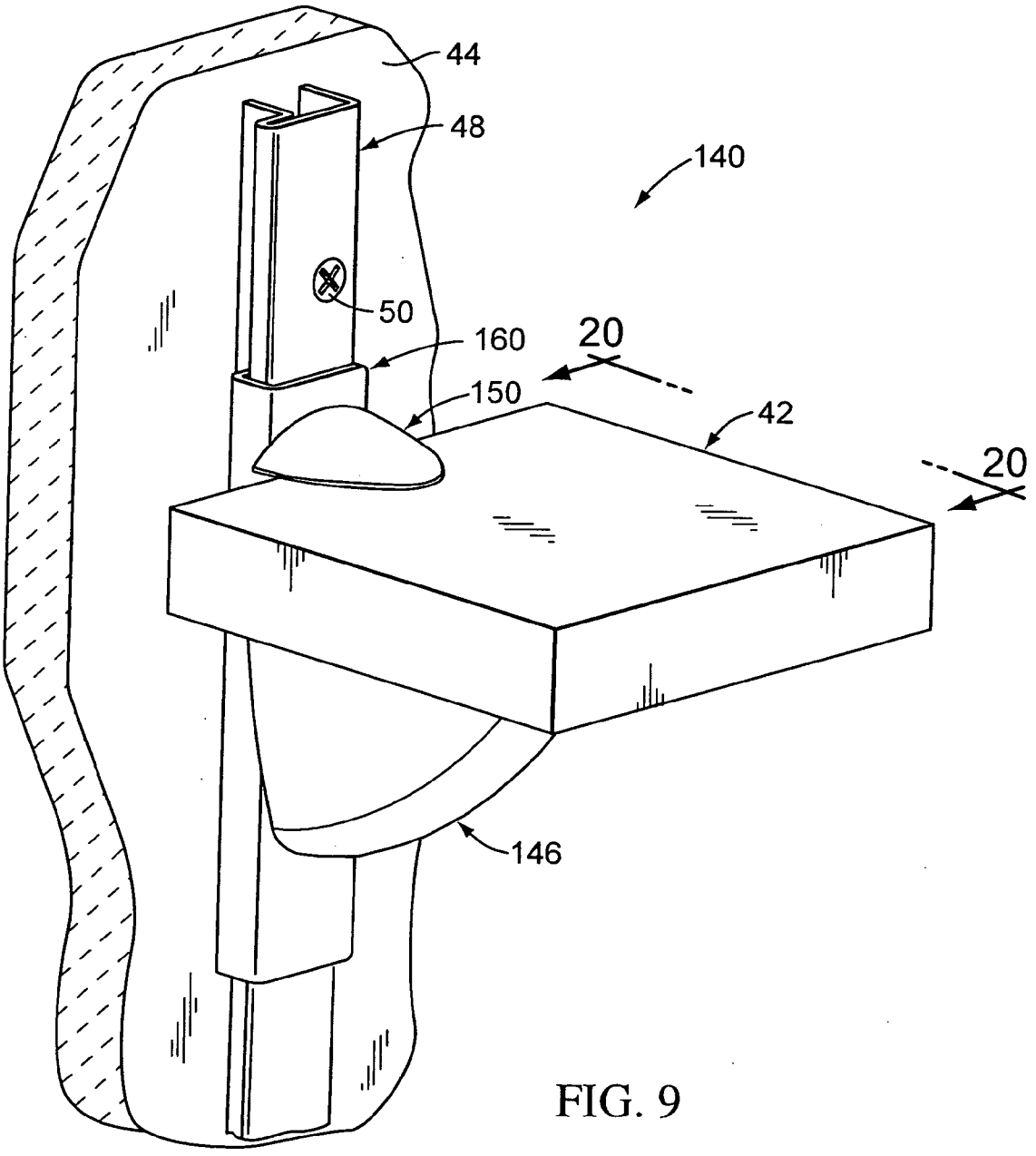


FIG. 9

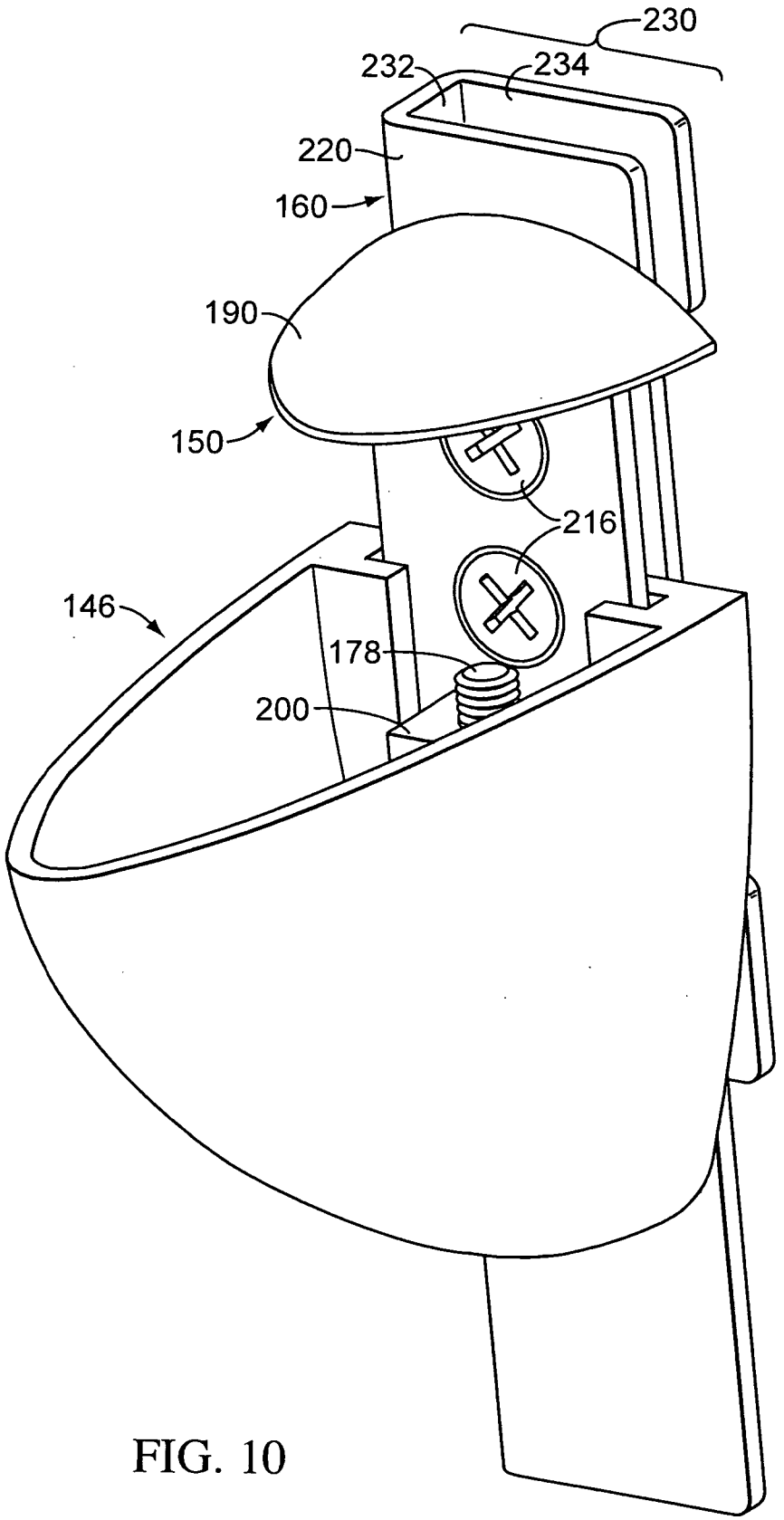
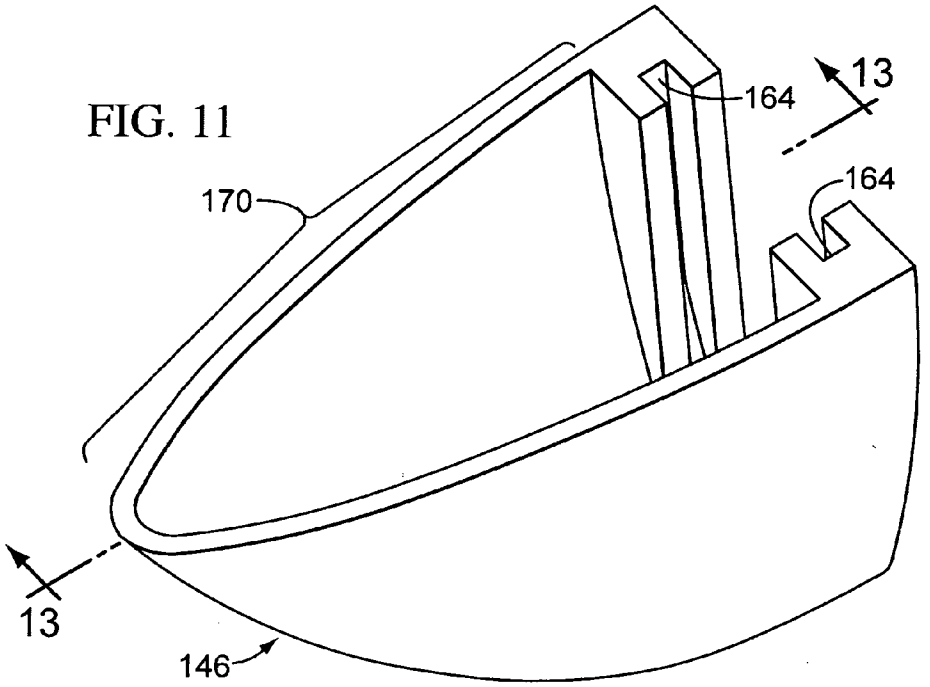


FIG. 10

FIG. 11



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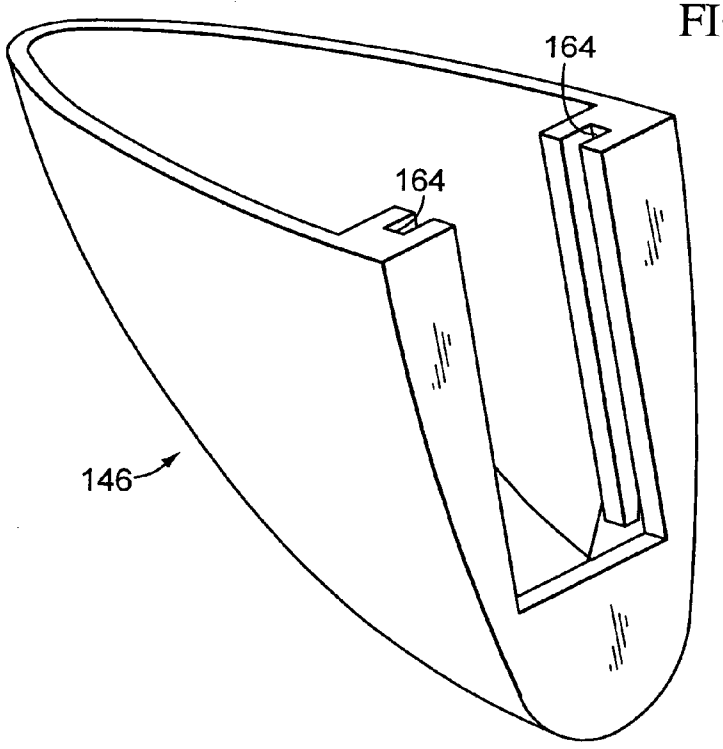

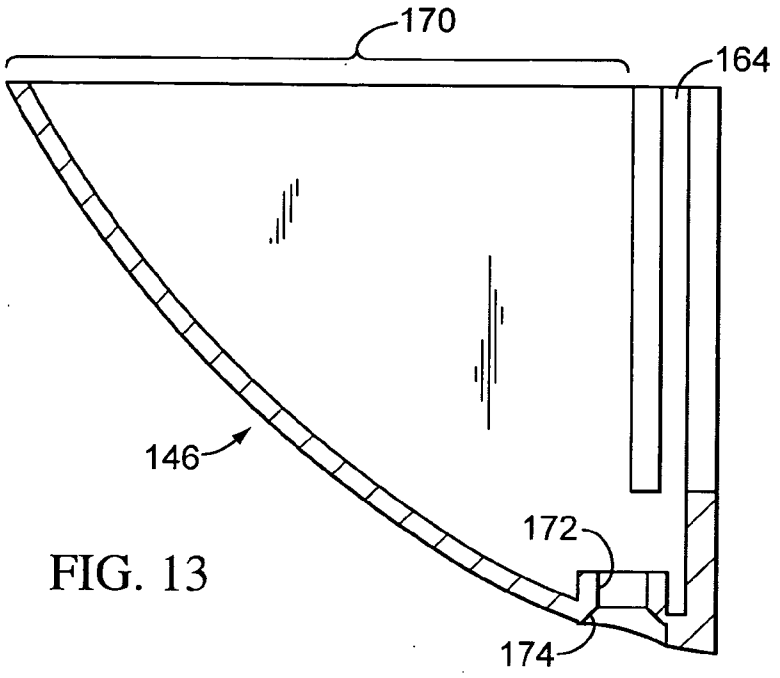

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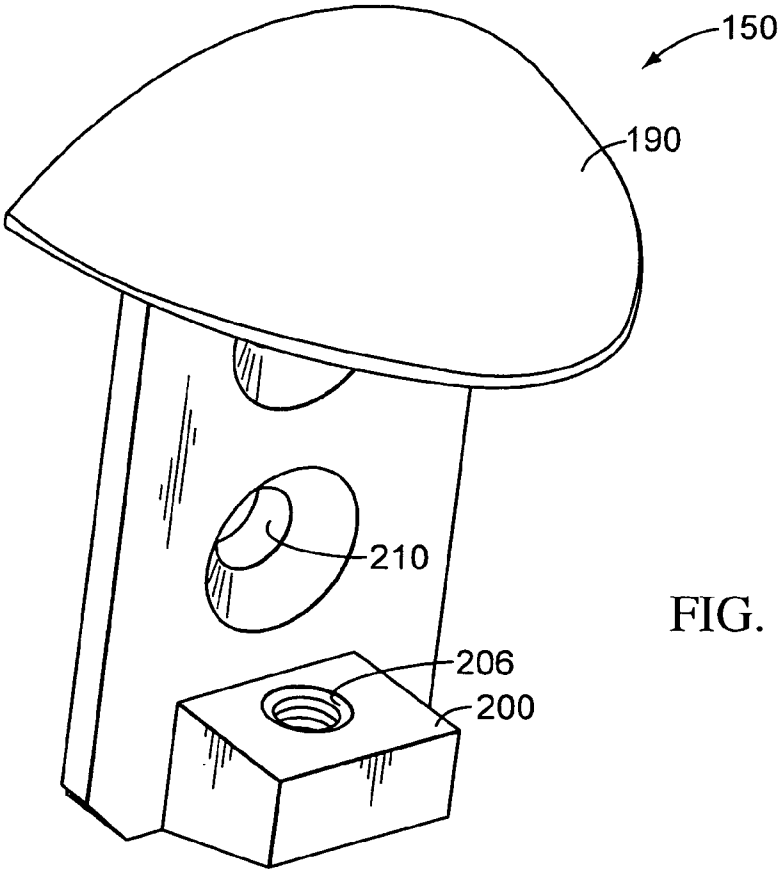
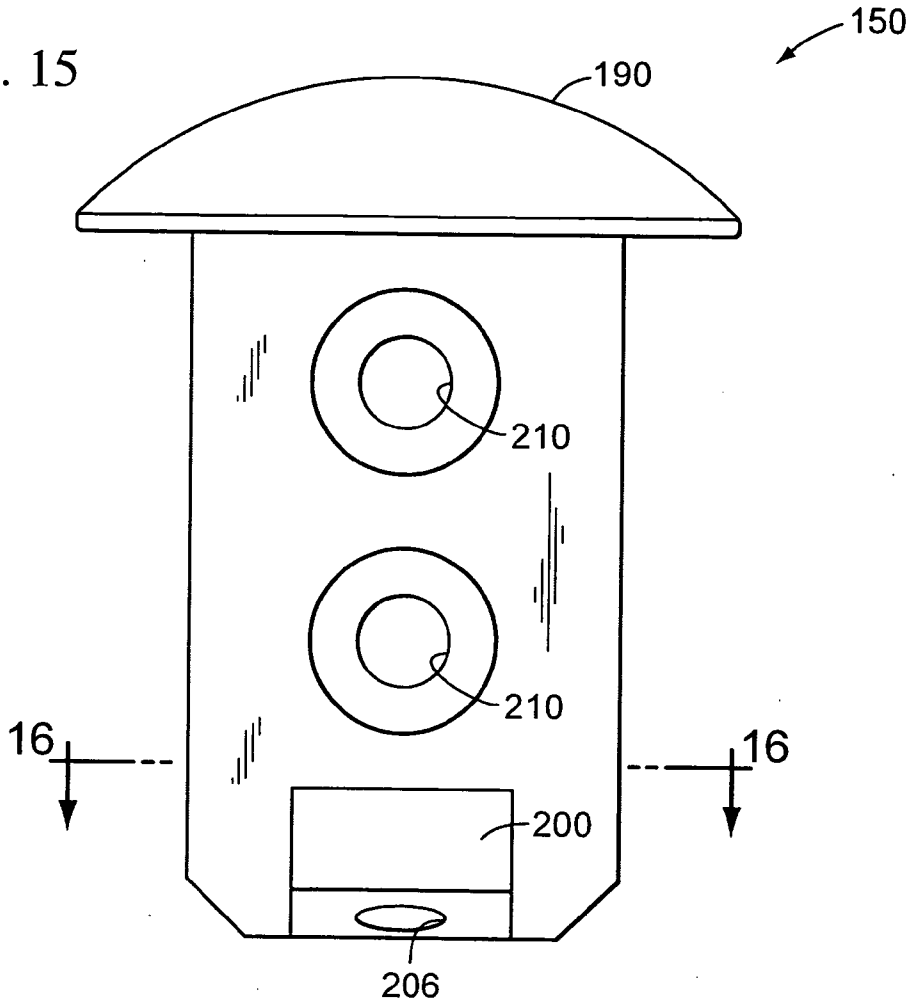


FIG. 14

FIG. 15



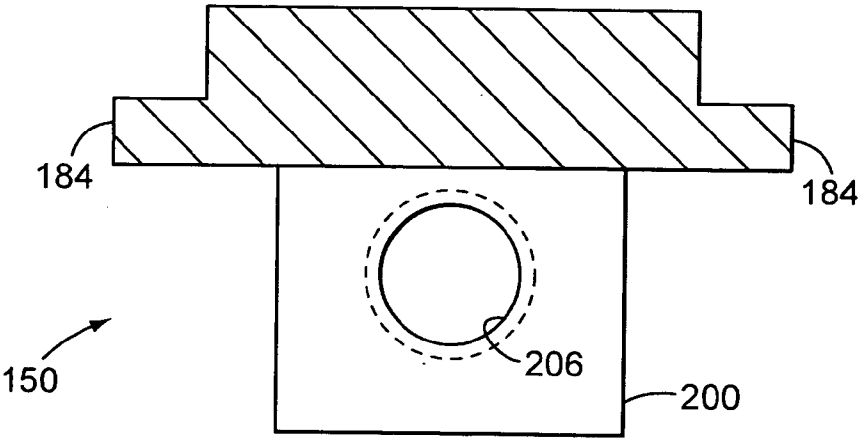
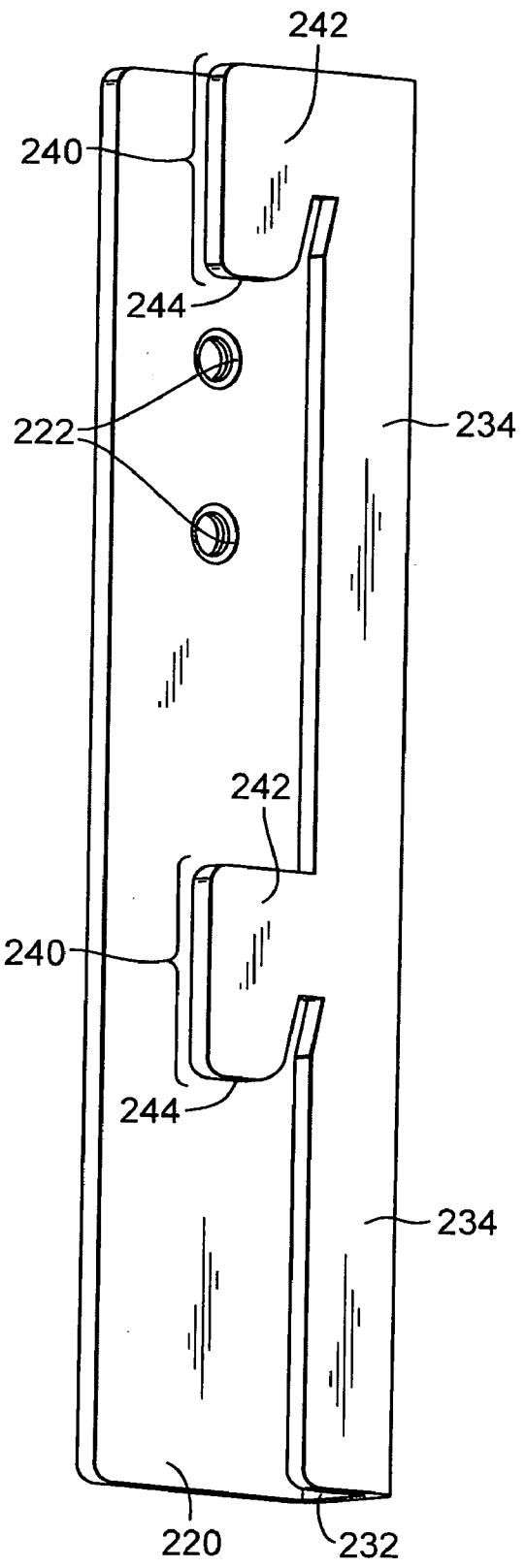
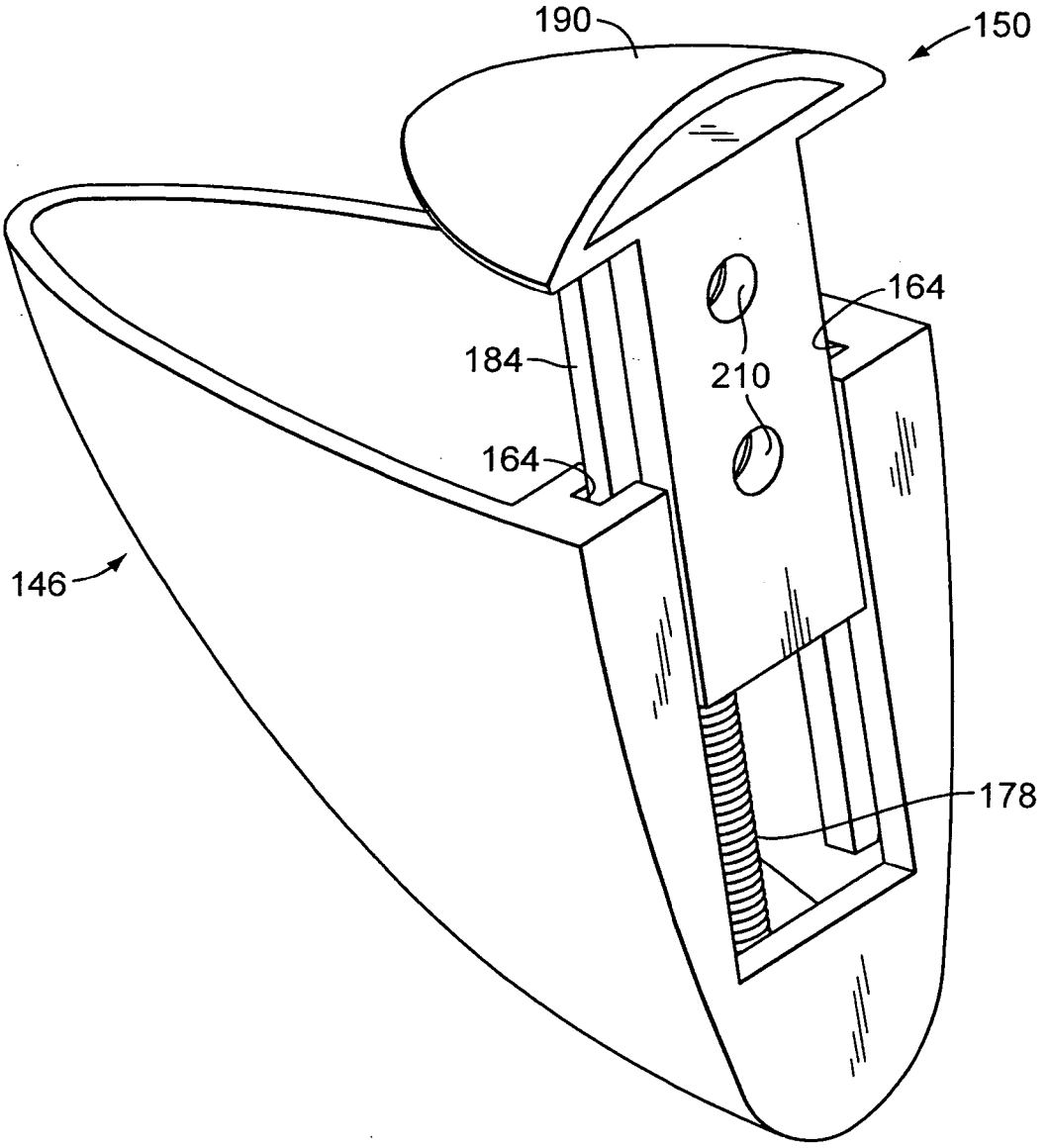


FIG. 16

FIG. 17





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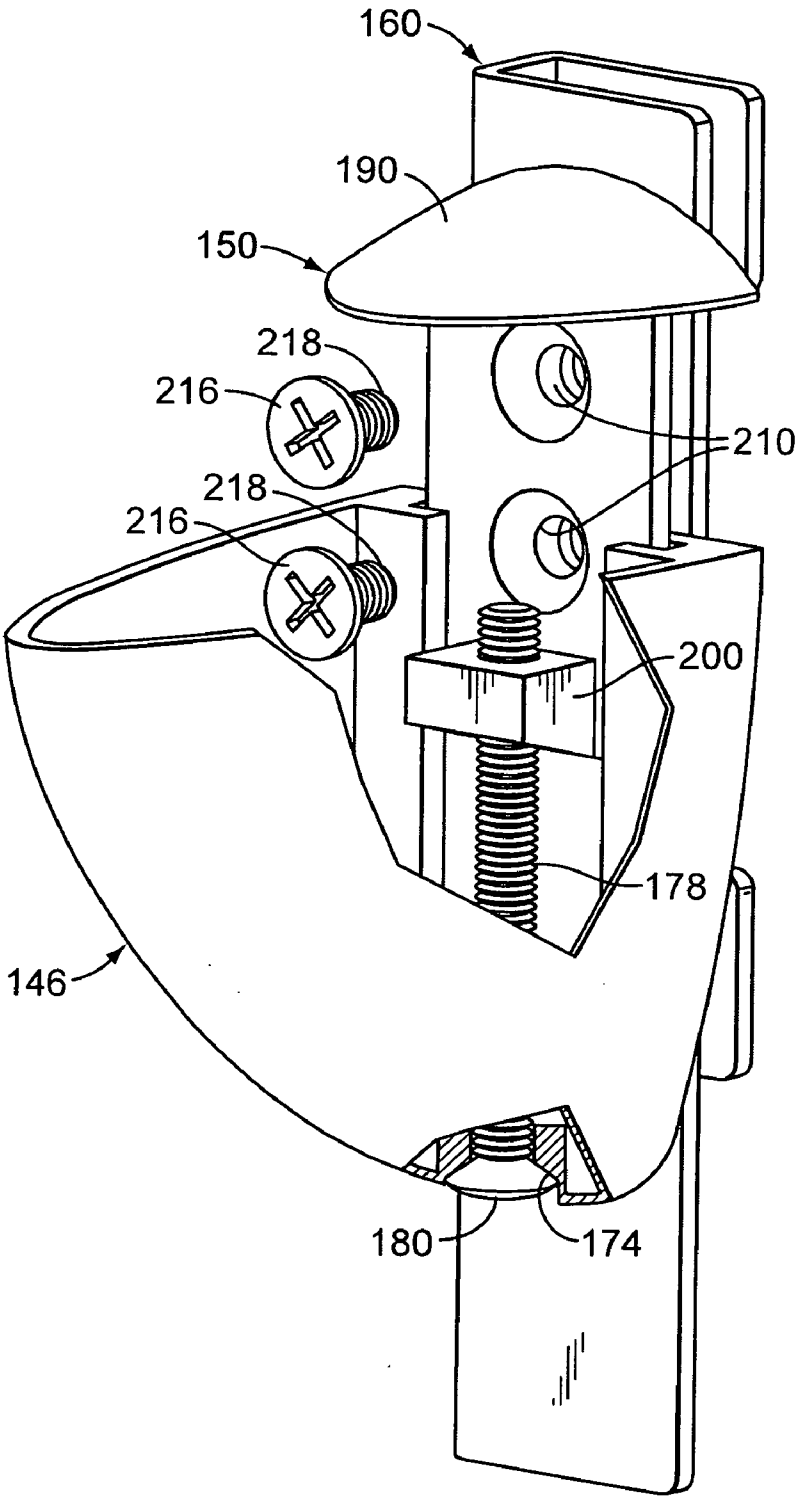
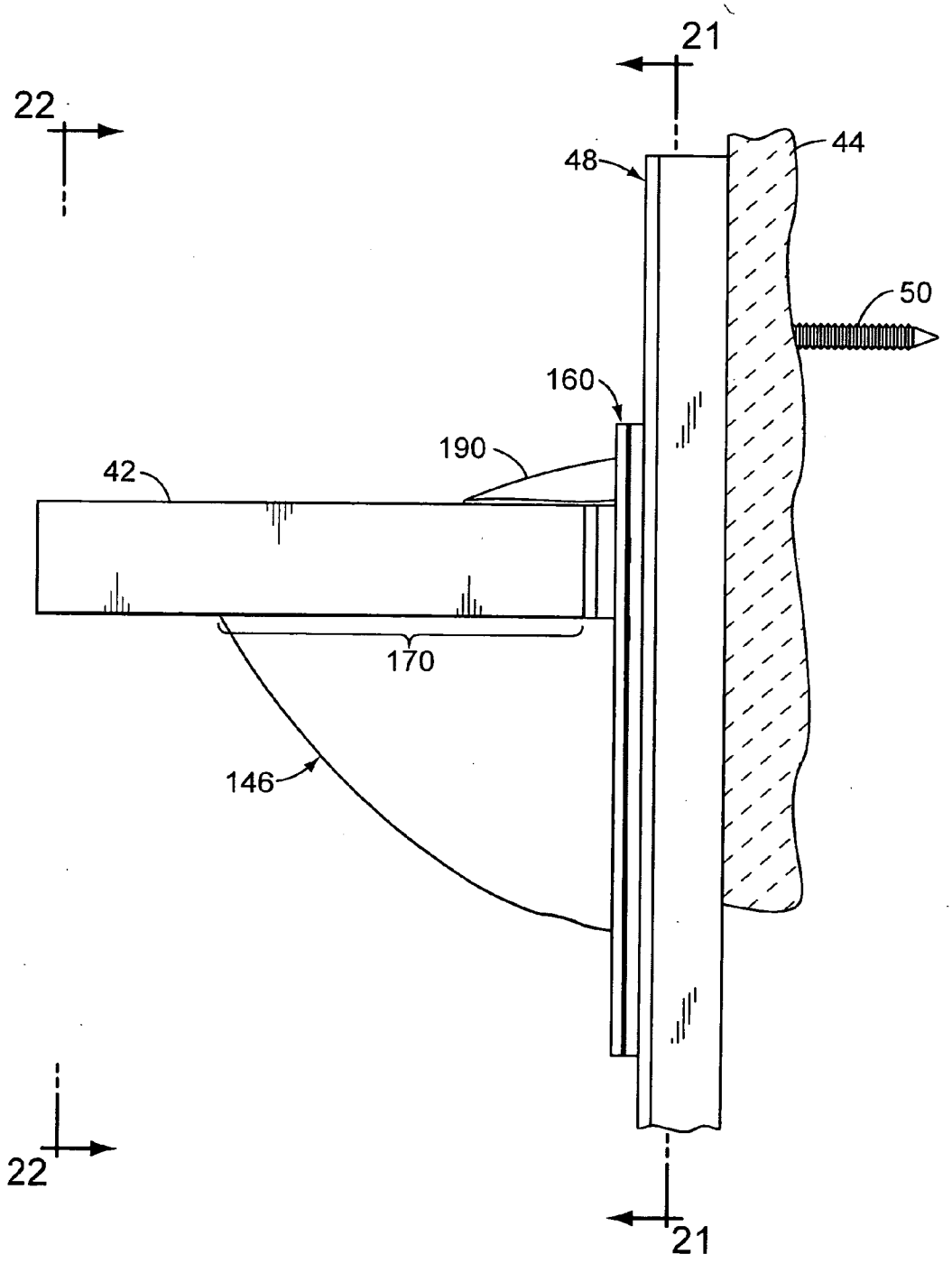


FIG. 19



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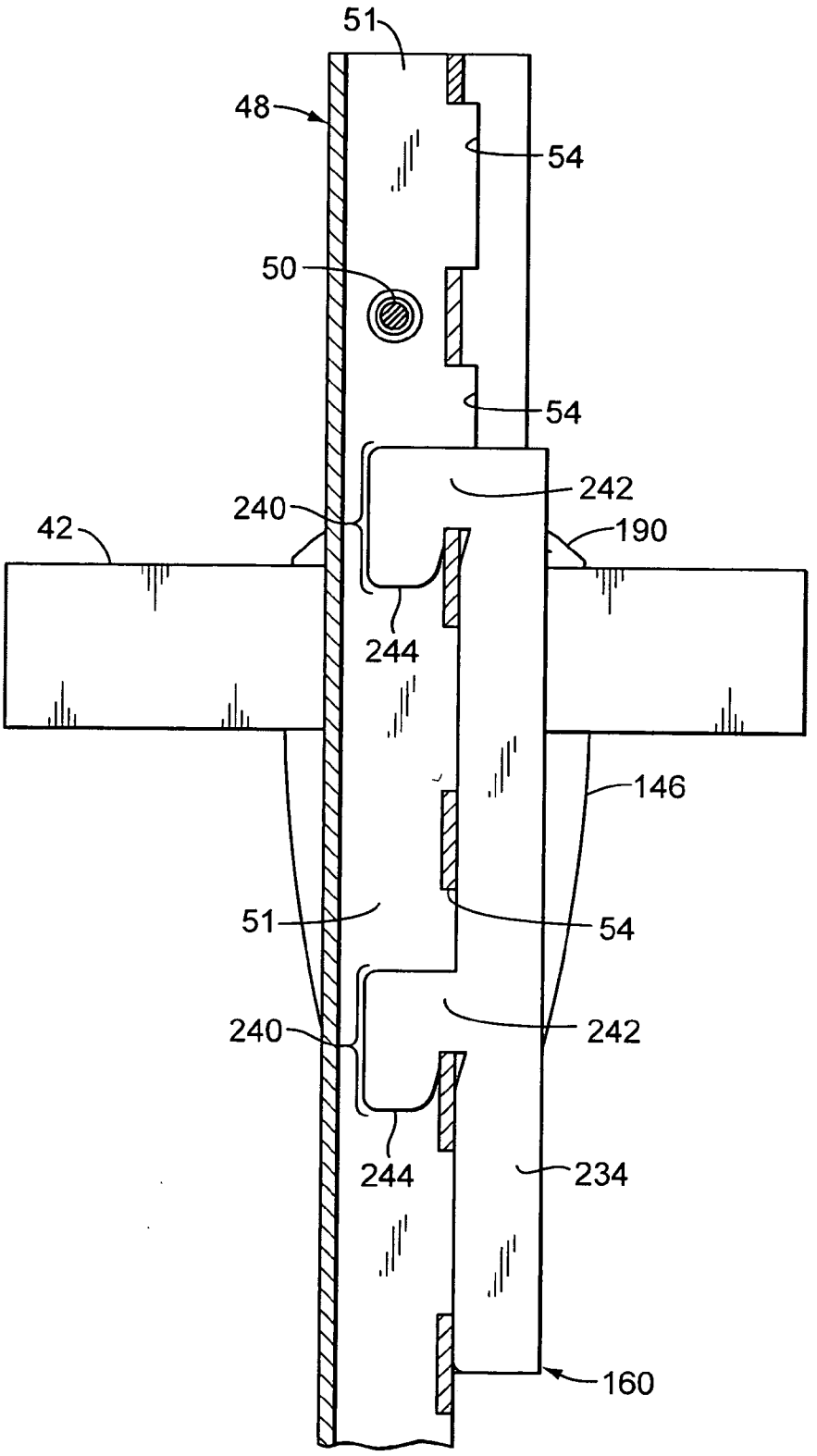
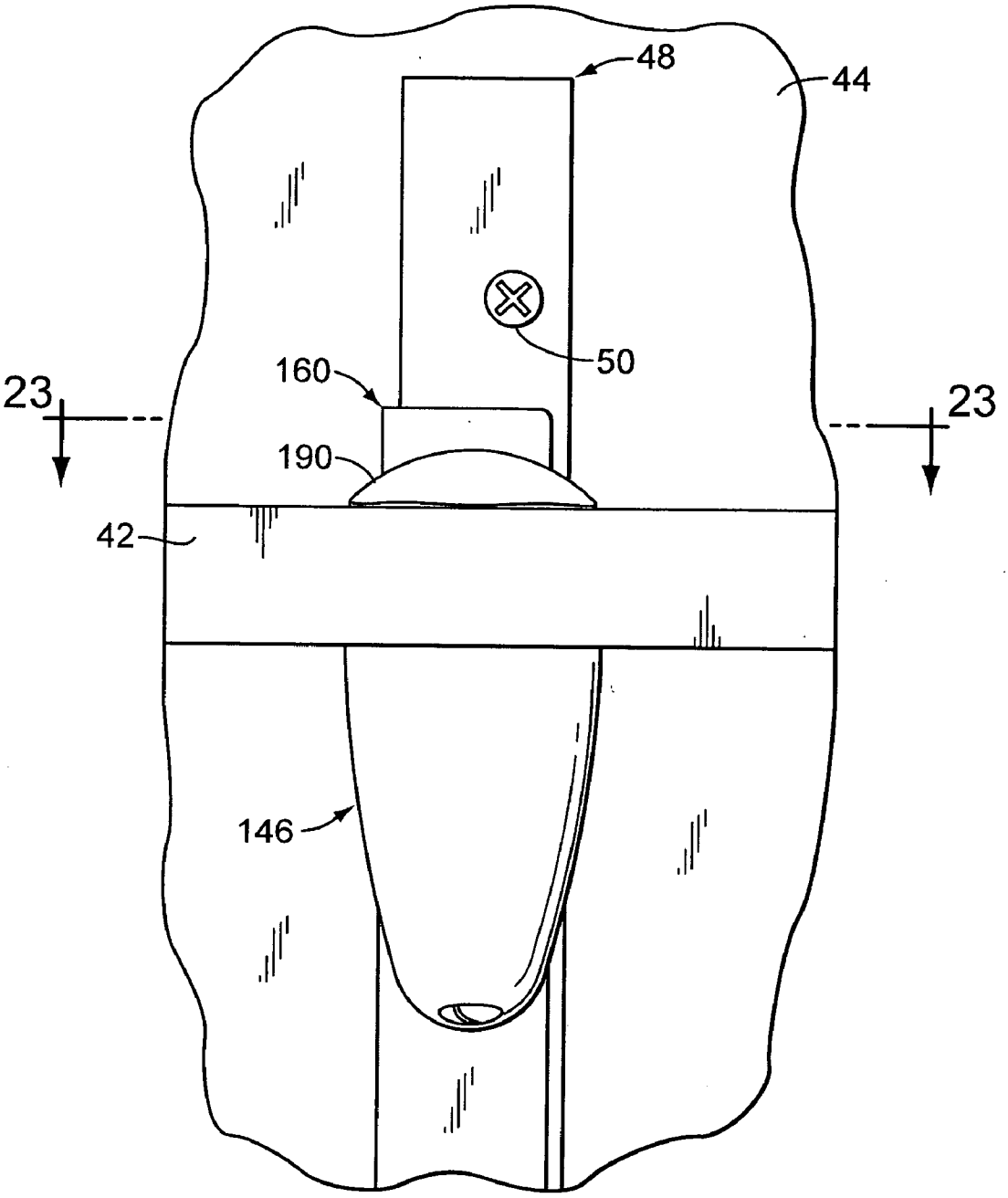


FIG. 21



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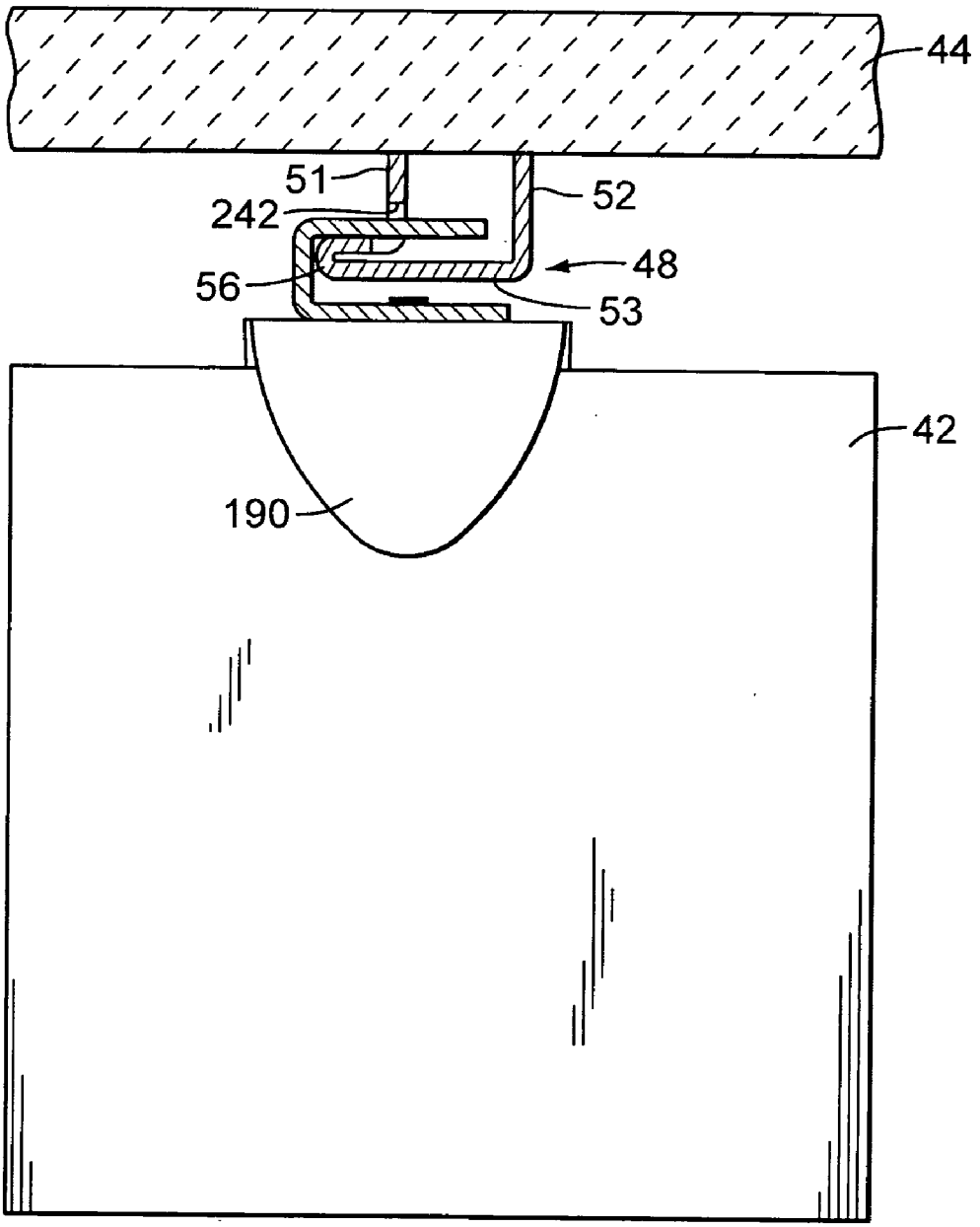


FIG. 23

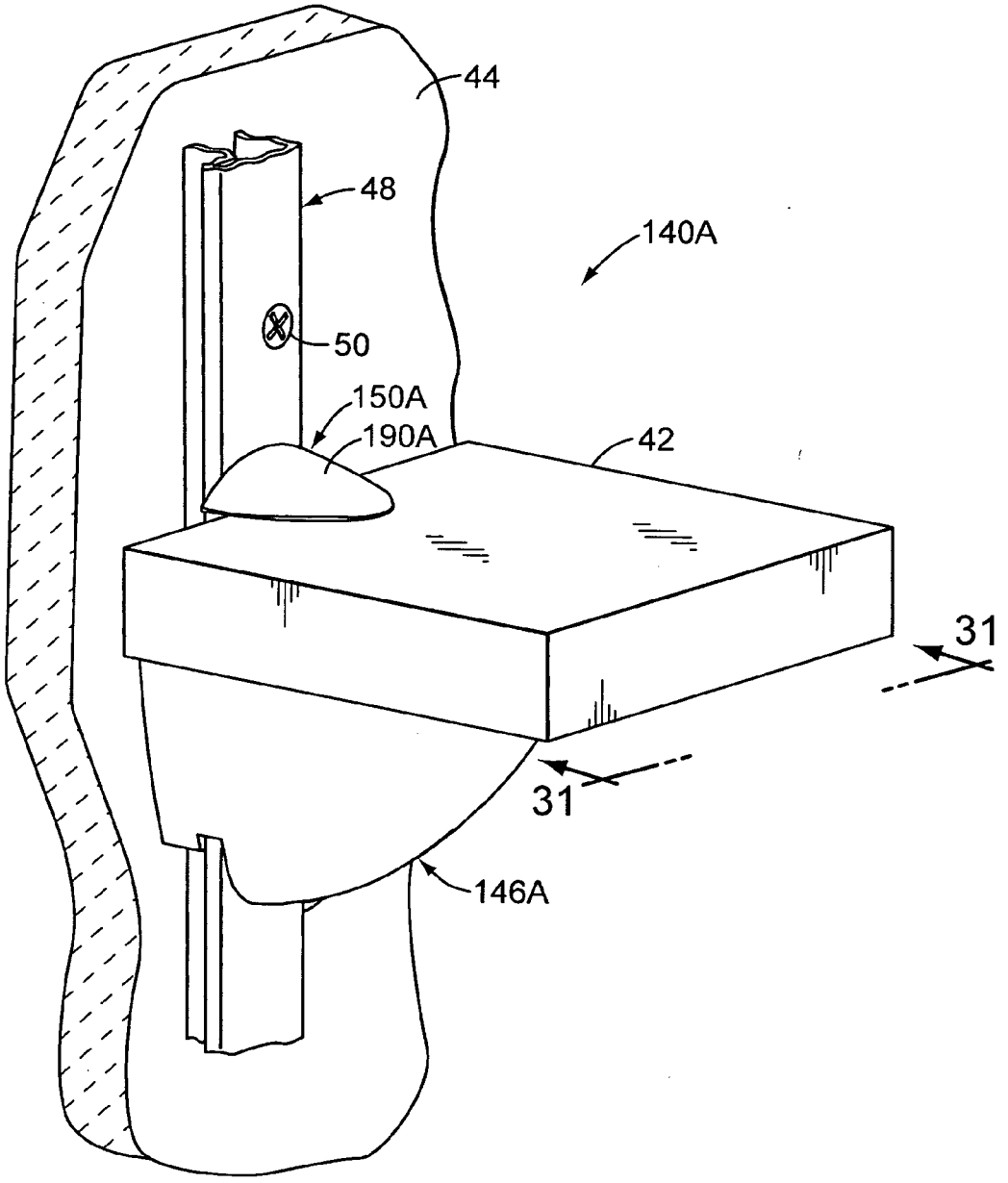


FIG. 24

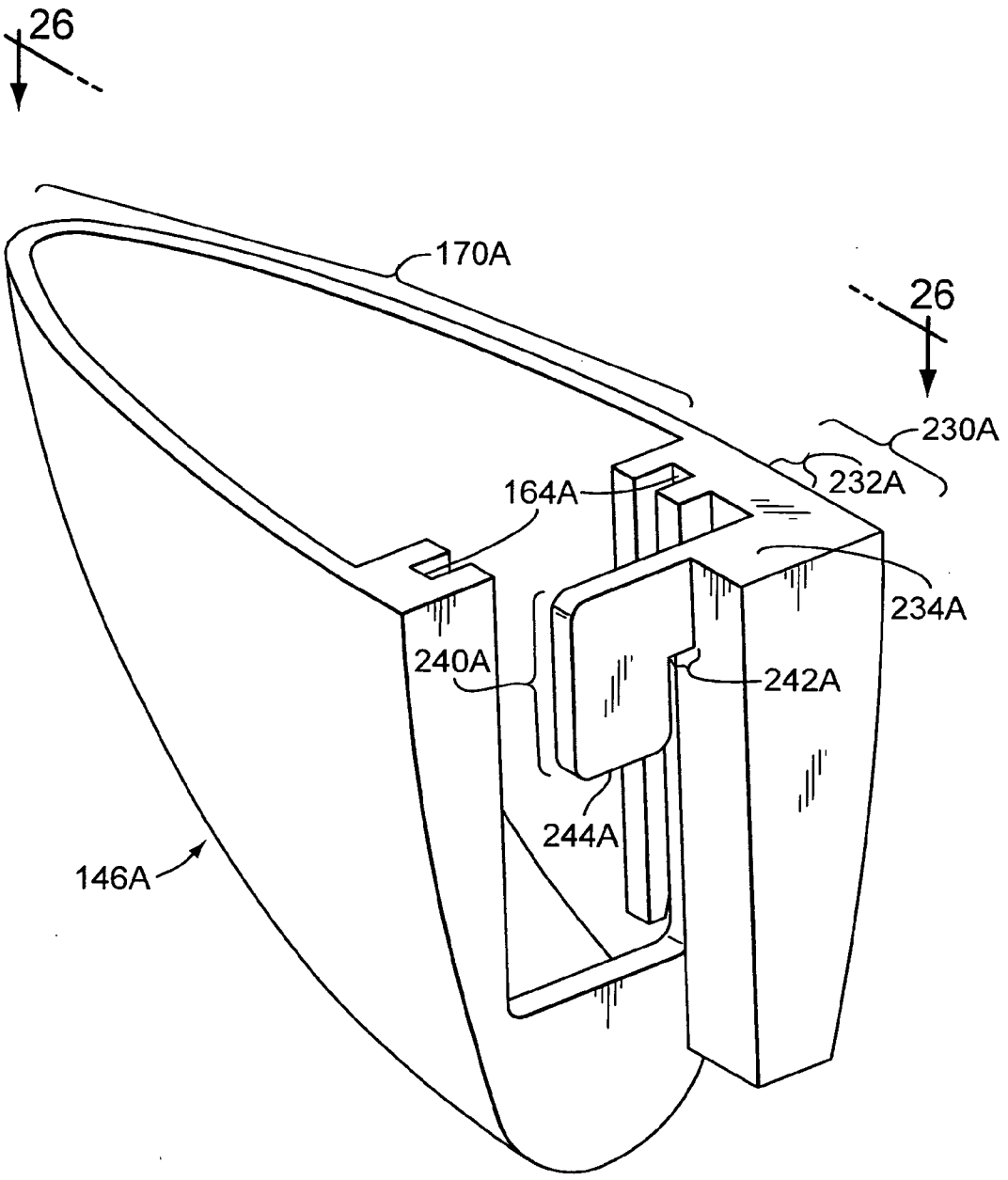


FIG. 25

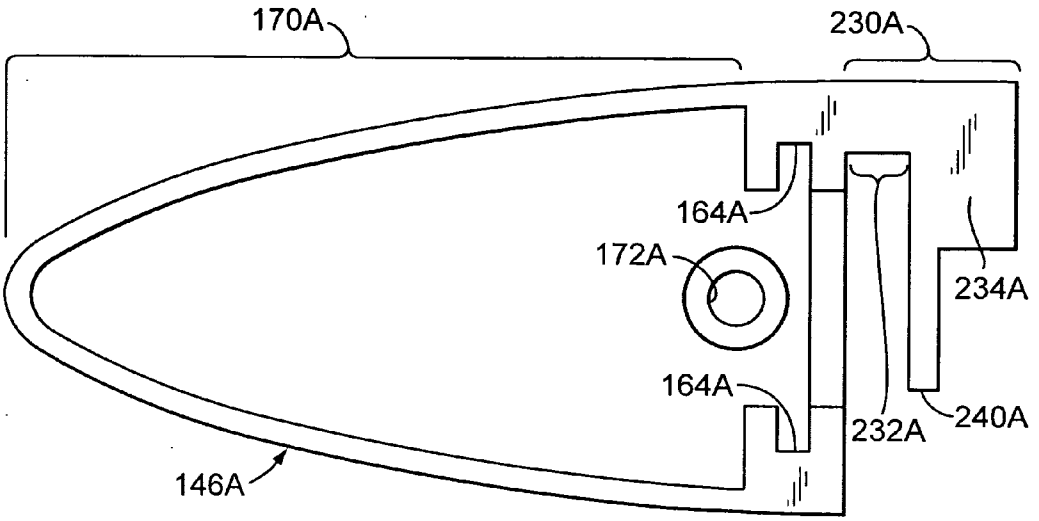

170A
230A
164A
172A
234A
164A
232A
240A
146A

FIG. 26

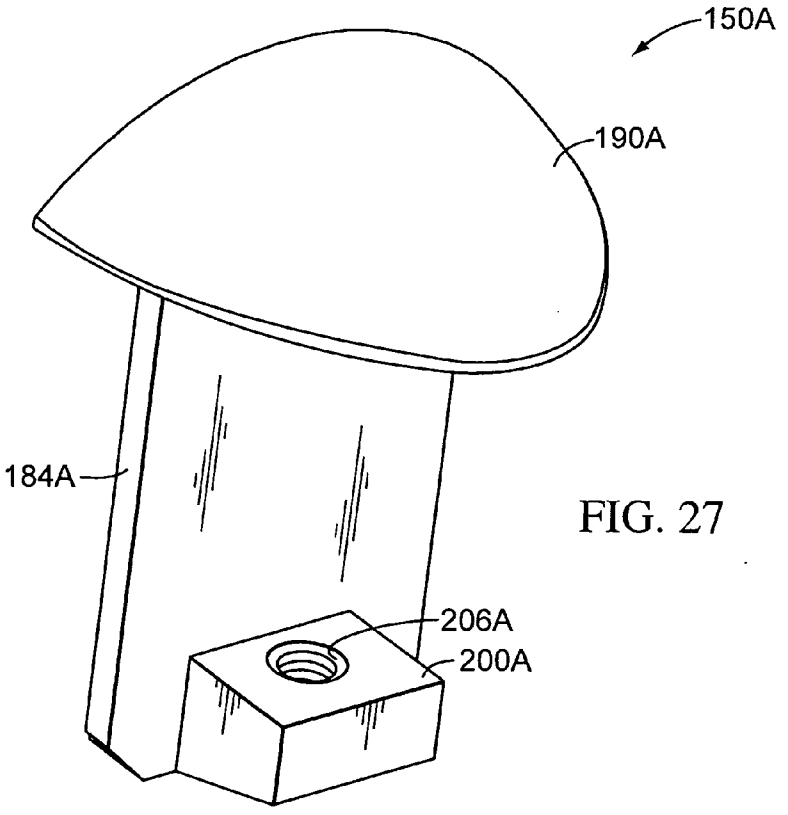
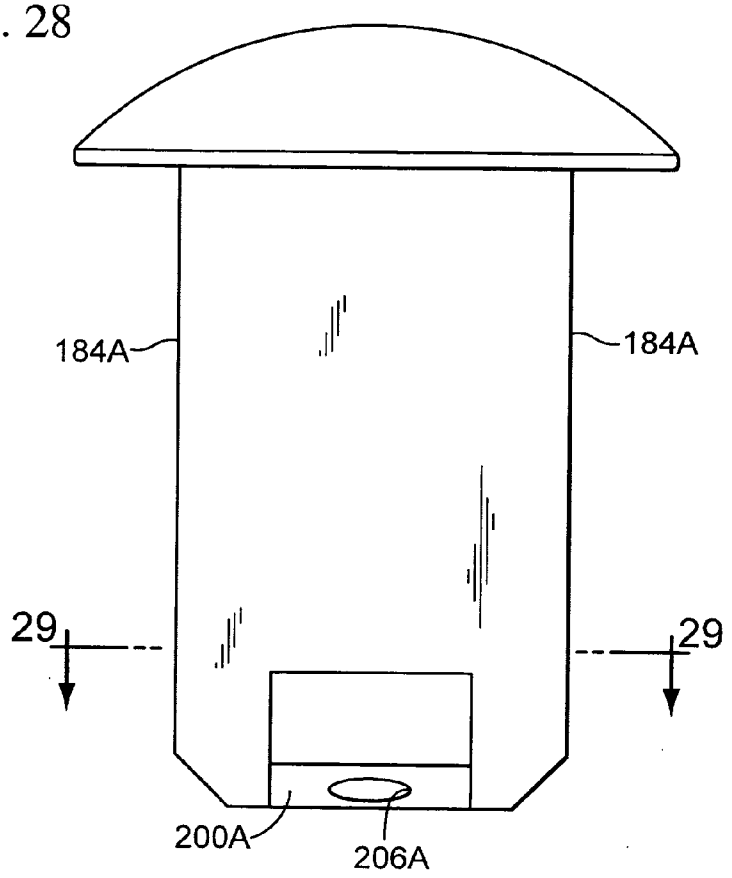

150A
190A
184A
206A
200A

FIG. 27

FIG. 28



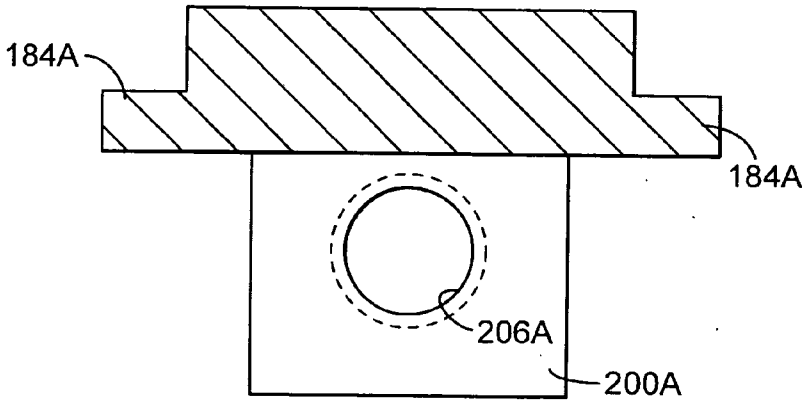


FIG. 29

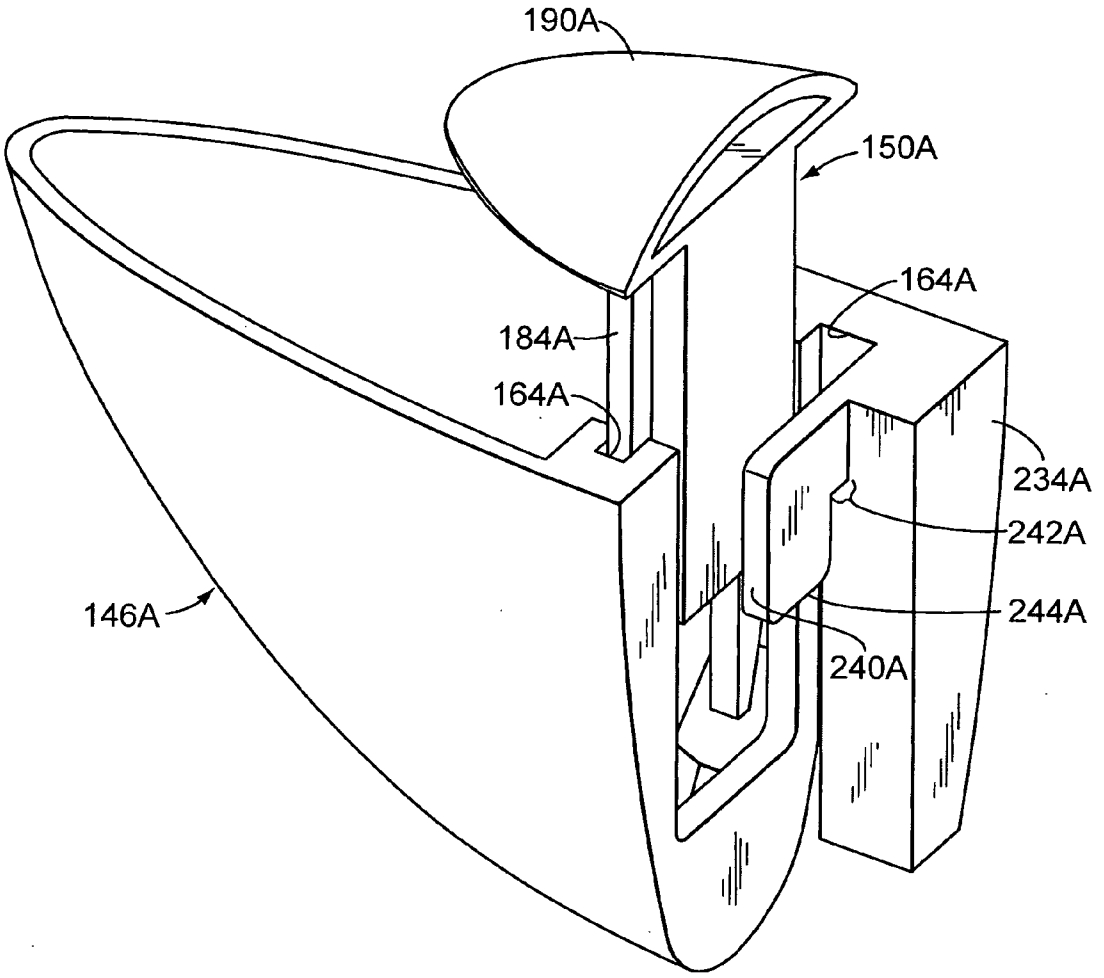


FIG. 30

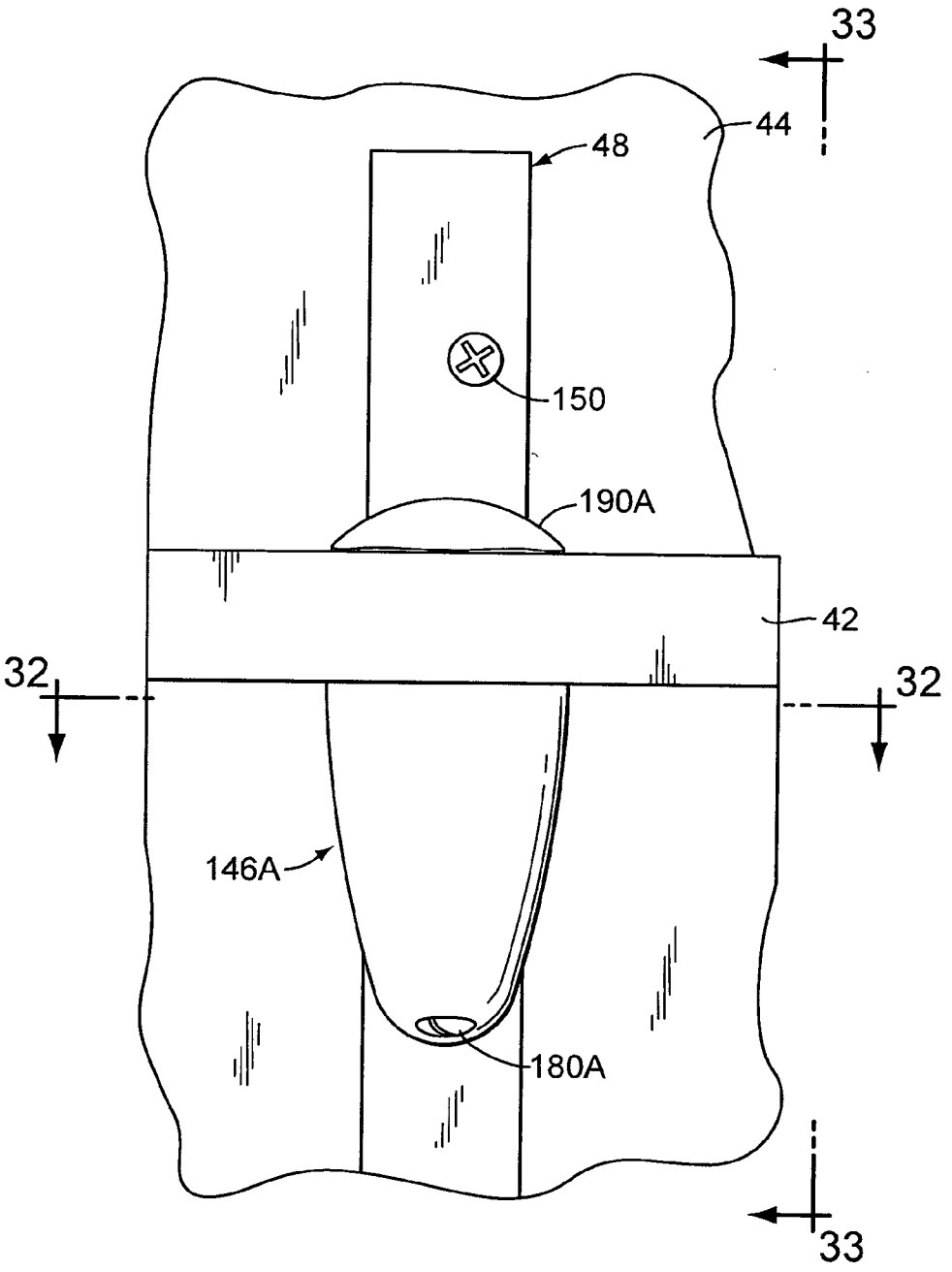


FIG. 31

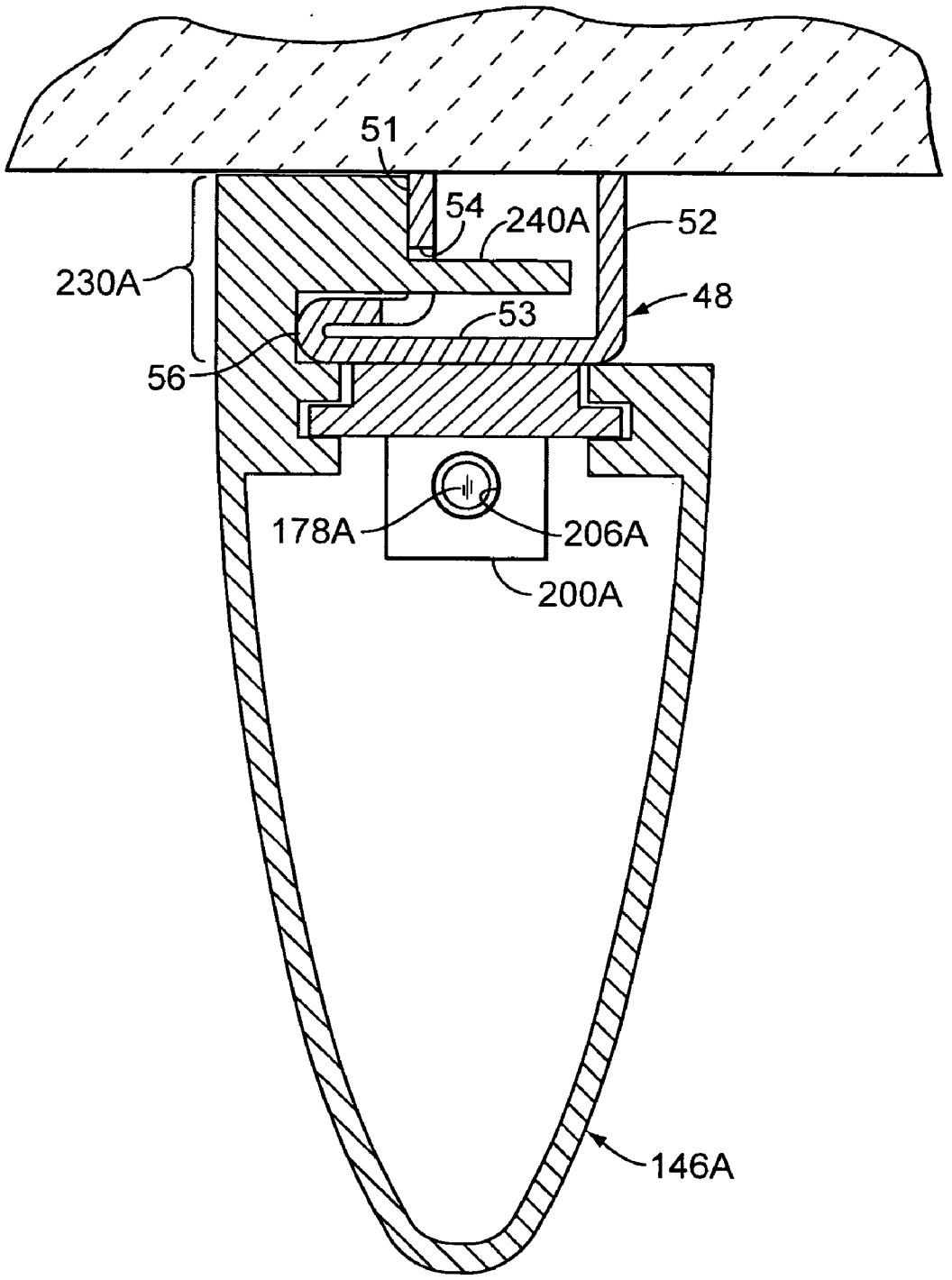


FIG. 32

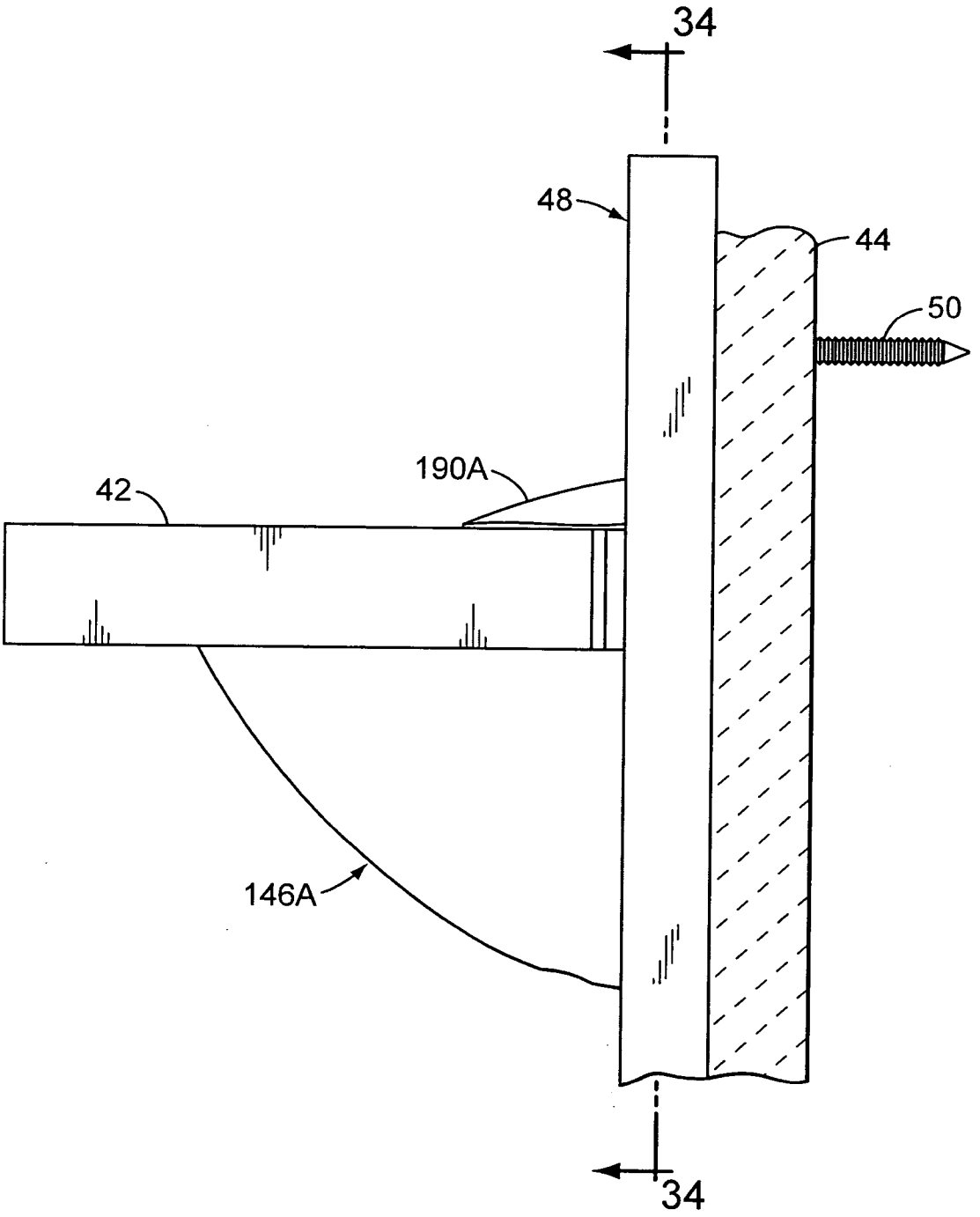


FIG. 33

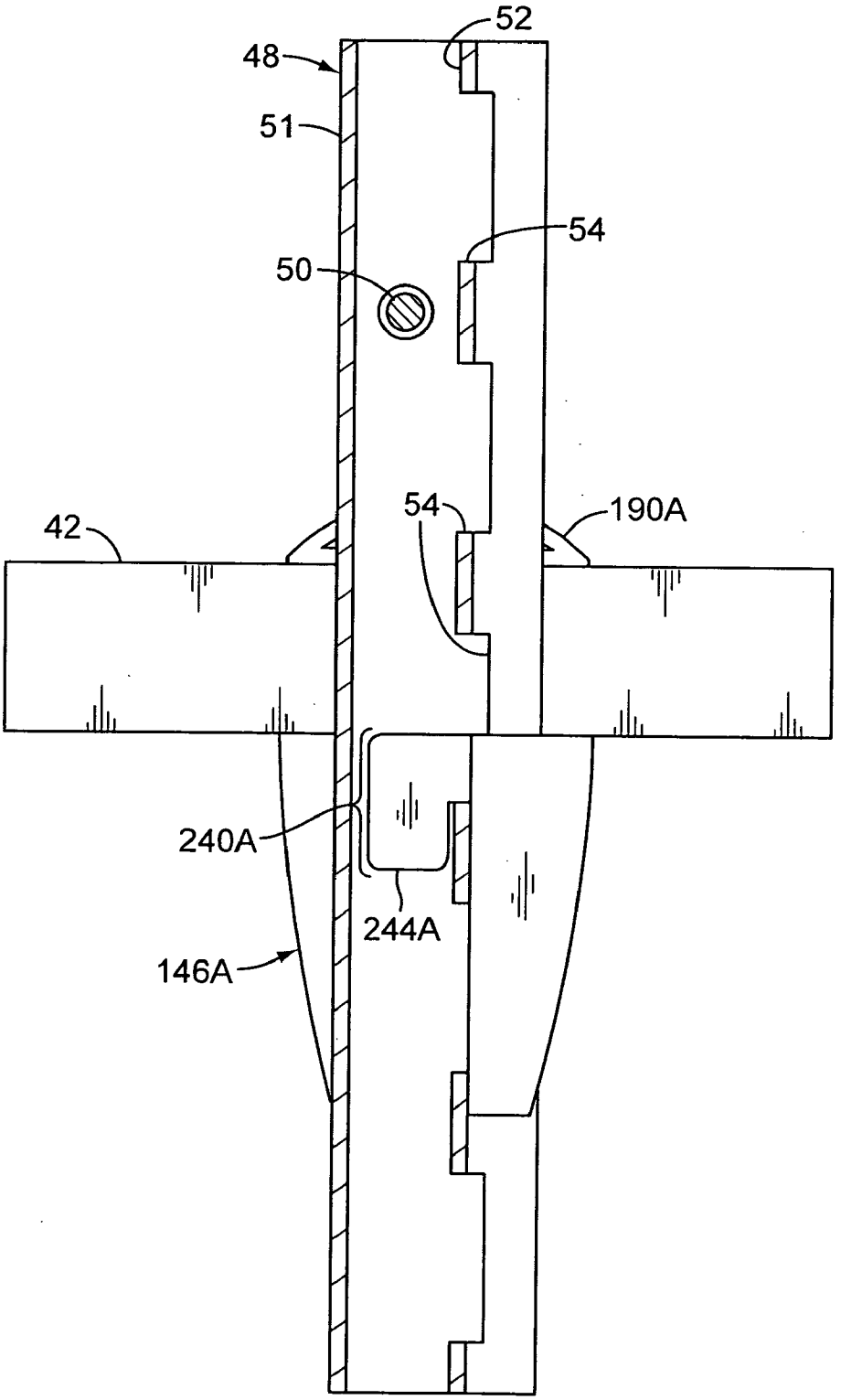


FIG. 34

SHELF SUPPORT SYSTEM

CROSS REFERENCE TO RELATED APPLICATION(S)

[0001] None.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] None.

REFERENCE TO A MICROFICHE APPENDIX

[0003] None.

TECHNICAL FIELD

[0004] This invention is directed to an improved shelf support system, and more particularly to a shelf support system that can support one or more shelves at selected elevations on a vertical surface.

BACKGROUND OF THE INVENTION AND TECHNICAL PROBLEMS POSED BY THE PRIOR ART

[0005] A typical shelving system available in the "do-it-yourself" market uses elongate, metal rails or standards which are adapted to be vertically oriented and fastened to a wall at laterally spaced-apart locations in a parallel array. The vertical standards are typically attached to a wall by screwing the standards into the studs in the wall. Each standard has a column of vertically spaced slots for receiving the attachment end or connector end of one or more plastic or metal, cantilevered, shelf supports or shelf support brackets. The cantilevered shelf supports are mounted in the slots of the standards at desired levels or elevations along the height of the installed standards. Shelves are placed horizontally across the shelf supports. Some types of shelf supports include holes for receiving screws that are screwed to the undersides of the shelves to securely hold the shelves to the shelf supports.

[0006] Variations of the above-described conventional shelving system exist. For example, U.S. Pat. No. 6,109,461 illustrates a shelving system in which the vertical standards can be hung from a single support bracket at the top of the wall. The vertical standard illustrated in the U.S. Pat. No. 6,109,461 also has a pair of columns of vertically spaced slots rather than just one column of vertically spaced slots.

[0007] While the above-described shelving systems can function satisfactorily in the applications for which they are intended, some people may think that the column or columns of vertically spaced slots in the standards which are exposed and visible above and below each shelf are aesthetically objectionable. It would be desirable to provide an improved shelving system in which the visibility of such slots could be minimized relative to an observer looking at the installed shelving system from the front of the shelving system.

[0008] It would also be desirable to provide an improved shelf support assembly that could either accommodate attachment of the shelf support to the standard on the wall or optionally be configured to permit mounting of the shelf support directly to a wall or other vertical support surface without using the standard.

BRIEF SUMMARY OF THE INVENTION

[0009] The present invention provides an improved system for mounting one or more shelves in a way that improves the aesthetic display of the components. One embodiment of the invention provides a set of components that permits the user to optionally mount a shelf support to a vertical standard attached to the wall or, alternatively, permits the user to mount the shelf support directly to the wall without requiring the use of such a vertical standard.

[0010] According to one form of the present invention, a system is provided for mounting one or more shelves to a generally vertical surface (e.g., wall), and the system includes at least one standard for being attached to the vertical surface. The standard has rearwardly extending, spaced-apart, first and second walls and has a front wall extending across the first and second walls to define the front of the standard. The standard first wall defines a column of vertically spaced slots. The standard also has a lateral extension extending laterally beyond the first wall to conceal the slots from view when the standard is attached to the vertical surface and viewed looking generally toward the front of the standard.

[0011] The system further includes at least one shelf support (e.g., shelf support bracket) that includes a shelf support platform and an attachment portion. The shelf support platform functions to support at least a portion of a shelf disposed thereon. The attachment portion is located at one end of the shelf support platform and extends adjacent and rearwardly beyond the standard lateral extension. The attachment portion has at least one tab that is located rearwardly of, and extends generally adjacent to, the standard lateral extension and standard front wall. The tab has a cantilevered portion that is adapted to pass through one of the standard first wall slots, and has a foot portion depending downwardly from the cantilevered portion adjacent the standard first wall below the one slot to hold the shelf support on the standard.

[0012] According to another form of the invention, a system is provided for mounting one or more shelves to a generally vertical surface, and the system consists of components which provide the installer with the option of mounting the shelving system directly to the vertical surface, or to a standard that is in turn mounted directly to the vertical surface. The standard has the same configuration as described above for the first form of the invention. If the installer decides to use the standard, the standard is attached to the wall.

[0013] A shelf support is provided, and the shelf support includes a cantilevered lower clamp jaw on which at least a portion of the shelf bottom surface can be disposed. The shelf support also has a pair of spaced-apart, vertical channels which open toward each other. The shelf support also includes a vertically oriented screw shank-receiving aperture for receiving the shank of a screw.

[0014] The system also includes a shelf retainer that has slide portions received in the shelf support channels, a cantilevered upper clamp jaw for engaging a top surface of the shelf, a horizontally oriented screw shank-receiving aperture, and a vertically oriented, threaded bore aligned with the shelf support vertically oriented screw shank-receiving aperture.

[0015] The system includes a first screw that has a head bearing against the shelf support and that has a shank extending through the shelf support vertically oriented screw shank-receiving aperture and into threaded engagement with the shelf retainer vertically oriented, threaded bore for adjustably holding the shelf support to the shelf retainer to position the lower clamp jaw at a selected distance below the upper clamp jaw thereby clamping the shelf therebetween.

[0016] The system also employs a hanger for mounting the shelf retainer to the standard that is attached to the vertical surface (e.g., wall). The hanger includes a front panel and an attachment portion. The front panel defines a horizontally oriented threaded bore for alignment with the shelf retainer horizontally oriented screw shank-receiving aperture. The attachment portion extends from the front panel adjacent and rearwardly beyond the standard lateral extension and has at least one tab. The attachment portion tab is located rearwardly of, and extends generally adjacent to, the standard lateral extension and standard front wall. The tab also has a cantilevered portion adapted to pass through one of the standard wall slots. The tab also has a foot portion depending downwardly from the cantilevered portion adjacent the standard first wall below the one slot to hold the hanger on the standard.

[0017] The system further includes a second screw which has a head bearing against the shelf retainer and which has a shank extending through the shelf retainer horizontally oriented screw shank-receiving aperture and into threaded engagement with the hanger horizontally oriented threaded bore to hold the shelf retainer to the hanger.

[0018] If the installer does not wish to employ one or more standards attached to the vertical surface, then no standard is used. In such a case, the installer also does not use the hanger for mounting the shelf retainer to the standard, and does not use the screw for attaching the shelf retainer to the hanger. Instead, a suitable fastener is provided for attaching the shelf retainer directly to the vertical surface (e.g., wall), and such a fastener may be an appropriate screw, toggle bolt, etc. The shelf support remains attached to the shelf retainer so that the lower clamp jaw can cooperate with the shelf retainer upper clamp jaw to hold the shelf.

[0019] According to yet another form of the present invention, the function of the above-described separate hanger (for mounting the shelf retainer to the standard) can be incorporated as a unitary part, and extension, of the shelf support that has the lower clamp jaw. In such a modified system, the standard is provided for being attached to the vertical surface (e.g., wall), and the standard has the same design as described above. The shelf support has a cantilevered lower clamp jaw on which at least a portion of the shelf bottom surface can be disposed. The shelf support also has a pair of spaced-apart, vertical channels which open toward each other. The shelf support also has a vertically oriented screw shank-receiving aperture for receiving the shank of a screw. Finally, the shelf support has an attachment portion that extends from the lower clamp jaw adjacent and rearwardly beyond the standard lateral extension and that has at least one tab. The tab is located rearwardly of, and extends generally adjacent to, the standard lateral extension and standard front wall. The tab has a cantilevered portion adapted to pass through one of the standard first wall slots. The tab also has a foot portion depending downwardly from the cantilevered portion adjacent the standard first wall below the one slot to hold the shelf support on the standard.

[0020] A shelf retainer is provided with slide portions for being received in the shelf support channels. The shelf retainer has a cantilevered upper clamp jaw for engaging the top surface of the shelf. The shelf retainer also has a horizontally oriented screw shank-receiving aperture, and also has a vertically oriented, threaded bore aligned with the shelf support vertically oriented screw shank-receiving aperture.

[0021] A screw is provided with a head for bearing against the shelf support. The screw has a shank extending through the shelf support vertically oriented screw shank-receiving aperture and into threaded engagement with the shelf retainer vertically oriented, threaded bore for adjustably holding the shelf retainer to the shelf support to position the shelf retainer upper clamp jaw at a selected distance above the shelf support lower clamp jaw thereby clamping the shelf therebetween.

[0022] Numerous other advantages and features of the present invention will become readily apparent from the following detailed description of the invention, from the claims, and from the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] In the accompanying drawings that form part of the specification, and in which like numerals are employed to designate like parts throughout the same,

[0024] FIG. **1** is a fragmentary, front, isometric view of a first form of the present invention for mounting one or more shelves on a vertical surface or wall by employing a rail or standard that is attached to the wall and to which a shelf support is mounted;

[0025] FIG. **2** is an isometric view of the standard employed in the first form of the invention illustrated in FIG. **1**;

[0026] FIG. **3** is an isometric view of the shelf support employed in the first form of the invention illustrated in FIG. **1**;

[0027] FIG. **4** is a front, isometric view similar to FIG. **1**, but FIG. **4** shows the installed components of the first form of the system prior to mounting a shelf thereon;

[0028] FIG. **5** is a fragmentary, side elevational view of the system illustrated in FIG. **1** with the wall shown in cross section;

[0029] FIG. **6** is a fragmentary, cross-sectional view taken generally along the plane **6-6** in FIG. **5**;

[0030] FIG. **7** is a fragmentary, front elevational view of the system shown in FIG. **1**;

[0031] FIG. **8** is a fragmentary, cross-sectional view taken generally along the plane **8-8** in FIG. **7**;

[0032] FIG. **9** is a fragmentary, front, isometric view of a second form of the system of the present invention shown installed on a fragmentary portion of a vertical wall;

[0033] FIG. **10** is an isometric view of a subassembly of some of the components shown in FIG. **9**;

[0034] FIG. **11** is a front, isometric view of the shelf support (including the lower clamp jaw) shown in FIGS. **9** and **10**;

[0035] FIG. **12** is a rear isometric view of the shelf support shown in FIG. **11**;

[0036] FIG. **13** is a cross sectional view taken generally along the plane **13-13** in FIG. **11**;

[0037] FIG. **14** is a front, isometric view of the upper clamp jaw of the second form of the system of the present invention shown in FIGS. **9** and **10**;

[0038] FIG. **15** is a front, elevational view of the upper clamp jaw shown in FIG. **14**;

[0039] FIG. **16** is an enlarged, cross-sectional view taken generally along the plane **16-16** in FIG. **15**;

[0040] FIG. **17** is a rear, isometric view of the hanger of the second form of the system of the present invention shown in FIGS. **9** and **10**;

[0041] FIG. **18** is a rear, isometric view of the upper clamp jaw shown in FIG. **14** assembled with the shelf support shown in FIG. **12**;

[0042] FIG. **19** is a front, isometric view of a subassembly of the hanger shown in FIG. **17**, the upper clamp jaw shown in FIG. **14**, and the shelf support shown in FIG. **1**; and in FIG. **19** a portion of the lower clamp jaw is broken away to show interior detail;

[0043] FIG. **20** is a fragmentary, side elevational view of the second form of the system of the present invention shown in FIG. **9** taken generally along the plane **20-20** in FIG. **9**;

[0044] FIG. **21** is a fragmentary, cross-sectional view taken generally along the plane **21-21** in FIG. **20**;

[0045] FIG. **22** is a fragmentary, front elevational view taken along the plane **22-22** in FIG. **20**;

[0046] FIG. **23** is a fragmentary, cross-sectional view taken generally along the plane **23-23** in FIG. **22**;

[0047] FIG. **24** is a fragmentary, front, isometric view of a third form of the system of the present invention shown installed on a fragmentary portion of a wall;

[0048] FIG. **25** is a rear, isometric view of the shelf support (including the lower clamp jaw) shown in FIG. **24**;

[0049] FIG. **26** is a top plan view taken generally along the plane **26-26** in FIG. **25**;

[0050] FIG. **27** is a front, isometric view of the upper clamp jaw shown in FIG. **24**;

[0051] FIG. **28** is a front, elevational view of the upper clamp jaw shown in FIG. **27**;

[0052] FIG. **29** is an enlarged, cross-sectional view taken generally along the plane **29-29** in FIG. **28**;

[0053] FIG. **30** is a rear, isometric view of a subassembly of the upper clamp jaw shown in FIG. **27** mounted in the lower clamp jaw shown in FIG. **25**;

[0054] FIG. **31** is a fragmentary, front elevational view taken generally along the plane **31-31** in FIG. **24**;

[0055] FIG. **32** is an enlarged, fragmentary, cross-sectional view taken generally along the plane **32-32** in FIG. **31**;

[0056] FIG. **33** is a fragmentary, side elevational view taken generally along the plane **33-33** in FIG. **31**; and

[0057] FIG. **34** is an enlarged, fragmentary, cross-sectional view taken generally along the plane **34-34** in FIG. **33**.

DETAILED DESCRIPTION

[0058] While this invention is susceptible of embodiment in many different forms, this specification and the accompanying drawings disclose only some specific forms as examples of the invention. The invention is not intended to be limited to the embodiments so described, however. The scope of the invention is pointed out in the appended claims.

[0059] For ease of description, many of the figures illustrating the invention show a shelving support system in the typical orientation that it would have on a vertically oriented wall, in terms such as upper, lower, horizontal, etc., are used with reference to this position. It will be understood, however, that the components of the shelving support system of this invention may be manufactured, stored, transported, and sold in an orientation other than the position described.

[0060] The shelving support system of this invention is suitable for use with a variety of conventional or special shelves. The shelves, per se form no part of, and therefore are not intended to limit, the present invention.

[0061] A first embodiment of the shelving support system of the present invention is illustrated in FIGS. **1-8**, and is designated generally therein by the reference number **40** in FIG. **1**. The first embodiment of the shelving support system is shown supporting a single shelf **42** on a vertical surface **44**, such as a wall. The shelf **42** is supported on a shelf support **46** which is mounted to a single standard **48** that is attached to the vertical surface or wall **44** by means of one or more suitable fasteners, such as the illustrated screws **50**. The shelf support **46** may be described as a shelf support "bracket," but for convenience herein, the shorter phrase "shelf support" will generally be used for the element **46**.

[0062] It will be appreciated that in the installation illustrated in FIG. **1**, the shelf **42** is a relatively narrow shelf that requires only one shelf support **46**. To provide enhanced stability, the shelf **42** maybe be screwed to the shelf support **46** where suitable screws **55** which are each positioned with the screw head at the bottom of the shelf support and which each has a threaded shank extending vertically upwardly into the shelf **42**.

[0063] It will be appreciated that in more typical shelving arrangements, the shelf **42** is normally much wider (longer) so that it would extend horizontally for a greater distance along the wall or other surface **44**. With such a typically wider or longer shelf **42**, there would be two (or more) standards **48** spaced apart in a vertically oriented, parallel arrangement. At least one separate shelf support would be associated with each vertical standard **48**. Further, typically a plurality of shelves **42** would be mounted with shelf supports **46** in a spaced, vertical array upwardly and downwardly on two or more such standards **48**.

[0064] For ease of illustration, the invention herein is described with reference to the one shelf **42**, the one shelf support **46**, and the one standard **48**. It should be understood

that the invention may be practiced with two or more longer shelves that are each supported by two or more shelf supports **46** mounted to two or more standards **48**. Where wider (longer) shelves are employed and are disposed across two or more shelf supports **46** mounted to two or more standards **48**, it may not be necessary to provide screws **55** for securing the shelves **42** to the shelf supports **46**.

[**0065**] As can be seen in FIG. **2**, the standard has a rearwardly extending first wall **51** and a rearwardly extending second wall **52**. The walls **51** and **52** are spaced apart, and, in the preferred embodiment, are substantially parallel and terminate in rear vertical edges or surfaces for bearing against the surface of the vertical wall **44** or other support surface to which the standard **48** is attached.

[**0066**] With references to FIG. **2**, the first wall **51** defines a column of vertically spaced slots **54** which are adapted to receive an attachment portion of the shelf support **46** as described in detail hereinafter. In one contemplated example, each slot **54** is about five-eighths inch high. As can be see in FIG. **2**, the standard **48** also has a lateral extension **56** which extends laterally beyond the first wall **51** to conceal the slots **54** from view when the standard **48** is attached to the vertical wall or other surface **44** and viewed when looking generally toward the front of the standard **48** (as in FIG. **1**).

[**0067**] In a presently preferred form of the invention, the standard **48** is made from metal, such as steel. A steel sheet (e.g., about one-eighth inch thick in one contemplated example) can be readily punched to form the slots **54** and formed by bending into the configuration of the standard **48**. With such a manufacturing process, the lateral extension **56** is defined by a U-shaped bent portion of the metal having a front leg **58** and a rear leg **60**.

[**0068**] It will be understood, however, that the standard **48** may be made from materials other than metal. The standard **48** could be extruded from a suitable thermoplastic material. The lateral extension **56** need not be formed by a U-shaped portion having legs **58** and **60**—rather, the lateral extension **56** could be provided as a single wall protruding from the injunction of the front wall **53** and first wall **51**.

[**0069**] As can be seen in FIG. **4**, the front wall **53** of the standard **48** is preferably provided with a plurality of vertically spaced-apart apertures **64** for each receiving one of the screws **50** (FIG. **1**) for attaching the standard **48** to the wall or other vertical surface **44**.

[**0070**] As can be see in FIG. **3**, the shelf support **46** can be characterized as having two portions—a shelf support platform **70** and an attachment portion **72**. The shelf support platform **70**, in the preferred embodiment illustrated in FIGS. **3** and **6**, has a generally U-shaped, transverse cross section defined by a (1) first leg **81**, (2) a second leg **82** which is spaced from, and generally parallel, to the first leg **81**, and (3) a connecting web **84** which runs along the length of the bottom of the shelf support platform **70**. The web **84** along the bottom of the shelf support platform **70** defines one or more apertures **86** (FIGS. **3** and **6**) for receiving the shanks of the screws **55** that may optionally be used to screw into the bottom of the shelf **42** for securing the shelf **42** to the shelf support **46**.

[**0071**] As can be seen in FIG. **3**, the shelf support attachment portion **72** is located at the rear end of the shelf support platform **70**. In the preferred form illustrated in FIG. **3**, the shelf support platform first leg **81** extends rearwardly into the attachment portion **72**. The shelf support platform second leg **82** defines a rearwardly facing, vertical, abutment surface **90** for engaging the front of the standard **48** when the shelf support **46** is attached to the standard **48** as can be seen in FIG. **6**.

[**0072**] As can be seen in FIG. **3**, the shelf support attachment portion **72** preferably includes a rearwardly extending portion **81**A which extends rearwardly as a continuation of the support platform first wall **81**. At the rearward end of the extending portion **81**A, the attachment portion **72** defines one or more tabs **92** which each has a cantilevered portion **94** and a foot portion **96**. In the preferred form illustrated in FIG. **3**, there are two such tabs **92**.

[**0073**] As can be seen in FIG. **6**, the tab cantilevered portion **94** extends through one of the slots **54** of the standard **48**. As can be seen in FIG. **8**, the tab foot portion **96** depends downwardly from the cantilevered portion **94** adjacent the standard first wall **51** below the slot **54** to hold the shelf support **46** on the standard **48**. Each tab **92** may be characterized as each extending generally adjacent to, and rearwardly of, the standard lateral extension **56** and standard front wall **53**. Each tab **92** may also be further characterized, in the preferred form illustrated, as extending generally parallel to, and rearwardly of, the standard lateral extension first leg **58**, second leg **60**, and front wall **53**. The shelf support **46** can be formed from sheet steel. It will be understood, however, that the shelf support **46** could be made from materials other than metal (e.g., a synthetic polymer).

[**0074**] Each shelf support **46** can be readily mounted to the standard **48** by inserting the tab **92** into the standard slots **54** and pushing the shelf support downwardly to fully seat the shelf support **46** on the standard **48**. Next, the shelf **42** can be placed on one or more shelf supports **46** attached to one or more standards **48**. Optionally, each shelf support **46** may also be screwed to the shelf **42** as previously described. When the mounted shelving system is viewed generally from the front (e.g., FIG. **1**), the mounting slots **54** in the standard **48** are not visible. Thus, the front of each standard presents a relatively flat front surface that is free of open apertures that might be considered to be aesthetically undesirable and/or that could snag objects placed on the shelf **42** or trap dust.

[**0075**] A second form of the shelving system of the present invention is illustrated in FIGS. **9-23** and is designated in some of the figures generally by the reference number **140**. As with the first embodiment **40** described above with reference to FIGS. **1-8**, the second form of the invention employs one or more standards **48** which are adapted to be mounted to a vertical surface or wall **44** with one or more screws or other suitable fasteners **50** as illustrated in FIG. **9**. The second form of the shelving system **140** includes a shelf support **146** which is attached to a shelf retainer **150** for clamping the shelf **42** between the shelf support **146** and shelf retainer **150**. The shelf retainer **150** and the attached shelf support **146** are mounted together to a hanger **160** which in turn is mounted to the standard **48**.

[**0076**] As can be seen in FIG. **11**, the shelf support **146** includes a rear portion defining a pair of spaced-apart vertical channels **164** which open toward each other, and the

shelf support **146** also includes a forwardly extending or cantilevered, lower clamp jaw **170** on which the bottom surface of the shelf **42** can be disposed as shown in FIG. **20**. The lower clamp jaw **170** is defined by a rim around a concave, hollow region. The jaw **170** could be solid or have other shapes.

[**0077**] As can be seen in FIG. **13**, the shelf support **146** also includes a vertically oriented screw shank-receiving aperture **172** with a countersunk opening **174**. The aperture **172** is not threaded and is adapted to receive the shank **178** (FIG. **19**) of a screw having a head **180** which is adapted to bear against the shelf support at the countersunk opening **174**.

[**0078**] As can be seen in FIGS. **14**, **15**, and **16**, the shelf retainer **150** has slide portions **184** for each being received in one of the shelf support vertical channels **164** as can be seen in FIG. **18**. The shelf retainer **150** also includes a cantilevered upper clamp jaw **190** for engaging the top surface of the shelf **42** (FIGS. **9** and **20**).

[**0079**] As can be seen in FIG. **14**, the lower end of the shelf retainer **150** includes a forwardly projecting lug or boss **200** defining a vertically oriented, threaded bore **206** which, when the shelf retainer **150** is mounted in the shelf support **146** as shown in FIG. **19**, is aligned with the shelf support vertically oriented screw shank-receiving aperture and with the screw shank **178** so that the screw shank **178** can be threadingly engaged with the shelf retainer threaded bore **206** (FIG. **12**).

[**0080**] The shelf retainer **150** also defines one or more apertures **210** (FIG. **15**), and in the preferred embodiment illustrated, two apertures **210** are provided in a spaced-apart, vertical array. As can be seen in FIG. **19**, each aperture **210** is not threaded, but is adapted to accommodate the threaded shank **218** of a machine screw having a head **216**. Each aperture **210** is countersunk to accommodate the screw head **216**.

[**0081**] As can be seen in FIG. **17**, the hanger **160** has a front panel **220** defining one or more horizontally oriented threaded bores **222**. As can be seen in FIG. **19**, the hanger bores **222** are adopted for receiving the screw shanks **218** extending rearwardly from the shelf retainer **150** when the shelf retainer **150** is attached with the screws to the hanger **160** (FIGS. **10** and **19**).

[**0082**] Initially, the shelf support **146** can be adjustably connected to the shelf retainer **150** with the threaded shank **178** of the screw extending upwardly from the bottom of the shelf support **146** into the threaded bore of the shelf retainer boss or lug **200** (FIG. **19**). The assembly of the shelf retainer **150** and connected shelf support **146** can then be attached to the hanger **160** with the two machine screws that each have the head **216** engaged with the shelf retainer **150** and the threaded shank **218** threadingly engaged with one of the threaded bores **222** of the hanger **160**. The connected assembly of the shelf support **146**, shelf retainer **150**, and hanger **160** can then be mounted at a selected elevation on the standard **48** as shown in FIGS. **20-23**.

[**0083**] In order to accommodate the mounting of the hanger **160** to the standard **48**, the hanger **160** includes an attachment portion **230** (FIG. **10**) that extends from the front panel rearwardly. When the hanger **160** is mounted on the standard **48**, the attachment portion **230** may be characterized as extending from the hanger front panel **220** adjacent and rearwardly beyond the standard lateral extension **56** as shown in FIG. **23**.

[**0084**] As can be seen in FIG. **10**, the hanger attachment portion **230** includes a rearwardly extending leg or wall **232** and a rear wall **234** extending from the wall or leg **232**. With reference to FIG. **17**, the rear wall **234** is spaced rearwardly of, and is generally parallel to, the front wall **220**. With continued reference to FIG. **17**, the hanger attachment portion **230** also includes one or more tabs **240**. In the preferred embodiment illustrated in FIG. **17**, the tabs **240** are vertically spaced apart and extend from the rear wall **234**. As can be seen in FIG. **17**, each tab **240** has a cantilevered portion **242** and a foot portion **244** which depends downwardly from the cantilevered portion **242**. As can be seen in FIG. **21**, when the hanger **160** is mounted on the standard **48**, the tab cantilevered portion **242** passes through one of the standard first wall slots **54**, and the tab foot portion **244** extends downwardly from the cantilevered portion adjacent the standard first wall **51** below the slot **54** to hold the hanger **160** on the standard **48**. Each tab **240** may be characterized as being located rearwardly of, and extending generally parallel to, the standard lateral extension **56**.

[**0085**] When the shelf support **146** connected to the shelf retainer **150** sufficiently far below the shelf retainer upper clamp jaw **190**, there is enough space between the upper clamp jaw **190** and the shelf support lower clamp jaw **170** to insert the shelf **42** as shown in FIG. **20**. If necessary, the adjusting screw in the shelf support **146** can be adjusted by engaging the screw head **180** (FIG. **19**) with a screw driver, and rotating the screw to move the shelf support **146** upwardly relative to the shelf retainer upper clamp jaw **190** so that the shelf **42** is tightly gripped between the lower clamp jaw **170** and upper clamp jaw **190**.

[**0086**] The second form of the shelf support system of the present invention described above with reference to FIGS. **9-23** accommodates an optional method of use with a reconfiguration of the components. In particular, in some applications, an installer may not care to have vertical adjustability of the shelf or shelves, and the installer may not wish to employ one or more standards **48** attached to the wall or other vertical surface **44**. Rather, the installer may wish to mount the shelf retainer **150** (with the attached shelf support **146**) directly to the wall **44**. In such a case, the installer would not use the hanger **160** and, of course, would not use the standard **48**. Instead, the machine screws (shown in FIG. **19** with the threads **218**) would be replaced with other suitable fasteners, such as wood screws, or other screws for mounting directly to a wall with or without other fastener devices (e.g., toggle bolt, nylon insert anchor, etc.). The shelf retainer **150** could then be mounted directly to the wall **44**, and the shelf support **146** could then be attached to the shelf retainer **150** with the screw shank **178**.

[**0087**] A third form of the shelving system of the present invention is illustrated in FIGS. **24-34** and is designated in some of the figures generally by the reference number **140**A. As with the first embodiment **40** described above with reference to FIGS. **1-8**, the third form of the invention employs one or more standards **48** which are adapted to be mounted to a vertical surface or wall **44** with one or more screws or other suitable fasteners **50** as illustrated in FIG. **24**. The third form of the shelving system **140**A includes a shelf

support **146**A which is attached to a shelf retainer **150**A for clamping the shelf **42** between the shelf support **146**A and shelf retainer **150**A. The shelf support **146**A, with the shelf retainer **150**A attached, is mounted to the standard **48**.

[**0088**] As can be seen in FIG. **25**, the shelf support **146**A includes a rear portion defining a pair of spaced-apart vertical channels **164**A which open toward each other, and the shelf support **146**A also includes a forwardly extending or cantilevered, lower clamp jaw **170**A on which the bottom surface of the shelf **42** can be disposed as shown in FIG. **24**. These aspects of the shelf retainer **146**A are the same as in the second embodiment of the shelf retainer **146** illustrated in FIG. **13**.

[**0089**] As can be seen in FIG. **26**, the shelf support **146**A also includes a vertically oriented screw shank-receiving aperture **172**A with a countersunk opening. This aspect of the shelf retainer **146**A is the same as in the second embodiment of the shelf retainer **146** illustrated in FIG. **13**. The aperture **172**A is not threaded and is adapted to receive the shank **178**A (FIG. **32**) of a screw having a head **180**A (FIG. **31**) which is adapted to bear against the bottom of the shelf support **146**A at the countersunk opening of the aperture **172**A.

[**0090**] In order to accommodate the mounting of the shelf support **146**A to the standard **48**, the shelf support **146**A includes an attachment portion **230**A (FIG. **26**) that extends rearwardly behind the channels **164**A. When the shelf support **146**A is mounted on the standard **48** as shown in FIG. **32**, the attachment portion **230**A may be characterized as extending from the lower clamp jaw **170**A adjacent and rearwardly beyond the standard lateral extension **56**.

[**0091**] As can be seen in FIG. **25**, the shelf support attachment portion **230**A includes a rearwardly extending leg or wall **232**A and a rear wall **234**A extending from the wall or leg **232**A. With reference to FIG. **25**, the rear wall **234**A is rearwardly of, and is generally parallel to, the channels **164**A.

[**0092**] With continued reference to FIG. **25**, the attachment portion **230**A also includes at least one tab **240**A. In the preferred embodiment illustrated in FIG. **25**, the tab **240**A extends from the rear wall **234**A. As can be seen in FIG. **25**, the tab **240**A has a cantilevered portion **242**A and a foot portion **244**A which depends downwardly from the cantilevered portion **242**A. As can be seen in FIGS. **32** and **34**, when the shelf support **146**A is mounted on the standard **48**, the tab cantilevered portion **242**A passes through one of the standard first wall slots **54**, and the tab foot portion **244**A extends downwardly from the cantilevered portion **242**A adjacent the standard first wall **51** below the slot **54** to hold the shelf support **146**A on the standard **48**. The tab **240**A may be characterized as being located rearwardly of, and extending generally parallel to, the standard lateral extension **56**.

[**0093**] As can be seen in FIGS. **27**, **28**, and **29**, the shelf retainer **150**A has slide portions **184**A for each being received in one of the shelf support vertical channels **164**A as can be seen in FIG. **30** and **32**. The shelf retainer **150**A also includes a cantilevered upper clamp jaw **190**A for engaging the top surface of the shelf **42** (FIGS. **24**, **31** and **33**).

[**0094**] As can be seen in FIG. **27**, the lower end of the shelf retainer **150**A includes a forwardly projecting lug or boss **200**A defining a vertically oriented, threaded bore **206**A which, when the shelf retainer **150**A is mounted in the shelf support **146**A as shown in FIG. **30**, is aligned with the shelf support vertically oriented screw shank-receiving aperture and with the screw shank **178**A (FIG. **32**) so that the screw shank **178**A can be threadingly engaged with the shelf retainer threaded bore **206** (FIG. **32**).

[**0095**] Initially, the shelf support **146**A can be adjustably connected to the shelf retainer **150**A with the threaded shank **178**A of the screw extending upwardly from the bottom of the shelf support **146**A into the threaded bore of the shelf retainer boss or lug **200** (FIG. **32**). The assembly of the shelf retainer **150**A and connected shelf support **146**A can then be mounted at a selected elevation on the standard **48** with the attachment portion **230**A at the rear of the shelf support **146**A as shown in FIGS. **32** and **34**.

[**0096**] When the shelf support **146**A is connected to the shelf retainer **150**A sufficiently far below the shelf retainer upper clamp jaw **190**A, there is enough space between the upper clamp jaw **190**A and the shelf support lower clamp jaw **170**A to insert the shelf **42** as shown in FIGS. **31** and **33**. If necessary, the adjusting screw in the shelf support **146**A can be adjusted by engaging the screw head **180**A (FIG. **31**) with a screw driver, and rotating the screw to move the shelf support **146**A upwardly relative to the shelf retainer upper clamp jaw **190**A so that the shelf **42** is tightly gripped between the lower clamp jaw **170**A and upper clamp jaw **190**A.

[**0097**] Of course, the second embodiment of the system illustrated in FIGS. **9-23** and the third embodiment of the system illustrated in FIGS. **24-34** may be used with a wider (i.e., longer) shelf **42** or shelves supported by a plurality of vertically oriented, parallel, spaced-apart standards **48** to which are mounted the second embodiment assembly of the shelf support **146**, shelf retainer **150**, and hanger **160**, or the third embodiment assembly of the shelf support **146**A and shelf retainer **150**A.

[**0098**] It will be readily apparent from the foregoing detailed description of the invention and from the illustrations thereof that numerous variations and modifications may be effected without departing from the true spirit and scope of the novel concepts or principles of this invention.

What is claimed is:

1. A system for mounting one or more shelves to a generally vertical surface, said system comprising:

(I) a least one standard for being attached to said vertical surface, said standard having rearwardly extending, spaced-apart, first and second walls and having a front wall extending across said first and second walls to define the front of said standard, said standard first wall defining a column of vertically spaced slots, said standard also having a lateral extension extending laterally beyond said first wall to conceal said slots from view when said standard is attached to said vertical surface and viewed looking generally toward said front of said standard; and

(II) at least one shelf support having

(A) a shelf support platform upon which at least a portion of a shelf can be disposed, and

(B) an attachment portion that

(1) is located at one end of said shelf support platform,

(2) extends adjacent and rearwardly beyond said standard lateral extension, and

(3) has at least one tab that

(i) is located rearwardly of, and extends generally adjacent to, said standard lateral extension and standard front wall,

(ii) has a cantilevered portion passing through one of said standard first wall slots, and

(iii) has a foot portion depending downwardly from said cantilevered portion adjacent said standard first wall below said one slot to hold said shelf support on said standard.

2. The system in accordance with claim 1 in which said shelf support platform has a generally U-shaped, transverse cross section defined by first and second, generally parallel, spaced-apart legs which are joined by a connecting web along the length of the bottom of said shelf support platform.

3. The system in accordance with claim 2 in which

said shelf support platform first leg extends rearwardly into said attachment portion; and

said shelf support platform second leg has a rearwardly facing, vertical, abutment surface for engaging said standard front wall.

4. The system in accordance with claim 1 in which

said shelf support attachment portion includes a rear wall generally parallel to, and behind, said standard lateral extension; and

said at least one tab extends from said rear wall.

5. A system for mounting one or more shelves to a generally vertical surface, said system comprising:

(I) at least one standard for being attached to said vertical surface, said standard having rearwardly extending, spaced-apart, first and second walls and having a front wall extending across said first and second walls to define the front of said standard, said standard first wall defining a column of vertically spaced slots, said standard also having a lateral extension extending laterally beyond said first wall to conceal said slots from view when said standard is attached to said vertical surface and is viewed looking generally toward said front of said standard;

(II) a shelf support having

(A) a cantilevered lower clamp jaw on which at least a portion of a shelf bottom surface can be disposed,

(B) a pair of spaced-apart, vertical channels which open toward each other, and

(C) a vertically oriented screw shank-receiving aperture for receiving the shank of a screw;

(III) a shelf retainer having

(A) slide portions received in said shelf support channels,

(B) a cantilevered upper clamp jaw for engaging a top surface of a shelf,

(C) a horizontally oriented screw shank-receiving aperture, and

(D) a vertically oriented, threaded bore aligned with said shelf support vertically oriented screw shank-receiving aperture;

(IV) a first screw having a head bearing against said shelf support and having a shank extending through said shelf support vertically oriented screw shank-receiving aperture and into threaded engagement with said shelf retainer vertically oriented, threaded bore for adjustably holding said shelf support to said shelf retainer to position said lower clamp jaw at a selected distance below said upper clamp jaw thereby clamping said shelf therebetween;

(V) a hanger for mounting said shelf retainer to said standard, said hanger including

(A) a front panel defining a horizontally oriented threaded bore for alignment with said shelf retainer horizontally oriented screw shank-receiving aperture,

(B) an attachment portion that

(1) extends from said front panel adjacent and rearwardly beyond said standard lateral extension, and

(2) has at least one tab that

(i) is located rearwardly of, and extends generally adjacent to, said standard lateral extension and standard front wall,

(ii) has a cantilevered portion passing through one of said standard first wall slots, and

(iii) has a foot portion depending downwardly from said cantilevered portion adjacent said standard first wall below said one slot to hold said hanger on said standard; and

(VI) a second screw having a head bearing against said shelf retainer and having a shank extending through said shelf retainer horizontally oriented screw shank-receiving aperture and into threaded engagement with said hanger horizontally oriented threaded bore to hold said shelf retainer to said hanger.

6. The system in accordance with claim 5 in which said shelf support lower clamp jaw is defined by a rim around a concave region.

7. The system in accordance with claim 5 in which said hanger attachment portion has a rearwardly extending wall extending from said front panel generally perpendicular to said front panel, and has a rear wall that extends from said rearwardly extending wall and that is generally parallel to said front panel.

8. The system in accordance with claim 7 in which said at least one tab extends from said rear wall.

9. A system for mounting one or more shelves to a generally vertical surface, said system comprising:

(I) at least one standard for being attached to said vertical surface, said standard having rearwardly extending, spaced-apart, first and second walls and having a front wall extending across said first and second walls to

define the front of said standard, said standard first wall defining a column of vertically spaced slots, said standard also having a lateral extension extending laterally beyond said first wall to conceal said slots from view when said standard is attached to said vertical surface and is viewed looking generally toward said front of said standard;

(II) a shelf support having

(A) a cantilevered lower clamp jaw on which at least a portion of a shelf bottom surface can be disposed,

(B) a pair of spaced-apart, vertical channels which open toward each other,

(C) a vertically oriented screw shank-receiving aperture for receiving the shank of a screw,

(D) an attachment portion that

(1) extends from said lower clamp jaw adjacent and rearwardly beyond said standard lateral extension, and

(2) has at least one tab that

(i) is located rearwardly of, and extends generally adjacent to, said standard lateral extension and standard front wall,

(ii) has a cantilevered portion passing through one of said standard first wall slots, and

(iii) has a foot portion depending downwardly from said cantilevered portion adjacent said standard first wall below said one slot to hold said shelf support on said standard;

(III) a shelf retainer having

(A) slide portions received in said shelf support channels,

(B) a cantilevered upper clamp jaw for engaging a top surface of a shelf,

(C) a horizontally oriented screw shank-receiving aperture, and

(D) a vertically oriented, threaded bore aligned with said shelf support vertically oriented screw shank-receiving aperture; and

(IV) a screw having a head bearing against said shelf support and having a shank extending through said shelf support vertically oriented screw shank-receiving aperture and into threaded engagement with said shelf retainer vertically oriented, threaded bore for adjustably holding said shelf retainer to said shelf support to position said shelf retainer upper clamp jaw at a selected distance above said shelf support lower clamp jaw thereby clamping said shelf therebetween.

10. The system in accordance with claim 9 in which said shelf support lower clamp jaw is defined by a rim around a concave region.

11. The system in accordance with claim 9 in which said shelf attachment portion includes a rearwardly extending wall and has a rear wall that extends from said rearwardly extending wall.

12. The system in accordance with claim 11 in which said at least one tab extends from said rear wall.

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