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(54) **ALUMINUM FENCE SYSTEM**

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(52) **U.S. Cl.**

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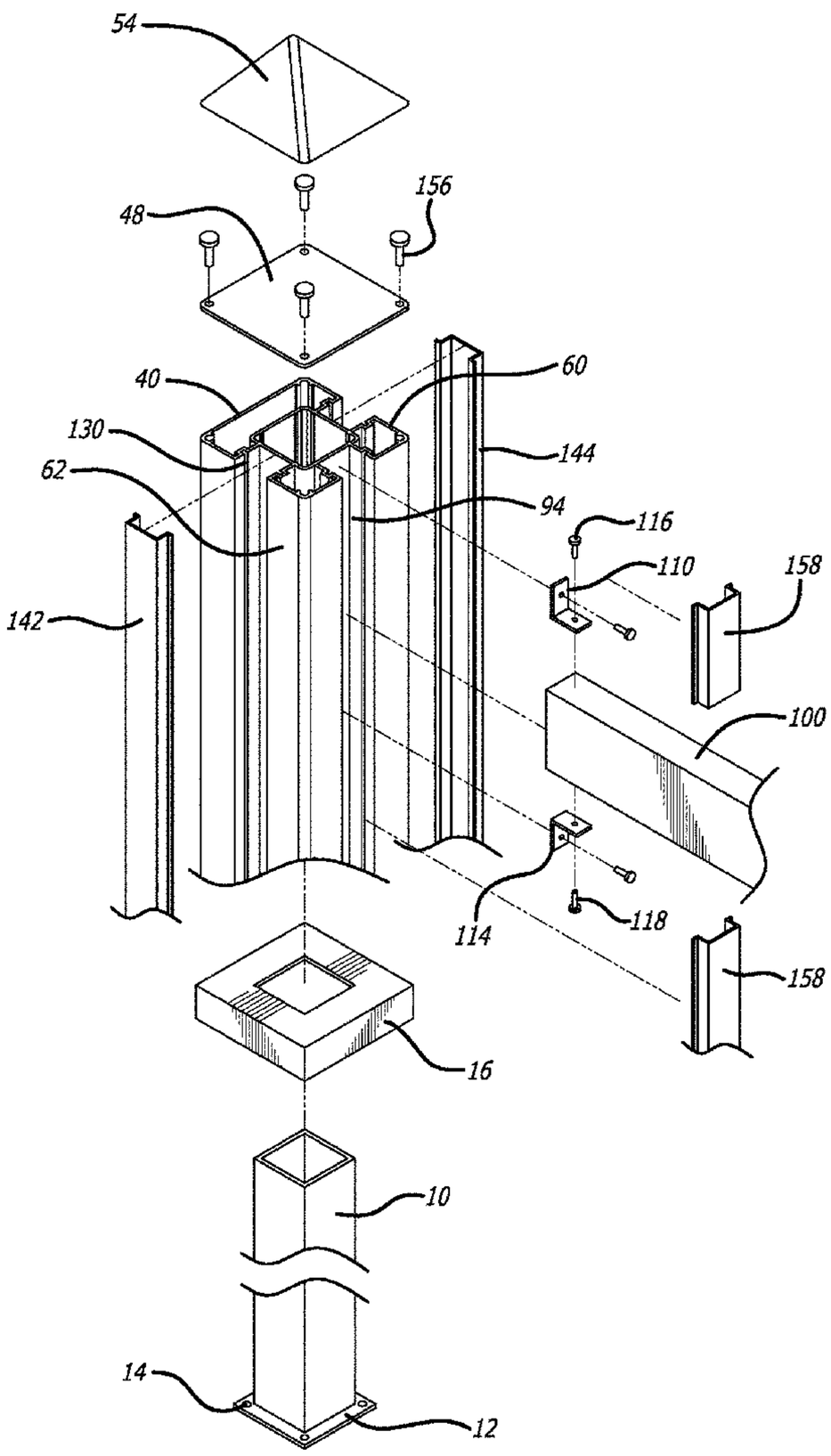
(57) **ABSTRACT**

The fence system attaches to an aluminum or steel rectangular base post in concrete or the ground. The inside wall of a fence column slides over the base post. The fence column also has an outside wall around the inside wall. Three sides of the fence column has an elongated slot which receives one end of a slat. The fence system also has a gate of the same style as the rest of the fence. A lockset housing replaces one fence column. The lockset's latch projects from the other side. A hollow post has a slot facing the latch when the gate is closed. A latch cover is held by the slot, and an extension of the latch cover extends along the lockset housing to block surreptitious opening the gate. Clips may secure transparent, translucent, or opaque panels from the top, bottom, and sides.



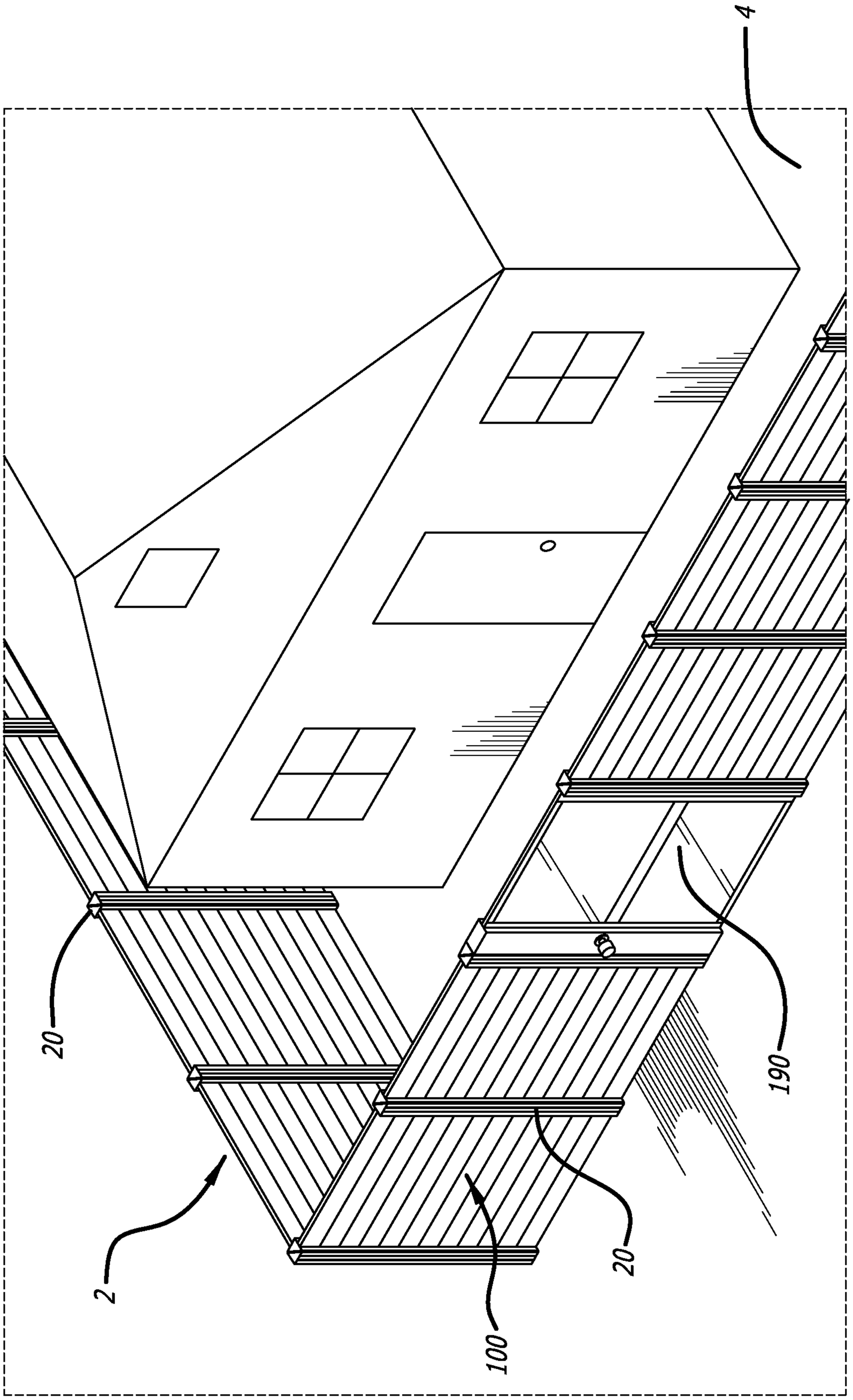


FIG. 1

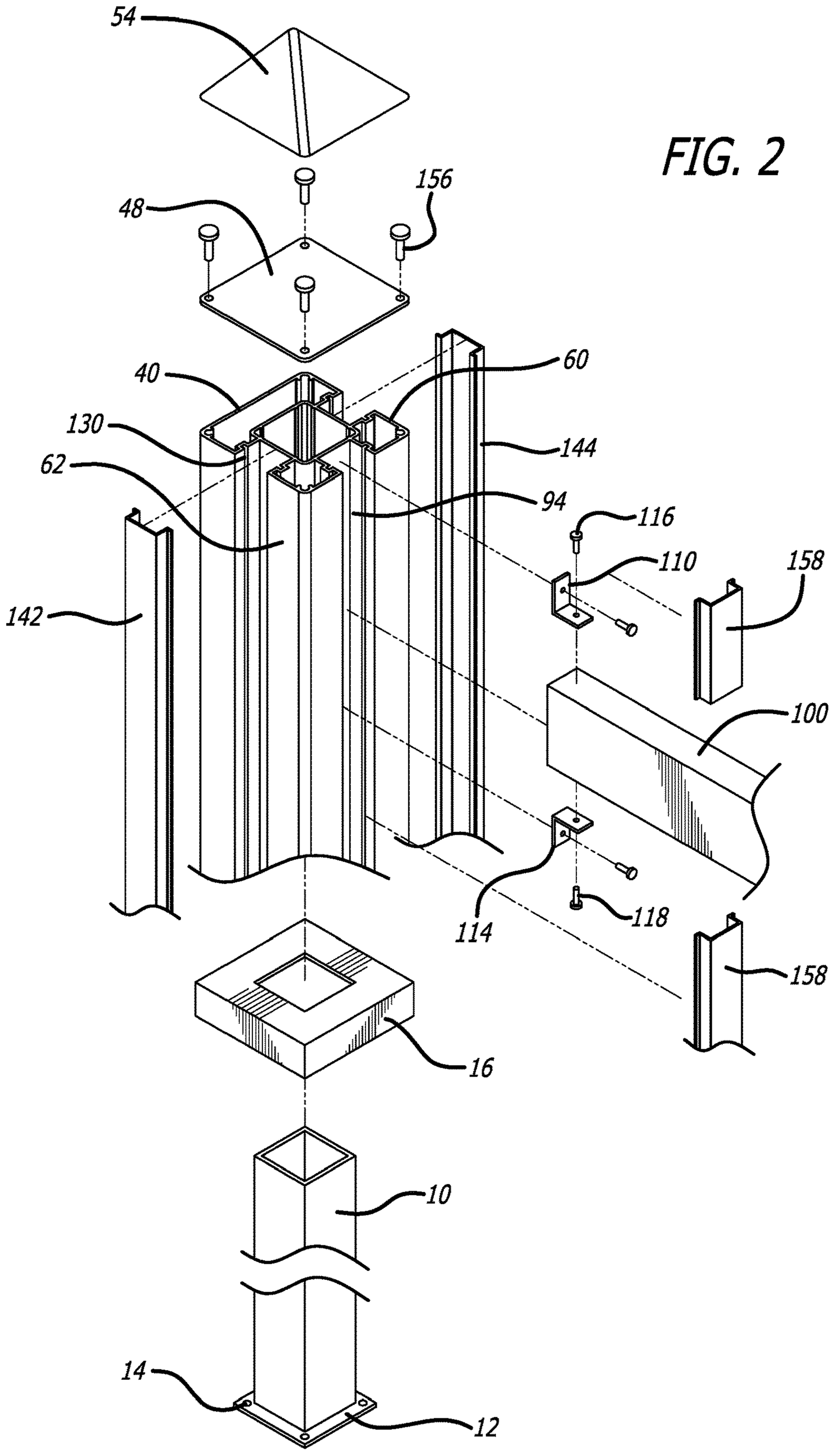

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FIG. 2

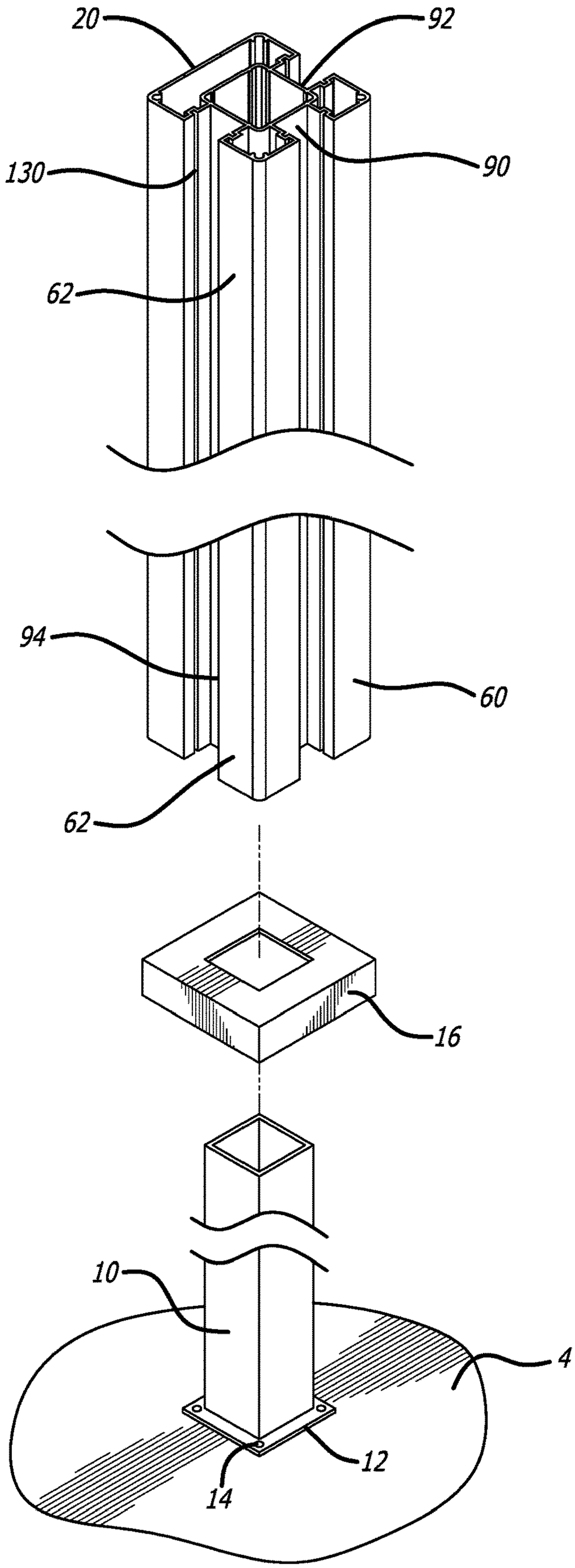


FIG. 2A

FIG. 2B

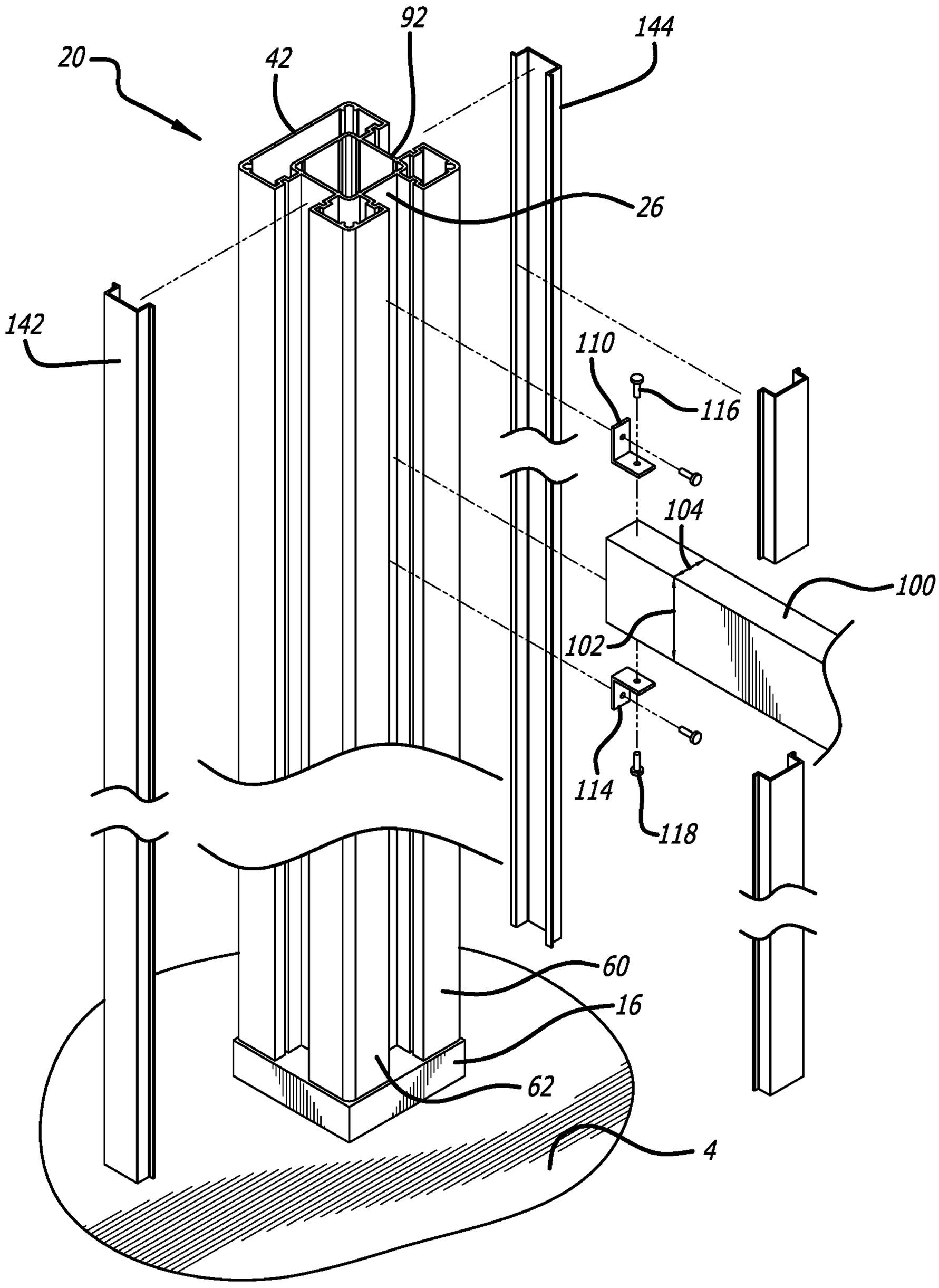
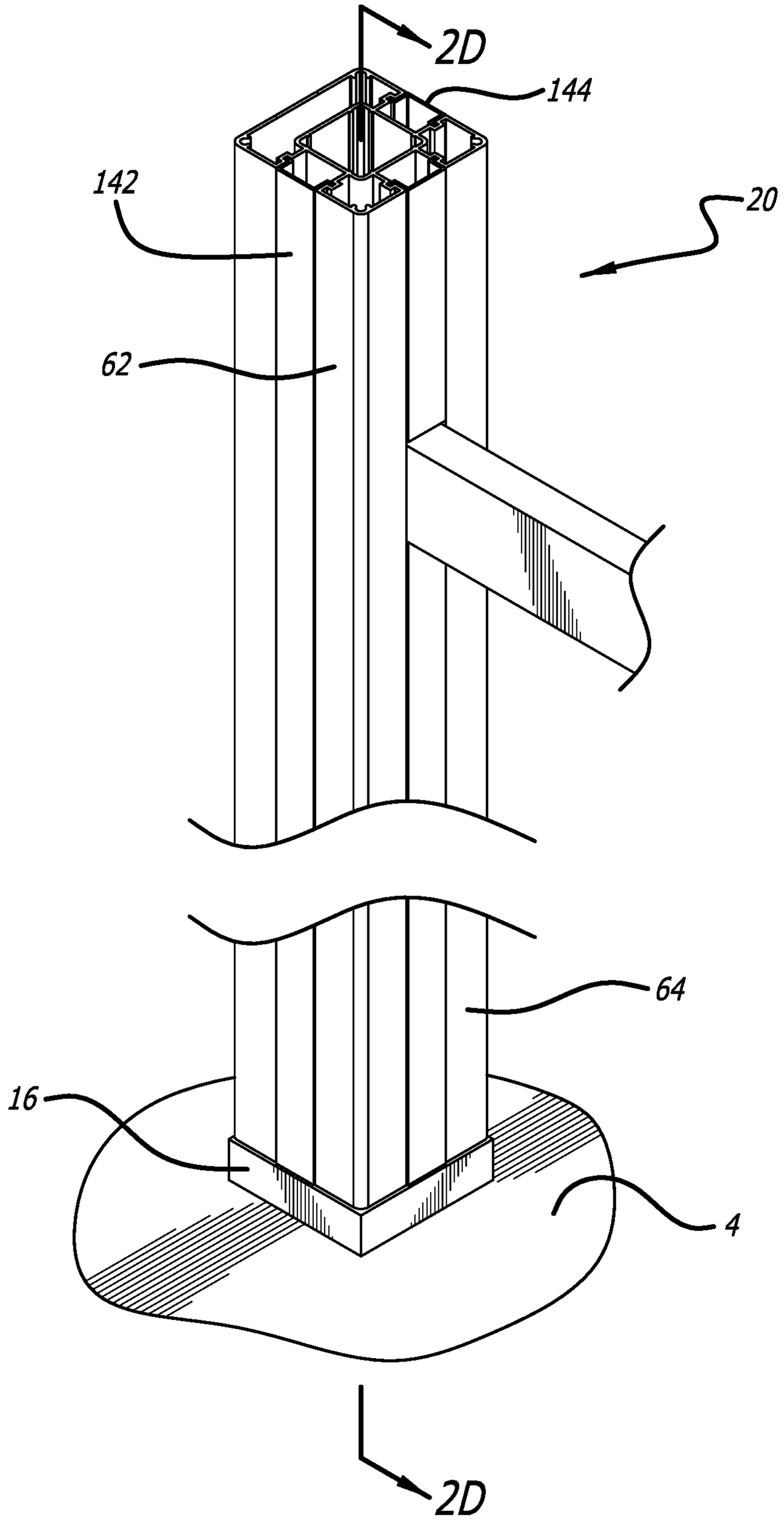


FIG. 2C



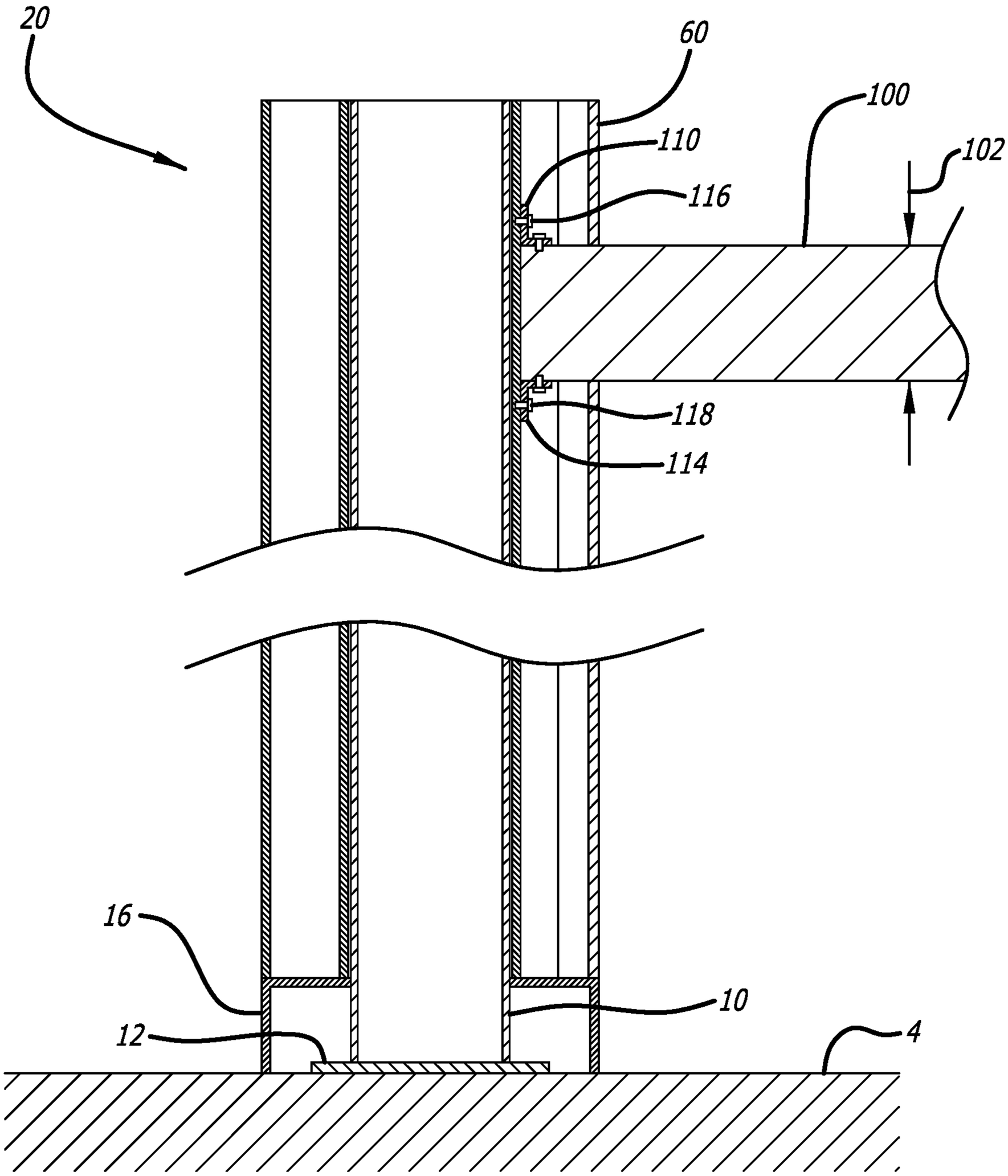


FIG. 2D

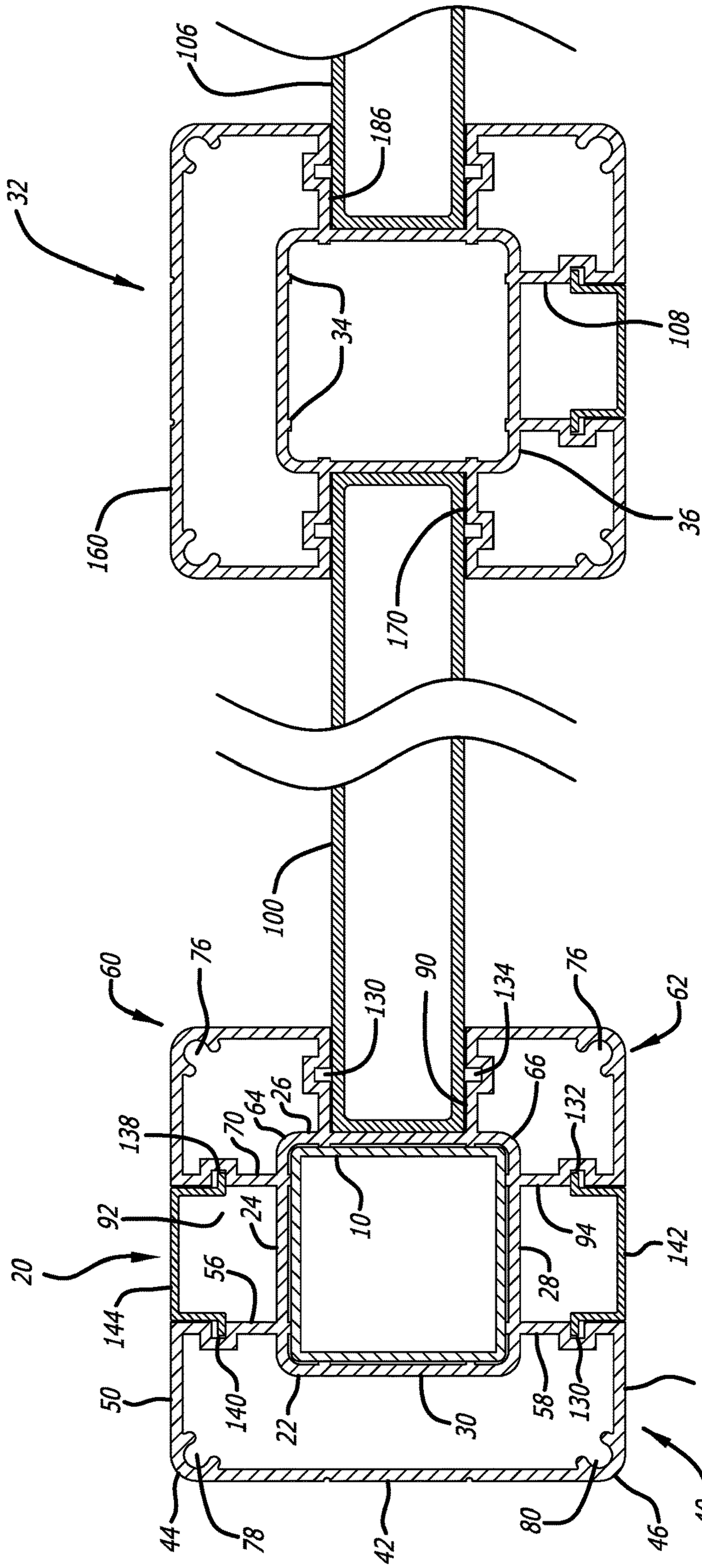

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FIG. 3

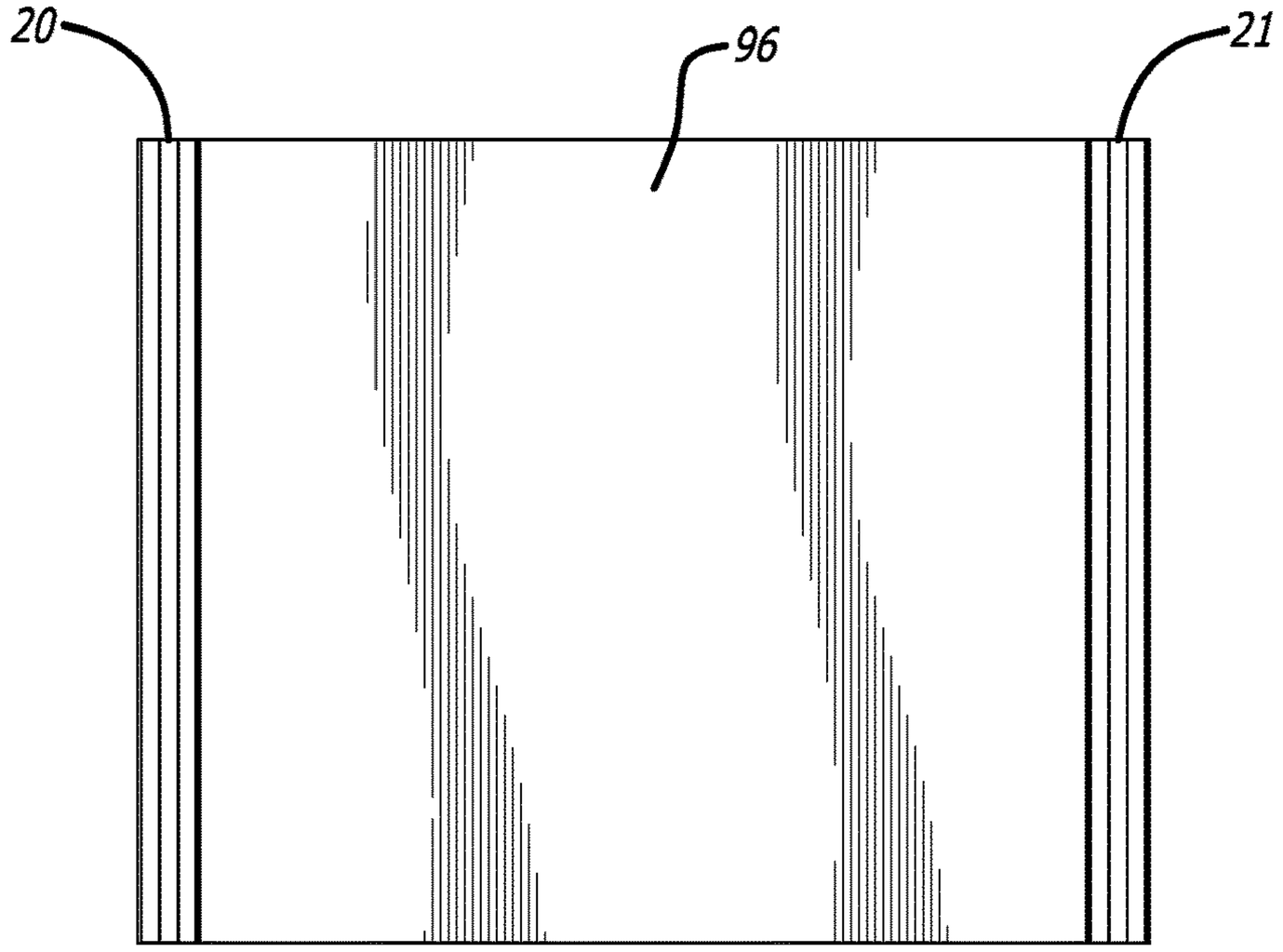

FIG. 4

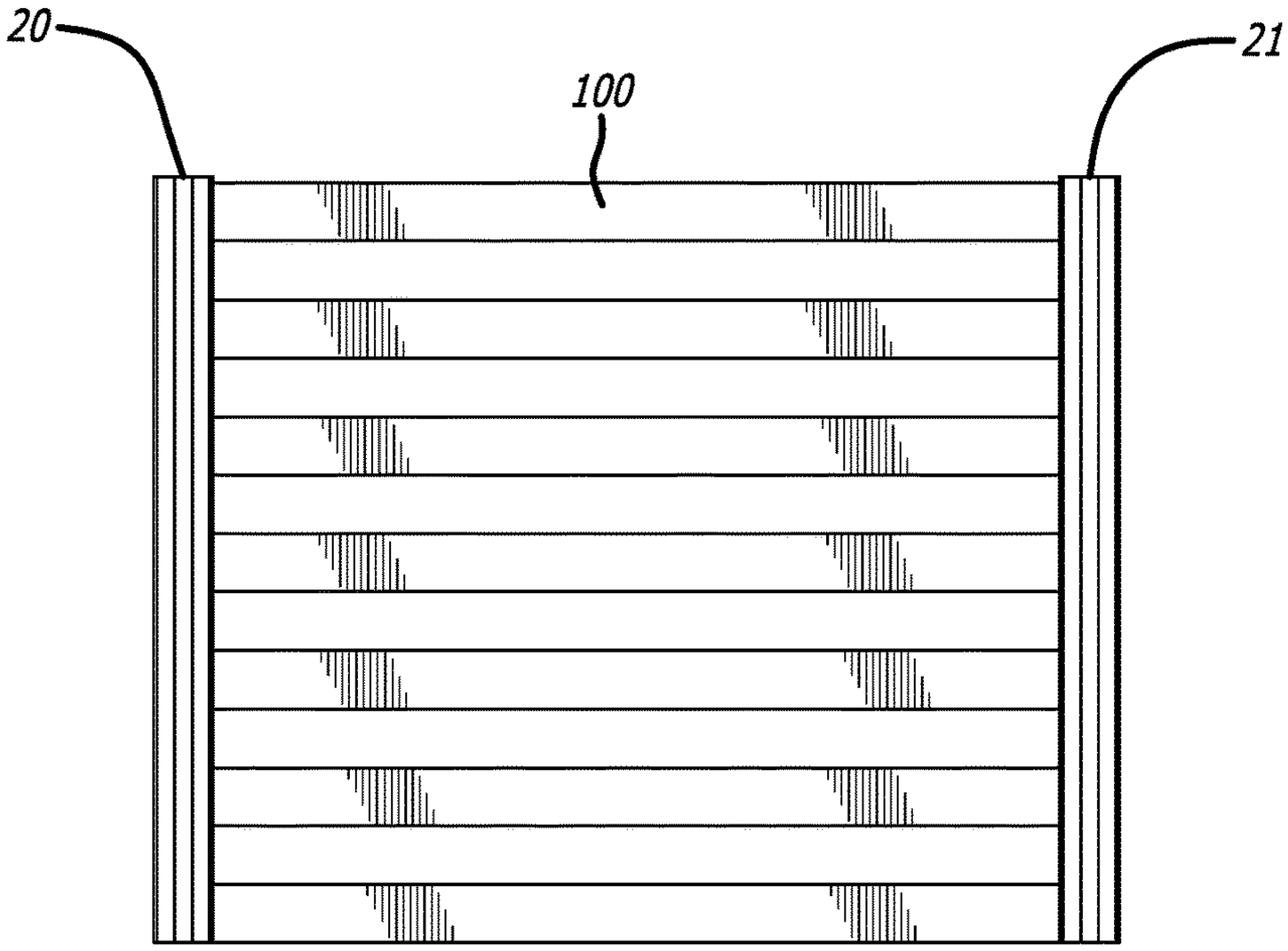

FIG. 5

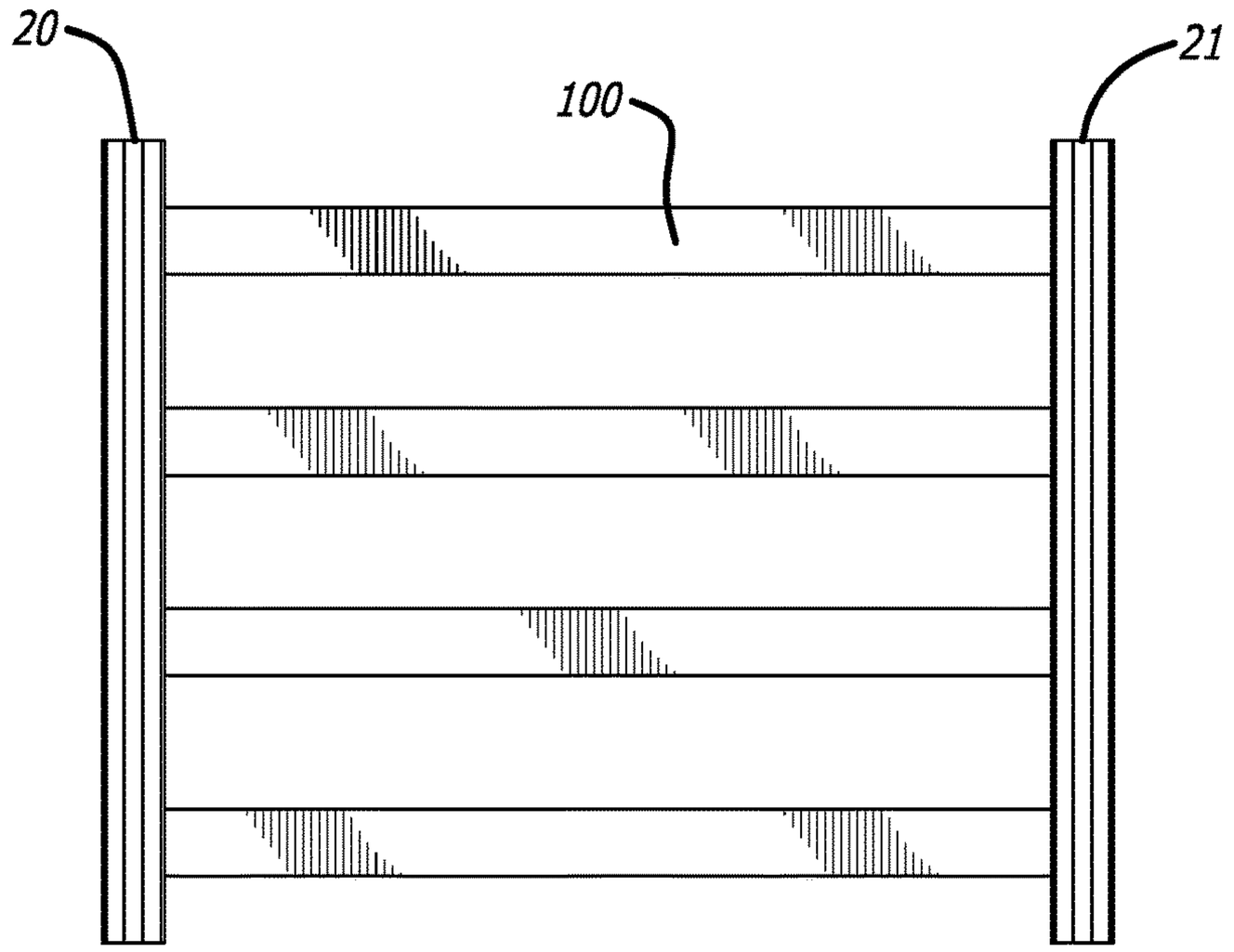

FIG. 6

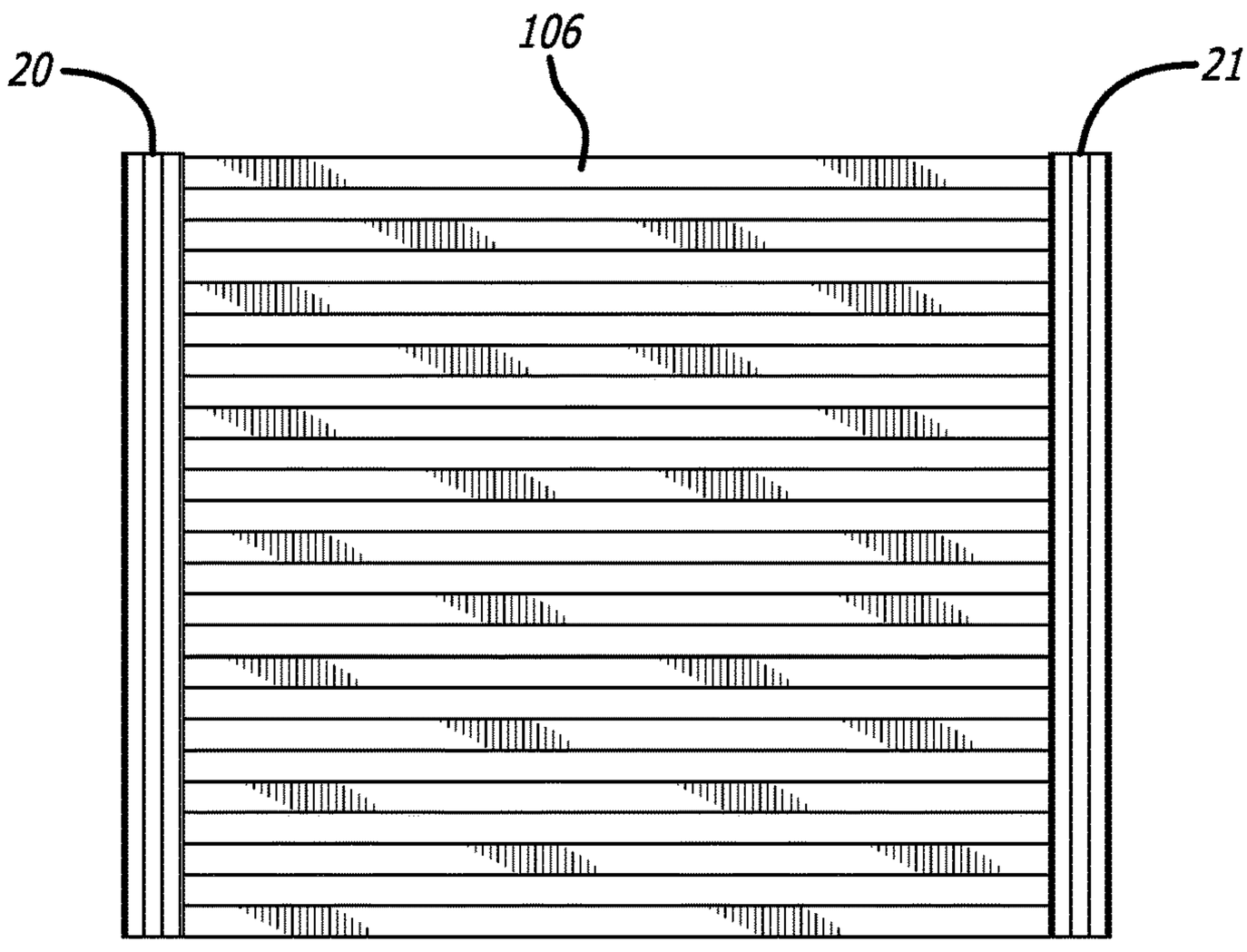

FIG. 7

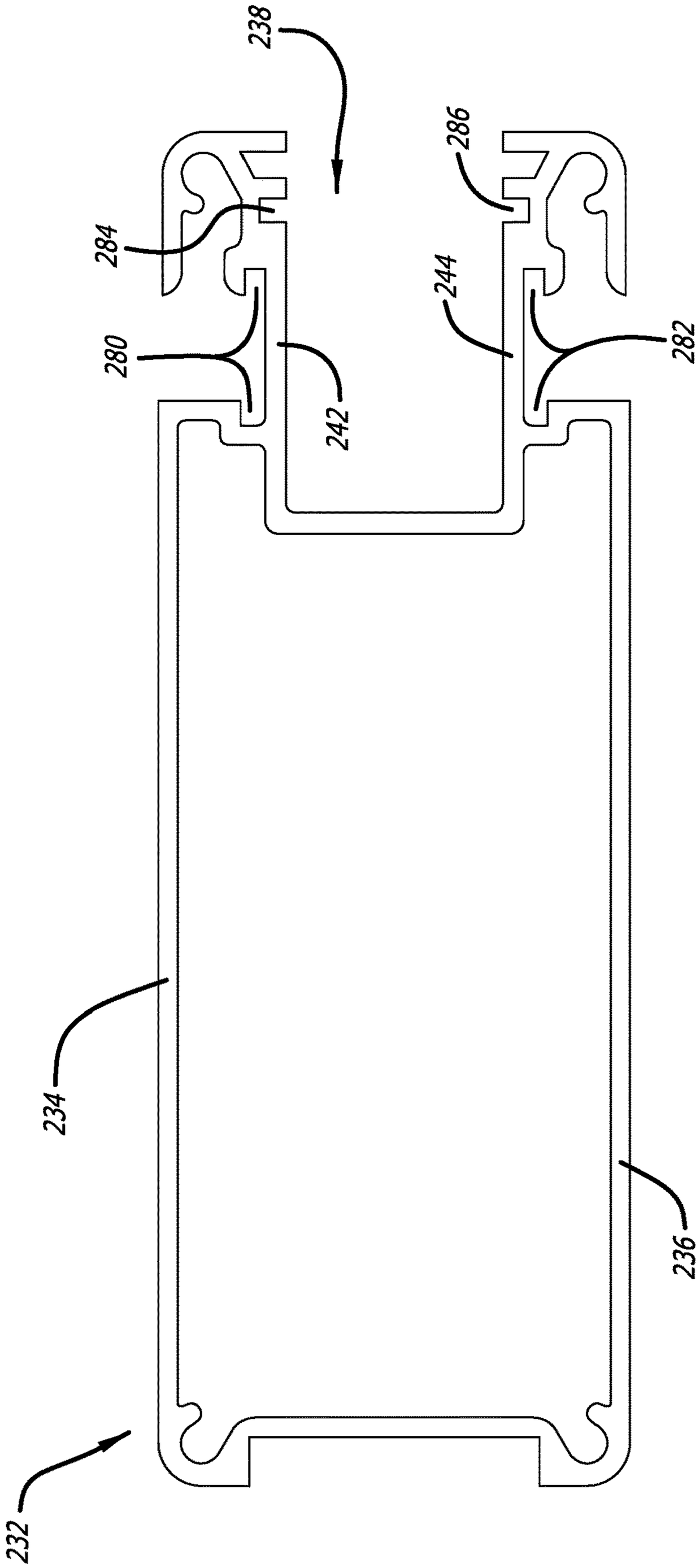

FIG. 8

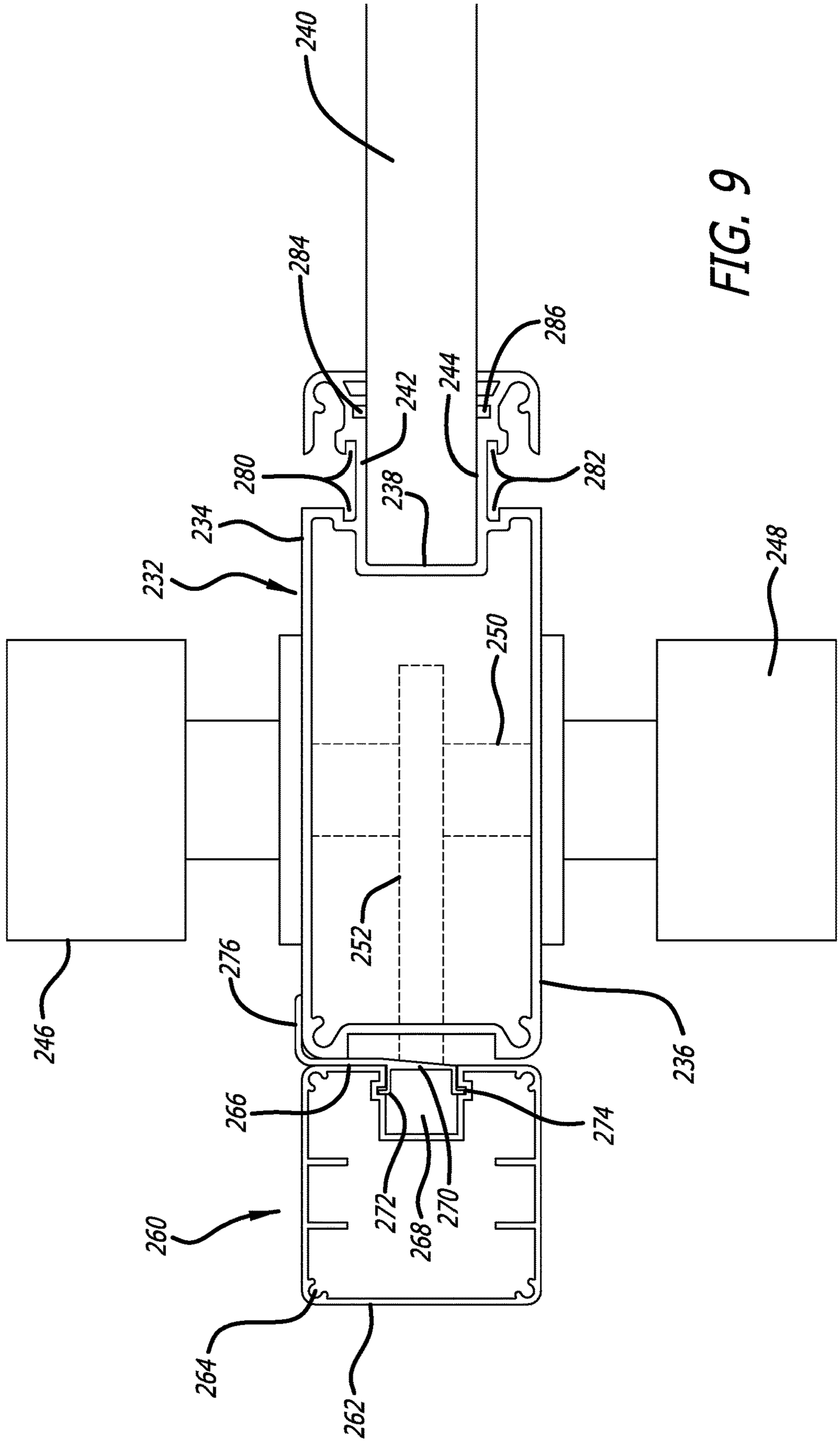
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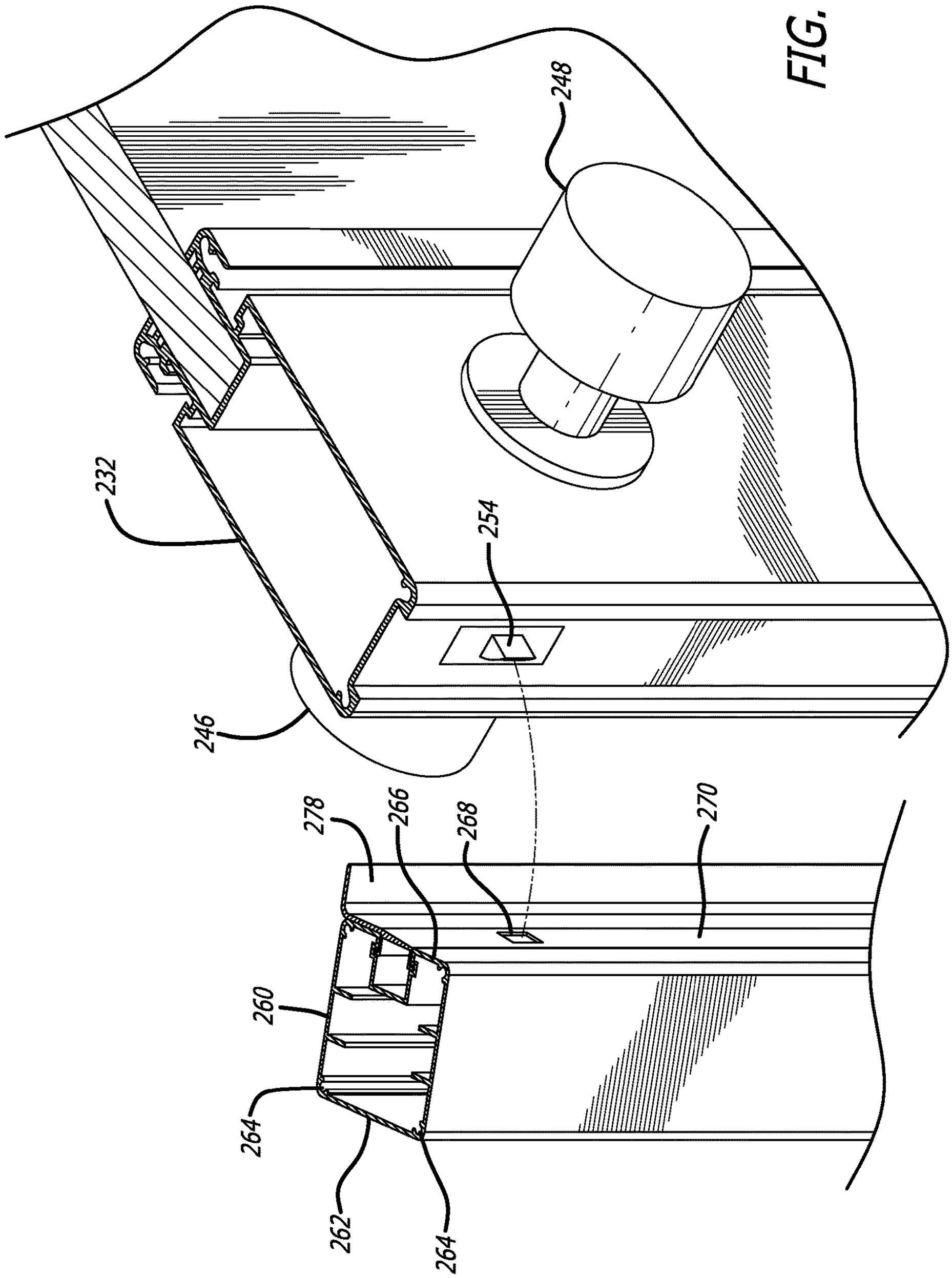
FIG. 9

FIG. 10



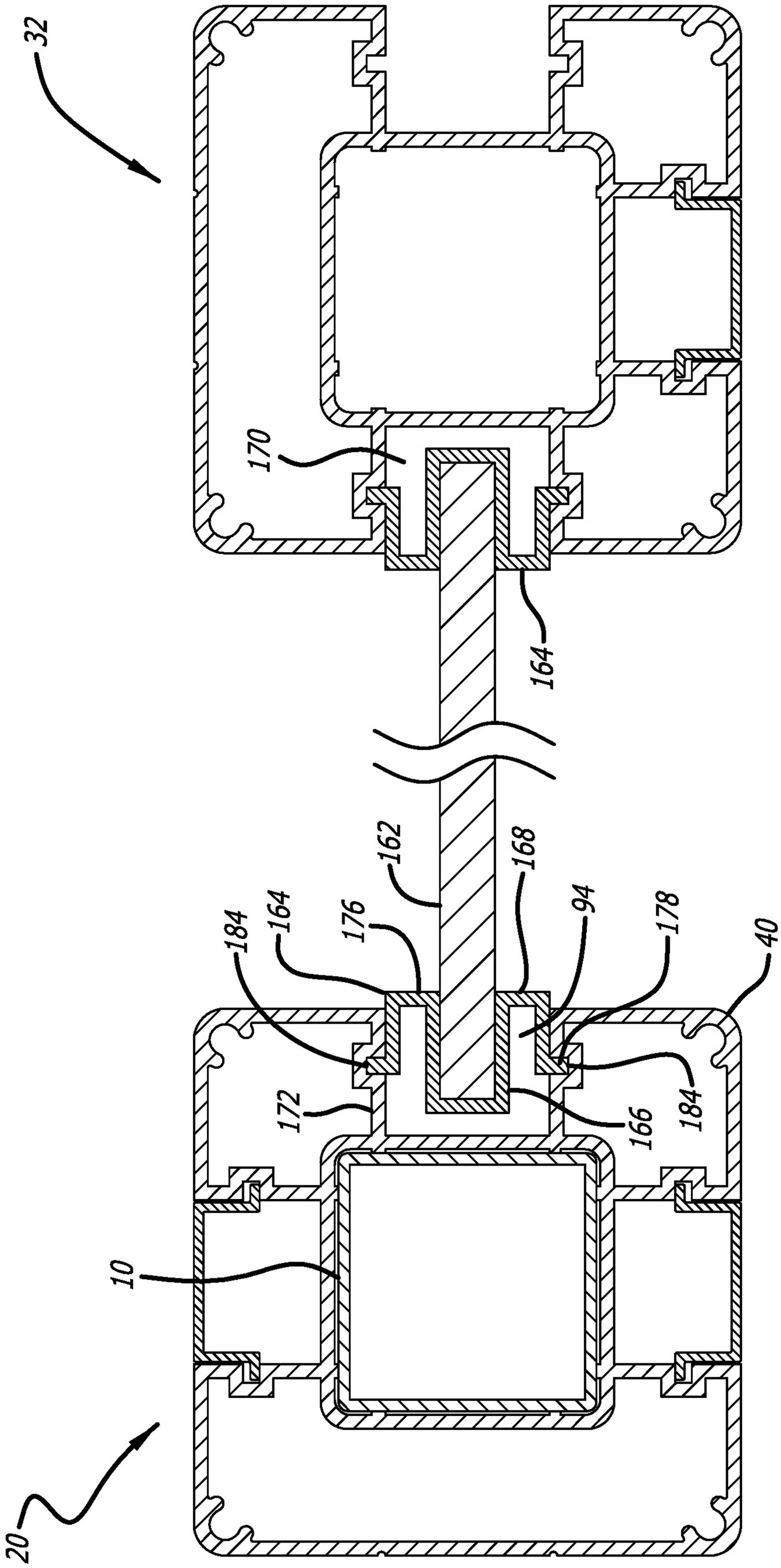


FIG. 11

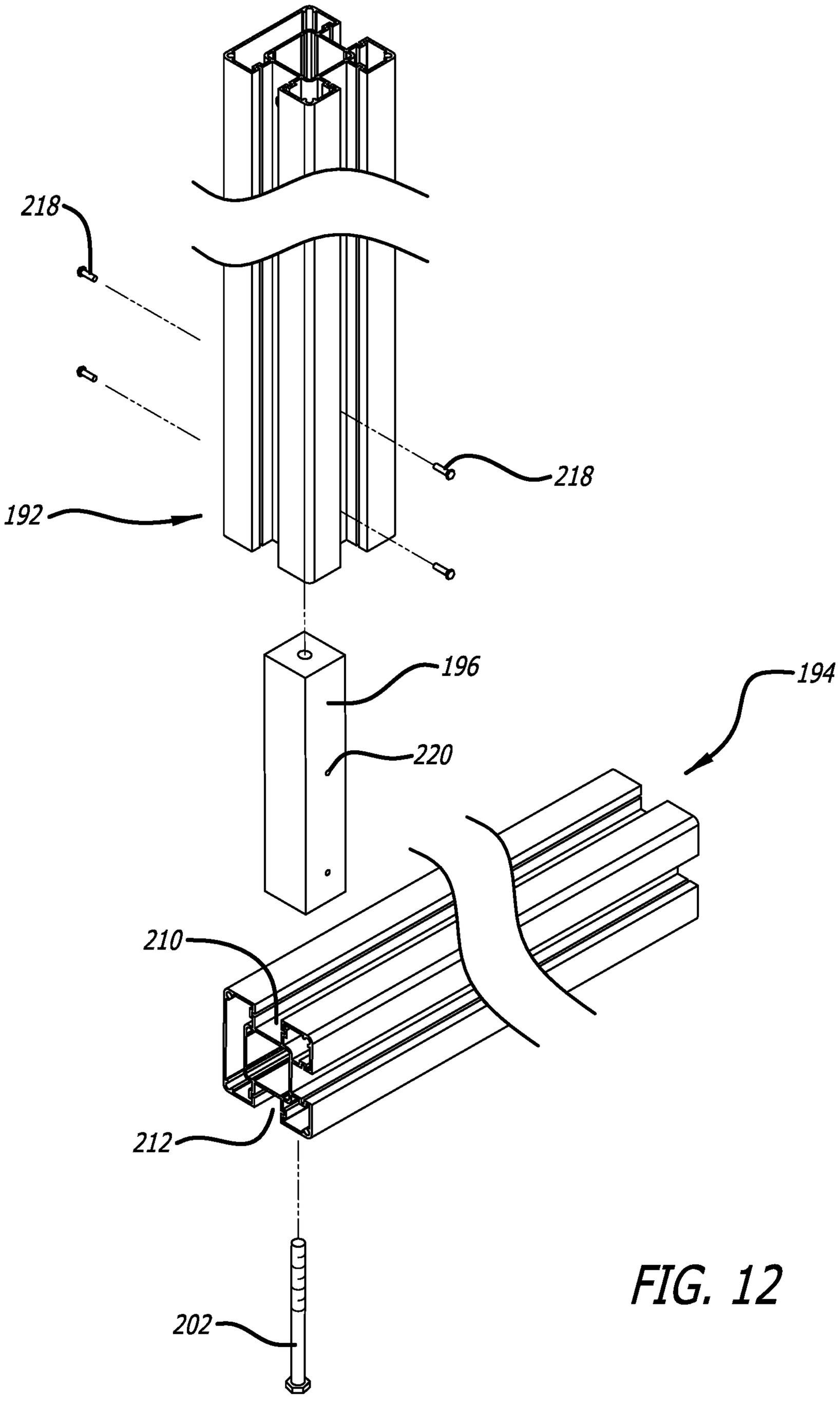


FIG. 12

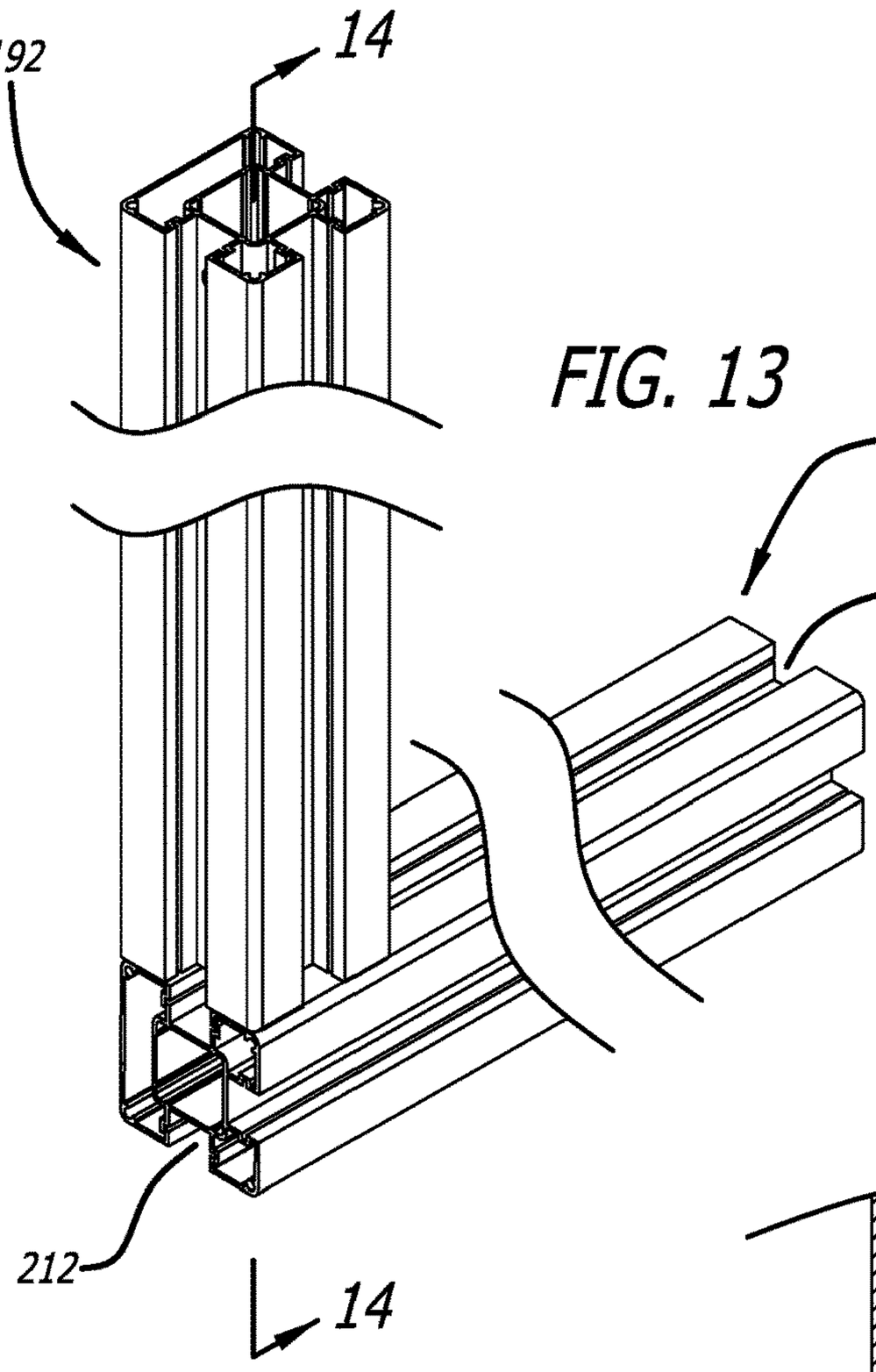


FIG. 13

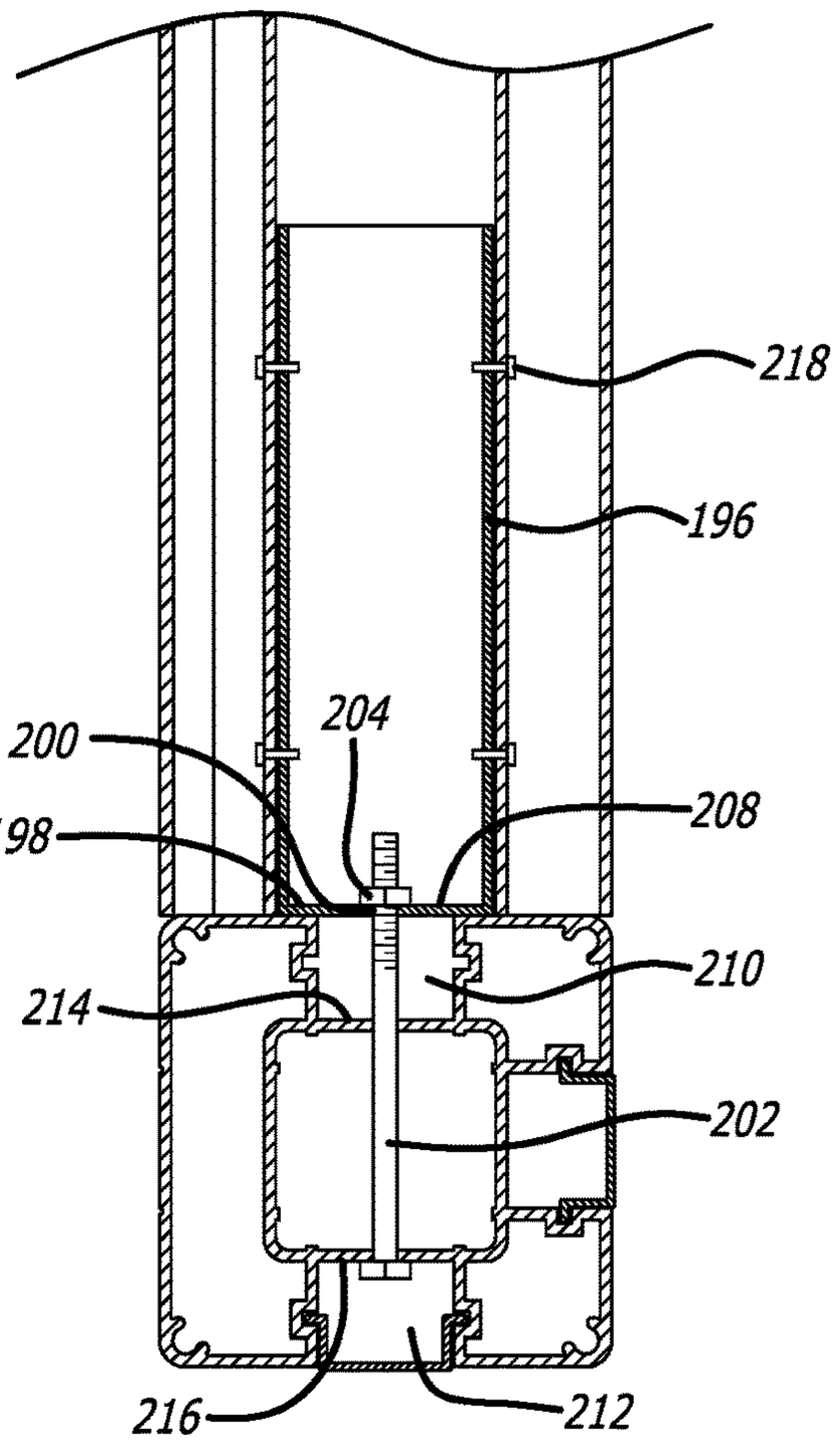


FIG. 14

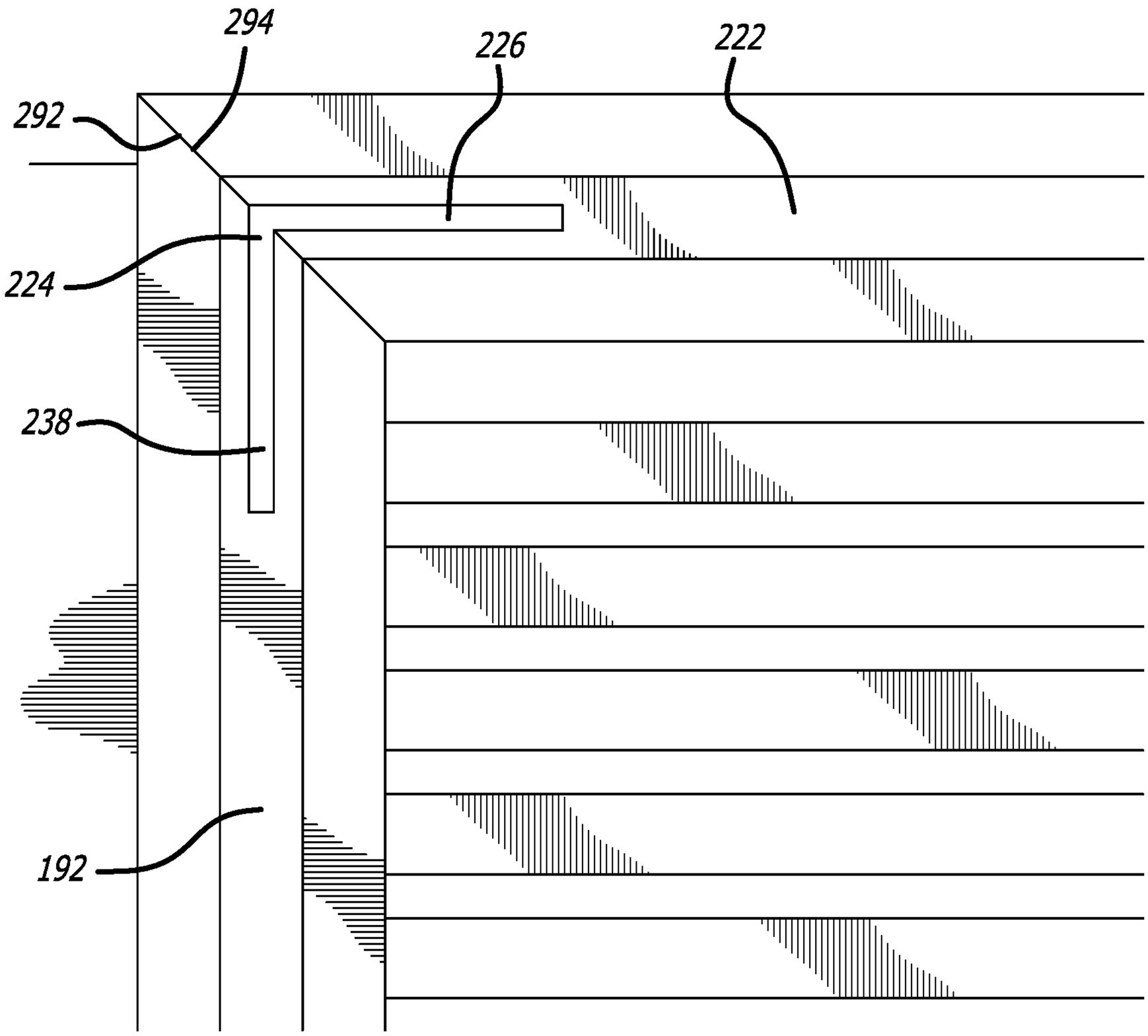


FIG. 15

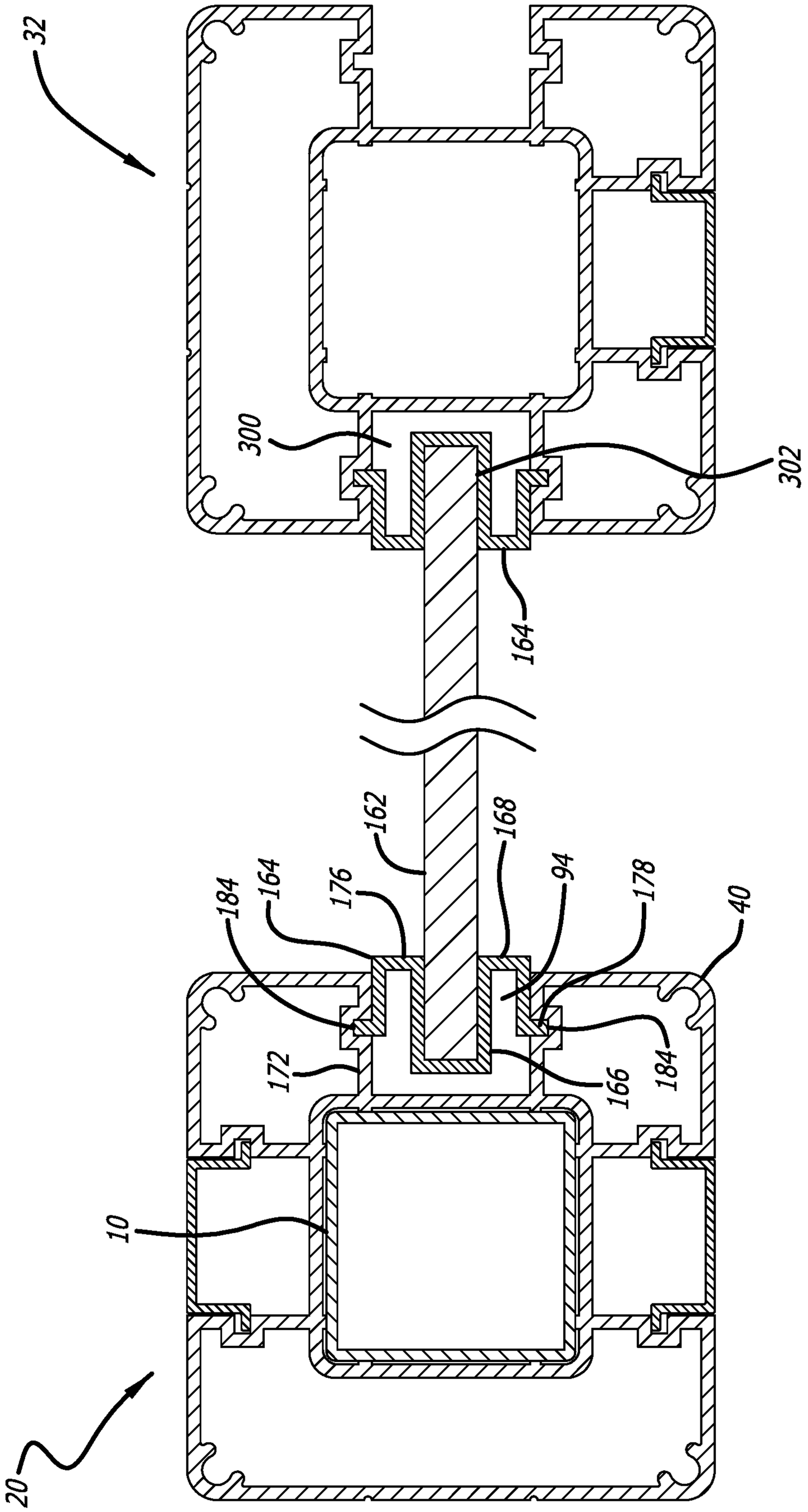
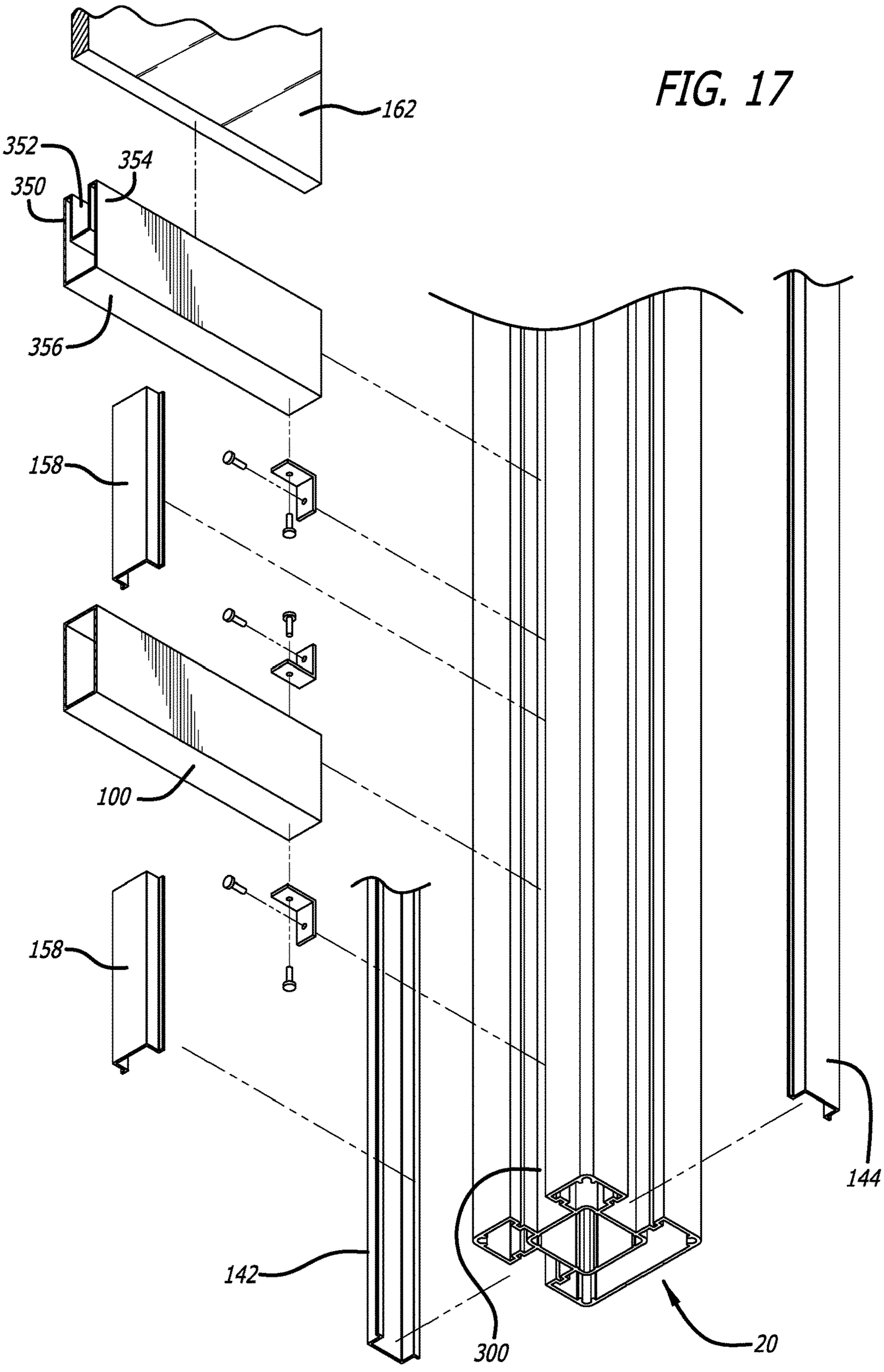


FIG. 16

FIG. 17



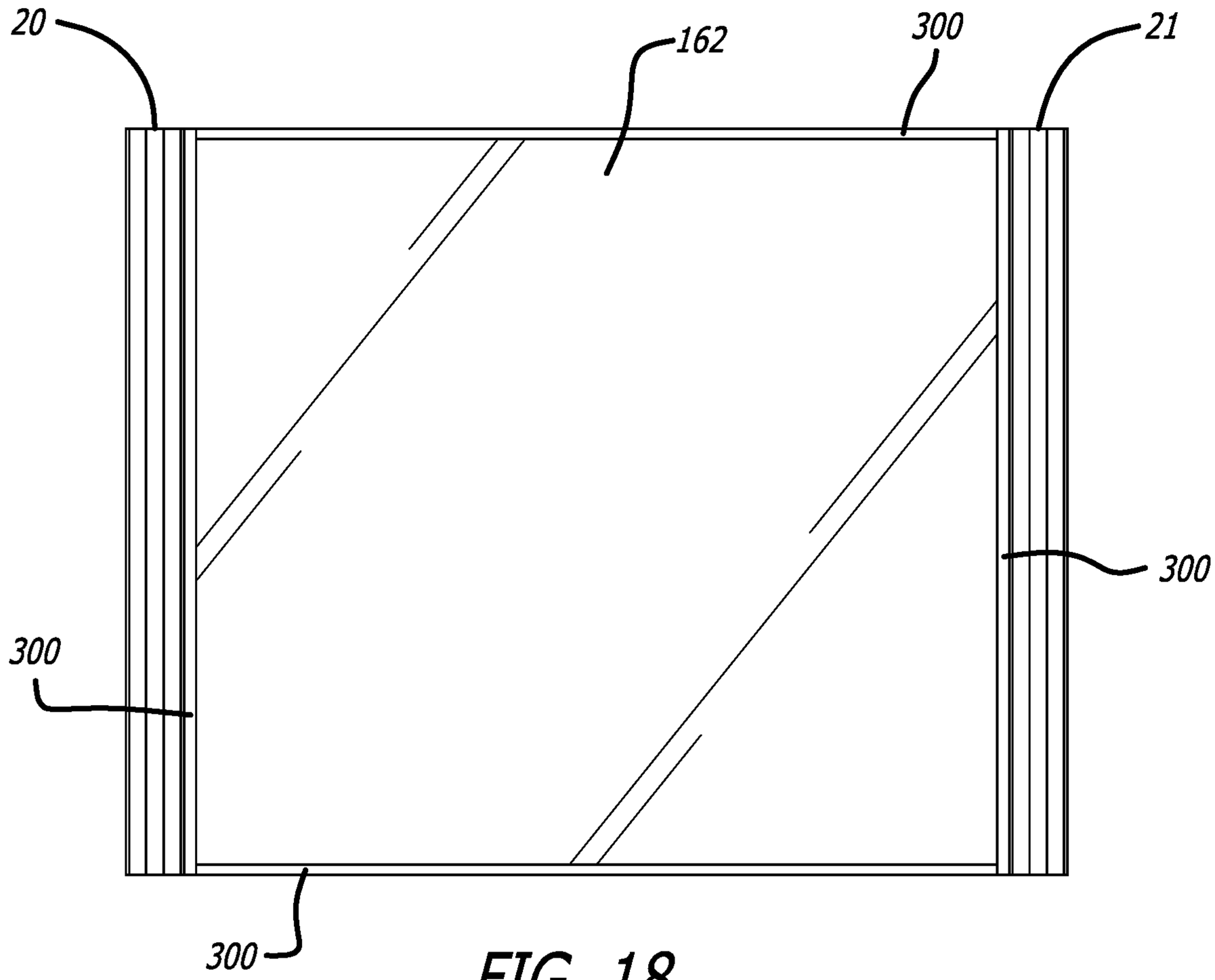


FIG. 18

ALUMINUM FENCE SYSTEM

RELATED APPLICATION INFORMATION

[0001] This patent claims priority from provisional patent application 63/296,126, filed Jan. 3, 2022, entitled ALUMINUM FENCE SYSTEM and is a continuation-in-part of non-provisional patent application Ser. No. 17/898,315, filed Aug. 29, 2022, entitled ALUMINUM FENCE SYSTEM, in order to add paragraphs, figures, and new claims corresponding to new subject matter.

NOTICE OF COPYRIGHTS AND TRADE DRESS

BACKGROUND

Field

[0003] This disclosure relates to fencing systems and gates.

Description of the Related Art

[0004] Many types of residential and commercial fencing exist. One type is pre-cut wooden fence posts with and panels or slats. Installers using those systems may purchase a desired number of posts, sink them with concrete, attach them with crossbars, and nail the slats to the crossbars. These fences have a more rustic, rough-cut feel that some find unattractive for certain applications.

[0005] Wrought iron fencing is also common. It usually is sold in panels, but to fit in the perimeter of a property or yard, panels must be cut to desired lengths with an acetylene torch. Wrought iron also is heavy, about 0.28 lb./in.^{3} though most components of wrought iron fencing are hollow and the pickets are spaced. Wrought iron fencing requires strong metal or brick posts to support them. Gates for wrought iron fencing usually are custom made and sized using a welder. Wrought iron becomes expensive because of the labor costs for a welder, the expense of sturdy posts, and the material and shipping cost of using iron. Wrought iron also is subject to rust and corrosion and needs regular painting especially in damp or rainy climates.

[0006] Chain link fence is widely available and inexpensive. It comes in rolls, and may be installed using standard posts and fittings. Many find chain link fencing unattractive, particularly for higher-end homes, and it often degrades and looks worse over time as fittings loosen, sections sag, and the bottom may become spaced from the ground.

[0007] One fencing solution for modern-style homes is fine-cut redwood or cedar fencing. The slats typically are installed horizontally between vertical posts, but the slats can be installed vertically. The slats may be arranged with wider slats and smaller slats interspersed with one another for aesthetic purposes. The support structure's posts usually are redwood or cedar, but they it may be metal. The posts typically are sunk in concrete or fixed to existing concrete or structures. These fences can be attractive especially for modern homes, but they are labor intensive. To appear appropriately, the slats must be cut precisely. Fine-cut, pre-sanded, and fine-grained redwood or cedar which are typically used is costly, three to five times the price of rough-cut fence slats. Though redwood and cedar resist weathering better than other wood, rain, snow, ice, and sunlight can still cause degradation so components must be replaced or at least periodically re-sanded and stained or painted.

[0008] Steel-based systems are said to mimic the shape and clean lines provided by the fine-cut redwood and cedar fences, but working with steel can be difficult. Steel must be cut with an acetylene torch, and a welder usually must attach the slats to steel posts and cross members. Steel slats may be painted and are strong but they can be heavy, difficult to install, and welding each member takes time and money for a professional welder.

[0009] Vinyl fencing systems exist. The vinyl fencing is easy to cut, simple to install, uninform in color (usually white), lightweight, and relatively aesthetically pleasing. However, vinyl stands up to heat quite poorly. The slats sag or fall out and usually must be screwed to a cross member or post. The connections between slats and posts often are visible. The slats themselves cannot be used alone for support because the vinyl is not sufficiently strong and rigid. So, support members are often included and spacing between posts must generally be closer than with metal-based systems.

SUMMARY

[0010] Most components shown herein are made from powder-coated aluminum. Aluminum is lightweight, less than 0.1 lb./in.^{3} (2.8 g/cm^3), substantially less than iron or steel. The light weight allows the persons constructing the fence system to move the aluminum components easily. Shipping is likewise less expensive. The powder coat or anodization can come in many colors and designs. The components here are hollow so any comparison with other material such as wrought iron must account for parts being hollow. For the thicknesses applicant uses, the components can be cut using a conventional electric miter saw and remain strong enough to be placed without additional non-aluminum support.

[0011] The principal components are extruded 6063 alloy powder-coated aluminum. Anodized aluminum is another choice, but powder coating allows for more colors and designs. Several components including a fence column have a complex cross-section for which forming by extrusion is ideal, and the 6063 alloy is a suitable choice for extrusions though other alloys also may be suitable.

[0012] The fence system attaches to aluminum or steel rectangular base posts that attaches to a fence column. The inside wall of a fence column fits over the base post. The fence column also has an outside wall around the inside wall. Each of three side of the fence column has a slot wide enough to accommodate one end of the slats. A bracket attaches the end of the slat to the fence column to secure the slats in place and provide rigidity to the entire structure. Additional slats may be added adjacent to the slat above or below, and spacers may leave space between the slats. The slats may be the same height, or their heights can vary for aesthetic purposes. All slots have grooves so empty slots can

receive a slot cover, and areas between spaced slats can receive covers sized to fit in the space between slats. The slot covers likewise provide uniform spacing between the slats and an overall aesthetic, clean appearance.

[0013] A plate covers the open end on top of the fence column, and self-drilling screws extend through apertures in the plate and secure the plate to the fence column's open end. Other plate covers attach to other open ends of fence columns or similar members used for other than a fence column. An adhesive secures a post cap to the top of the fence column and the plate.

[0014] The fence system also includes a gate, which may have two intersecting members: fence column (vertical) and platform (horizontal). The platform is at the bottom of the gate, and structure like the platform may be at the gate's top. The fence column and platforms may have the same extruded shape. A short post secures the fence column and platform together.

[0015] The horizontal platform is positioned with a slot open upward and a slot open downward. A bolt extends through a hole in the platform to a threated opening in a short post within the fence column to secure the fence column to the platform.

[0016] An L-brace though the centers of the horizontal platform and the vertical fence columns could secure them together. To cover the intersection of the L-brace's horizontal and vertical sections, the adjacent ends horizontal platform and vertical fence column are cut at a 45° angle so they intersect at a right angle and cover the L-brace.

DESCRIPTION OF THE DRAWINGS

[0017] FIG. **1** is a perspective view of applicant's fence surrounding a building.

[0018] FIG. **2** is an exploded view of parts of a fence.

[0019] FIG. **2**A is an exploded view of parts of a fence.

[0020] FIG. **2**B is an exploded view of parts of a fence.

[0021] FIG. **2**C is an exploded view of parts of a fence.

[0022] FIG. **2**D is a sectional front view of a fence through plane **2**D-**2**D in FIG. **2**C.

[0023] FIG. **3** is a sectional plan view of a fence.

[0024] FIG. **4-7** are front views of different slat arrangements of the fence.

[0025] FIG. **8** is a sectional plan view of a component of a fence used as part of a gate.

[0026] FIG. **9** is a sectional plan view of components of a fence used as part of a gate.

[0027] FIG. **10** is a perspective view the door structure of a fence.

[0028] FIG. **11** is a sectional plan view of a section of a fence with a thinner slat like a glass slat.

[0029] FIG. **12** is an exploded, perspective view showing a connection between two fence columns connected at right angles to each other.

[0030] FIG. **13** is a perspective view with the two fence columns connected at right angles to each other

[0031] FIG. **14** is a sectional plan view of structure for a fence through plane **14-14** of FIG. **13**.

[0032] FIG. **15** is front view of a top corner of a fence with an internal bracket.

[0033] FIG. **16** is a sectional plan view of a portion of a fence with a window framed within.

[0034] FIG. **17** is a cross section of an upper or lower window frame.

[0035] FIG. **18** is a front view of a window pane mount for the fence or gate.

DETAILED DESCRIPTION

[0036] Overview: A fence system **2** surrounds or partially surrounds property **4** (FIG. **1**). The fence system's fence column **20** attaches to steel or other metal square, rectangle, or polygon base post **10** (FIGS. **2**, **2**A-**2**D, **3**, **11**). Those figures also show the structure of fence column. Having a base post with the same shape as the base post prevents or limits pivoting of the fence column about the base post. The base post could be round, but that would require a different inside shape of fence column **20**, but a round-to-round connection may allow the fence column to pivot about the base post. Though the specification uses "rectangle," the word encompasses the other shapes. But the drawing show a square or nearly square base with rounded internal and external corners. The gate **190** is shown as fully framed, unlike the surrounding fence portions, but the gate **190** may be fully framed or the slats may be mounted directly into an upright fence post and/or specialized fence post on two sides which form the entirety of the gate frame, when joined with any interior slats.

[0037] Base post **10** can attach to concrete, deck, soil, or to the top of a brick, block, or concrete wall. The base post may be painted or treated to resist corrosion or rust. Base post **10** in FIGS. **2**, **2**A-D attaches to concrete or a deck **2**. The base post in the figures is 1.25 in. (3.175 cm)×1.25 in., but opposite walls may be elongated slightly. Conversions between English and metric are approximated. The base post may have outer flange **12** with screw openings **14** (FIGS. **2**, **2**A, **2**D). Bolts (not shown) secure the flange to concrete. The bolts may extend upward from the concrete when the concrete is poured. Then nuts secure the flange to the bolt and concrete.

[0038] Cover **16** slides over the base post. The inside wall of a fence column slides over the base post (FIGS. **2**, **2**A-**2**D). The cover hides the outer flange and bolts for a pleasing appearance.

[0039] To mount the base post on soil, an 18 in. to 24 in. (46 cm to 61 cm) hole is dug. After concrete is poured into the hole, the base post is pushed into the soft concrete and plumbed to be vertical. Whether base posts **10** are in concrete or soil, the base posts are aimed to account for the path of the fence system.

[0040] Connection of slats to fence column: Fence slats **100** extend between fence columns **20** around property **4** (FIG. **1**). The fence column (FIG. **3** and others) has a base post receiver, inside wall **22**, around base post **10**. The inside wall has four sides **24**, **26**, **28**, and **30** (FIG. **3**). Adjacent inside walls meet at a 3.4 mm (0.13 in.) outside radius. The inside spacing between walls **24** and **28** is 33 mm (1.3 in.), and the inside dimension between walls **26** and **30** is 34 mm (1.3 in.). Inside wall **22** is almost square to fit with the base post **10**. The thickness of the aluminum components may vary, but it typically is 1.78 mm (0.07 in.).

[0041] Screws, other fasteners (not shown) or an adhesive may secure the base post to the inside wall, but friction may suffice. See also projections **34** on inside wall **36** of the other fence column **32** (FIG. **3**). Those projections are small enough to allow the base post to pass into the inside wall but the productions deform when the base post is inserted in inside wall **36** to push against the base post and hold the base

post within the inside wall. Fence column **32** on the right side of FIG. **3** does not show a base post within inside wall **36**.

[0042] Fence column **20** also has outside tubular member **40** attached to and spaced outside of inside wall **22** (FIGS. **2**, **2**A-**2**D, **3**, **11**). Because fence column **20** is extruded, "attached" in the context of the fence column means components are in contact or in such near contact that the aluminum maintains the components' positions with each other. The outside tubular member includes base member **42** with first and second ends **44** and **46** (left side of FIG. **3**). The distance between the ends is greater than the length of inside wall **30** (FIG. **3**). The base member's width may be 70 mm (2.8 in.) versus 33 mm (1.3 in.) for inside wall **22**. End walls **50** and **52** continue from end **44** and **46** and then continue as sidewalls **56** and **58** to intersect fourth and first inside walls **30** and **24** (FIG. **3**).

[0043] Three-sided pillars **60** and **62** extend outward near corners **64** and **66** of inside wall **22** (FIG. **3**). Open-ended gaps like gap **76** are at the outside corners of pillars **60** and **62**. Depending on the location of the end of fence column **20**, the gaps receive self-drilling screws **156** for holding cover plate **48** at the top of fence column **20** (FIG. **2**). Gaps **78** and **80** on the ends of outside tubular member **40** perform a similar function. Silicone or other adhesive attaches pyramid cover **54** above cover **48** (FIG. **2**) to keep water, debris, and insects out of fence columns **20**. Cover **48** and pyramid cover **54** may be attached to exposed ends during construction to keep rain or dirt outside the fence column **20** or other appropriate components.

[0044] The sizes and positions of outside tubular member **40** and three-sided pillars **60** and **62** create three slots **90**, **92** and **94** (FIGS. **2**, **2**A-**2**D, **3**). The slots are sized to receive one end of one or more elongated slats such as slat **100** received in slot **94** (FIG. **2**D, **3**, **9**, **10**). The slots' width dimension are wide enough to accommodate one end of a slat like slat **100**. Additional slats may contact the slat below, or the slats may be spaced from adjacent slats.

[0045] Slats **100** may be powder-coated aluminum, which can be cut to length with an electric miter saw. Each slat's width may be 20.6 mm (0.8 in.). The height of each slat may be 140 mm (5.5 in.), 50 mm (2 in.) or another height. The slats in the drawings are rectangular in cross-section and a height **102** that may exceed its width **104** (FIG. **2**B).

[0046] Stainless steel, L-shaped fasteners **110** and **114** and their associated stainless steel, self-driving screws **116** and **118** through wall **26** secure slat **100** to wall **26** at the inside end of slot **94** (FIGS. **2**, **2**B, **2**D). Stainless steel screws work well securing parts like the L-shaped fasteners into the aluminum slats and fence column **20**.

[0047] Each sidewall of slots **90**, **92**, and **94** has opposing grooves **130**, **132**, **134**, **136**, **138**, and **140** (FIGS. **2**, **2**A-D, and **3**) formed during extrusion. Slot covers such as covers **142** and **144** cover unused slots in the fence member (FIGS. **2**B, **3**). Each slot cover has an outside wall **146** and two sides **148** and **150**, each with a distal shoulder **152** and **154**. The distal shoulders are sized to fit in their respective groove like groove **130** (FIGS. **2**, **2**A-**2**C, **3**). When the distal shoulders at the bottom of the slot cover are inserted into the grooves of a slot, the slot cover can be glided through its grooves to cover its empty slot. Though the structure uses grooves in the slots for the slot covers, when the slot cover reaches its final position, they may be fastened with an adhesive or in other ways at their positions in the slots.

[0048] The slats extend from one fence column **20** to adjacent fence column **32** (FIG. **3**). With the three slots **90**, **92** and **94** (FIGS. **2**A-**2**C and **3**), the fence system is not limited to a straight line. In FIG. **3**, for example, slat **100** extends from slot **90** of fence column **20** into slot **170** of fence column **32**. Another slat, **98** extends from slot **186** in the same general direction as slat **100**. Slat **98** also could extend from slot **188** at a right angle to slat **100**. Turning fence column **32** 180° extends slot **188** in the opposite right angle in FIG. **3**.

[0049] Increasing the slots' widths slightly may allow changing the angles that the slats, e.g., **98** and **100**, project from fence column **20** so the fence can accommodate irregular property shapes. Angled slats still are secured by screws through L-shaped fasteners **110** and **118**.

[0050] Slats' Positioning: FIGS. **4** through **7** show four of many possible slat arrangements. FIG. **4** has 140 mm slats **96** in which the bottom of one slat rests on the top of the adjacent slat. From a distance, the arrangement may appear solid. A similar arrangement could have 140 mm slat **100**, 50 mm slat **106** or another height slat or a mixture of them stacked above each other.

[0051] Slats **100** in FIG. **5** are about 140 mm high and are spaced apart about 140 mm apart. The 140 mm slats **106** in FIG. **6** are spaced apart farther than those in FIG. **5**, and the 50 mm slats in FIG. **7** are spaced about 50 mm apart. Note the slats in FIGS. **5** and **7** and the single slat in FIG. **4** are aligned with the top and bottom of the fence columns **20** and **21**, but the top and bottom slats in FIG. **6** are spaced from the top of the fence columns. FIGS. **5** through **7** only use slats of one width. Slats of two different widths and even three or more widths can be used.

[0052] L-shaped fasteners **110** and **118** secure slats to fence columns **20** in fence system with spacing between the slats, (FIG. **2**). That spacing could leave parts of slot **94**, the L-shaped fasteners **110** and **114**, and screws **116** and **118** visible and exposed. Spacers **158** (FIGS. **2**, **2**C) can cover those parts of the otherwise open slot. Spacers have the same shape as slot covers **142** and **144**. After one slat **100** is secured in place, spacer **158** is slid through grooves like groove **130** and **134** until it contacts the slat. Then another slat is slid through the slot and secured to wall **26**. The process continues until the top slat is secured to its position.

[0053] A window of transparent material like glass or plastic **162** may replace one or more aluminum slats (FIG. **11**) reliant upon a slot cover of a different form. The transparent material allows light to shine through, and the resident and guests can see out. The window also could be frosted or translucent to allow light to pass through it.

[0054] Here, the glass window **162** extends between fence columns **20** and **32** into slots **90** and **170** (FIG. **11**) much as in FIG. **3**. However, the window may be thinner than applicant's aluminum slats, and it may be taller or shorter than any slat. Clip **164** secures the window in the slot. The clip has a U-shaped portion **166**, which is the width of the glass piece. FIG. **11** shows how the window fits in the U-shaped portion. Side projections **168** and **176** may project out from the U-shaped section to about the width of the slot, and distal projections **172** and **178** fit into the slot. Distal shoulders **176** and **180** project outward from wall **172** and **178** into slot grooves **182** and **184** to position clip **164**.

[0055] Alternatively, the clips **164** and **168** may take the form of a U-shaped device fully filling the entirety of the slots **90** and **170** with or without engaging grooves **182** and

184. See FIG. **16**. In such a case, the window **162** may be fully-framed (FIG. **17**) by such clip **164** and **168**. The clip may project outward from the edges of the columns **20** and **32** such that the clips **164** and **168** appear to fully frame the window **162**. See FIG. **17**. Silicone or rubber gaskets may be used to secure and frame the window **162** within the clips **164** and **168**. When mounting the window **162**, it may be fully framed or only framed on two sides.

[0056] Gates: The fence system can include sliding or pivoting door-like gates such as pivoting gate **190** (FIG. **1**). Because gates slide, roll or pivot, they don't attach to concrete, deck or soil. Gates, especially sliding and rolling ones, may be wider than the spacing of conventional fence sections like those in FIG. **1**, so stronger, more rigid tops and bottoms may be desirable.

[0057] The gate may rely upon only two upright members, one on either side of the gate, with the slats forming the frame of the horizontal portion of the gate since the slats themselves are structural and generally made of rigid material such as aluminum. In such a case, the slats operate in much the same way as the fence post and slat combinations. Except, in the case of a gate, the two fenceposts on either side of the gate are not connected to the ground, but instead are joined to two adjacent fixed, fenceposts on either side, one mounted on hinges, the other connected or adjacent and including a latch and catch. This configuration is preferable as both easier to manufacture on site when constructing the fence and having fewer parts.

[0058] In such a case, one of the fenceposts making up the gate, particularly the one nearest the latch, may be of a unique shape (FIGS. **8-10**) which is of a shape designed to have mounted thereon a conventional lockset. The use of the word "conventional" here is important meaning a traditional United States lockset with a mounting position and size of approximately 2 and $\frac{1}{8}^{th}$ inches in diameter. There have existed locksets made for use with thin gate and fence frames that are uniquely manufactured and, typically, thin. These are ordinarily on the order of 1 inch in width and designed for very narrow use. They operate adequately, but are expensive, cannot be keyed to the same key as the home around which the gate is located, and are more difficult to find in different styles than a traditional, conventional lockset. So, as used herein the phrase "conventional lockset" means one having a lock bore of 2 and ⅛ inches and the lockset housing **232** (FIG. **10**) discussed below is of a sufficient width to accommodate a "conventional lockset" as defined herein.

[0059] Alternatively, the gate may have two intersecting members: fence columns **192** (vertical) and platform **194** (horizontal) (FIGS. **12-13**). Both may have the same shape as fence column **20** (FIG. **3**). Using the same fence columns allows builders to keep one component in inventory for both locations, but different dimensioned fence columns could be used. Applicant uses horizontal platform **194** at the bottom of gates (FIGS. **12-13**), but the horizontal platform also can be used on fence sections that are not gates.

[0060] Vertical fence column **192** extends upward from horizontal platform **194**. See FIGS. **12-15**. The horizontal platform becomes a base with its bottom aligned with and at a right angle to the vertical fence column. Instead of a base post attached to the ground like base post **10** in FIGS. **2**, **2**A, **2**D, and **3**, applicant uses a short post **196** secured to vertical fence columns **192** and to horizontal platform **194** (FIGS. **12**, **14**). Those figures show one short post, but a gate usually has at least two short posts at opposite sides of the gate. Longer gates also may have one or more intermediated, spaced-apart, short posts to improve support.

[0061] Short post **196** may be hollow and have the same outer dimensions as base post **10** (FIG. **3** and others). The short post may be coated carbon steel or stainless steel to withstand corrosion. Instead of using bolt **210** and nut **204**, the bottom end **208** of the short post may be welded shut, and the end would have a threaded opening **200** for receiving a modified bolt like bolt **202** (FIGS. **12** and **14**). A drilled hole (not numbered) extends through inside walls **214** and **216** of the horizontal platform and through the bottom wall **198** if short post **196** (FIG. **14**).

[0062] To install the short post, horizontal platform **194** is positioned with slot **210** open upward and slot **212** open downward (FIGS. **12-14**). Bolt **202** fits through the holes and engages threaded opening **200** to connect to the short post. FIG. **14** shows nut **204** secured to the end of the bolt, but a nut may be unnecessary when opening **200** and bolt **202** have common threads to be secured to each other. If a nut is used, a locking washer (not shown) between head **206** of the bolt and the horizontal platform **194** also could secure the bolt.

[0063] Until components are aligned, having the bolt remain loose may be advantageous. Smaller screws **218** (FIGS. **12**, **14**) may be threaded through the slots into preexisting, threaded openings **212** in post **196** for securing the post to its fence column. Inserting those screws also may await aligning the components.

[0064] For a wide gate, one or two additional short posts like short post **196** may mount at spaced-apart locations between the ends of the gate. These short posts support a fence column with slots extending to the sides for receiving slats with the layout of the layout used between fence columns.

[0065] Rolling gates have wheels facing downward from the bottom fence column. The wheels may travel over a metal track attached to concrete under the gate. The support for the wheel attaches to a bolt through the bottom fence column (not shown).

[0066] During assembly, slot covers like cover **142** and **144** (FIGS. **2**B and **3**) are slid into place. Then the slats like slats **100** and **106** are inserted in the slots of vertical post column **192** attached by an L-shaped fastener like fastener **110**. The first inserted slat may mount in slot **200** of vertical fence column **194**, or using fasteners, the first inserted slat may be spaced from horizontal platform **194**.

[0067] To make the gate more rigid, a similar arrangement of the horizontal and vertical fence columns may mount on the top to the gate after the slats are positioned between the vertical fence columns.

[0068] An alternate arrangement for a fence section uses an L-brace **224** (FIG. **15**) to secure vertical fence column **192** and horizontal platform **222** at the top of the fence section. The L-brace may be steel for strength and may be formed from one square, hollow crosspiece with outside dimensions the same as or like short post **10**'s dimensions. The steel may be treated or painted for rust and corrosion prevention. The L-brace is cut to a desired length at a 45° angle, and one piece is rotated 180°. The 45°-angle ends are welded together to form the L-brace's horizontal section **226** and vertical section **224**.

[0069] The free end **226** of L-brace **220** extends into a center section of horizontal platform **228**, and the L-brace's

vertical section **228** extends into the center section of vertical fence column **232**. FIG. **15** shows neither center section, but they are formed from an inside wall like wall **22** in FIG. **3**. Screws (not shown) through the slots of the fence column and platform into the L-brace secure the fence columns to the L-brace. Because the L-brace is steel, the bracket's holes may be predrilled and tapped.

[0070] To cover the region near the intersection of L-brace **224**'s horizontal section **226** and vertical section **224**, the adjacent ends **292** and **294** of the horizontal platform and vertical fence columns are cut at a 45° angle so they intersect to form a right angle. Self-drilling screws may extend through the fence columns into predrilled holds in L-brace **224** after ends **292** and **294** are brought together tightly.

[0071] For swing gates, a fence column like fence column **20** mounts vertically on a base post like post **10**, attaches to another stationary fence column, or attaches to a concrete, block, stucco, wood, or brick wall. One or more hinges (not shown) attach the fence column that pivots with the gate to the stationary object.

[0072] FIGS. **8**, **9**, and **10** show components for the side of the swinging gate that swings open and close. Lockset housing **232** replaces fence column **20** from other figures. It has two elongated sides **234** and **236**. The right end (FIGS. **8** and **9**) forms a slot **238** that receives slats **240**. The slats are stacked like they are in other sections of the fence. These slats may be held in place by L-shaped fasteners (not shown) like fastener **110** and **118** in FIG. **2**B. Self-drilling screws (not shown) also may extend through walls **240** and **242** near the right end of the lockset housing **232** into the slats. See FIG. **9**.

[0073] Lockset housing **232** receives a lockset, which includes doorknobs **246** and **248** (FIG. **9**). The doorknobs extend through drilled holes (not shown) through elongated walls **232** and **234**. The drilled holes are typically about 3.5 ft. (1.1 m) above the ground. The doorknobs attach to other lockset structure based on instructions often included with purchased locksets.

[0074] Parts of the lockset extend from the doorknobs to a conventional mechanism **250** inside lockset housing **232**. Rotating a doorknob causes the mechanism to move latch assembly **252** to the right (FIG. **9**) to withdraw latch bolt **254** (FIG. **10**). Releasing the doorknobs in the other direction allows the bolt to move outward as FIG. **10** shows. Because the lockset is conventional, and the installer can choose among different locksets, the installer uses components for the chosen lockset. The lockset latch may include a dead-latch plunger to block that may prevent an intruder from using a screwdriver, credit card or other flat device to push the latch inward to open the gate.

[0075] Instead of or in addition to latch **254**, the gate may have a deadbolt lock (not shown) as part of the lockset. Applicant also could use a lock for sliding gates such as a sliding gate lock from Locinox USA. The lockset may use electronics for opening the latch through fingerprint recognition, a numeric combination, or remote through wi-fi or other wireless network protocols.

[0076] Post **260** specifically designed for the gate (FIGS. **9** and **10**) may be extruded aluminum. Its back wall **262** may attach to a building wall to another fence column like fence column **20**. It also may be attached to the ground though a post. Slot **268** in post **260** has gaps **264** at the inside corners the receive screws for attaching a cover. Post **260**'s front wall **266** receives slot cover **270** in grooves **272** and **274** (FIG. **9**), and opening **268** in the slot cover receives latch **254** when the gate is pivoted closed. Front wall **266** includes extension **276** that extends a short distance along elongated wall **236** (FIG. **9**). The extension blocks intruders from reaching latch **252** to force the gate open. Extension **276** should face outward from the property, and the gate opens in toward the opposite direction. See FIG. **10**.

[0077] Narrow walls **242** and **244** at the right side of elongated walls **234** and **236** (FIG. **9**) have grooves **280** and **282** for receiving slot covers (not shown) or slats so that the post **260** may be used without any other posts, interior frame, or horizontal posts along with a plurality of slats and may still self-support and self-frame while providing sufficient space to mount a conventional lockset on the lockset housing **232**. Those covers may be sized to align with the outside surface of elongated walls **234** and **236**. Other grooves **284** and **286** also may receive spacers like spacers **158** (FIG. **2**) between slats.

[0078] Grooves like groove **130** (FIG. **2**) inside the three fence column's slots like slot **90** run the length of the fence column. Slot covers may slide into those grooves to create a near-uniform flat face for the side with the slot cover.

[0079] Having no visible slots makes the fence column smooth and aesthetically pleasing. When slats are installed in a slot, the slot cover hide the slats' open ends and any rough edges made while cutting the aluminum.

[0080] Locating the slots along the fence columns' three sides enables the fence columns to be used for straight fence sections and for corners turning "left" or "right" along a fence row. The final side of the fence column, base wall **42**, has no groove because that side needs no panels installed to that side.

[0081] returning to FIG. **16**, an embodiment of the present system that encloses transparent, translucent, or opaque window **162** is shown. Though discussed as a window herein, other substantially flat panels could be used (e.g. flat sheet of metal, a wooden panel or slats, a plexiglass or plastic panel, and similar materials). Window **162** is held between clips **164** at either side. Clips **300** enclose window **162** at the top and bottom of those panels. Clips **300** can be inserted into slot **90**, **92**, **94** or **170** in the same manner as are slats **100**. In some embodiments, rubber backing or silicone caulk may be used between windows **162** and clips **300** to prevent vibration of the window **162** within the clips **300**.

[0082] FIG. **17** discloses a cross section of an upper or lower window frame **350**. The upper or lower window frame **350** includes no clips and instead is a fully-formed enclosure (in cross section) so that it may be mounted separately from the upright fence posts (or any horizontal fence posts) and may have a flush and aesthetic exterior appearance. There is an upper U-groove **352**, and the sides **354** and bottom **356** fully enclose an interior portion (not labeled). The frame **350** is of a width that it may be mounted so that its two ends fit within a slot in an upright fence post, fully enclosing a window when combined with the clips **300** shown in FIG. **16**.

[0083] Turning next to FIG. **18**, a side view of the panel **162** framed within clips **164** and **300**. Clip **300** is the same width as slots **90**, **92**, **94**, and **170** so that clip **300** may fit into those slots. However, clip **300** does not have slot grooves **184**. This allows clip **300** to fit within slots **90**, **92**, **94**, and **170** perpendicular to clips **164**. Clip **300** is the same as upper or lower window frame **350** and has a U-shaped portion **352**, which is the width of the window **162**. The window **162** fits

in the U-shaped portion **352** of clip **300** in the same manner as it fits into the U-shaped portion of clip **164**. In some embodiments, rubber backing or silicon caulk may be used between windows **162** and U-shaped portion **352** to prevent vibration of the window **162** within the clips **164** and **300**. This configuration shown in FIG. **17** could be used with a fixed fence post set or could form a part of a gate.

[0084] However, clip **300** encloses the top and bottom of the panel **162**, therefore, clip **300** does not contain any distal shoulders to engage with slot grooves.

[0085] Clip **300** can slide into slots **90**, **92**, **94**, or **170** adjacent to (that is, below, on top of, or in between) clips **164**. There, clips **300** may be held in place using L-shaped fasteners **110** and **118**. Alternatively, clips **300** and **164** may be cut at 45°-angles and joined together, similar to the way L-brace sections **226** and **224**, or ends **292** and **294** of the horizontal platform and vertical fence column, are joined together. Neither option requires welding of the aluminum.

[0086] Though the window **162** is shown as a single pane, the window **162** may in fact be multiple panes in much the same manner that the slats may be placed at various places along a given upright post. Individual panes may be separated using covers **142** and **144** and may be held in place with L-shaped fasteners **110** and **118**. Such clips **300** for use on bottom and top to fully-frame the window **162** may not include distal shoulders so that such shoulders do not extend outward from the frame. Instead, such clips **300** may be fully flush on their exterior, providing only a frame around the window **162**. And, the slats and windows **162** may be interspersed or alternated in a given gate (e.g. with a window portion near the top, slats from the ground to waist height). With the clip **300** operating as a separator, fully framing the window **162** within the gate or fence portion and the slats acting to support the gate or fence portion as described above.

[0087] Clips **300** may be oriented with their U-shaped portion **352** pointing up or down to enclose the bottom or top of a panel **162**, respectively. Two clips **300** can be oriented abutting each other, but with their U-shaped portions **352** oriented in opposite directions, in order to put two windows **162** between columns **32** and **20** without leaving a gap between the clips **300**. The clips **300** may be fixed together to help maintain their position and improve strength. Alternatively, two clips **300** can be oriented with space in between them, with their U-shaped portions **352** oriented in opposite directions, in order to put a gap between the two windows **162** and their respective clips **300**. Other numbers of windows **162** and clips **300** may be arranged to place additional windows **162** (or slats) between columns **32** and **20**, with or without spaces between the windows **162** and their respective clips **300**. The description is illustrative, not limiting and is for example only. Although this application shows and describes examples, those having ordinary skill in the art will find it apparent they can make changes, modifications or alterations. Examples may involve specific combinations of method acts or system elements, but those acts and those elements may be combined in other ways to achieve the same objectives. Acts, elements and features discussed only with one embodiment are not intended to be excluded from a similar role in other embodiments.

[0088] "Plurality" means two or more. A "set" of items may include one or more of such items. The terms "comprising," "including," "carrying," "having," "containing," "involving," and similar words in the written description or the claims are open-ended, i.e., each means, "including but not limited to." Only the transitional phrases "consisting of" and "consisting essentially of" are closed or semi-closed transitional phrases regarding claims. The ordinal terms like "first," "second," "third," etc., in the claims don't by themselves connote any priority, precedence, or order of one claim element over another or the temporal order in which acts of a method are performed. Instead, they merely are labels to distinguish one claim element having a certain name from another element having a same name (but for the ordinal term's use). Alternatives like "or" include one or any combination of the listed items. "Applicant" means the assignee of this application at the time of filing.

It is claimed:

1. A fence system comprising:

a first upright fence column, formed of a single piece, the first upright fence column having an inside wall sized to receive a base post and an outside wall around the inside wall;

the first upright fence column including at least one slot extending the length of the first upright fence column from the inside wall toward the outside wall, the at least one slot having grooves along either side, each groove adapted to receive distal shoulders of an extension;

the extension having a length and a height extending from the inside wall through the length of the slot, distal shoulders to engage the grooves, and a U-shaped opening adapted to receive a flat panel;

a horizontal clip extending away from the first upright fence column, the horizontal clip having a width sized to be received in the at least one slot, the horizontal clip having a U-shaped opening adapted to receive a flat panel.

2. The fence system of claim **1** wherein the extension and horizontal clip are cut at 45°-angles and fastened to the first upright fence column.

3. The fence system of claim **2** wherein the horizontal clip is held in place adjacent to the extension using L-shaped fasteners.

4. The fence system of claim **1** wherein the panel is composed of plastic, plastic composite, metal, metal composite, glass, glass composite, wood, wood composite, or a composite of any of them.

5. The fence system of claim **1** further comprising a second upright fence column and a second extension;

the second upright fence column formed of a single piece, the second upright fence column having an inside wall sized to receive a base post and an outside wall around the inside wall;

the second upright fence column including a second at least one slot extending the length of the second upright fence column from the inside wall toward the outside wall, the second at least one slot having grooves along either side, each groove adapted to receive distal shoulders of an extension;

the second extension having a length and a height extending from the inside wall through the length of the slot of the second upright column, distal shoulders to engage the grooves, and a U-shaped opening adapted to receive a flat panel; and

wherein the horizontal clip extends to the second upright fence column.

6. The fence system of claim **5** further comprising a second horizontal clip;

the second extension being slotted into the at least one slot of the first column, the second extension being slotted into the second at least one slot of the second column, the horizontal clip extending from the at least one slot of the first column to the second at least one slot of the second column and having its U-shaped portion opening upward;

the panel being slotted into the extension, second extension, and horizontal clip;

and the second horizontal clip extending from the at least one slot of the first column to the second at least one slot of the second column and having its U-shaped portion opening downward and slotted over the panel.

7. The fence system of claim **6** further comprising a second panel, third horizontal clip, and fourth horizontal clip;

the third horizontal clip above the second horizontal clip and extending from the at least one slot of the first column to the second at least one slot of the second column and having its U-shaped portion opening upward;

the second panel being slotted into the extension, second extension, and third horizontal clip;

and the fourth horizontal clip extending from the at least one slot of the first column to the at least one slot of the second column and having its U-shaped portion opening downward and slotted over the second panel.

8. The fence system of claim **5** wherein the second upright fence column incorporates at least two elongated sidewalls of sufficient width to accommodate a conventional lockset.

9. The fence system of claim **8** further comprising a stationary upright fence column formed of a single piece, the stationary upright fence column having an inside wall sized to receive a base post and an outside wall around the inside wall;

the stationary upright fence column including at least one slot extending the length of the stationary upright fence column from the inside wall toward the outside wall, the at least one slot having grooves along either side, each groove adapted to receive distal shoulders of a latch strike plate;

a latch strike plate having a length and a height extending from the inside wall through the length of the slot, distal shoulders to engage the grooves, a latch opening positioned to receive a latch from a conventional lockset, and a strike extension extending the length of the latch strike plate for engaging the outside wall of the second upright column when the gate is closed.

10. The fence system of claim **9** wherein the second upright fence column has at least one cutout in the outside wall for at least one lock faceplate positioned to insert a latch from a conventional lockset into the latch opening of the latch strike plate.

11. A fence system comprising:

a first upright fence column, formed of a single piece, the first upright fence column having an inside wall sized to receive a base post and an outside wall around the inside wall;

the first upright fence column including a first slot extending the length of the first upright fence column from the inside wall toward the outside wall, the first slot having grooves along either side, each groove adapted to receive distal shoulders of a first extension;

the first extension extending from the inside wall through the length of the first slot;

a second upright fence column, formed of a single piece, the second upright fence column having a hollow cross-section, and incorporating a second slot extending the length of the second upright fence column;

a second extension extending the length of the second upright fence column within the second slot; and

a panel extending between the first upright fence column and the second upright fence column, fixed at either side within the first and second extensions within the first and second slot.

12. The fence system of claim **11** further comprising a pair of horizontal clips, the pair of horizontal clips extending between the first upright fence column and second upright fence column, the pair of horizontal clips having a width sized to be received in the first and second slots of the first and second upright fence columns, the pair of horizontal clips having a U-shaped opening adapted to receive a panel; and

the panel fixed within the U-shaped openings of the pair of horizontal clips.

13. The fence system of claim **12** wherein the first and second extensions and the pair of horizontal clips are joined together to form a rectangular shape surrounding the panel.

14. The fence system of claim **12** wherein the pair of horizontal clips are held in place adjacent to the opposed clips using L-shaped fasteners.

15. The fence system of claim **12** wherein the panel is composed of plastic, plastic composite, metal, metal composite, glass, glass composite, wood, wood composite, or a composite of any of them.

16. The fence system of claim **12**, further comprising a second panel and second pair of horizontal clips;

the second panel fixed between the first and second extensions; and

the second panel additionally fixed in the U-shaped openings of the second pair of horizontal clips.

17. The fence system of claim **12** wherein the first upright fence column and the second upright fence column form a gate and the second upright fence column incorporates at least two elongated sidewalls of sufficient width to accommodate a conventional lockset.

18. The fence system of claim **17** further comprising a stationary upright fence column formed of a single piece, the stationary upright fence column having an inside wall sized to receive a base post and an outside wall around the inside wall;

the stationary upright fence column including a third slot extending the length of the stationary upright fence column from the inside wall toward the outside wall, the third slot having grooves along either side, each groove adapted to receive distal shoulders of a latch strike plate;

a latch strike plate having a length and a height extending from the inside wall through the length of the slot, distal shoulders to engage the grooves, a latch opening positioned to receive a latch from a conventional lockset, and a strike extension extending the length of the latch strike plate for engaging the outside wall of the second upright column when the gate is closed.

19. The fence system of claim **18** wherein the second upright fence column has at least one cutout in the outside

wall for at least one lock faceplate positioned to insert a latch from a conventional lockset into the latch opening of the latch strike plate.

20. A fence system comprising:

a first upright fence column, formed of a single piece, the first upright fence column having an inside wall sized to receive a base post and an outside wall around the inside wall;

the first upright fence column including a first slot extending the length of the first upright fence column from the inside wall toward the outside wall, the first slot having grooves along either side, each groove adapted to receive distal shoulders of an extension, the extension having a length and a height extending from the inside wall through the length of the first slot;

a second upright fence column, formed of a single piece, the second upright fence column having a hollow cross-section, incorporating a second slot extending the length of the second upright fence column, at least one cutout in the outside wall for at least one lock faceplate positioned to insert a latch from a conventional lockset into a latch opening of a latch strike plate;

a panel extending between the first upright fence column and the second upright fence column, mounted between the first and second slot; and incorporating at least two elongated sidewalls of sufficient width to accommodate a conventional lockset;

a pair of opposed extensions, each running the length of the first and second slot, mounted within the first and second slot;

a pair of horizontal clips, the pair of horizontal clips extending between the first upright fence column and second upright fence column, the pair of horizontal clips having a width sized to be received in the at least one slot of the first and second upright fence columns, the horizontal clip having a U-shaped opening adapted to receive a panel;

the panel fixed within the pair of opposed extensions and the pair of horizontal clips;

a stationary upright fence column formed of a single piece, the stationary upright fence column having an inside wall sized to receive a base post and an outside wall around the inside wall and at least one slot extending the length of the stationary upright fence column from the inside wall toward the outside wall, the at least one slot having grooves along either side, each groove adapted to receive distal shoulders of a latch strike plate; and

the latch strike plate having a length and a height extending from the inside wall through the length of the slot, distal shoulders to engage the grooves, a latch opening positioned to receive a latch from a conventional lockset, and a strike extension extending the length of the latch strike plate for engaging the outside wall of the second upright column when the gate is closed.

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