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McCarthy et al.

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(54) **FENCE SYSTEM**

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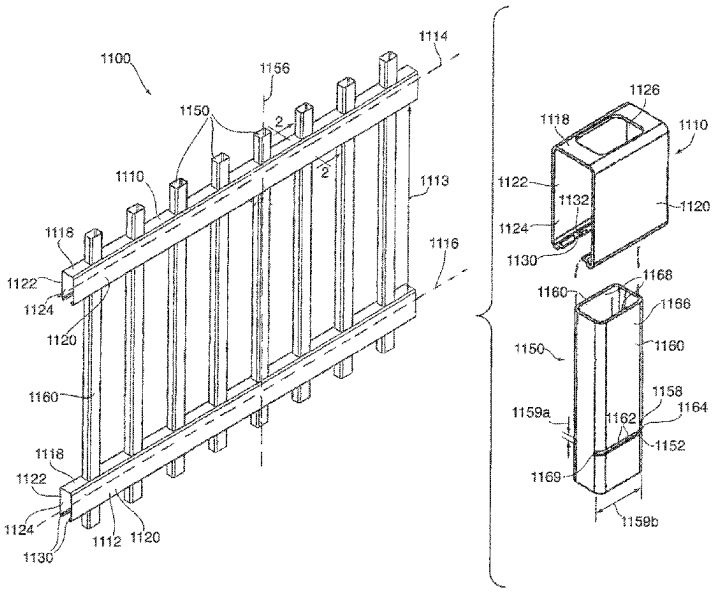
(57) **ABSTRACT**

A fence section includes an upper horizontal rail, a lower horizontal rail, and vertical members. At least one of the vertical members is connected to the upper horizontal rail by an upper connection system and to the lower horizontal rail by a lower connection system.

20 Claims, 31 Drawing Sheets



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Applicant, Ninth Amendment with a Declaration of Rolf Ohrstrom Pursuant to 37 C.F.R. 1.132 (Response to Dec. 13, 2019 Office Action), U.S. Appl. No. 14/990,552, filed Mar. 13, 2020.
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United States Patent and Trademark Office, Applicant-Initiated Interview Summary, U.S. Appl. No. 14/990,552, filed Apr. 28, 2020.
Applicant, Tenth Amendment (Response to Mar. 27, 2020 Office Action), U.S. Appl. No. 14/990,552, filed May 27, 2020.
United States Patent and Trademark Office, Advisory Action Before the Filing of an Appeal Brief, U.S. Appl. No. 14/990,552, filed Jun. 10, 2020.

Fig. 1

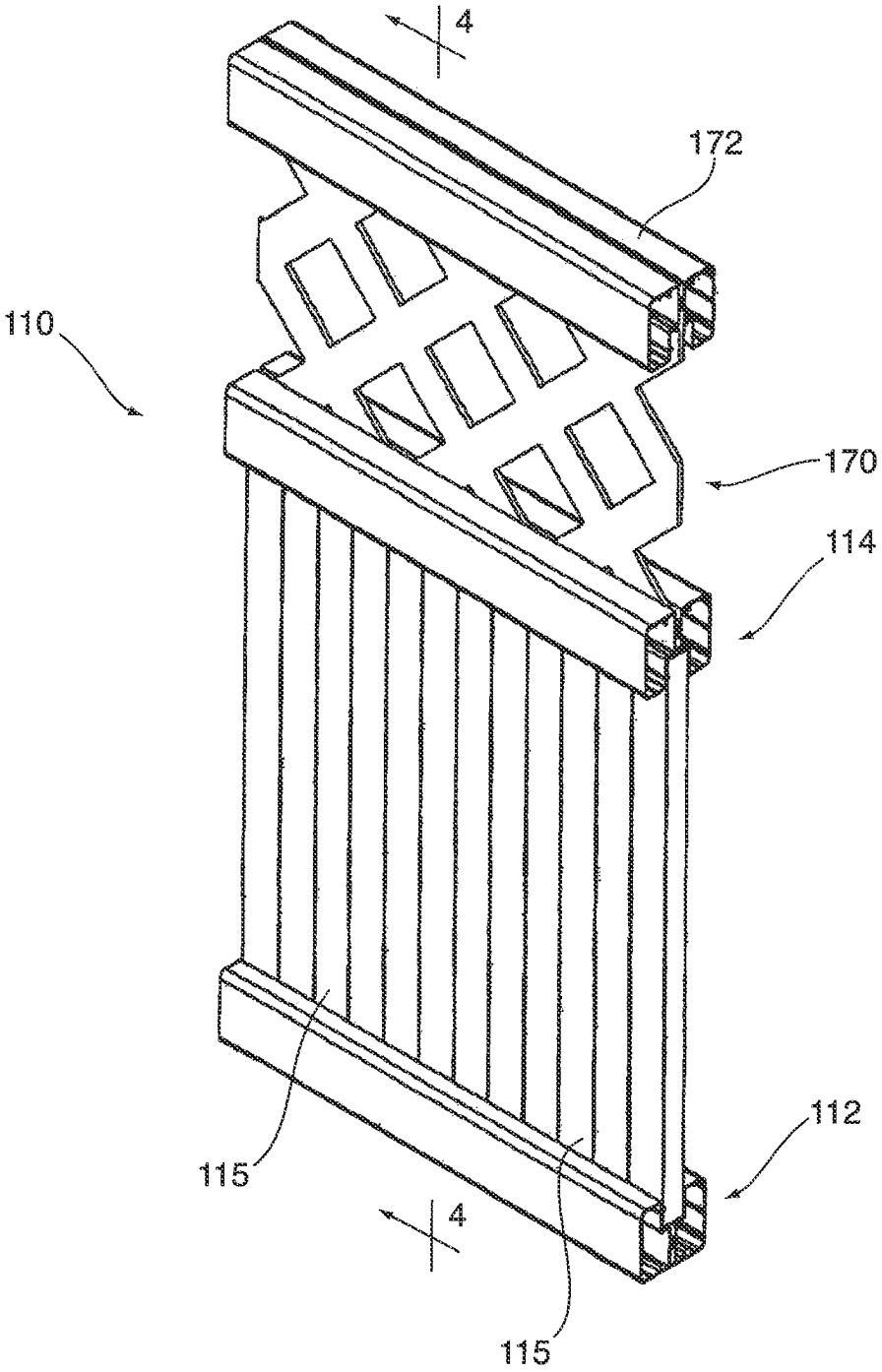
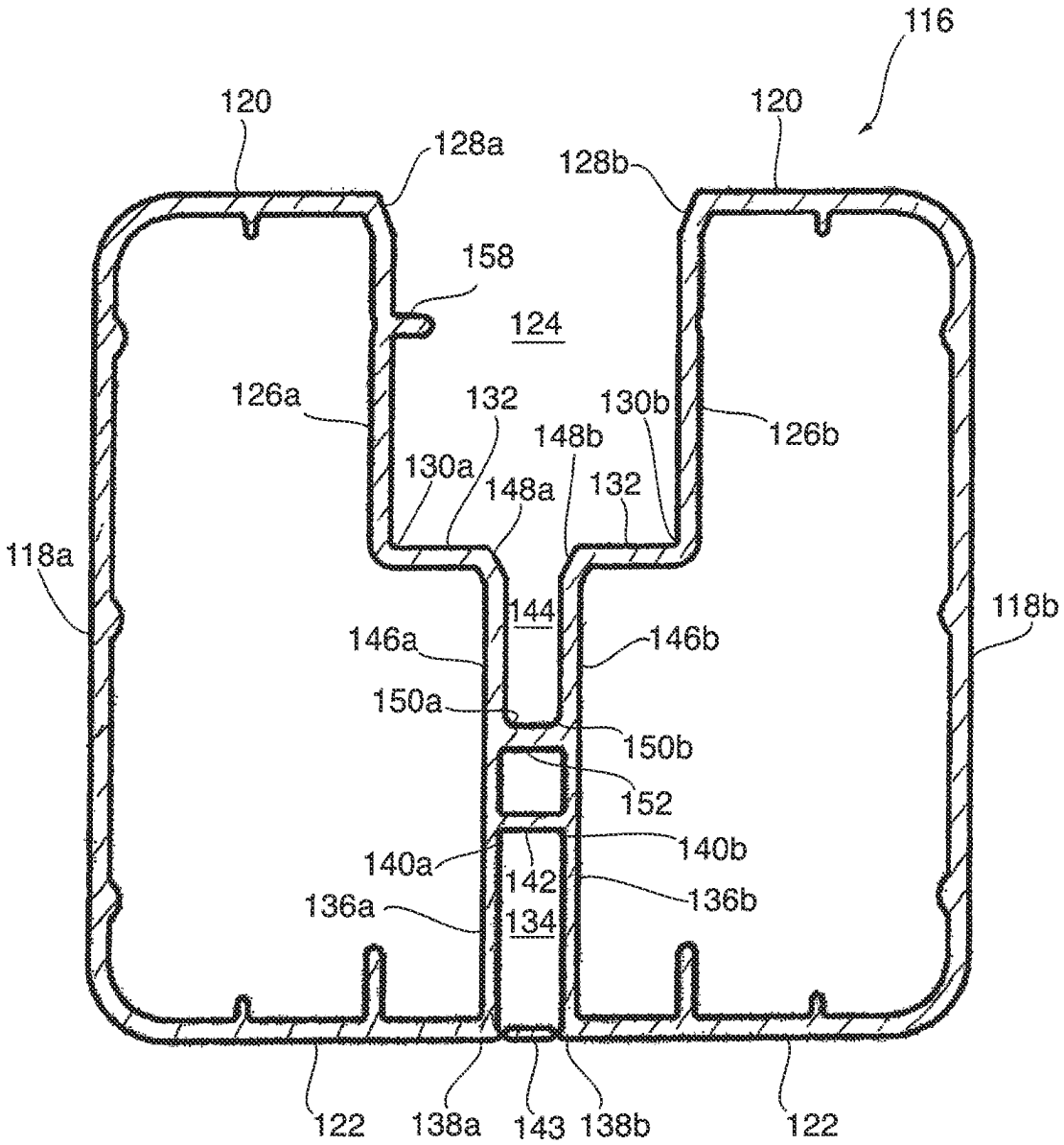


Fig. 2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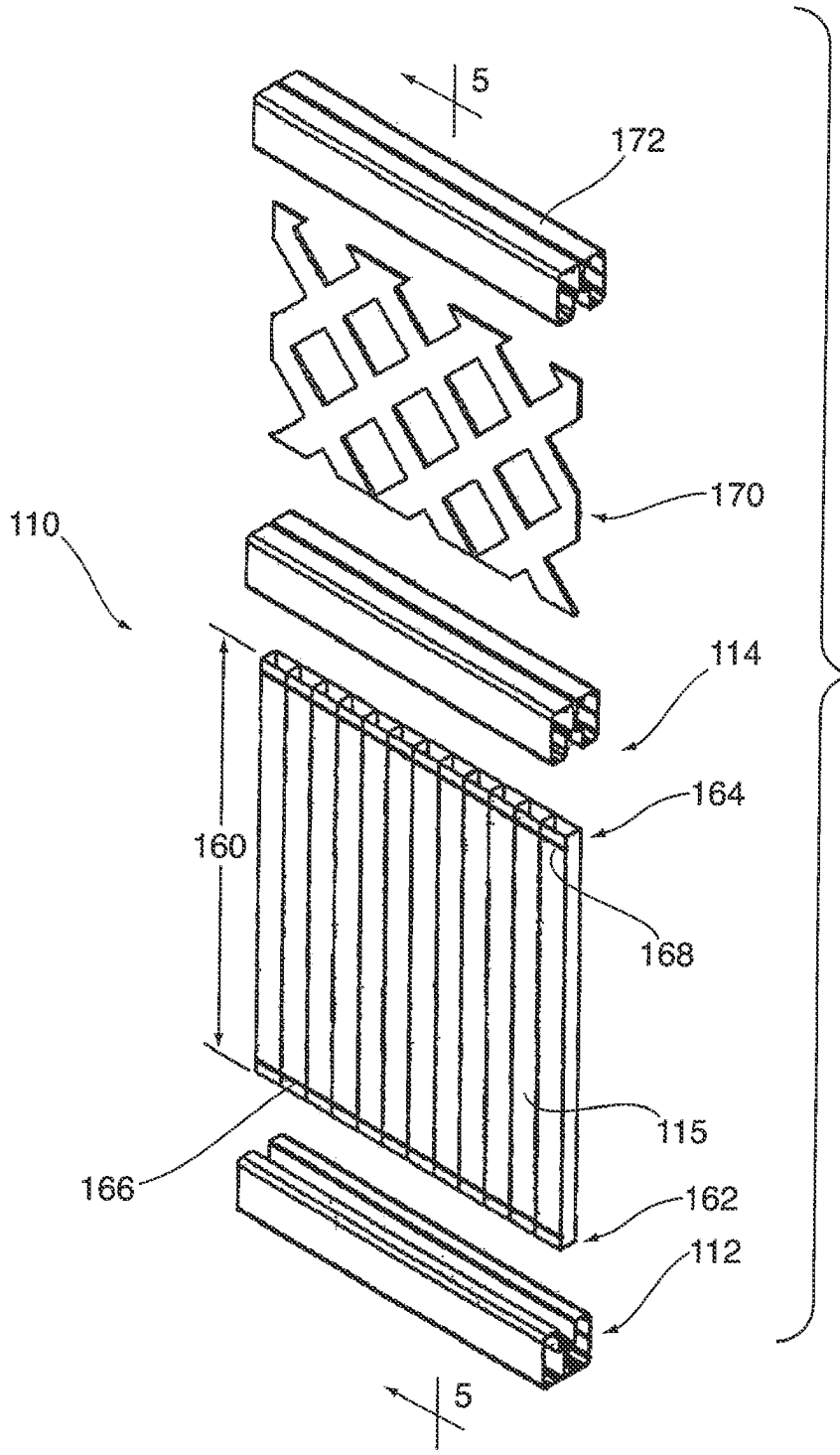

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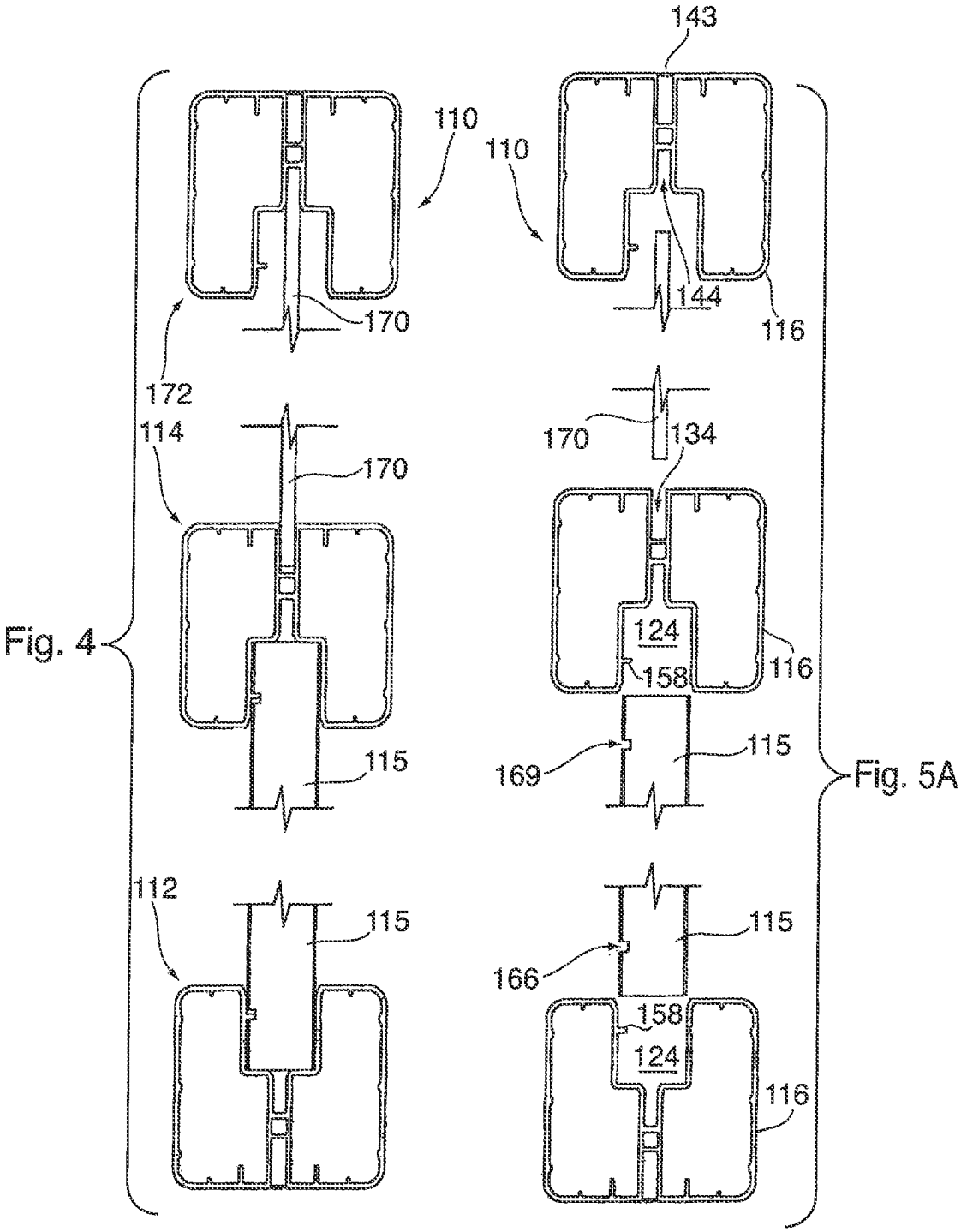
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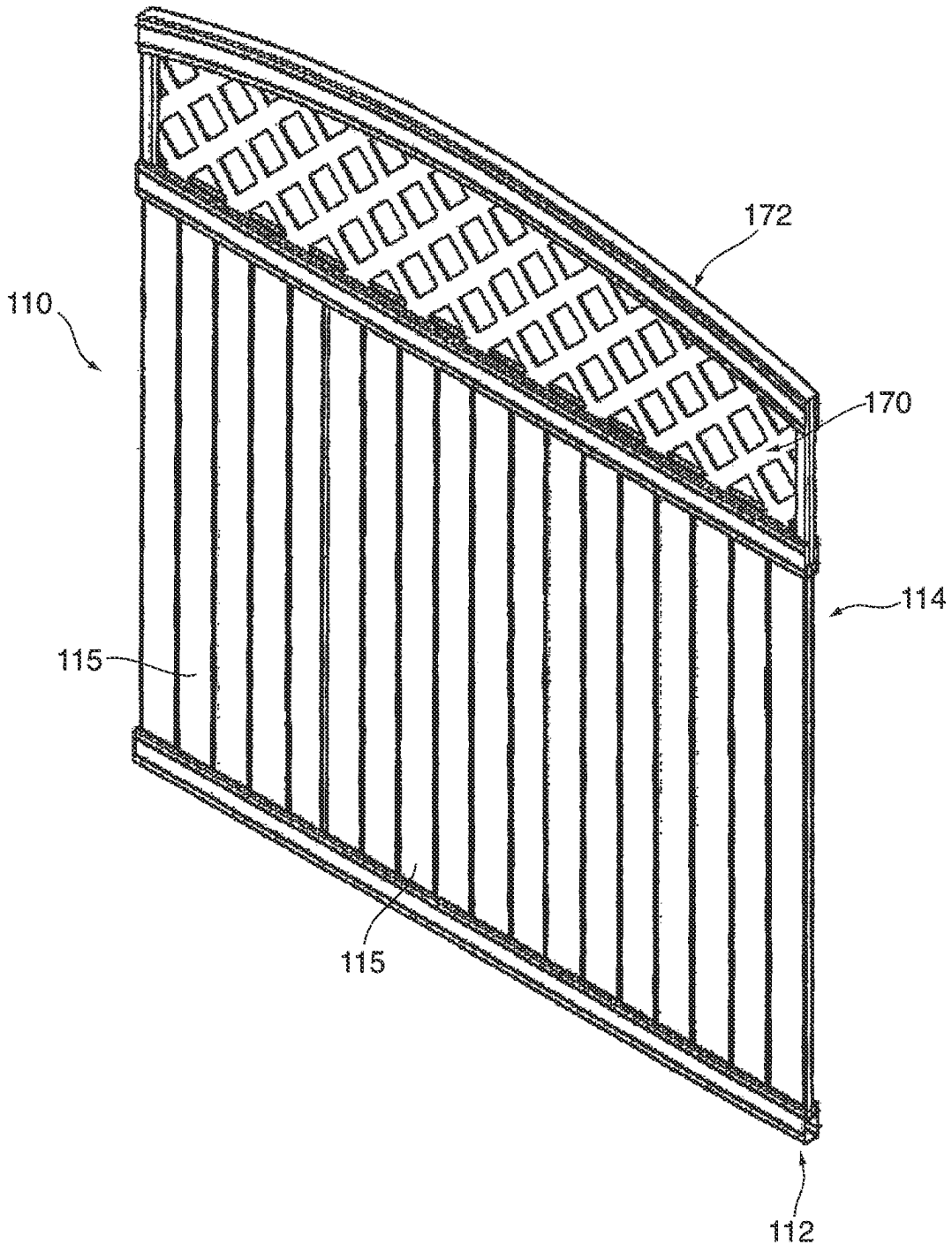
Fig. 4

Fig. 5A

Fig. 5B



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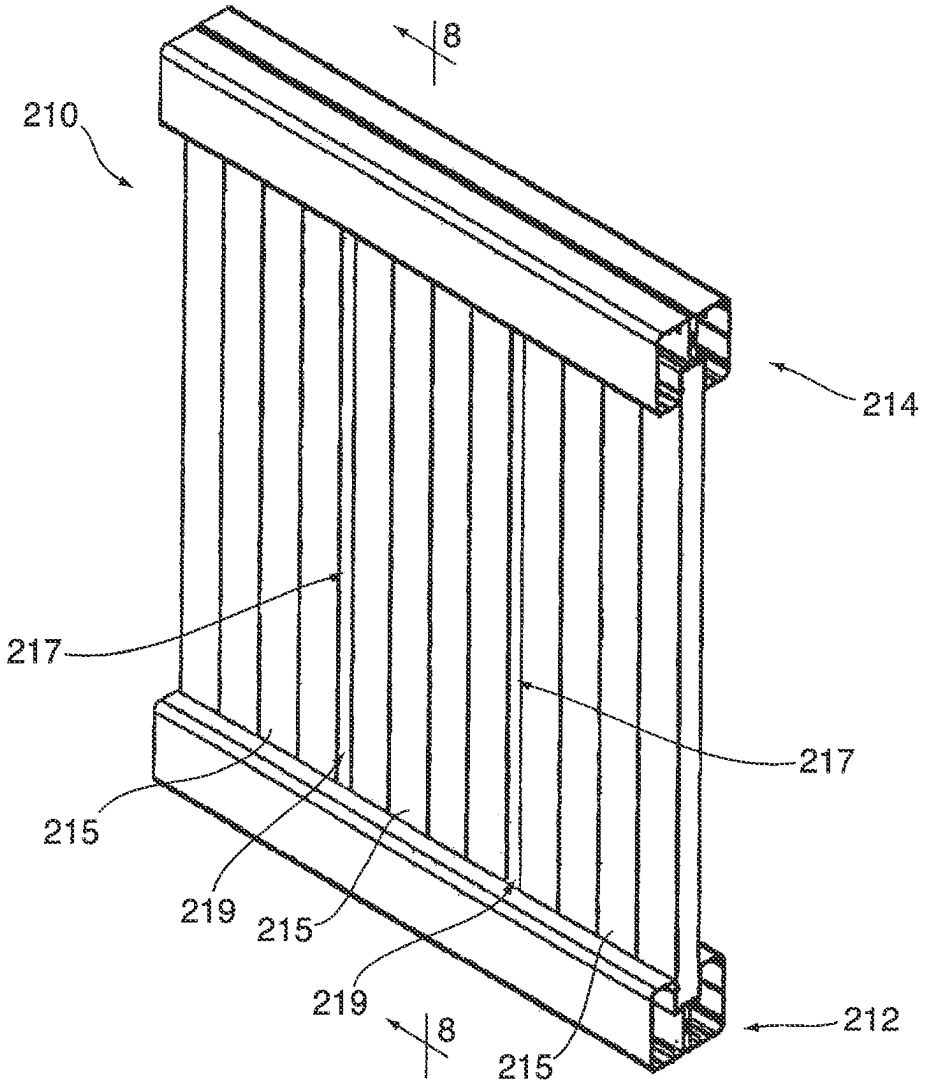

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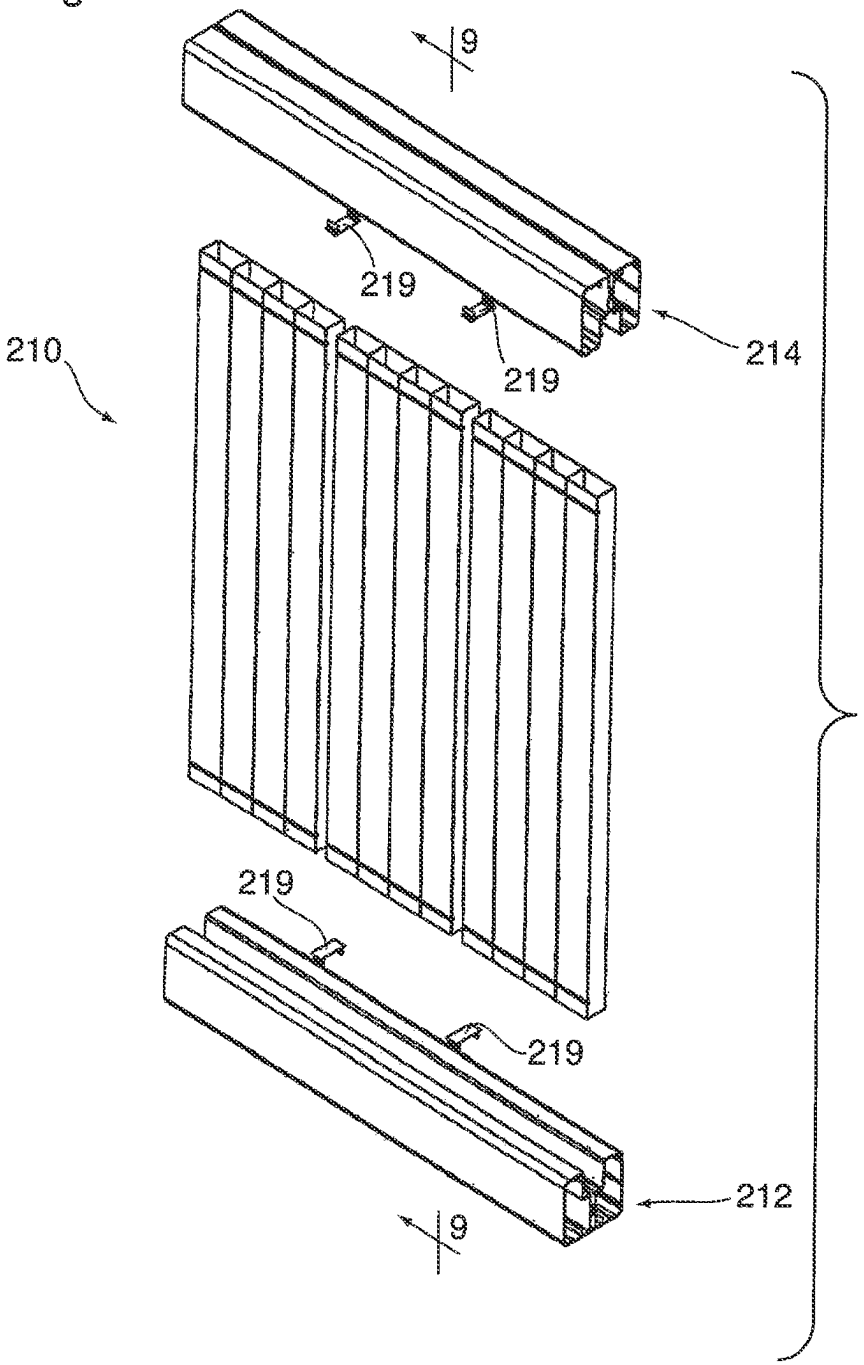

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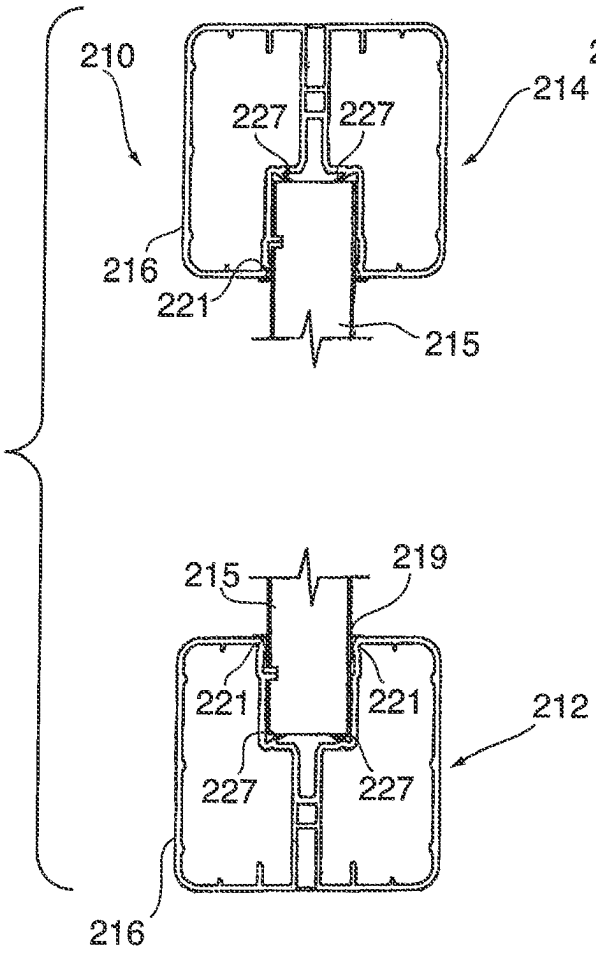
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Fig. 9

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Fig. 10

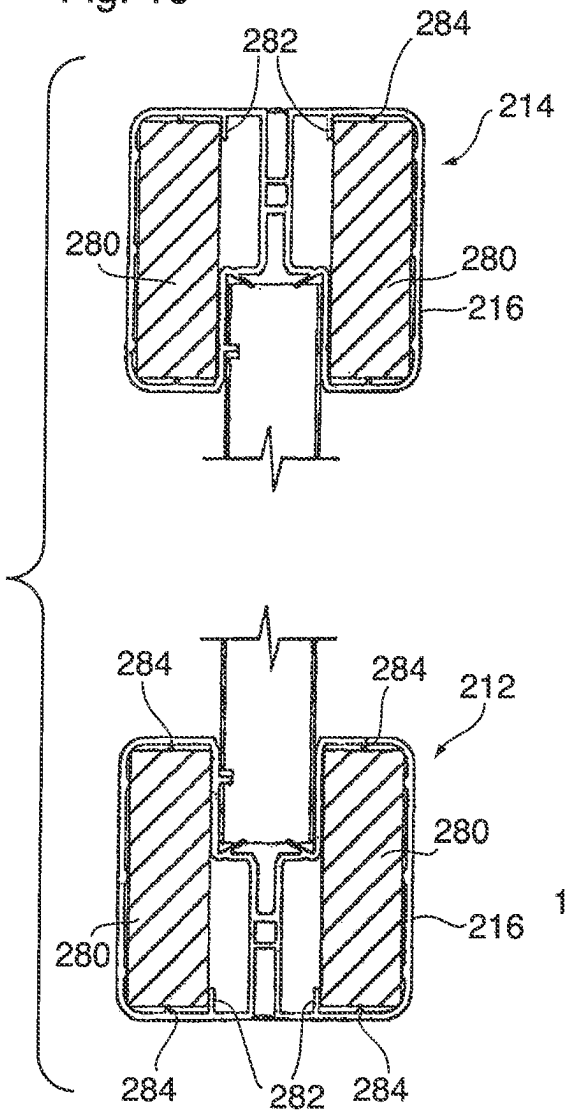
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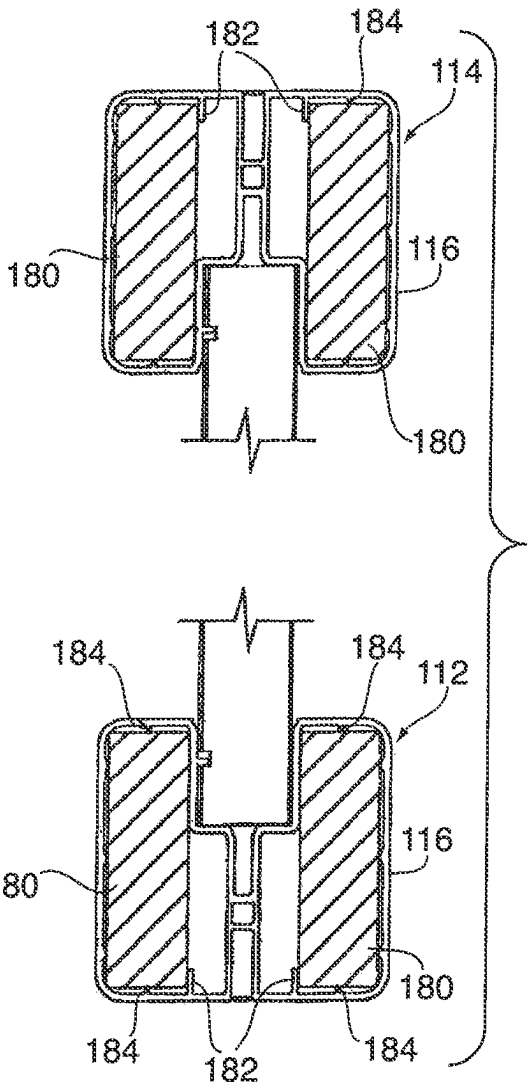
Fig. 11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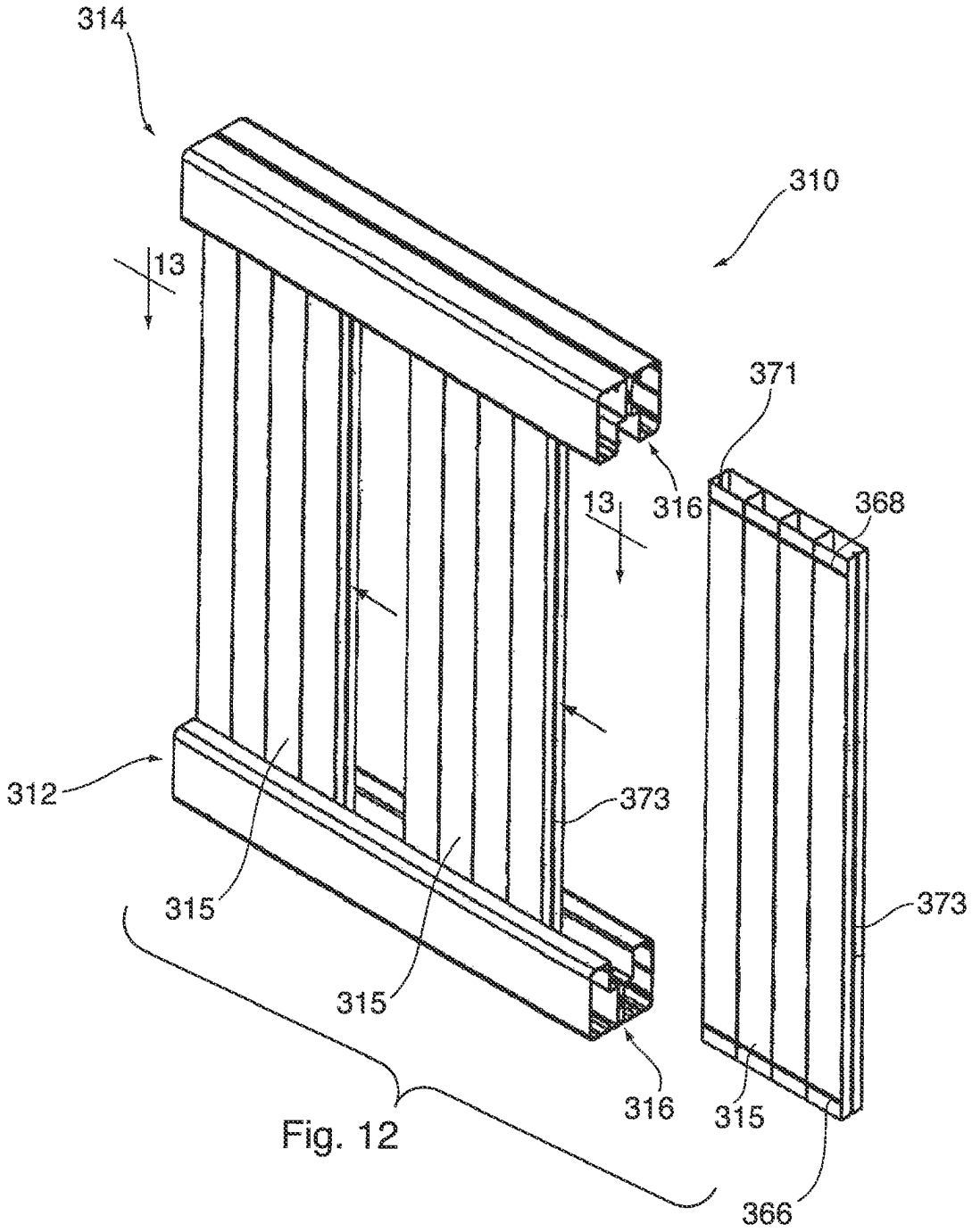

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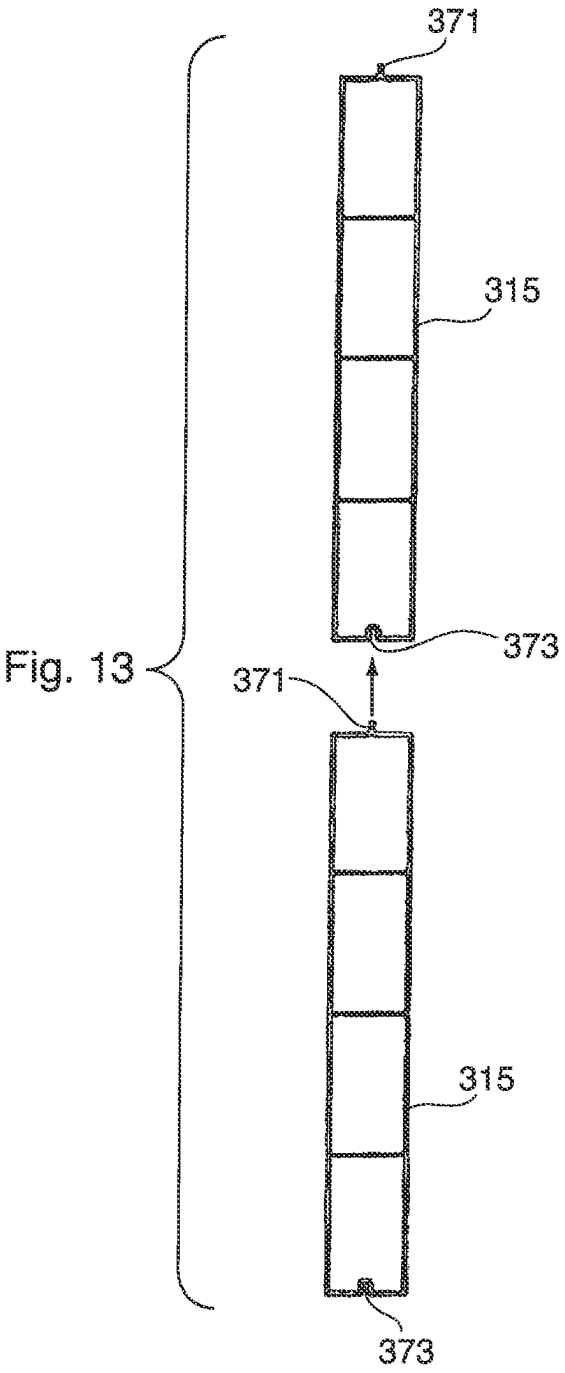

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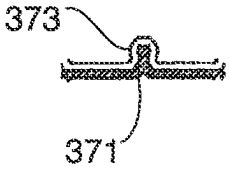

Fig. 14

Fig. 15

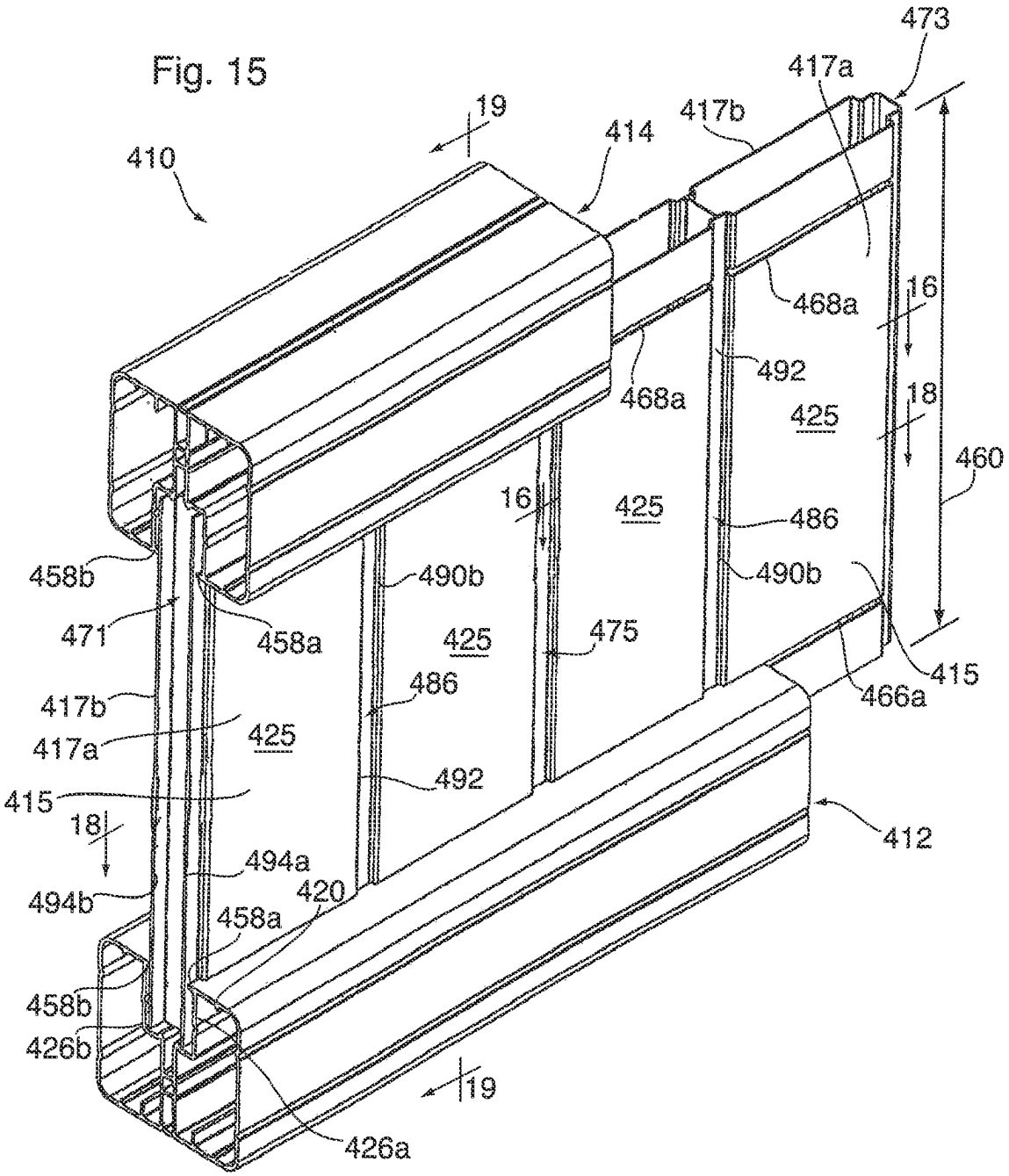
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Fig. 16

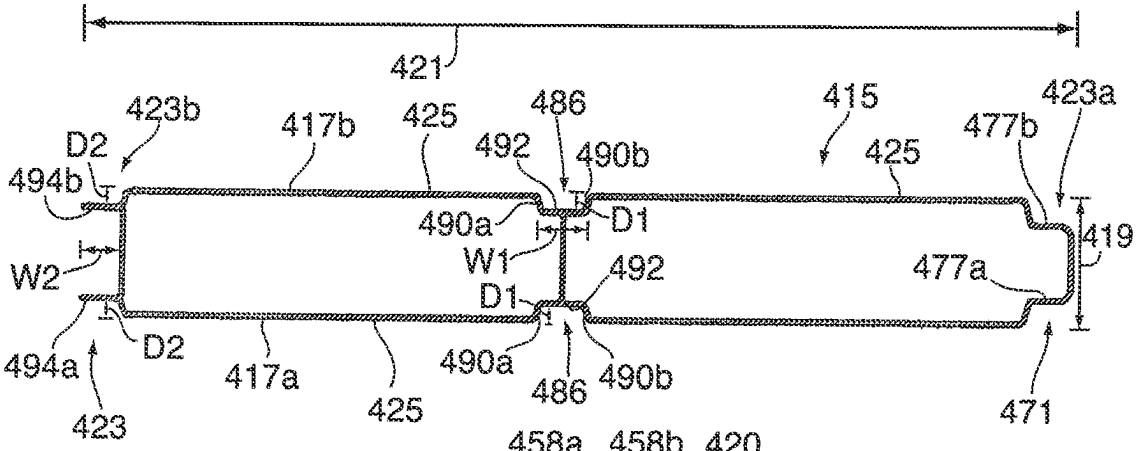
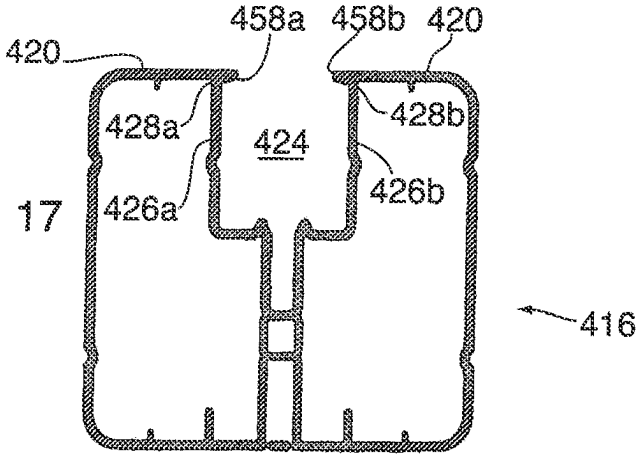


Fig. 17



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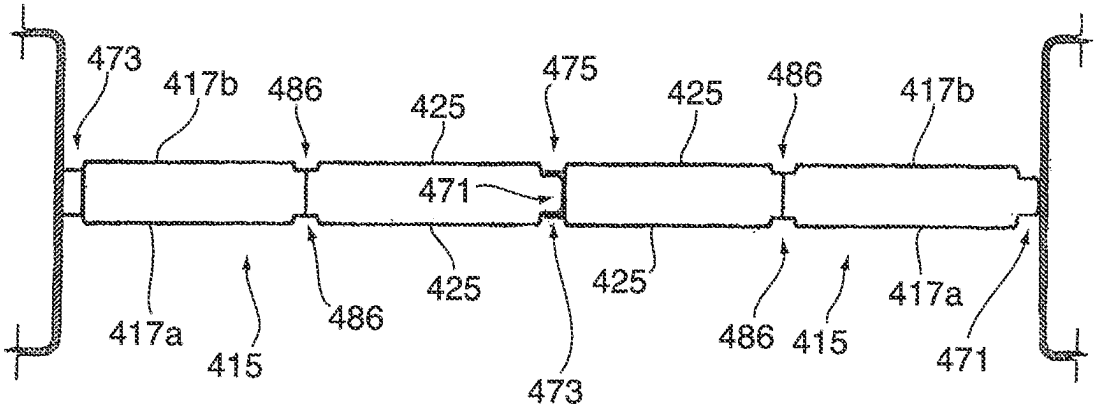

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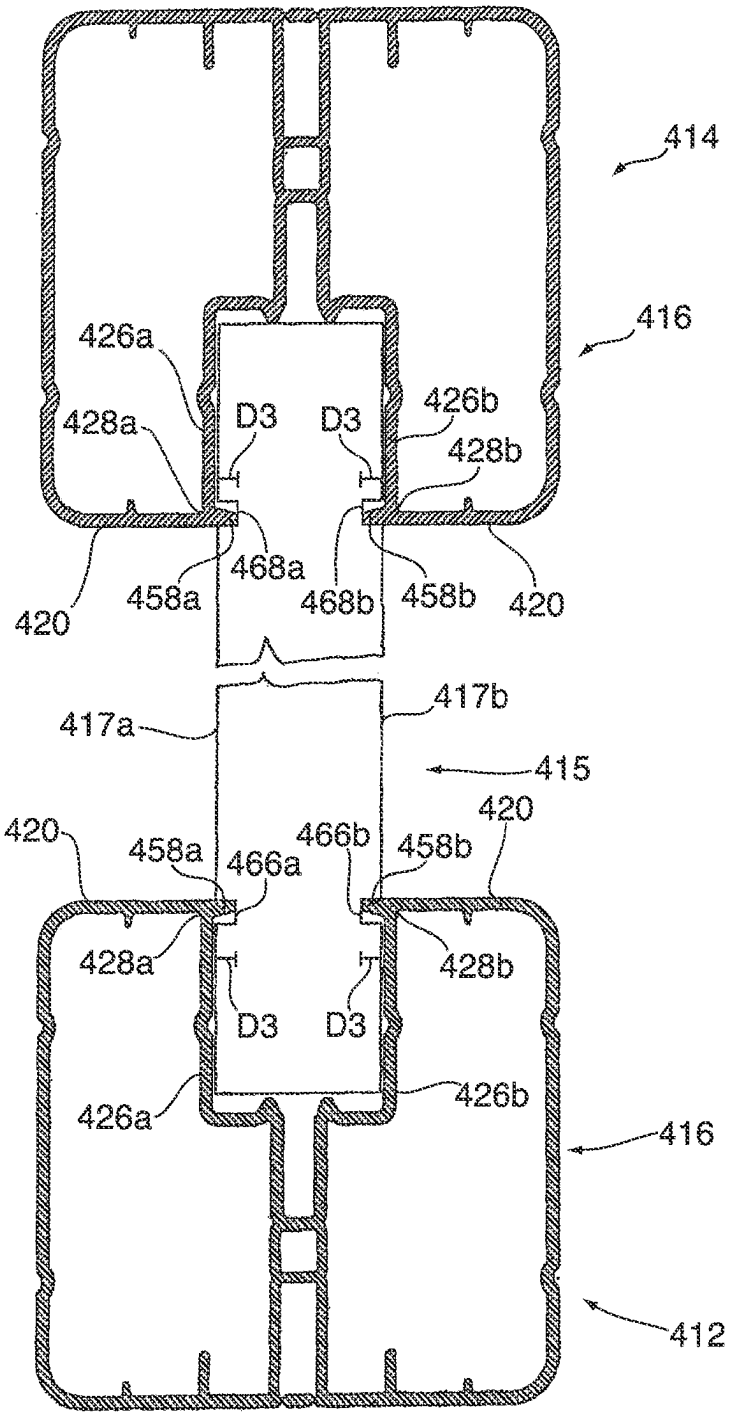
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Fig. 20

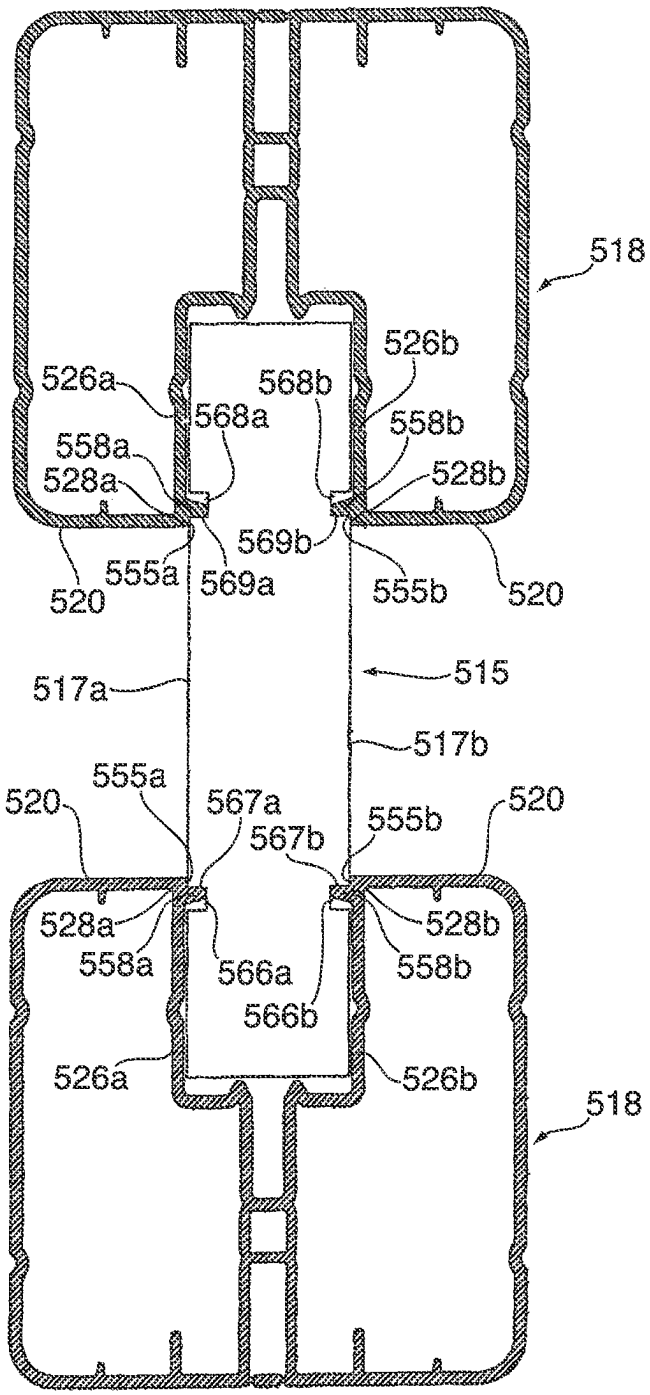
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Fig. 21

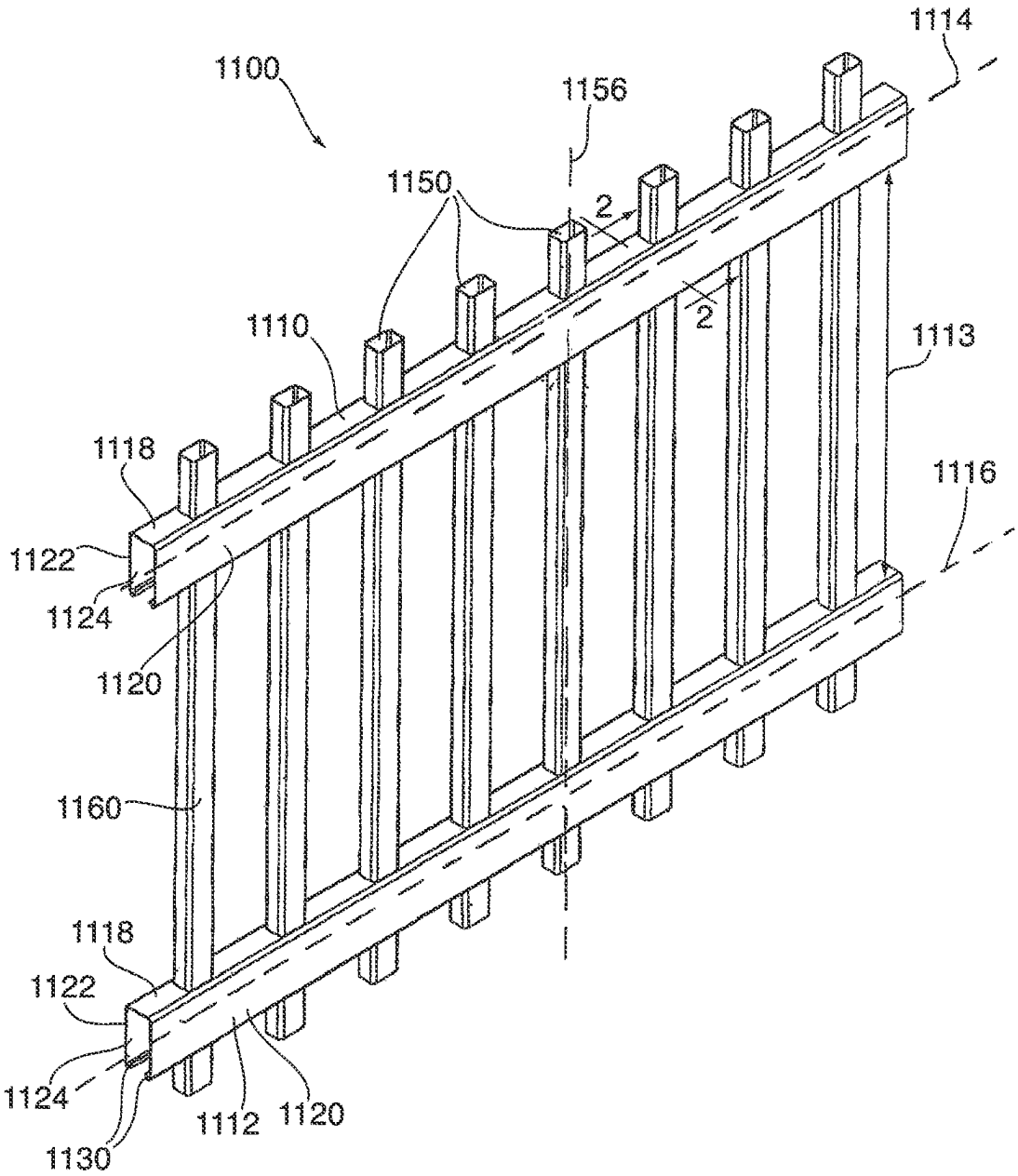
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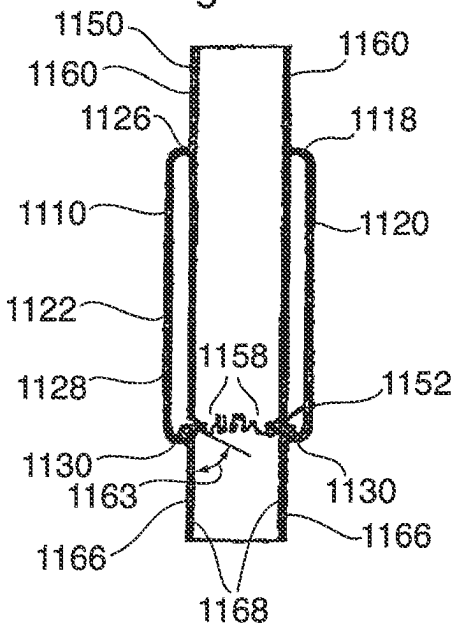
Fig. 22



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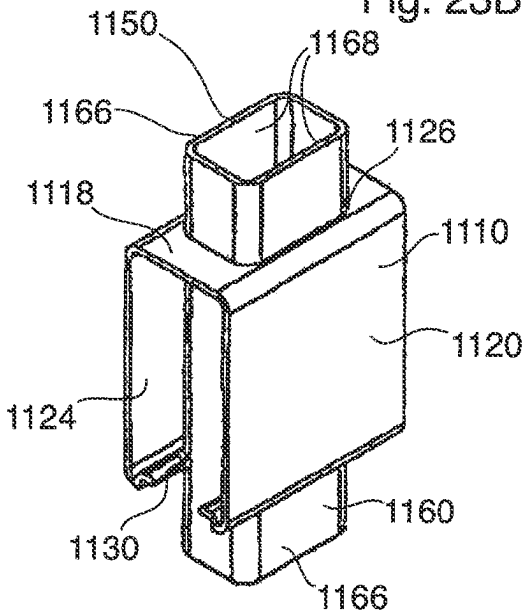
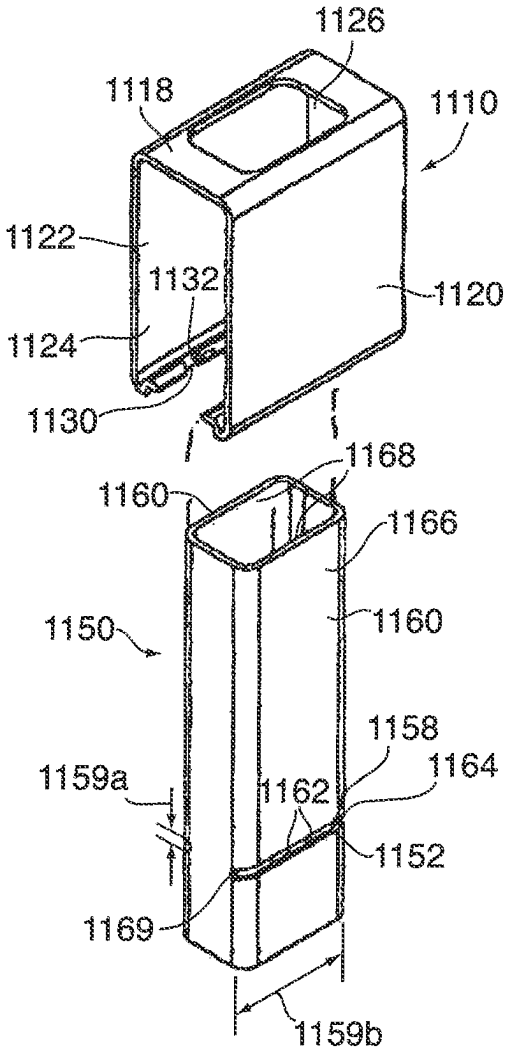


Fig. 23B



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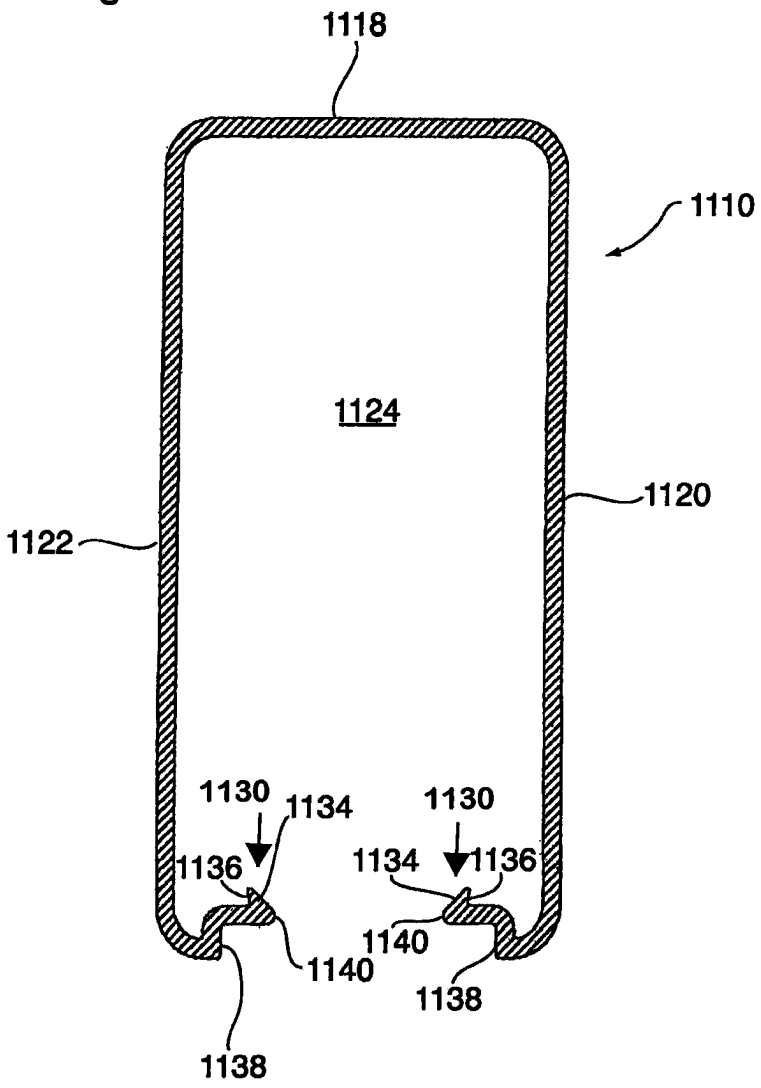
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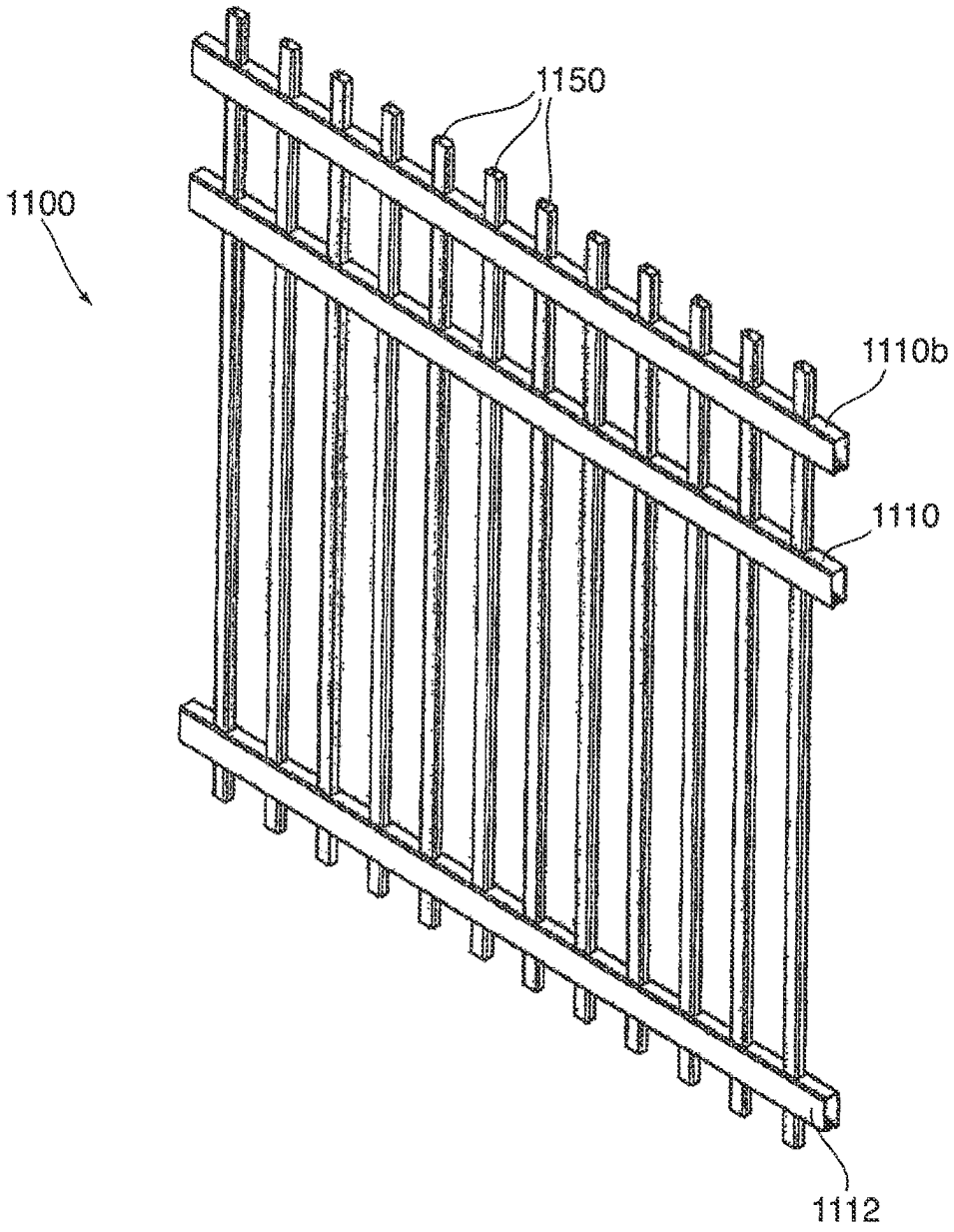
Fig. 24B



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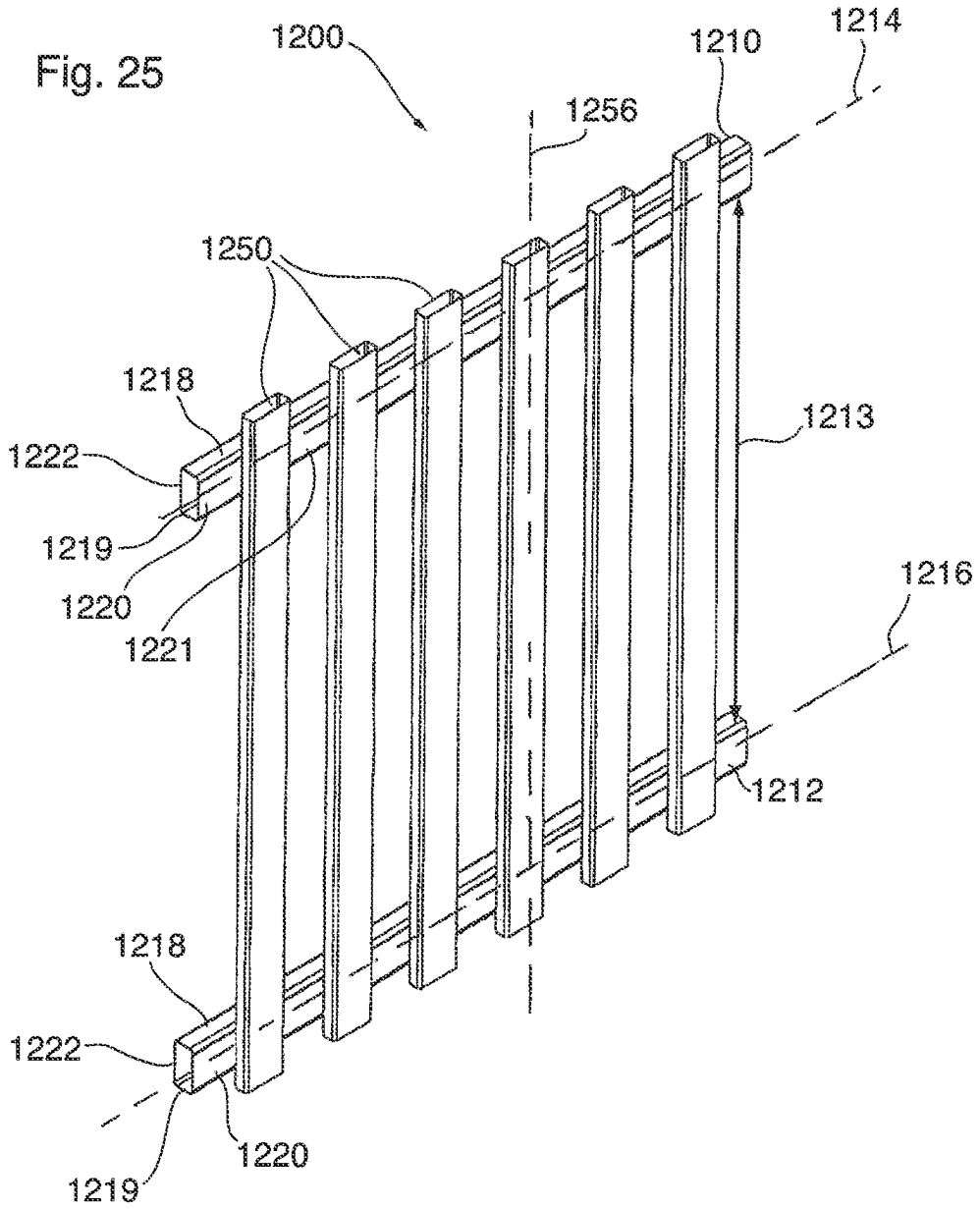
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Fig. 26A

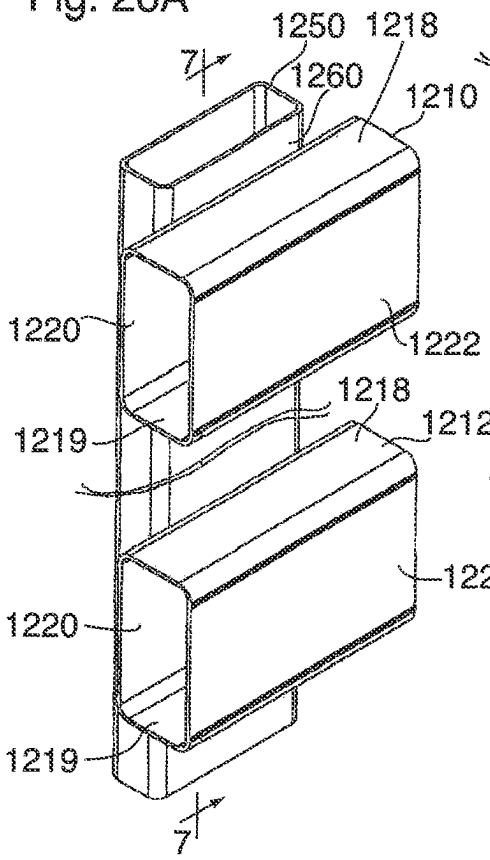
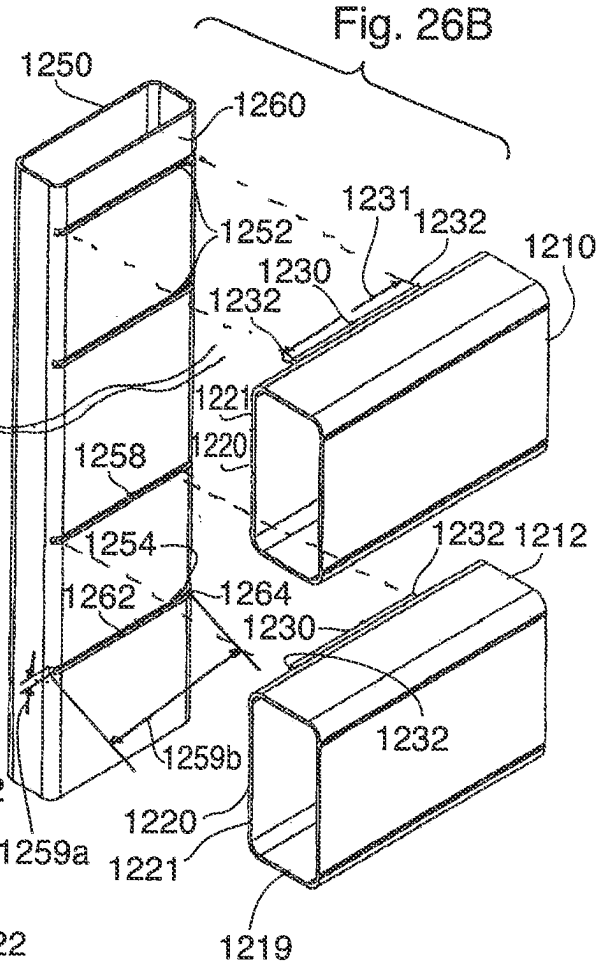


Fig. 26B



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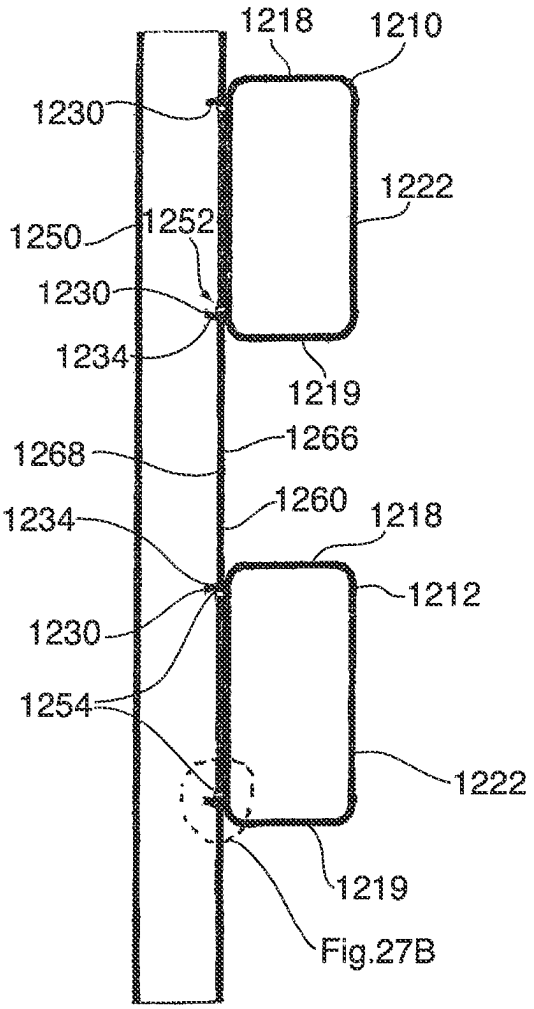
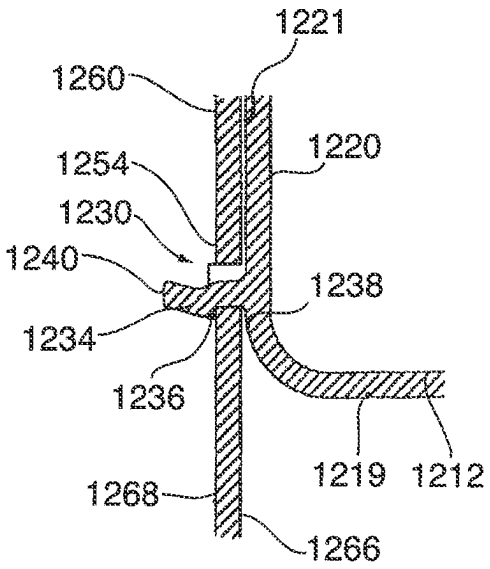


Fig. 27B



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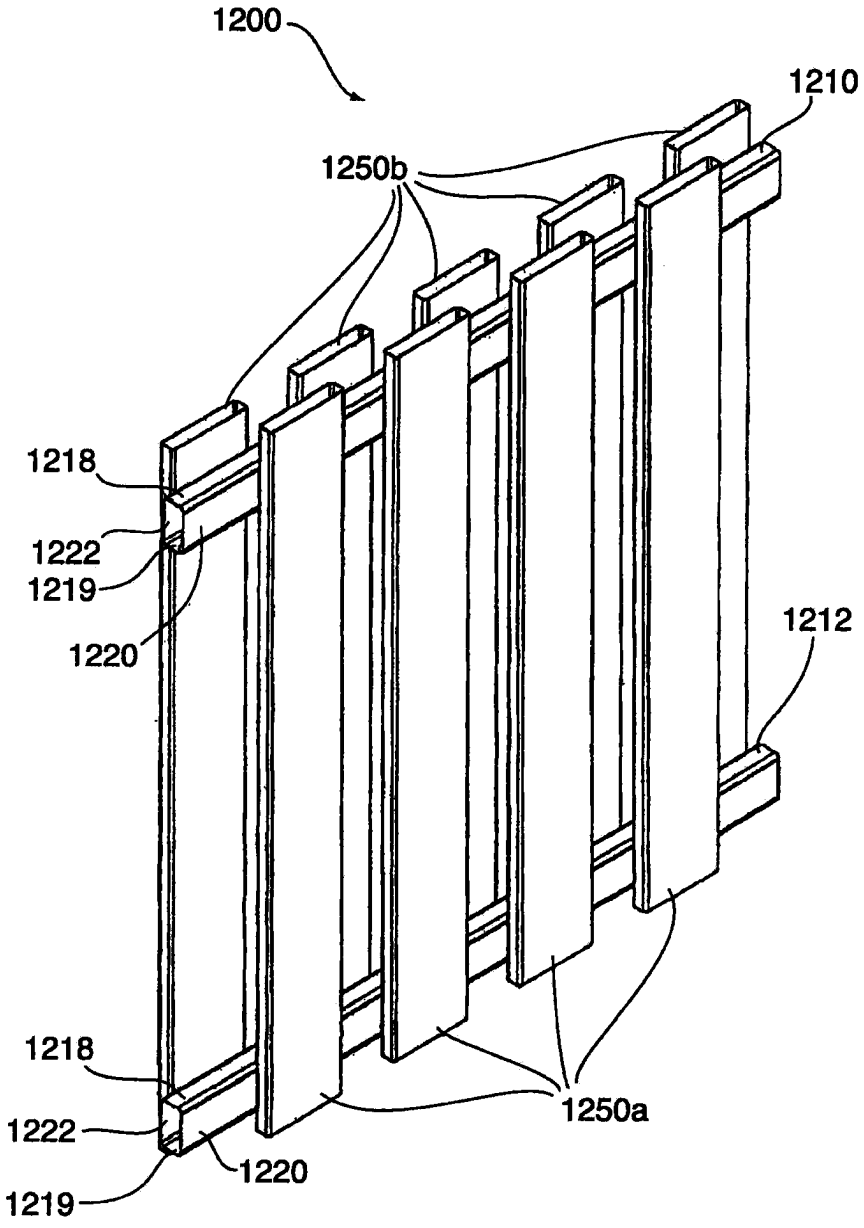
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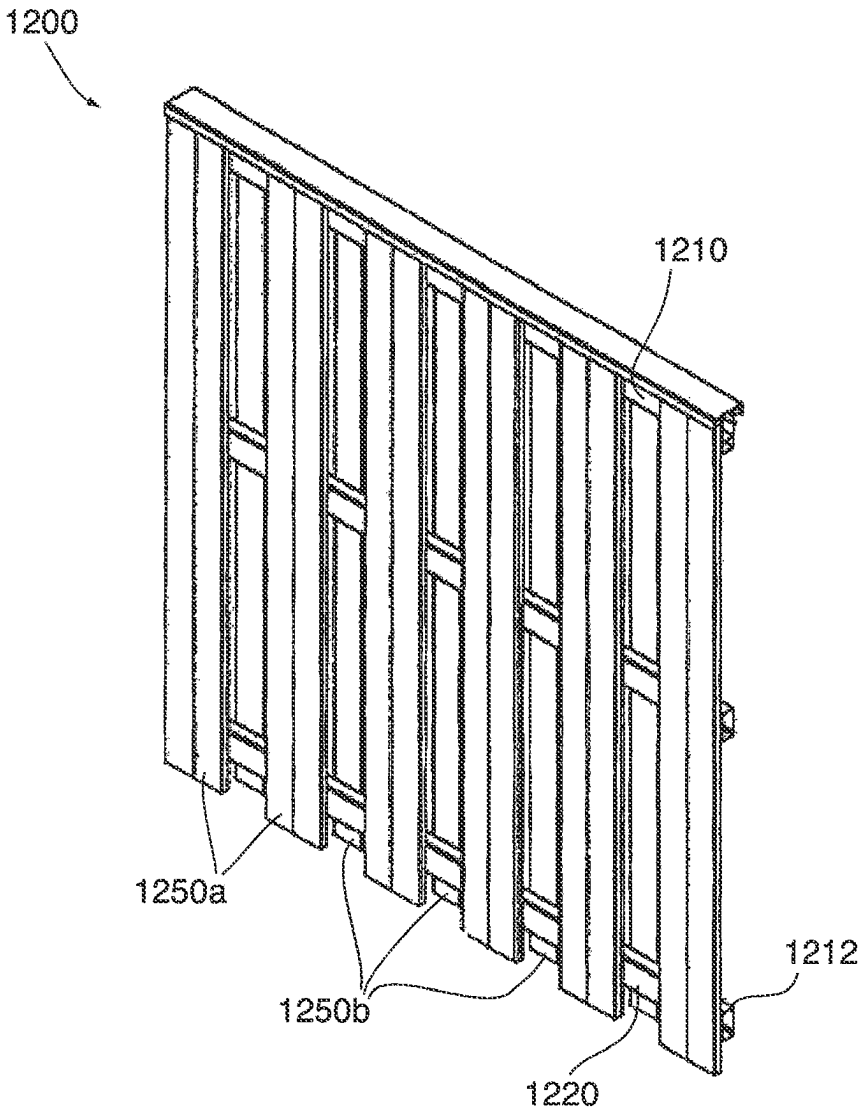
Fig. 28B



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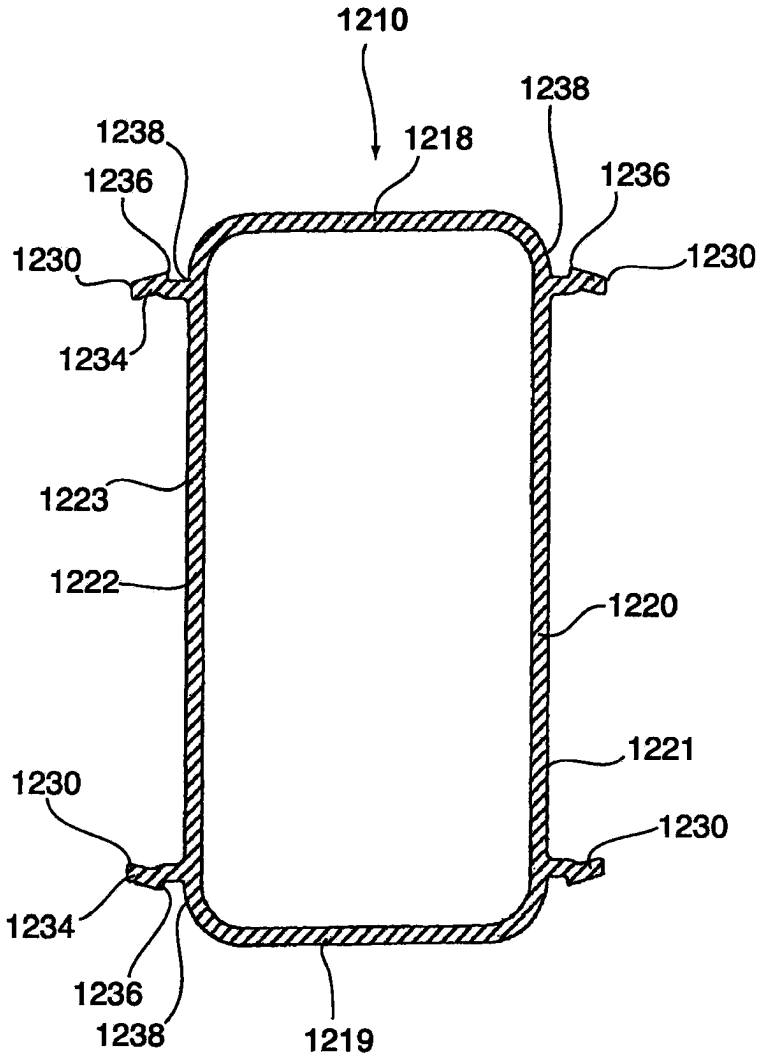
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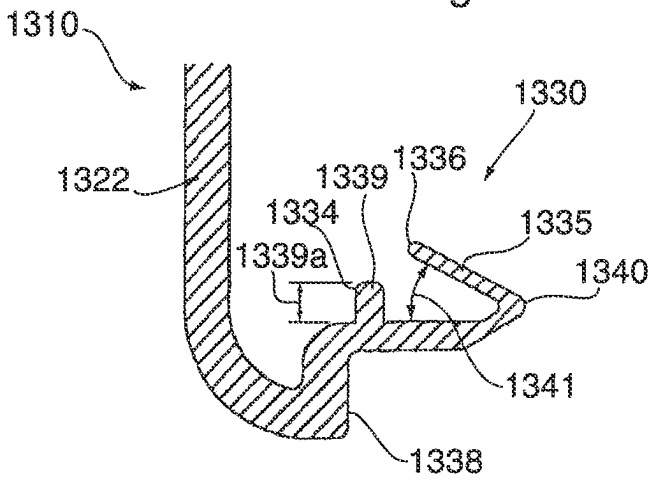
Fig. 30B



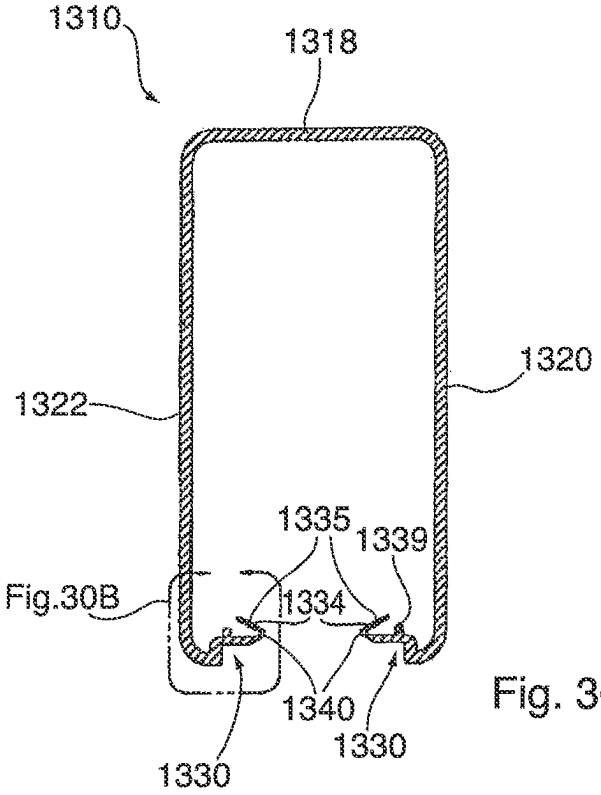


Fig. 30A

Fig. 31A

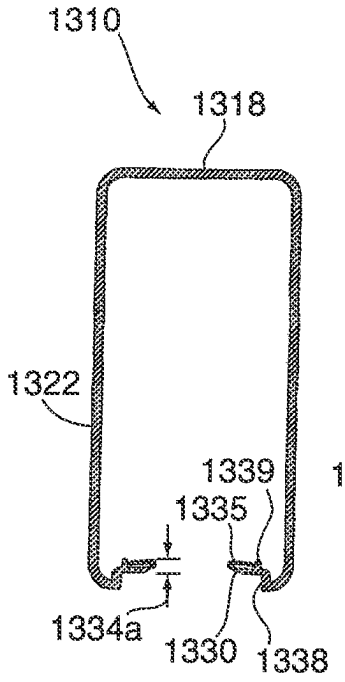


Fig. 31B

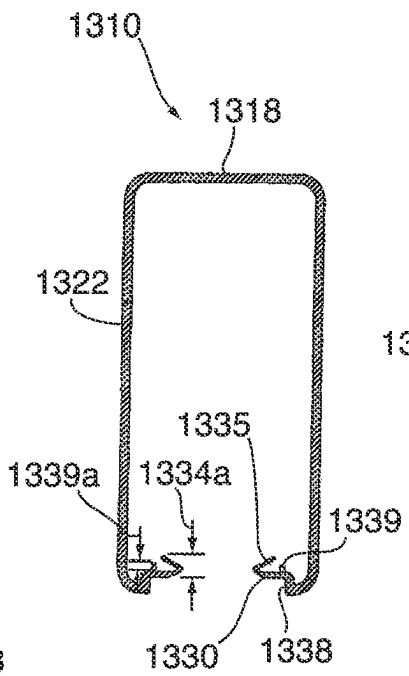


Fig. 31C

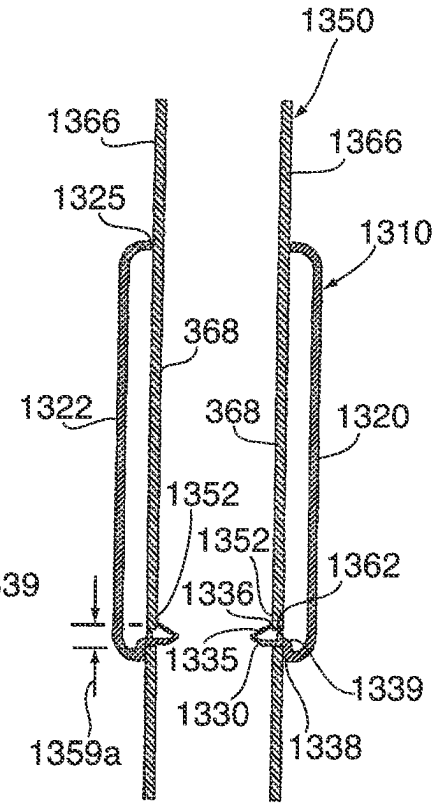


Fig. 31D

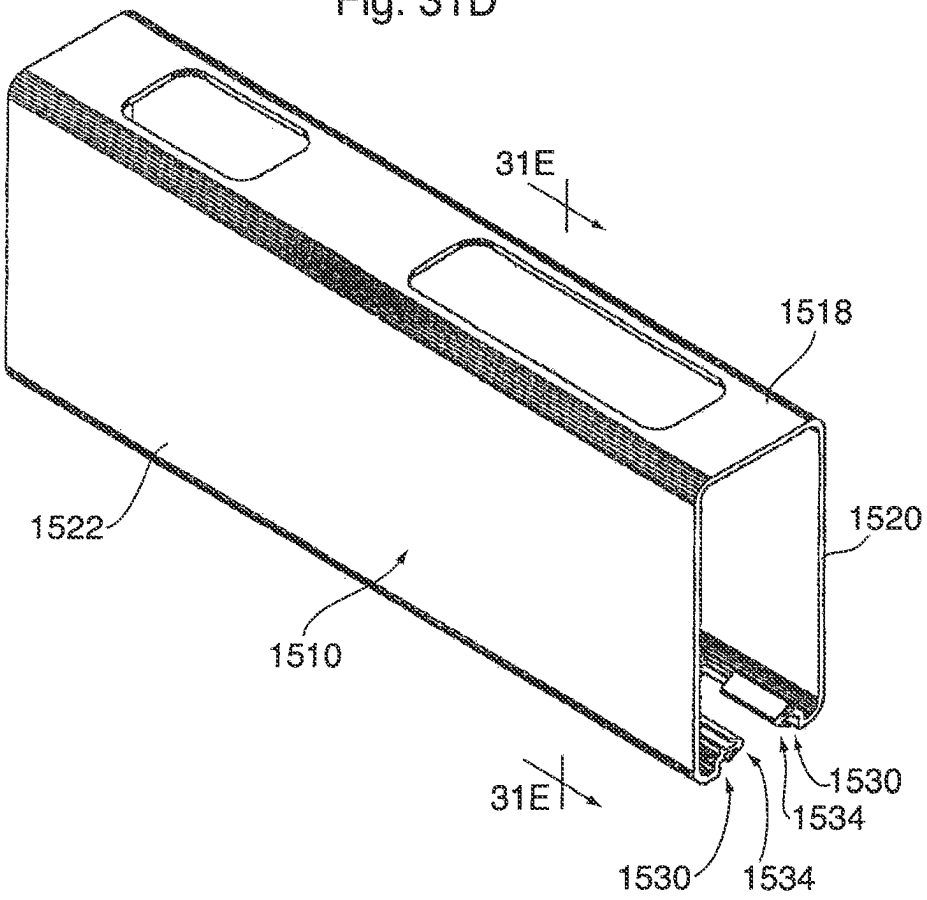


Fig. 31E

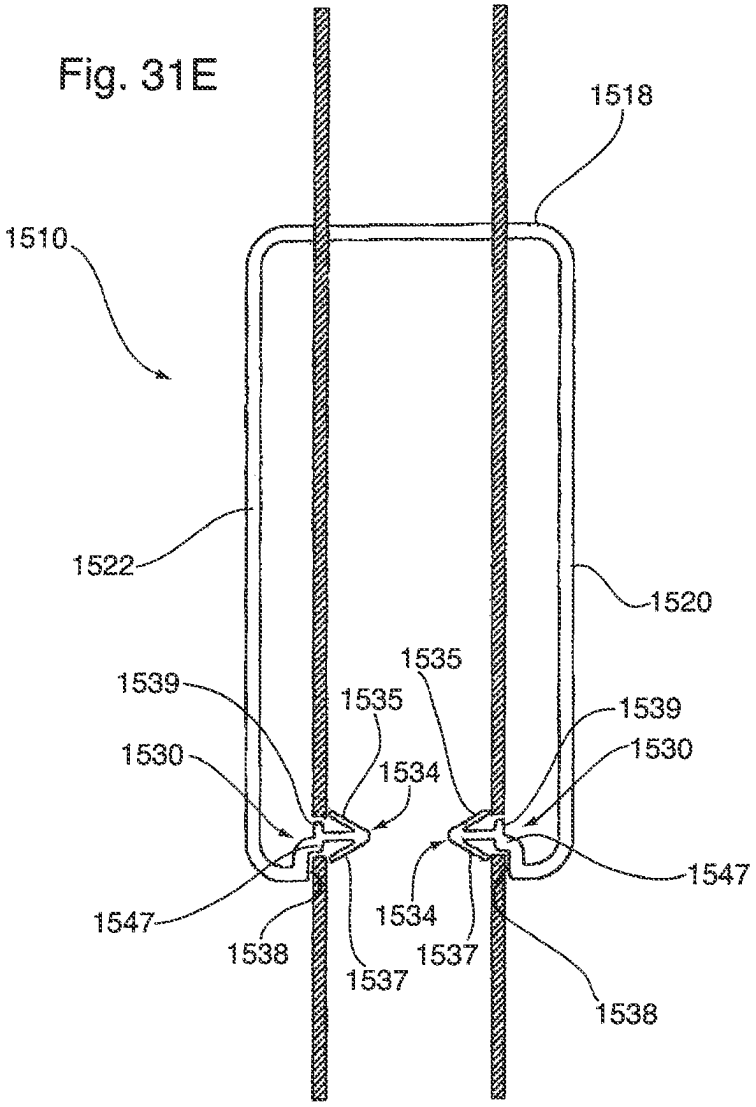

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Fig. 32

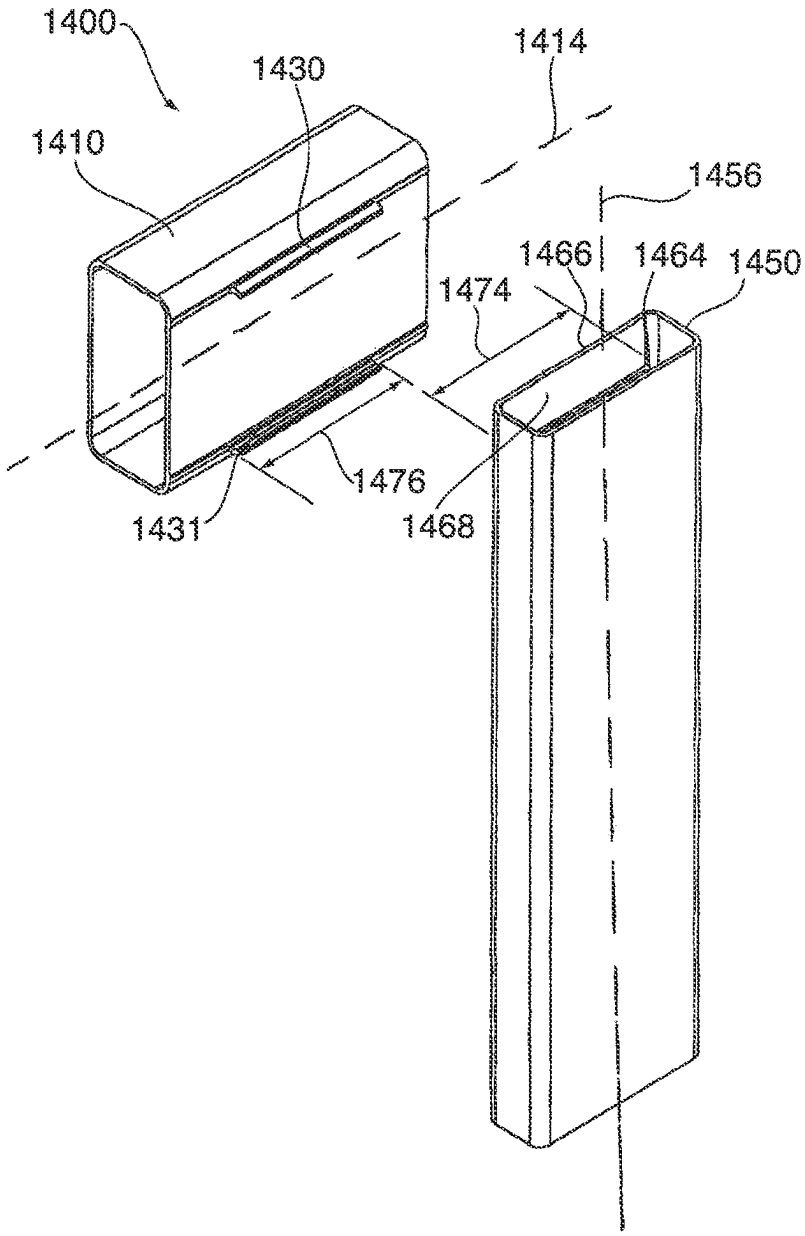
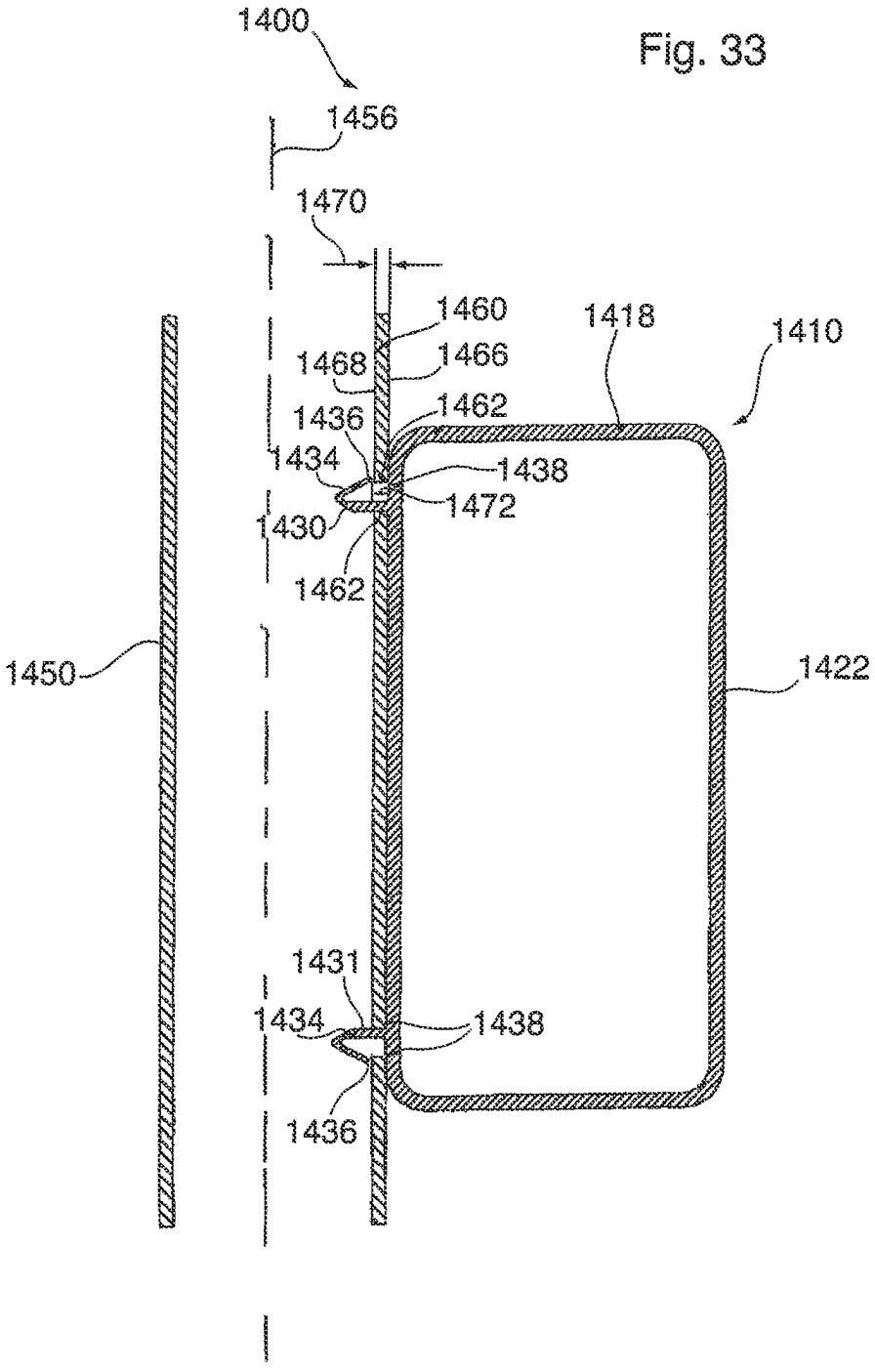


Fig. 33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FENCE SYSTEM

RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 14/990,552 filed on Jan. 7, 2016, which is a divisional of U.S. patent application Ser. No. 13/968,485 filed on Aug. 16, 2013, which is a divisional of U.S. patent application Ser. No. 12/581,998 filed on Oct. 20, 2009, which claims priority from U.S. Provisional App. Ser. No. 61/106,665 filed on Oct. 20, 2008, U.S. Provisional App. Ser. No. 61/109,764 filed on Oct. 30, 2008, and Canadian Patent App. Ser. No. 2,669,440 filed on Jun. 18, 2009, each of which is hereby incorporated by reference as if fully set forth herein.

FIELD

The Applicant's teaching disclosed herein relates to fence systems, for example privacy fences and picket fences, and to one or more methods and apparatuses associated with elements of fence systems and the connection structure and assembly thereof.

BACKGROUND

The following paragraphs are not an admission that anything discussed therein is citable as prior art or part of the general knowledge of people skilled in the art.

U.S. Pat. No. 5,702,090 (Edgman) discloses a plastic fence assembly, particularly adapted for use as residential privacy fencing and the like, comprising plural post members which are formed of hollow extruded plastic and have opposed side walls and end walls intersected by one or more elongated channels. Elongated spacer elements may be inserted in the channels and retained therein by interlocking projections on the spacer elements and recesses formed in the sidewalls of the post channels. The spacer elements support side edges of vertically extending picket members, brackets for horizontally extending center rail members and to position at least one or both of elongated top and bottom rail members of the fence assembly. The top and bottom rail members have elongated slots formed therein for receiving opposite ends of generally planar boardlike picket members. The top and bottom rail members and the spacer members may be cut to length as may the post and picket members to provide fencing of a desirable height and distance between posts.

U.S. Pat. No. 5,988,599 (Forbis) discloses a modular fence system. The system includes fence planks designed for insertion into open channels of upper and lower fence rails. The fence rails are supported in a horizontal orientation between intermittent fence posts, with the fence planks extending vertically between the rails. The planks include resilient protrusions at their upper ends. The protrusions of the planks are designed to fit into internal passages formed in the open channels of the upper fence rail, into engagement with ledges defining the passages, to inhibit inadvertent removal of the planks from the upper rail.

U.S. Pat. No. 6,478,287 (DeSouza) discloses a fence panel constructed from extruded hollow polyvinyl plastic boards. The boards are arranged with vertical end boards and filler boards between the end boards. Three horizontal rails each have a board on each side of the vertical boards with a horizontal filler board between the top rail boards to seal off the upper ends of the vertical boards. All of the boards are secured together with a plastic adhesive without the use of any mechanical fasteners.

U.S. patent application publication 2008/0217598 (Dombroski) discloses a fence assembly that is made up of a plurality of fence sections. Each section is made up of panels with top, bottom and side edges and front and rear surfaces. Slots are spaced from and milled into the panels along one of the sets of edges. A pair of trim extends over and covers the set edges and each trim has projections that snap or slide into the front and rear slots. Alternatively the edges of the panel may be beaded and slid over the slotted side of the trim. The fence sections are coupled pivotably to fence posts such that the panels may pivot, under force of wind, about either their top or bottom end. The panels are restored to generally vertical position by the force of gravity. A counterweight within the fence post linked to the panels can be used to restore panels to their vertical position. In an alternate embodiment, the brackets coupling the panels to the fence posts may slide along the fence posts and the panels bow in response to high winds. The fence panels may include resilient strips along their vertical edges.

U.S. patent application 2008/0023684 (Diamond et al.) discloses a non-metallic fence system that has a singular snap lock mechanism for permitting the easy construction of the fence. It also includes a securing device for fixing a fabric to a fence having a rigid body including at least two prongs therefrom and an open face strut profile capable of receiving the prong therein, wherein the prongs are locked within the open face and the fixture can be removed by twisting 90 degrees.

SUMMARY

The following summary is intended to introduce the reader to the disclosure provided herein but not to define any invention. In general, this disclosure describes one or more methods or apparatuses related to injection drive units in injection molding machines.

According to one aspect, a fence system includes a first extruded lineal extending lengthwise along a first longitudinal axis. The first lineal has a sidewall with at least a first slot in the sidewall and the first slot extends generally perpendicular to the longitudinal axis. The fence system also includes a second extruded lineal extending lengthwise along a second longitudinal axis. The second extruded lineal includes at least a corresponding first attachment leg extending outward from the second extruded lineal and parallel to the second longitudinal axis. The first attachment leg is integrally extruded with the second extruded lineal and is received in the first slot to secure together the first and second extruded lineals.

According to some aspects, a fence section comprises: a) a generally horizontal first rail having an upper face with a first panel recess extending lengthwise along the first rail and extending laterally between opposed first recess sidewalls, the first rail including a first tongue extending laterally from one towards the other of the first recess sidewalls and lengthwise along the first rail; b) a generally horizontal second rail spaced vertically above the first rail and having a lower face with a second panel recess extending lengthwise along the second rail and extending laterally between opposed second slot sidewalls, the second rail including a second tongue extending laterally from one towards the other of the second recess sidewalls and lengthwise along the second rail; and c) a plurality of vertical members extending generally vertically between the first rail and the

second rail, each vertical member having a panel height extending between upper and lower ends of the panel and a panel thickness extending laterally between opposed front and back panel faces, the lower end of each vertical member being received in the first panel recess and the upper end of each vertical member being received in the second panel recess. Each vertical member has a constant cross-sectional panel profile along the panel height, and each vertical member includes a lower slot and an upper slot extending horizontally across a width of the vertical member and lengthwise of the rail, the lower slot receiving the first tongue therein and the upper slot receiving the second tongue therein.

In some examples, the vertical members can be in the form of fence panels, pickets, boards, or slats. The vertical members and/or the rails can, in some examples, be formed of plastic and can be injection molded.

In some examples, each vertical member comprises an extruded lineal, made of, for example, but not limited to, a plastic material. The upper and lower slots can comprise cuts (for example, saw cuts) or a similar material-removal feature in the lineals. The slots can be parallel to, and spaced equally apart from, the upper and lower edges of panels.

In some examples, the rails can comprise extruded lineals. The rails can have a constant cross-sectional profile along their length. The rails can be made of a plastic material. Each of the rails, including, for example, the first and second rails and an optional third rail can have a common rail profile. In other words, a length of extruded lineal having the common rail profile can be used as any one of the first, second, or third rails.

According to some aspects, a fence section, comprises: a) a generally horizontal lower rail having an upper face with a lower panel recess extending lengthwise along the first rail and extending laterally between opposed first and second lower recess sidewalls, the lower rail including a lower rail first tongue extending laterally from the first lower recess sidewall towards the second lower recess sidewall and lengthwise along the lower rail, and a lower rail second tongue extending laterally from the second lower recess sidewall towards the first lower recess sidewall and lengthwise along the lower rail; b) a generally horizontal upper rail spaced vertically above the lower rail and having a lower face with an upper panel recess extending lengthwise along the upper rail and extending laterally between opposed first and second upper recess sidewalls, the upper rail including an upper rail first tongue extending laterally from the first upper recess sidewall towards the second upper recess sidewall and lengthwise along the upper rail, and a upper rail second tongue extending laterally from the second upper slot sidewall towards the first upper slot sidewall and lengthwise along the upper rail; and c) a plurality of fence panels extending generally vertically between the lower rail and the upper rail, each fence panel having a panel height extending between upper and lower ends of the panel and a panel thickness extending laterally between opposed front and back panel faces, the lower end of each fence panel being received in the lower panel recess and the upper end of each fence panel being received in the upper panel recess. Each fence panel has a constant cross-sectional panel profile along the panel height, and each fence panel includes a first and a second lower groove and a first and a second upper groove extending horizontally across a width of the fence panel and lengthwise of the rail, the first lower groove receiving the lower rail first tongue therein, the second lower groove receiving the lower rail second tongue therein, the first upper groove receiving the upper rail first tongue therein, the second upper groove receiving the upper rail second tongue therein.

In some examples, the front and/or back faces of fence panel can comprise one or more vertical channels extending along the height of the panel. The channel(s) can give the illusion that each panel comprises a plurality of slats. Each channel can comprise a channel face, and opposed lateral faces. The channel can have the same depth as each of the grooves, and each tongue can abut the channel face(s).

In some examples, each fence panel is provided with cooperating male and female engagement elements, such that each fence panel may be connected to one or more other fence panels. The male and female engagement elements can be configured such that when a male engagement element is inserted into a female engagement element, the joint provides the appearance of a channel. For example, each female engagement element can comprise opposed walls, between which the male engagement element is inserted. The opposed walls can be provided at a distance from the front and back faces of the panel, respectively, that is equal to the depth of the channel(s), and the width of each opposed walls can be equal to the width of the channel face.

In some examples, the first and second lower tongues and the first and second upper tongues are joined to the first and second upper and lower slot sidewalls, respectively, at a vertical position generally at the outer ends of the first and second upper and lower sidewalls. In other examples, the first and second lower tongues and the first and second upper tongues are joined to the first and second upper and lower slot sidewalls, respectively, at a vertical position spaced from the outer ends of the first and second upper and lower sidewalls.

According to some aspects, a connection structure for a fence comprises a first extruded lineal extending lengthwise along a first longitudinal axis and having a sidewall with at least a first slot in the sidewall. The first slot extends generally perpendicular to the longitudinal axis. The connection structure also comprises a second extruded lineal extending lengthwise along a second longitudinal axis, the second extruded lineal including at least a corresponding first attachment leg extending outward from the second extruded lineal and parallel to the second longitudinal axis. The first attachment leg can be integrally extruded with the second extruded lineal and is received in the first slot to secure together the first and second extruded lineals.

In some examples, the first extruded lineal comprises a second slot parallel to, and spaced apart from, the first slot, and the second extruded lineal comprises a corresponding second attachment leg parallel to the first attachment leg and received in the second slot.

In some examples, each slot comprises an opening through one sidewall. Each opening may have opposed slot edge faces and opposed slot end faces. Each slot edge face and each slot end face may extend laterally from an outer surface of the sidewall to an inner surface of the sidewall.

In some examples, the slot edge faces are parallel to each other.

In some examples, the slot edge faces are oblique relative to the first longitudinal axis.

In some examples, each attachment leg comprises a distal portion spaced apart from the second extruded lineal and a barb extending from the distal portion. Each barb may comprise an abutment surface that bears against the inner surface of the sidewall adjacent the respective slot into which the attachment leg is received for retaining the

attachment leg within the slot when the attachment leg is fully inserted into the respective slot.

In some examples, the second extruded lineal comprises a base surface. Each attachment leg may extend from the base surface. The base surface may oppose the abutment service and be spaced apart from the abutment surface by a distance greater than a thickness of the first extruded lineal sidewall.

In some examples, the slot end faces are spaced apart by a first width and the attachment leg received within each slot has a second width. The second width may be generally equal to the first width so that translation of the first extruded lineal relative to the second extruded lineal along the second longitudinal axis is inhibited when the attachment leg is received within the slot.

In some examples, each barb comprises at least one resilient retaining member. The at least one resilient member may be moveable between insertion and retention positions. When the at least one resilient retaining member is in the insertion position the barb can pass between the slot edge faces, and when the at least one resilient retaining member is in the retention position the barb is inhibited from passing between the slot edge faces.

In some examples, the at least one resilient retaining member comprises the abutment face.

According to some aspects, a fence section comprises an upper horizontal rail and a lower horizontal rail extending along respective upper and lower rail axes. The lower rail is spaced vertically below the upper horizontal rail. Each of the rails can comprise a respective extruded lineal including integrally formed attachment legs. The fence section can further comprise a plurality of vertical members each extending between the upper and lower horizontal rails. Each of the vertical members comprises at least one upper slot and at least one lower slot. At least portions of the attachment legs of the upper and lower rails are received within respective ones of the slots to secure each vertical member to the upper and lower horizontal rails.

In some examples, each of the vertical members extends along a respective vertical axis. The upper and lower slots may be generally elongated in a lateral direction generally perpendicular to the vertical axis, and the slots may be generally narrow in the vertical direction. The upper and lower slots can each have a slot length extending generally perpendicular to the vertical axis, and a slot thickness extending in the vertical direction. The slot thickness can be less than the slot length. In some examples, the slot thickness can be only a fraction of the slot length, for example only about one-fifth, or about one-tenth, or about one-fifteenth, or less than about one-twentieth of the slot length.

In some examples, the upper and lower slots can form an opening through a sidewall of each vertical member. Each opening may comprise opposed slot edge faces and opposed slot end faces. Each slot edge face and each slot end face may extend laterally from an outer surface of the sidewall to an inner surface of the sidewall.

In some examples, the slot edge faces are parallel to each other.

In some examples, the slot edge faces are oblique relative to the outer surface of the sidewall.

In some examples, the slot end faces are parallel to each other and are spaced apart by a slot length and the slot edge faces are spaced apart by a slot height.

In some examples, each attachment leg comprises opposing attachment leg end faces spaced apart by an attachment leg length. The attachment leg length may be less than the slot length of the corresponding slot.

In some examples, each attachment leg includes a barb. Each barb may comprise an abutment surface that bears against the inner surface of the sidewall adjacent the respective corresponding slot, into which the attachment leg is received when the attachment leg is fully inserted into its slot.

In some examples, the upper and lower rails each comprise a base surface. Each attachment leg may extend from one base surface. Each base surface may oppose the abutment surfaces of the attachment legs extending therefrom, and may be spaced apart from the abutment surfaces by a distance greater than a thickness of the sidewall.

In some examples, each barb has a generally wedge-shaped cross-section comprising a leading edge spaced apart from its abutment surface so that the each barb facilitates insertion of the attachment leg into its slot and resists removal of the attachment leg from its slot.

In some examples, each attachment leg is resiliently moveable between a first position for inserting the attachment leg and barb through the respective slot and a second position for retaining the attachment leg within the respective slot. In the second position the abutment surface may engage the inner surface of the sidewall, and the attachment leg may be biased toward the second position.

In some examples, each barb comprises at least one resilient retaining member. The at least one resilient member may be moveable between insertion and retention positions. When the at least one resilient retaining member is in the insertion position, the barb has a barb height that is less than the slot height. When the at least one resilient retaining member is in the retention position, the barb has a barb height that is greater than the slot height.

In some examples, each resilient retaining member is biased toward the retention position.

In some examples, the resilient retaining member comprises the abutment surface. When the attachment leg is fully inserted in its slot and the resilient retaining member is in the retention position, the abutment surface may engage the inner surface of the sidewall.

In some examples, each attachment leg further comprises a protrusion. The protrusion may extend away from the attachment leg and may be intermediate the resilient retaining member and the base surface.

In some examples, each the protrusion has a protrusion height that can be less than the slot height.

In some examples, each protrusion is registered with one slot edge face when the attachment leg is fully received in its slot to inhibit vertical displacement between the vertical members and upper and lower rails.

In some examples, both horizontal rails have a common extruded profile comprising a downward opening, generally C-shaped channel. The channel may have a horizontal upper wall and first and second vertical, laterally spaced apart, integrally formed rail sidewalls. The profile may define an internal cavity between the rail sidewalls and adjacent the upper wall.

In some examples, the upper wall of each horizontal rail comprises a plurality of apertures spaced apart along the length of the rail. The apertures in the upper horizontal rail may be aligned with corresponding apertures in the lower horizontal rail and each vertical member may pass through respective aligned ones of the apertures in the upper and lower horizontal rails.

In some examples, each vertical member extends beyond the upper wall of the upper horizontal rail and extends beyond a bottom edge of the sidewalls of the lower horizontal rail.

In some examples, the attachment legs include laterally opposed first and second attachment legs extending inwardly towards each other from the first and second sidewalls respectively.

In some examples, each vertical member comprises a set of opposing upper slots and a set of opposing lower slots formed in opposing sidewalls of the vertical member for receiving the first and second opposed attachment legs of the upper and lower rails respectively.

In some examples, both horizontal rails have a common extruded profile comprising spaced apart top and bottom walls connected by integrally formed first and second rail sidewalls forming a generally rectangular channel.

In some examples, the attachment legs extend from an outer surface of the first rail sidewall of both horizontal rails.

In some examples the fence section comprises attachment legs extending from an outer surface of the second rail sidewall of both horizontal rails.

In some examples, the plurality of vertical members comprises first and second sets of vertical members. The attachment legs may extend from the first rail sidewall of the upper and lower horizontal rail and may be received within the corresponding upper and lower slots of the vertical members in the first set of vertical members, thereby securing each vertical member in the first set of vertical members adjacent the first sidewall of both horizontal side rails.

In some examples, the attachment legs extend from the second sidewall of the upper and lower horizontal rails and are received within the corresponding upper and lower slots of the vertical members in the second set of vertical members, thereby securing each vertical member in the second set of vertical members adjacent the second sidewall of both horizontal side rails.

In some examples, vertical members from the first and second sets are arranged in an alternating sequence along the length of the upper and lower horizontal side rails.

In some examples, the attachment leg length is generally equal to the slot length so that translation of each vertical member relative to the upper and lower horizontal rails along the upper and lower rail axes is inhibited when the attachment leg is received its slot.

In some examples, the attachment of the vertical members to the upper and lower horizontal rails comprises only the connection between the attachment legs and slots and is free from other fastening means.

In some examples, the connection between the attachment legs and slots comprises a snap-fit connection.

According to some aspects, a method of assembling a fence section comprises the steps of: a) providing a first horizontal rail having at least one integrally formed attachment leg extending therefrom, b) providing a second horizontal rail, the second horizontal rail being spaced apart from the first horizontal rail and having at least one integrally formed attachment leg extending therefrom, c) providing a plurality of vertical members, each vertical member having at least one upper slot formed in a sidewall for receiving one attachment leg from the first horizontal rail and at least one lower slot formed in the sidewall for receiving one attachment leg from the second horizontal rail, and d) connecting each vertical member to the first and second horizontal rails by inserting one attachment leg on the first horizontal rail into the at least one upper slot on each vertical member and inserting one attachment leg on the second horizontal rail into the at least one lower slot on each vertical member.

According to some aspects, a method of making a fence system includes extruding a vertical member profile along an extrusion axis, and cutting the profile to length along a cutting axis generally perpendicular to the extrusion axis to form vertical members for a fence. During or after the profile is cut to length, at least one upper and at least one lower attachment slot can be cut into the vertical member, parallel to the cutting axis and adjacent upper and lower ends of each vertical member. The method can include extruding upper and lower rail profiles, each including an attachment leg extending laterally outwardly of the rail profiles for engagement with the slots of the vertical members.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawings included herewith are for illustrating various examples of articles, methods, and apparatuses of the present specification and are not intended to limit the scope of what is taught in any way. In the drawings:

FIG. **1** is a perspective view of a first example of a fence section according to one aspect of the Applicant's teaching;

FIG. **2** is a cross-sectional view of a common extruded rail profile of the fence section of FIG. **1**;

FIG. **3** is a partially exploded perspective view of the fence section of FIG. **1**;

FIG. **4** is a cross-sectional view of the fence section of FIG. **1** taken along the lines **4-4**;

FIG. **5**A is a cross-sectional view of the fence section of FIG. **3** taken along the lines **5-5**;

FIG. **5**B is a perspective view of an alternate example of a fence section;

FIG. **6** is a perspective view of another example of a fence section;

FIG. **7** is an exploded perspective view of the fence section of FIG. **6**;

FIG. **8** is a cross-sectional view of the fence section of FIG. **6** taken along the lines **8-8**;

FIG. **9** is a cross-sectional view of the fence section of FIG. **7** taken along the lines **9-9**;

FIGS. **10** and **11** are cross-sectional views of portions of the fence sections of FIGS. **6** and **1**, respectively, with optional wooden reinforcement members;

FIG. **12** is a perspective view of another example of a fence section;

FIG. **13** is a cross-sectional view of a portion of the fence section of FIG. **12** taken along the lines **13-13**;

FIG. **14** is an enlarged view of a portion of the fence section of FIG. **13**;

FIG. **15** is a perspective view of another example of a fence section;

FIG. **16** is a cross sectional view of a fence panel, taken along line **16-16** in FIG. **15**;

FIG. **17** is a cross-sectional view of a common extruded rail profile of the fence section of FIG. **15**;

FIG. **18** is a cross sectional view of a fence section, taken along line **18-18** in FIG. **15**;

FIG. **19** is a cross sectional view of a fence section, taken along line **19-19** in FIG. **15**; and

FIG. **20** is a cross sectional view of another example of a fence section.

FIG. **21** is a perspective view of another example of a fence section;

FIG. **22** is a partial section view of the fence section of FIG. **21**;

FIG. **23**A is a perspective view of a portion of a fence section;

FIG. **23**B is an exploded view of the fence section of FIG. **23***a*;

FIG. **24**A is a section view of a rail;

FIG. **24**B is a perspective view of another example of a fence section;

FIG. **25** is a perspective view of another example of a fence section;

FIG. **26**A is a perspective view of a portion of a fence section;

FIG. **26**B is an exploded view of the fence section of FIG. **26***a*;

FIG. **27**A is a section view of the fence section of FIG. **26***a*;

FIG. **27**B is a detail view of a portion of FIG. **27**;

FIG. **28**A is a perspective view of another example of a fence section;

FIG. **28**B is a perspective view of another example of a fence section;

FIG. **29** is an end view of another example of a rail;

FIG. **30**A is an end view of a rail having a barb with a resilient member;

FIG. **30**B is a detail view of a portion of FIG. **30**;

FIG. **31**A is an end view of a rail of FIG. **30** with the resilient barb in the insertion position;

FIG. **31**B is an end view of a rail of FIG. **30** with the resilient barb in the retention position;

FIG. **31**C is an end view of a rail of FIG. **30** connected to a vertical member and having the resilient barb in the retention position;

FIG. **31**D is a perspective illustration of another example of a rail;

FIG. **31**E is a cross section taken along line **31**E-**31**E in FIG. **31**D, and further including a vertical member mounted to the rail;

FIG. **32** is a perspective view of a connection structure for use with a fence section; and

FIG. **33** is a partial section view of the connection structure of FIG. **32**.

DETAILED DESCRIPTION

Various apparatuses or processes will be described below to provide an example of an embodiment of each claimed invention. No embodiment described below limits any claimed invention and any claimed invention may cover processes or apparatuses that are not described below. The claimed inventions are not limited to apparatuses or processes having all of the features of any one apparatus or process described below or to features common to multiple or all of the apparatuses described below. It is possible that an apparatus or process described below is not an embodiment of any claimed invention. Any invention disclosed in an apparatus or process described below that is not claimed in this document may be the subject matter of another protective instrument, for example, a continuing patent application, and the applicants, inventors or owners do not intend to abandon, disclaim or dedicate to the public any such invention by its disclosure in this document.

Referring to FIG. **1**, an example of a fence section **110** includes generally horizontal first and second rails **112**, **114**, (also referred to as lower rail **112** and upper rail **114**) and a plurality of fence panels (also called vertical members) **115** extending generally vertically between the first and second rails **112**, **114**.

Referring to FIG. **2**, each of the rails **112**, **114** is, in the example illustrated, made of a common extruded rail profile **116**. The profile **116** includes laterally spaced apart side faces **118***a*, **118***b* extending between a proximal face **120** and a distal face **122** spaced vertically apart from the proximal face **120**. A generally U-shaped panel recess **124** is provided in the proximal face **120**. The panel recess **124** has laterally spaced apart first and second panel recess sidewalls **126***a*, **126***b*, each having an outer end **128***a*, **128***b* at the proximal face **120**, and an inner end **130***a*, **130***b* disposed vertically intermediate the proximal face **120** and the distal face **122**. A panel recess base **132** extends generally laterally inwardly from the inner ends **130***a*, **130***b* of the panel recess sidewalls **126***a*, **126***b*.

In the example illustrated, the rail profile **116** includes a distal lattice recess **134** associated with the distal face **122**. The distal lattice recess **134** includes opposed distal lattice recess sidewalls **136***a*, **136***b* each having an outer end **138***a*, **138***b* at the distal face **122**, and an inner end **140***a*, **140***b* disposed vertically intermediate the distal face **122** and the panel recess base **132**. A distal lattice recess base **142** extends generally laterally between the inner ends **140***a*, **140***b* of the distal lattice recess sidewalls **136***a*, **136***b*.

A frangible cover strip **143** can be provided for releasably covering the distal lattice recess **134**. The frangible cover strip **143** can extend laterally between the outer ends **140***a*, **140***b* of the distal lattice recess sidewalls **136***a*, **136***b*. In the example illustrated, the distal face **122** is generally planar, and the frangible cover strip **143** is coplanar with the distal face **122**.

In the example illustrated, the connection between opposed lateral edges of the cover strip **143** and the adjacent outer ends **138***a*, **138***b* of the distal lattice sidewalls **136***a*, **136***b* comprises a thinned section of extruded material (e.g. having opposed v-grooves), facilitating tearing away the cover strip **143** to provide access to the recess **134** for use.

The rail profile **116** can additionally or alternatively be provided with a proximal lattice recess **144** associated with the proximal face **120**. The proximal lattice recess **144** has laterally spaced apart proximal lattice recess sidewalls **146***a*, **146***b* each having an outer end **148***a*, **148***b* at the panel recess base **132**, and an inner end **150***a*, **150***b* vertically intermediate the panel recess base **132** and the distal lattice recess base **142**. A proximal lattice recess base **152** extends laterally between the inner ends **150***a*, **150***b* of the proximal lattice recess sidewalls **146***a*, **146***b*.

The rail profile **116** further includes at least one tongue **158** extending from one panel recess sidewall inwardly of the recess **124**, towards the opposing panel recess sidewall. In the example illustrated, the tongue **158** extends from the panel recess sidewall **126***a* laterally (generally horizontally) towards the other panel recess sidewall **126***b*. The tongue **158** is joined to the panel recess sidewall **126***a* at a vertical position generally intermediate the inner and outer ends **128***a*, **130***a* thereof.

Referring to FIG. **3**, the fence panel **115** has a height **160** extending between lower and upper ends **162**, **164** of the panel **115**. Each fence panel **115** has a generally constant lateral thickness along its height **160**, and can comprise an extruded lineal having a constant cross-sectional panel profile along its height **160**. Each panel **115** has a lower groove (or slot) **166** provided in one face of the panel **115** and extending across the panel **115** in a direction lengthwise of the rails **112**, **114**, adjacent the lower end **162**. Each panel **115** has a similar upper groove (or slot) **168** adjacent the upper end **164**.

Referring to FIGS. **3**, **4**, and **5**A, in use, the lower ends **162** of the fence panels **115** are received in the first panel recesses **124** of the first rail **112**. The upper ends **164** of the fence panels **115** are received in the first panel recesses **124** of second rail **114**. The tongues **158** of the respective rails **112**, **114** are received in the respective slots **166**, **168**. The panels **115** can be inserted by sliding the panels **115** length-

wise along the rails **112**, **114** with the tongues **158** aligned with the slots **166**, **168**. Alternatively, the rails **112**, **114** and the panels **115** can be press fit together in a generally vertical direction with the ends **162**, **164** of the panels **115** aligned with the recess **124**, and at least one of the rail or panel resiliently deforming to accommodate insertion of the end of the panel **115** past the tongue **158**. The engagement of the tongue **158** in the grooves **166**, **168** provides interlocking of the panels **115** with the rails **112**, **114** along substantially the entire width (extending parallel to the length of the rails **112**, **114**) of the panels **115**.

As seen in FIGS. **1** and **3**, the fence section **110** can be provided with a lattice panel **170** mounted in the upper face of the second rail **114**. The cover strip **143** can be removed from the second rail **114**, and a lower marginal portion of the lattice panel **170** can be seated in the distal lattice recess **134**.

A third rail **172** can be mounted atop the lattice panel **170**. In the example, illustrated, the third rail **172** has the same common rail profile **116** as the first and second rails **112**, **114**. An upper marginal portion of the lattice panel **170** is received in the proximal lattice recess **144** (see also FIGS. **4** and **5**).

In an alternate example shown in FIG. **5**B, the lattice panel **170** may have a curved upper end, and the third rail **172** may also be curved between opposed ends thereof.

In FIGS. **6** and **7**, another example of a rail section **210** is shown. The rail section **210** is similar to the rail section **110**, and like features are identified by like reference characters, incremented by 100. The rail section **210** includes first and second rails **212**, **214** with fence panels **215** extending vertically therebetween. In the fence section **210**, gaps **217** are provided between adjacent ones of the panels **215**. The rails **212**, **214** have a common rail profile **216** to which spacers **219** can be clipped in registration with the gaps **217** to facilitate providing the gaps **217** between the panels **215**.

Referring to FIGS. **8** and **9**, the common rail profile **216** includes inwardly directed lugs **221** extending laterally inwardly from the panel recess sidewalls near the upper ends thereof. The lugs **221** inter-engage with protrusions **223** extending laterally outwardly from mounting legs **225** extending from the back surface of the spacer **219**.

The profile **216** can also include pressure tabs **227** extending generally from the panel recess base towards the proximal face of the profile **216**. The pressure tabs **227** are configured to bear against the end face of the panel **215**. This can facilitate secure mounting of the panels **215** in the panel recesses **224**.

In FIGS. **10** and **11**, the profiles **216** and **116** are shown with wooden reinforcement members **280**, **180** (respectively) provided within the hollow interior of the respective rails **212**, **214**, **112**, **114**. The profiles **116**, **216** can be sized to accommodate dimensional lumber (e.g. 1×3). Webs **182**, **282** and/or standoffs **184**, **284** can be provided in the interior of the profiles **116**, **216** to provide a snug fit for the wooden reinforcement **180**, **280**.

FIG. **12** shows another example of a fence section **310** having rails **312**, **314** with a common rail profile **316**. Fence panels **315** are provided with cooperating male and female engagement elements **371**, **373** extending along the height **360** of the panels **315** at opposite vertical side edges thereof. The male engagement elements **371** can be received in the female engagement elements **373** of an adjacent panel **315** (FIGS. **13** and **14**) to facilitate securing together the fence section **310**.

FIGS. **15-19** show another example of a fence section **410** that is similar to the fence section **110**, with like features identified by like reference characters incremented by 300. The fence section **410** includes first and second rails **412**, **414** (or lower rail **412** and upper rail **414**), with a common rail profile **416** and a plurality of panels **415** extending between the rails **412**, **414**.

Referring to FIGS. **15** and **16**, the fence panels **415** each have opposed front and back faces **417***a*, **417***b* generally disposed in vertical planes, parallel with each other and the rails **412**, **414**. Each panel **415** has a panel thickness **419** extending orthogonally between the front and back faces **417***a*, **417***b*, and a panel width **421** extending longitudinally along the rails **412**, **414**, between opposed first and second vertically extending ends **423***a*, **423***b*.

The front and back faces **417***a*, **417***b* can be provided with one or more recessed channels **486** extending along the height **460** of the panel. Each channel **486** comprises opposed channel side faces **490***a*, **490***b*, extending generally orthogonally from the respective panel face **417***a*, **417***b* and towards the panel interior (i.e. towards the opposing panel face), and a channel base **492** extending between the lateral faces. The channel base **492** is, in the example illustrated, generally planar and parallel to the faces **417***a*, **417***b*. The orthogonal (or lateral) extent of the channel side faces **490***a*, **490***b* generally defines a channel depth D**1**. The spacing between the channel side faces **490***a*, **490***b* (measured parallel to the rails) generally defines a channel width W**1**. The channels **486** provide the panels **415** with raised panel portions **425** on either side of the recessed channels **486**. The raised panel portions **425** can create the appearance of a plurality of side-by-side slats each extending longitudinally along the height **460** of the panel **415**.

In the example shown, each panel **415** comprises one channel **486** spaced approximately mid-way between the vertically extending ends **423***a*, **423***b*. However, in other examples, more than one channel **486** may be provided on each face.

Referring to FIGS. **16** and **18**, each fence panel **415** is, in the example illustrated, provided with cooperating male and female engagement elements **471**, **473** at respective ones of the vertically extending side edges or ends **423***a*, **423***b*. The male and female engagement elements are configured such that when two panels **415** are assembled in side-by-side relation, the male engagement element **471** can inter-engage with the female engagement element **473**. In the example illustrated, the engagement elements **471**, **473** are integrally extruded with the panels **415**, and extend continuously along the height **460** of the panels **415**. When the male engagement element **471** is inserted into the female engagement element **473**, the male protruding member fits within laterally spaced apart front and rear walls **494***a*, **494***b* of the female engagement member **473**. Each wall **494***a*, **494***b* is generally parallel to, and in the same plane as, the base **492** of the channels **486** in the respective front and rear panel faces **417***a*, **417***b*. The front wall **494***a* is laterally recessed relative to the front panel face **417***a* by a distance D**2** that is generally equal to the distance D**1**. The back wall **494***b* is similarly offset relative to the back panel face **417***b*.

Further, the width W**2** (extending parallel to the rails **412**, **414**) of each wall **494***a*, **494***b* is generally equal to the width W**1** of the channel face **492**. Accordingly, referring to FIG. **18**, when the male engagement element **471** is inserted between the walls **494***a* and **494***b* of FIG. **16**, the joint **475** appears similar to channel **486**, with walls **494***a* and **494***b* appearing similar to channel face **492**. The male member **471** has front and rear sidewalls **477***a*, **477***b* that are also generally parallel to, and the same width as, the channel bases **492**. The lateral spacing of the sidewalls **477***a*, **477***b* from the respective faces **417***a*, **417***b*, is slightly greater than

D1 so that the male member **471** fits within the female member **473**. However, the single male member **471** abutting a newel post at one end of the fence nevertheless has a visual appearance very similar to channels **486** and female end **473** (see FIG. **18**).

Referring to FIG. **17**, each common rail profile **416** comprises at least one laterally inwardly directed tongue extending inwardly of the recess **424**. In the example illustrated, two laterally opposed first and second tongues **458***a*, **458***b* are provided, each extending inwardly of the recess **424**. The first tongue **458***a* extends from the first panel recess sidewall **426***a* towards the second panel recess sidewall **426***b*, and the second tongue **458***b* extends from the second panel recess sidewall **426***b* towards the first panel recess sidewall **426***a*. The tongues **458***a* and **458***b* are joined to the panel recess sidewalls **426***a*, **426***b* at a vertical position generally at the outer ends **428***a*, **428***b* thereof, respectively. In other words, the tongues **458***a* and **458***b* extend inwardly from the sidewalls **426***a*, **426***b* generally at the respective outer ends **428***a*, **428***b*, thereof. The tongues **458***a*, **458***b* can be generally coplanar with the proximal face **420**.

Referring to FIG. **19**, the panels **415** are provided with at least one slot or groove to receive the at least one tongue of the rail profile. In the example illustrated, two grooves are provided (front and back lower grooves) **466***a*, **466***b* to receive tongues **458***a* and **458***b*, respectively, of the lower rail **412**, and with front and back upper grooves **468***a*, **468***b* to receive the tongues **458***a*, **458***b*, respectively, of the upper rail **414**. In the example illustrated, the grooves **466** and **468** extend across the raised panel portions **425** of the panels **415**, between the edges **423***a*, **423***b* and the channels **486**. The bases **492** of the channels **486** are free of the grooves **466***a*, **466***b*, **468***a*, **468***b* and remain vertically intact across the elevation at which the grooves **466***a*, **466***b*, **468***a*, **468***b* are provided in the raised panel portions **425** on either side of the channels **486**.

To provide the grooves **466***a*, **466***b*, **468***a*, **468***b*, a saw cut can be made across the entire width **421** of the panel **415**. The depth of cut can be set to generally equal the channel depth D1, so that the thickness of the extruded wall forming the raised panels **425** is cut through, but the wall forming the base **492** is below the depth of cut and so remains uncut.

Upon installation, when the tongues **458***a*, **458***b* are received in the slots **466** and **468**, the innermost edges of the tongues **458***a*, **458***b* generally abut the channel bases **492**. This can help to close off what would otherwise be an opening between the outer edges **428***a*, **428***b* of the panel slot sidewalls **426***a*, **426***b* and the base panel **492** of the channels **486**. If left uncovered, such openings could admit snow, dirt, water or other matter to invade the rails. Further, as grooves **466**, **468** are not provided in channels **486** (i.e. grooves **466**, **468** are not cut into the channel bases **492**), the channel bases **492** may provide additional strength to the panels **415**.

FIG. **20** shows another example of a common rail profile **518** and a panel **515**. In this example, the tongues **558***a* and **558***b* are joined to the panel recess sidewalls **526***a*, **526***b* at a vertical position near but spaced slightly vertically inward of the outer ends **528***a*, **528***b* thereof. The tongues **558***a* and **558***b* are slightly spaced from the junction of the panel recess sidewalls **526***a*, **426***b*, and the proximal face **520**, vertically recessed relative to the proximal face **520**. This can provide a vertical skirt segment **555***a*, **555***b* of the respective panel slot sidewalls **526***a*, **526***b* extending between the tongues **558***a*, **558***b* and the proximal face **520**. The skirt segments **555***a*, **555***b* can conceal proximal edges **567***a*, **567***b* and **569***a*, **569***b* of the upper and lower grooves **566***a*, **566***b*, **568***a*, **568***b* in the front and back faces **417***a*, **417***b* of the panel **415**, respectively, and provide additional lateral support to the raised panel portions **425** adjacent such proximal edges **567***a*, **567***b* and **569***a*, **569***b*.

Another example of a fence section **1100** is shown in FIGS. **21** to **24**. Referring to FIG. **21**, fence section **1100** includes generally horizontal upper and lower rails **1110**, **1112** that extend along respective upper and lower rail axes **1114**, **1116**. The lower rail **1112** is generally aligned with and spaced vertically below the upper rail **1110** by a distance **1113**. The distance **1113** between the rails **1110**, **1112** may be chosen based on the customer requirements or according to industry standards. In some examples the distance **1113** may be between about 0.2 meters and 3.0 meters. In other examples, the distance **1113** may be about 1.5 meters. In the example illustrated each of the rails **1110**, **1112** is formed from a respective extruded lineal and includes integrally formed attachment legs **1130**.

Referring still to FIG. **21**, the fence section **1100** includes a plurality of vertical members **1150** extending between the upper and lower horizontal rails **1110**, **1112**. Referring to FIGS. **22** and **23***b*, each vertical member **1150** includes at least one upper slot **1152** and at least one lower slot (not shown) corresponding to attachment legs **1130** of the upper and lower rails **1110**, **1112** respectively. The attachment legs **1130** of the upper and lower rails **1110**, **1112** are received within their corresponding upper slot **1152** and lower slot to secure each vertical member **1150** to the upper and lower horizontal rails **1110**, **1112**.

Each of the vertical members **1150** defines and extends along a respective vertical axis, for example vertical axis **1156**. The vertical members **1150** are, in the example illustrated, extruded lineals that each have the same extruded cross section. In some examples each vertical member **1150** may be extruded as a separate member, or may be an injection molded member, or the vertical members **1150** may each be cut to length from a single, longer extruded member. The vertical axis of each vertical member generally coincides with the extrusion direction of the vertical members. The upper **1152** and lower slots of the vertical members **1150** extend generally perpendicular to its vertical axis. The upper **1152** and lower slots may be formed in the vertical members **1150** using a secondary manufacturing process after the vertical members **1150** have been extruded, for example by cutting, routing, machining and milling. In the example illustrated the upper **1152** and lower slots are formed by plunge cutting with a saw blade having a thickness generally equal to the thickness of the slot. The saw blade can have a depth a cut that provides a slot all the way through the sidewall, and having notches in each edge wall orthogonal to the sidewall.

FIGS. **22** to **23**B show the lower slot **1152** in detail. The upper slot may be identical to the lower slot, and is not shown separately in detail. As shown in FIGS. **23**A and **23**B, the lower slot **1152** forms an opening **1158** that extends through their respective sidewalls **1160** on each vertical member **1150**. Each opening **1158** includes and is defined by a pair of opposed slot edge faces **1162** and a pair of opposed slot end faces **1164**, each slot edge face **1162** and each slot end face **1164** extending laterally from an outer surface **1166** of the sidewall **1160** to an inner surface **1168** of the sidewall **1160**. The slot edge faces **1162** are generally parallel to each other.

In some examples the upper **1152** and lower slots are cut into the sidewall **1160** so that the slot faces **1162**, **1164** are generally orthogonal to the outer surface **1166** of the sidewall **1160**. Such slots may be created by cutting the vertical

members **1150** using a saw blade that is generally orthogonal to the sidewalls **1160**. In other examples, the slots are cut into the sidewall **1160** so that the slot edge faces **1162** are at an oblique angle **1163** relative to outer surface **1166**. This type of angle slot may be formed by cutting the vertical members **1150** with an angled saw blade. Angled slot edge faces **1162** may provide clearance for the attachment legs **1130** to flex and bend as they are snapped or snap-fit into the slots while maintaining the vertical connection to and support of the rail members **1110**, **1112** once the attachment legs **1130** have been fully inserted into their respective slots. The slot end faces **1164** are parallel to each other and are spaced apart by a slot length **1159***b* and the slot edge faces **1162** are spaced apart by a slot height **1159***a*.

In the example illustrated, each attachment leg **1130** comprises opposing attachment leg end faces **1132** spaced apart by an attachment leg length. The attachment leg length is generally equal to, but slightly less than the slot length **1159***b* of the corresponding slot so that the attachment leg end faces **1132** can closely fit between the slot end faces **1164** without interfering with the slot end faces **1164** so that the attachment leg **1130** can be inserted into its slot.

Referring to FIG. **24**A, each attachment leg **1130** includes a barb **1134**. The barb **1134** includes an abutment surface **1136** that engages and bears against a portion of the inner surface of the sidewall **1168** adjacent or proximate the slot into which the attachment leg **1130** is received. When an attachment leg **1130** is fully inserted into its slot the engagement between the abutment surface **1136** of the barb **1134** and the inner surface of the sidewall **1168** tends to retain the attachment leg **1130** within the slot and resist removal therefrom.

Referring still to FIG. **24**A, the upper rails **1110** also includes a base surface **1138**. Each attachment leg **1130** formed on the rail **1110** extends from a base surface **1138** and each base surface **1138** generally opposes the abutment surfaces **1136** of the attachment legs **1130** extending therefrom. The base surface **1138** is generally spaced apart from the abutment surfaces **1136** by a distance that is greater than the thickness of the sidewalls **1160** of the vertical members **1150**. The lower rail **1112** is arranged in substantially the same manner as the upper rail **1110**. As illustrated in FIG. **22**, when an attachment leg **1130** is fully inserted into its slot, the barb **1134** will be positioned inside the hollow interior of the vertical member **1160** and its abutment surface **1136** will engage the inner surface of the vertical member **1160**. As described above, the base surface **1138** of each rail **1110**, **1112** is opposed to and offset from the abutment surface **1136** so that the base surface **1138** will simultaneously engage the outer surface **1166** of the sidewall **1160** when the abutment surface **1136** engages the inner surface **1168**.

Referring still to FIG. **24**A, each barb **1134** has a generally wedge-shaped cross-section comprising a leading edge **1140** spaced apart from its abutment surface **1136** so that the each attachment leg **1130** facilitates insertion into and resists removal from its slot. The relative size and shape of the barb **1134** may be chosen to provide the insertion and removal performance desired by the user. Each attachment leg **1130** may also be resilient, or include some resilient portions, so that it is moveable between a first position for inserting the attachment leg **1130** and barb **1134** through its slot and a second position for retaining (or securing or locking) the attachment leg **1130** within its slot. When the attachment leg **1130** is in its first or insertion position the barb **1134** can be passed through the slot from outside the vertical member **1150** to inside the hollow interior of the vertical member **1150**. To facilitate insertion of the attachment leg **1130** and barb **1134**, an angled portion of the barb **1134** (extending from the leading edge to the abutment surface **1136** in the example shown) may engage a slot edge face **1162** and act as a cam surface to guide the barb **1134** as it is inserted. The engagement between the barb **1134** and the slot edge face **1162** may also create a force that is sufficient to deflect the resilient portion of the attachment leg **1130** as the leg **1130** is inserted. When the attachment leg **1130** is in the second position the abutment surface **1136** engages the inner surface **1168** of the sidewall **1160**. The resilient nature of the attachment leg **1130** biases the attachment leg **1130** is second position. In other examples, the attachment **1130** may be biased toward its second position by an external biasing means (for example a spring).

In the example illustrated in FIGS. **21** to **24**A, horizontal rails **1110**, **1112** have a common extruded profile generally taking the form a downward opening, generally C-shaped channel. Each rail **1110**, **1112** channel has a horizontal upper wall **1118** and first and second vertical, spaced apart, integrally formed rail sidewalls **1120**, **1122** that define an internal cavity **1124**. The upper wall **1118** of each horizontal rail **1110**, **1112** includes a plurality of apertures **1126** spaced apart along the length of the rail **1110**, **1112**. When the fence section **1100** is assembled the rails **1110**, **1112** are positioned so that the apertures **1126** in the upper horizontal rail **1110** are aligned with corresponding apertures **1126** in the lower horizontal rail so that each vertical member **1150** extending between the horizontal rails **1110**, **1112** is received within one aperture **1126** in the upper horizontal rail **1110** and its corresponding aperture **1126** in the lower horizontal rail **1112**.

Referring to FIG. **21**, in the example illustrated, each vertical member **1150** extends beyond the upper wall **1118** of the upper horizontal rail **1110** beyond the bottom edge of the sidewalls **1120**, **1122** of the lower horizontal rail **1112** so that the fence section **1100** may visually resemble a traditional picket fence constructed using known techniques. The extent to which the vertical members **1150** extend above and below the horizontal rails **1110**, **1112** may be adjusted based on customer preference or any other consideration. As the position of the horizontal rails **1110**, **1112** relative to the vertical members **1150** is based on the relative location of the slots **1152**, **1154**, the position of the slots **1152**, **1154** on the vertical members **1150** may be changed to suit the customer requests.

When the rails **1110**, **1112** have a generally C-shaped profile, as illustrated in FIGS. **21** to **24**, the rails **1110**, **1112** are formed with opposing pairs of attachment legs **1130** extending from an inner face **1128** of the first and second rail sidewalls **1120**, **1122** of the upper and lower rails **1110**, **1112**. In this configuration, the attachment legs **1130** are arranged as pairs of opposing attachment legs **1130** along the length of the internal cavity **1124** at a desired interval (based on the desired spacing of the vertical members **1150**). Each attachment leg **1130** in a pair of opposing attachment legs **1130** extends toward its opposing attachment leg **1130** and into the internal cavity **1124**.

Complementing the arrangement of opposing attachment legs **1130** each vertical member **1150** includes a set of complimentary opposing upper slots **1152** and a set of opposing lower slots **1154** formed in opposing sidewalls **1160** of the vertical member **1150** for receiving the opposing pairs of attachment legs **1130** on the upper and lower rails **1110**, **1112** respectively.

In this example, the rail sidewalls **1120**, **1122** may also be at least partially resilient to enable them to flex outwardly when the vertical members **1150** are inserted through the

internal cavity **1124** when the attachment legs **1130** are not aligned with the slots **1152**, **1154**, and then to return to their original configuration after the attachment legs **1130** are inserted through the slots **1152**, **1154**.

The apertures **1126** in the upper walls **1118** of the rails **1110**, **1112** are illustrated as being generally rectangular, with rounded corners that are shaped to snugly receive the vertical members **1150**. In other examples, both the apertures **1126** and the vertical members **1150** maybe of a different configuration. While the vertical members **1150** are shown as being generally rectangular, it is understood that the cross-sectional shape (and its dimensions and proportions) of the vertical members **1150** may be any suitable shape, including square, rectangular, triangular, circular and polygonal. Similarly, the apertures **1126** may be of any desired size and shape that can receive a corresponding vertical member. The apertures may have the same general shape and size as the vertical members so that the vertical members closely fit within the apertures with little visible gap between the surfaces of the vertical member and the receiving aperture. Alternatively, the apertures may be of a different size and/or shape than the vertical members so that the vertical members are loosely received within the apertures. For example, a round vertical member could be loosely received within a larger, square aperture.

In an alternate example shown in FIG. **24**B, the fence section **1100** includes a second horizontal upper rail **1110***b*, positioned above the upper rail **1110**. The second horizontal upper rail **1110***b* is substantially the same as the upper rail **1110**. Further the vertical members **1150** include a second upper slot (not shown), which corresponds to attachment legs (not shown) of the second upper rail **1110***b*. The second upper rail **1110***b* is mounted to the vertical members in the same manner as the upper rail **1110**. The second horizontal upper rail **1110***b* may, for example, be included in the fence section **1100** for aesthetic purposes.

Referring now to FIGS. **25** to **29**, another example of a fence section **1200** is shown. The connection structure used to attach the members of fence section **1200** is similar to the connection structure of fence section **1100**, and like features are identified by like reference characters, incremented by 100. The fence section **1200** includes upper and lower horizontal rails **1210**, **1212** that are spaced apart by a vertical distance **1213**.

Fence section **1200** also includes a plurality of vertical members **1250** extending between the upper and lower horizontal rails **1210**, **1212**. Referring to FIG. **26**B, each vertical member **1250** includes a pair of upper slots **1252** and a pair lower slots **1254** corresponding to the attachment legs **1230** of the upper and lower rails **1210**, **1212** respectively. The attachment legs **1230** of the upper and lower rails **1210**, **1212** are received within their corresponding slots **1252**, **1254** to secure each vertical member **1250** to the upper and lower horizontal rails **1210**, **1212**. The connection between the attachment legs **1230** and the slots **1252**, **1254** can provide the only attachment between the rails **1210**, **1212** and the vertical members **1250**. In these examples no additional mechanical or chemical fasteners are used to secure the vertical members **1250** to the rails **1210**, **1212**. In other examples, the connection between the attachment legs **1230** and the slots **1252**, **1254** (or the members of other examples described herein) may be supplemented using known chemical or mechanical fasteners including, for example, but not limited to, glue, screws, nails, bolts, welding or adhesive tape.

Referring to FIG. **25**, each of the vertical members **1250** defines and extends along a respective vertical axis, for example vertical axis **1256**. The vertical members **1250** are extruded lineals that each have the same extruded cross section. In some examples each vertical member **1250** may be extruded as a separate member; in other examples the vertical members **1250** may each be cut to length from a single, longer extruded member. The vertical axis of each vertical member generally coincides with the extrusion direction of the vertical members. The upper and lower slots **1252**, **1254** of the vertical members **1250** extend generally perpendicular to the axis **1256**.

With reference to FIG. **26***b*, the upper and lower slots **1252**, **1254** in the example illustrated each form an opening **1258** that extends through a sidewall **1260** on each vertical member **1250**. Each opening **1258** includes and is defined by a pair of opposed slot edge faces **1262** and a pair of opposed slot end faces **1264**, each slot edge face **1262** and each slot end face **1264** extending laterally from an outer surface **1266** of the sidewall **1260** to an inner surface **1268** of the sidewall **1260** (shown in FIG. **27**) The slot edge faces **1262** are generally parallel to each other.

In some examples the slots **1252**, **1254** can be cut into the sidewall **1260** so that the slot faces **1262**, **1264** are generally orthogonal to the outer surface **1266** of the sidewall **1260**. Such slots **1252**, **1254** may be created by plunge cutting the vertical members **1250** using a saw blade that is generally orthogonal to the sidewalls **1260**. In other examples, the slots **1252**, **1254** are cut into the sidewall **1260** so that the slot edge faces **1262** are at an oblique angle relative to the outer surface **1266**. The slot end faces **1264** are parallel to each other and are spaced apart by a slot length **1259***b* and the slot edge faces **1262** are spaced apart by a slot height **1259***a*.

Referring to FIG. **26**B, each attachment leg **1230** comprises opposing attachment leg end faces **1232** spaced apart by an attachment leg length **1231**. The attachment leg length **1231** is generally equal to, but slightly less than the slot length **1259***b* of the corresponding slot **1252**, **1254** so that the attachment leg end faces **1232** can closely fit between the slot end faces **1264** without interfering with the slot end faces **1264** so that the attachment leg **1230** can be inserted into its slot **1252**, **1254**.

Referring to FIGS. **27**A and **27**B, each attachment leg **1230** includes a barb **1234**. The barb **1234** includes an abutment surface **1236** that engages and bears against a portion of the inner surface **1267** of the sidewall **1260** adjacent or proximate the slot **1252**, **1254** into which the attachment leg **1230** is received. When an attachment leg **1230** is fully inserted into its slot **1252**, **1254** the engagement between the abutment surface **1236** of the barb **1234** and the inner surface of the sidewall **1268** tends to retain the attachment leg **1230** within the slot **1252**, **1254** and resist removal therefrom.

Referring to FIG. **27**B, the upper and lower rails **1210**, **1212** also include a base surface **1238**. Each attachment leg **1230** formed on the rail **1210**, **1212** extends from the base surface **1238** and each base surface **1238** generally opposes the abutment surfaces **1236** of the attachment legs **1230** extending therefrom. The base surface **1238** is generally spaced apart from the abutment surfaces **1236** by a distance that is greater than the thickness of the sidewalls **1260** of the vertical members **1250**. As illustrated, when an attachment leg **1230** is fully inserted into its slot **1252**, **1254** the barb **1234** will be positioned inside the hollow interior of the vertical member **1260** and its abutment surface **1236** will engage the inner surface of the vertical member **1260**. As described above, the base surface **1238** of each rail **1210**, **1212** is opposed to and offset from the abutment surface

1236 so that the base surface 1238 will simultaneously engage the outer surface 1266 of the sidewall 1260 when the abutment surface 1236 engages the inner surface 1268. In other examples, the offset between the abutment surface 1236 and the base surface 1268 may be greater than the thickness of the sidewall 1260. The relative size and shape of the barb 1234 may be chosen to provide the insertion and removal performance desired by the user.

Each attachment leg 1230 may also be resilient, or include some resilient portions, so that it is moveable between a first position for inserting the attachment leg 1230 and barb 1234 through its slot 1252, 1254 and a second position for retaining (or securing or locking) the attachment leg 1230 within its slot 1252, 1254. When the attachment leg 1230 is in its first or insertion position the barb 1234 can be passed through the slot 1252, 1254 from outside the vertical member 1250 to inside the hollow interior of the vertical member 1250. To facilitate insertion of the attachment leg 1230 and barb 1234, an angled portion of the barb 1234 (extending from the leading edge 1240 to the abutment surface 1236 in the example shown) may engage a slot edge face 1262 and act as a cam surface to guide the barb 1234 as it is inserted, as described in detail above with respect to fence section 1100. When the attachment leg 1230 is in the second position the abutment surface 1236 engages the inner surface 1268 of the sidewall 1260. The resilient nature of the attachment leg 1230 biases the attachment leg 1230 is second position.

In the example of the fence section 1200 illustrated in FIGS. 25 to 29 (FIG. 29 only shows horizontal rail 1210, however, horizontal rail 1212 is arranged in substantially the same manner), both horizontal rails 1210, 1212 have a common extruded profile (also referred to as a first extruded lineal) that is formed by spaced apart top and bottom walls 1218, 1219 connected by integrally formed first and second rail sidewalls 1220, 1222 forming a generally rectangular channel.

In one example, as illustrated in FIGS. 25 to 27A, the attachment legs 1230 on each rail 1210, 1212 all extend from the outer surface 1221 of the first rail sidewall 1220. In this example, the vertical members 1230 are all attached on the same side of the horizontal rails 1210, 1212 creating a single-sided fence section.

In another example, as illustrated in FIGS. 28A, 28B, and 29, the upper and lower rails 1210, 1212 may be configured to include attachment legs 1230 extending from the outer surface 1221 of rail sidewall 1220 as well as including additional attachment legs 1230 extending from an outer surface 1223 of the second rail sidewall 1222. In this example, the plurality of vertical members 1250 can be described as first and second sets or groups of vertical members 1250*a*, 1250*b*. Each set of vertical members 1250*a*, 1250*b* being attached on opposite sides of the rails 1210, 1212.

In this configuration, the attachment legs 1230 extending from the first rail sidewall 1220 of the upper and lower horizontal rails 1210, 1212 are received within and connected to the corresponding upper and lower slots 1252, 1254 of the vertical members 1250 in the first set of vertical members 1250*a* thereby securing each vertical member in the first set of vertical members 1250*a* adjacent the first sidewall of both horizontal side rails. Similarly, the attachment legs 1230 extending from the second sidewall 1222 of the upper and lower horizontal rails 1210, 1212 are received within and connected to the corresponding upper and lower slots 1252, 1254 of the vertical members 1250 in the second set of vertical members 1250*b*, thereby securing each vertical member 1250 in the second set of vertical members 1250*b* on the opposite side of the rails 1210, 1212 from the first set of vertical members 1250*a*, adjacent the second sidewall 1222 of both horizontal side rails 1210, 1212. When assembled in this configuration, the fence section 1200 can be described as a double-sided fence.

In the double-sided configuration, the first and second sets of vertical members 1250*a*, 1250*b* can be arranged to directly oppose each other, or, as illustrated in FIG. 28, the vertical members 1250 from the first and second sets of vertical members 1250*a*, 1250*b* can be arranged in an alternating (or staggered or offset) sequence along the length of the upper and lower horizontal rails 1210, 1212. The first and second sets 1250*a*, 1250*b* can also be arranged in pairs in an alternating sequence, as shown in FIG. 28B.

In either the single-sided or double-sided configurations the attachment legs 1230 have an attachment leg length 1231 (the distance between opposing attachment leg end faces 1232, shown in FIG. 26B) that is generally equal to the slot length 1259*b* so that the translation (or moving or shifting) of each vertical member 1250 relative to the upper and lower horizontal rails 1210, 1212 along the upper and lower rail axes 1214, 1216 is inhibited when the attachment leg 1230 is received its slot 1252, 1254. Having the close or tight fit between the attachment legs 1230 and the slots 1252, 1254 may prevent the fence section 1200 from rattling (for example when exposed to wind) and may help maintain the desired spacing between vertical members 1250 for aesthetic and/or privacy purposes.

In each of the examples of fence sections described above, the attachment of the vertical members 1250 to the upper and lower horizontal rails 1210, 1212 includes only the connection between the attachment legs 1230 and the slots 1252, 1254 and is free from other fastening means. The connection between the attachment legs 1230 and the slots 1252, 1254 is a press-fit or snap-fit connection wherein an attachment leg 1230 is aligned with a corresponding slot 1252, 1254 and an insertion force is applied (by a user or during the manufacturing process) to push the attachment leg 1230 (including barb 1234) completely into its slot 1252, 1254. During insertion process the attachment leg 1230 (or a portion thereof) may deflect or bend as it passes through its slot 1252, 1254 and then "snap back" or return to its original position to positively engage a portion of the vertical member 1230 and retain the attachment leg 1230 within its slot 1252, 1254 once fully inserted. Fully inserted is understood to mean inserted to the extent necessary for the attachment leg 1130, 1230 to operatively or positively engage its slot 1252, 1254 so as to be retained therein to functionally secure the vertical members 1150, 1250 to the rails 1110, 1112, 1210, 1212. In the examples described, the attachment legs 1130, 1230 may be considered fully inserted when the they have been inserted to the point where abutment surface 1136, 1236 of the barb 1134, 1234 engages the inner surface 1168, 1268 of the vertical member sidewall 1160, 1260. When a functional or operational engagement between the vertical members and the rails is achieved an attachment leg 1130, 1230 may be considered fully inserted, even if a portion of the attachment leg 1130, 1230 extends beyond the outer sidewall surface 1168, 1268 such that a portion of the attachment leg is visible to the user after the fence sections have been assembled and the vertical members are slightly spaced from the rails.

Generally, a method for assembling a fence section using the snap-fit connectors described above includes providing a first and second horizontal rails that are parallel to, and spaced apart from each other. Both the first and second rails

include at least one integrally formed attachment leg extending therefrom. In addition to the first and second rails the assembly method includes providing a plurality of vertical members. The size and shape of the vertical members may be dictated by user preferences or by the style of fence section being created (for example fence sections **1100**, **1200**). Each vertical member provided includes at least one upper slot formed in a sidewall for receiving one attachment leg from the first horizontal rail and at least one lower slot formed in the sidewall for receiving one attachment leg from the second horizontal rail. Depending on the fence style selected the upper and lower slots may be formed on the same sidewall or on opposing sidewalls. The fence panel is then assembled by connecting each vertical member to the first and second horizontal rails by inserting each attachment leg on the first horizontal rail into a corresponding upper slot on each of the vertical members and inserting each attachment leg on the second horizontal rail into the corresponding lower slot on each on each vertical member.

Referring to FIGS. **30**A to **31***c*, another example of a barb **1334** is shown. The barb **1334** is an alternative to the barbs **1134**, **1234** described above and is suitable for use with the members of fence sections **1100** and **1200**. For the purpose of describing barb **1334** the like features of the horizontal rails and vertical members of fence sections **1100** and **1200** are identified by like reference characters, incremented by 100 and 200 respectively. In the example illustrated the barb **1334** is formed on the attachment leg **1330** of an upper rail **1310** that most closely resembles upper rail **1110**. However, it is understood that the barb **1334** could be used on lower rail **1112** (as the rails **1110**, **1112** have a common extruded profile), on the rails **1210**, **1212** of fence section **1200** and on the attachment legs of the connection structure **1400** described below.

Referring to FIGS. **30**A and **30**B, the upper rail **1310** includes an upper wall **1318**, first and second rail sidewalls **1320**, **1322** and attachment legs **1330**. Like rail **1110** described in detail above, the attachment legs **1330** extend from rail sidewalls **1320**, **1322** for engaging the upper slots **1352** of vertical members **1350**. Each attachment leg **1330** includes a barb **1334** at is free or distal end (the end spaced away from the rail sidewall **1320**, **1322**). Each barb **1334** includes a resilient retaining member **1335** (or tab or locking member) that is movably connected to the attachment leg **1330** near the leading edge **1340**. The resilient retaining member **1335** is moveable between an insertion position, in which the retaining member **1335** is collapsed (or retracted or folded) against (or positioned in close proximity too without actually touching) the attachment leg **1330**, and a retention position, in which the retaining member **1335** is upstanding (at an angle **1341** between 0 and 90 degrees) and extends away from the attachment leg **1330**.

When the resilient retaining member **1335** is in the insertion position (as best shown in FIG. **31***a*) the barb **1334** has a barb height **1334***a* that is less than the slot height **1359***a* to allow insertion of the barb **1334** through the slot **1352**. When the resilient retaining member **1335** is in the retention position (as best shown in FIGS. **31***b* and **31***c*) the barb has a barb height **1334***a* that is greater than the slot height **1359***a* so that the attachment leg **1330** cannot easily pass back through the slot **1352**. Each resilient retaining member **1335** is biased toward the retention position so that the retaining members **1335** will automatically move from the insertion position to the retention position when fully inserted into the slots.

The resilient retaining member **1335** of each barb **1334** forms the abutment surface **1336** and when the attachment leg **1330** is fully inserted in its slot (as defined above) the resilient retaining member **1335** moves to the retention position so that the abutment surface **1336** engages the inner surface **1368** of the vertical member sidewall **1360**. In the examples illustrated, when the retaining member **1335** is inserted and moved to the retention position the base surface **1338** of the rail **1310** contacts the outer surface **1366** of the vertical member sidewall **1360**.

In some examples, the contact between the retaining member **1335** and the base surface **1338** and the inner and outer surfaces **1366**, **1368** of the vertical member sidewall **1360** creates a satisfactory connection between the rails and the vertical members. In other examples, as shown in FIGS. **31***a* to **31***c*, the retaining leg **1330** may include a protrusion or projection **1339**. The protrusion **1339** extends away from the attachment leg **1330** and is position intermediate the resilient retaining member **1335** and the base surface **1338**. Each protrusion **1339** has a protrusion height **1339***a* (shown in FIG. **31**B) that is approximately the same as, but slightly less than, the slot height **1359***a* allowing the protrusion **1339** to closely fit within the slot **1352**. Each protrusion is registered with one slot edge face **1362** when the attachment leg **1330** is fully received in the slot **1352**. This configuration allows the attachment leg **1330** to be inserted into the slot **1352** and inhibits vertical displacement between the vertical members **1350** and upper **1310** and lower rails (as shown in FIG. **31***c*) as the projection **1339** is closely received within the slot **1352** and will contact the slot edge surface **1362** if the rail **1310** is moved vertically with respect to the vertical member **1350**, or vice versa.

Referring now to FIGS. **31**D and **31**E, another example of a barb **1534** is shown. The barb **1534** is similar to the barb **1334**, described hereinabove, and like features in FIGS. **31**D and **31**E are identified by like reference numerals as in FIGS. **30** to **31**C, incremented by 200. The barb **1534** includes a resilient retaining member **1535** that is movably connected to the attachment leg **1530** near the leading edge **1540**, and extends generally upwardly from the leading edge **1540**. The barb **1534** further includes a second resilient retaining member **1537**, which is configured similarly to the retaining member **1535**, but extends downwardly from the leading edge **1540**. The second resilient retaining member **1537** functions in a substantially similar manner to the resilient retaining member **1534**, as described with respect to FIGS. **30** to **31**C.

Similarly to the example of FIGS. **30** to **31**C, the retaining leg **1530** of FIGS. **31**D and **31**E includes a protrusion **1539**, which extends away from the attachment leg **1530**. The example of FIGS. **31**D and **31**E further includes a shoulder **1547** opposed to the protrusion **1539**. The shoulder **1547** and the protrusion **1539** cooperate to centre the barb **1534** with respect to the slot.

Referring now to FIGS. **32** and **33**, an example of a connection structure **1400** for connecting members of a fence or other structure, for example fence sections **1100** and **1200**, is shown comprising a first extruded lineal **1450** and a second extruded lineal **1410**. The first extruded lineal **1450** extends lengthwise along a first longitudinal axis **1456** and has a sidewall **1460** with at least one slot **1452** (also referred to as a first slot) formed in the sidewall **1460**. In the example illustrated the first slot **1452** extends generally perpendicular to the longitudinal axis **1456**. In other examples the slot **1452** may be at an oblique angle relative to the longitudinal axis **1456**, for example 30 degrees or 45 degrees.

The second extruded lineal **1410** extends lengthwise along a second longitudinal axis **1414** and includes an attachment leg **1430** (also referred to as a first attachment

leg) corresponding to the slot **1452**. The attachment leg **1430** extends outward from the second extruded lineal **1410** and is generally parallel to the second longitudinal axis **1414**. The first attachment leg **1452** is integrally formed with the second extruded lineal **1410** and is inserted into or received within in the first slot **1452** to secure the first extruded lineal **1450** to the second extruded lineal **1410**.

Optionally, as shown in FIGS. **32** and **33**, the first extruded lineal **1450** includes a second slot **1453**. The second slot **1453** is generally parallel to, and spaced apart from, the first slot **1452**. In this example, the second extruded lineal **1410** has a corresponding second attachment leg **1431** that is parallel to the first attachment leg **1430** and is received in the second slot **1453** when the first and second lineals **1450**, **1410** are connected.

In the single-slot and double-slot examples, each slot **1452**, **1453** forms an opening that extends through the sidewall **1460**. Each opening or slot **1452**, **1453** has opposed slot edge faces **1462** and opposing slot end faces **1464**. The slot edge faces **1462** and slot end faces **1464** extending through the sidewall **1460** from the outer surface **1466** of the sidewall **1460** to the inner surface **1468** of the sidewall **1460**.

In the example illustrated, the slot edge faces **1462** are parallel to each other and perpendicular to the outer surface **1466** of the sidewall **1460** and the first longitudinal axis **1456**. In another example, the slot edge faces **1462** are at an oblique angle relative to the first longitudinal axis **1456** (for example the slot edge faces **1162** and **1262** described above).

Each attachment leg **1430**, **1431** has a distal portion spaced apart from the second extruded lineal **1410** and a barb **1434** that extends from the distal portion. Each barb **1434** includes an abutment surface **1436** that engages and bears against a portion of the inner surface **1468** of the sidewall **1460** that is adjacent the slot **1452**, **1453** into which the attachment leg **1430**, **1431** is received. This engagement between the abutment surface **1436** and the inner sidewall surface **1468** may help to retain the attachment leg **1430**, **1431** within its slot **1452**, **1453** when the attachment leg **1430**, **1431** is fully inserted into its slot **1452**, **1453**.

The second extruded lineal **1410** also includes a base surface **1438** that cooperates with the abutment surface **1436** to secure the second extruded lineal **1410** to the first extruded lineal **1450**. Each attachment leg **1430**, **1431** extends from the base surface **1438** and the base surface **1438** generally opposes the abutment service **1436** (either physically—i.e. the surfaces are facing each other, or operationally/functionally—i.e. the abutment surface and the base surface exert generally opposing forces on the first extruded lineal) and is spaced apart from the abutment surface **1436** by a distance **1472** that is greater than the thickness T of the first extruded lineal sidewall **1460**.

The slot end faces **1464** are spaced apart by a first width **1474** (also referred to as a slot width) and the attachment legs **1430**, **1431** received within each slot **1452**, **1453** second width **1476**. The second width **1476** is generally equal to, but at least slightly shorter than, the first width **1474** so the attachment legs **1430**, **1431** can fit within the slots **1452**, **1453** but translation or sliding of the first extruded lineal **1450** relative to the second extruded lineal **1410** along the second longitudinal axis **1414** is inhibited when the attachment legs **1430**, **1431** are received in their slots **1452**, **1453**.

While the above description provides examples of one or more processes or apparatuses in accordance with the applicant's contribution to the state of the art as disclosed herein, it will be appreciated that other processes or apparatuses may be within the scope of such contribution, and any exclusive right that may be granted to the applicants in respect of such contribution is not necessarily limited to the aforementioned examples as specifically described herein.

We claim:

1. A fence section, comprising:

an upper horizontal rail including a first longitudinally-extending wall extending lengthwise of the upper horizontal rail and laterally between first and second upper rail sidewalls that depend from the first longitudinally-extending wall and are spaced apart from one another to define an upper rail cavity, wherein the first longitudinally-extending wall includes a plurality of upper rail apertures;

a lower horizontal rail, spaced vertically below the upper horizontal rail, including a second longitudinally-extending wall extending lengthwise of the lower horizontal rail and laterally between first and second lower rail sidewalls that depend from the first longitudinally-extending wall and are spaced apart from one another to define a lower rail cavity, wherein the second longitudinally-extending wall includes a plurality of lower rail apertures; and

a plurality of vertical members;

wherein:

for at least one of the plurality of vertical members:

the vertical member is connected to the upper horizontal rail by an upper connection system and to the lower horizontal rail by a lower connection system;

wherein:

the upper connection system includes a first upper connecting structure and a second upper connecting structure; and

the lower connection system includes a first lower connecting structure and a second lower connecting structure;

wherein:

the first upper rail sidewall includes a first upper counterpart of the first upper connecting structure, and the vertical member includes a second upper counterpart of the first upper connecting structure;

the second upper rail sidewall includes a first upper counterpart of the second upper connecting structure, and the vertical member includes a second upper counterpart of the second upper connecting structure;

the first lower rail sidewall includes a first lower counterpart of the first lower connecting structure, and the vertical member includes a second lower counterpart of the first lower connecting structure;

the second lower rail sidewall includes a first lower counterpart of the second lower connecting structure, and the vertical member includes a second lower counterpart of the second lower connecting structure;

the second upper counterpart of the first upper connecting structure, the second upper counterpart of the second upper connecting structure, the second lower counterpart of the first lower connecting structure, the second lower counterpart of the second lower connecting structure and the vertical member are integrally formed within a unitary one-piece construction;

and

for the upper connection system, the connection of the vertical member to the upper horizontal rail is effected by:

(i) a first upper interaction between the first upper counterpart of the first upper connecting structure

and the second upper counterpart of the first upper connecting structure, and

(ii) a second upper interaction between the first upper counterpart of the second upper connecting structure and the second upper counterpart of the second upper connecting structure;

for the lower connection system, the connection of the vertical member to the lower horizontal rail is effected by:

(i) a first lower interaction between the first lower counterpart of the first lower connecting structure and the second lower counterpart of the first lower connecting structure, and

(ii) a second lower interaction between the first lower counterpart of the second lower connecting structure and the second lower counterpart of the second lower connecting structure;

the vertical member extends through the upper horizontal rail via a respective upper rail aperture and the lower horizontal rail via a respective lower rail aperture;

the vertical member and the upper horizontal rail are co-operatively configured such that establishing of the connection by the upper connection system is effected in response to insertion of the vertical member through the upper horizontal rail via the respective rail aperture;

the vertical member and the lower horizontal rail are co-operatively configured such that establishing of the connection by the lower connection system is effected in response to insertion of the vertical member through the lower horizontal rail via the respective rail aperture;

and

for the upper connection system,

(i) at least one of

(a) the first upper counterpart of the first upper connecting structure, and

(b) the second upper counterpart of the first upper connecting structure,

is resiliently deformable, such that at least one of the first upper counterpart of the first upper connecting structure and the second upper counterpart of the first upper connecting structure is deflected while the inserting is being effected,

and

(ii) at least one of

(a) the first upper counterpart of the second upper connecting structure, and

(b) the second upper counterpart of the second upper connecting structure,

is resiliently deformable, such that at least one of the first upper counterpart of the second upper connecting structure and the second upper counterpart of the second upper connecting structure is deflected while the inserting is being effected, and

for the lower connection system,

(i) at least one of

(a) the first lower counterpart of the first lower connecting structure, and

(b) the second lower counterpart of the first lower connecting structure,

is resiliently deformable, such that at least one of the first lower counterpart of the first lower connecting structure and the second lower counterpart of the first lower connecting structure is deflected while the inserting is being effected, and

(ii) at least one of

(a) the first lower counterpart of the second lower connecting structure, and

(b) the second lower counterpart of the second lower connecting structure,

is resiliently deformable, such that at least one of the first lower counterpart of the second lower connecting structure and the second lower counterpart of the second lower connecting structure is deflected while the inserting is being effected;

while the connection of the vertical member to the upper horizontal rail is effected by: (i) the first upper interaction between the first upper counterpart of the first upper connecting structure and the second upper counterpart of the first upper connecting structure, and (ii) the second upper interaction between the first upper counterpart of the second upper connecting structure and the second upper counterpart of the second upper connecting structure:

the first upper counterpart of the first upper connecting structure and the second upper counterpart of the first upper connecting structure are co-operatively configured to oppose a deflection, of at least one of the first upper counterpart of the first upper connecting structure and the second upper counterpart of the first upper connecting structure, that is effective for defeating the first upper interaction; and

the first upper counterpart of the second upper connecting structure and the second upper counterpart of the second upper connecting structure are co-operatively configured to oppose a deflection, of at least one of the first upper counterpart of the second upper connecting structure and the second upper counterpart of the second upper connecting structure, that is effective for defeating the second upper interaction; and

while the connection of the vertical member to the lower horizontal rail is effected by: (i) the first lower interaction between the first lower counterpart of the first lower connecting structure and the second lower counterpart of the first lower connecting structure, and (ii) the second lower interaction between the first lower counterpart of the second lower connecting structure and the second lower counterpart of the second lower connecting structure:

the first lower counterpart of the first lower connecting structure and the second lower counterpart of the first lower connecting structure are co-operatively configured to oppose a deflection, of at least one of the first lower counterpart of the first lower connecting structure and the second lower counterpart of the first lower connecting structure, that is effective for defeating the first lower interaction; and

the first lower counterpart of the second lower connecting structure and the second lower counterpart of the second lower connecting structure are co-operatively configured to oppose a deflection, of at least one of the first lower counterpart of the second lower connecting structure and the second lower counterpart of the second lower connecting structure, that is effective for defeating the second lower interaction.

2. The fence section of claim 1, wherein

at least one of the first upper counterpart of the first upper connecting structure and the second upper counterpart of the first upper connecting structure is biased into the first upper interaction;

at least one of the first upper counterpart of the second upper connecting structure and the second upper counterpart of the second upper connecting structure is biased into the second upper interaction;

at least one of the first lower counterpart of the first lower connecting structure and the second lower counterpart of the first lower connecting structure is biased into the first lower interaction; and

at least one of the first lower counterpart of the second lower connecting structure and the second lower counterpart of the second lower connecting structure is biased into the second lower interaction.

3. The fence section of claim 1, wherein each one of the upper and lower horizontal rails includes an extruded lineal of plastic material.

4. The fence section of claim 1, wherein:

the first upper counterpart of the first upper connecting structure is resiliently deformable between:

a first position for permitting the insertion of the vertical member through the upper horizontal rail via the respective upper rail aperture, and

a second position for effecting the first upper interaction with the second upper counterpart of the first upper connecting structure;

and

the first upper counterpart of the second upper connecting structure is resiliently deformable between:

a first position for permitting the insertion of the vertical member through the upper horizontal rail via the respective upper rail aperture, and

a second position for effecting the second upper interaction with the second upper counterpart of the second supper connecting structure;

and

the first lower counterpart of the first lower connecting structure is resiliently deformable between:

a first position for permitting the insertion of the vertical member through the lower horizontal rail via the respective lower rail aperture, and

a second position for effecting the first lower interaction with the second lower counterpart of the first lower connecting structure;

and

the first lower counterpart of the second lower connecting structure is resiliently deformable between:

a first position for permitting the insertion of the vertical member through the lower horizontal rail via the respective lower rail aperture, and

a second position for effecting the second lower interaction with the second lower counterpart of the second lower connecting structure.

5. The fence section of claim 1, wherein for each one of the at least one vertical member: the connection of the vertical member to the upper horizontal rail is exclusively via the upper connection system, and the connection of the vertical member to the lower horizontal rail is exclusively via the lower connection system.

6. The fence section of claim 1, wherein:

the second upper counterpart of the first upper connecting structure includes a first upper slot;

the second upper counterpart of the second upper connecting structure includes a second upper slot;

the second lower counterpart of the first lower connecting structure includes a first lower slot;

the second lower counterpart of the second lower connecting structure includes a second lower slot;

the first upper interaction includes an extension of the first upper counterpart of the first upper connecting structure into the first upper slot;

the second upper interaction includes an extension of the first upper counterpart of the second upper connecting structure into the second upper slot;

the first lower interaction includes an extension of the first lower counterpart of the first lower connecting structure into the first lower slot; and

the second lower interaction includes an extension of the first lower counterpart of the second lower connecting structure into the second lower slot.

7. A fence section comprising:

at least two horizontal rails, each one of the at least two horizontal rails including a longitudinally-extending wall extending lengthwise of the horizontal rail and laterally between first and second rail sidewalls that depend from the longitudinally-extending wall and are spaced apart from one another, wherein the longitudinally-extending wall includes at least one rail aperture;

and

at least one vertical member;

wherein:

the at least two horizontal rails and the at least one vertical member are co-operatively configured such that, for at least one of the at least one vertical member:

the vertical member is connected to each one of the at least two horizontal rails by a respective connection system such that at least two connection systems are provided;

each one of the at least two connection systems includes a first connecting structure and a second connecting structure;

the first connecting structure includes a first counterpart that is connected to a second counterpart, wherein the first counterpart of the first connecting structure is defined by the first rail sidewall and the second counterpart of the first connecting structure is defined by the vertical member;

the second connecting structure includes a first counterpart that is connected to a second counterpart, wherein the first counterpart of the second connecting structure is defined by the second rail sidewall and the second counterpart of the second connecting structure is defined by the vertical member; and

the second counterpart of the first connecting structure, the second counterpart of the second connecting structure and the vertical member are integrally formed within a unitary one-piece construction;

the connection of the first counterpart of the first connecting structure to the second counterpart of the first connecting structure is established by a first interaction between the first counterpart of the first connecting structure and the second counterpart of the first connecting structure, and the connection of the first counterpart of the second connecting structure to the second counterpart of the second connecting structure is established by a second interaction between the first counterpart of the second connecting structure and the second counterpart of the second connecting structure;

for each one of the at least two horizontal rails, the connection with the vertical member is established in response to insertion of the vertical member through the horizontal rail via a respective rail aperture, wherein:

at least one of: (a) the first counterpart of the first connecting structure and (b) the second counterpart of the first connecting structure is resiliently deformable, such that at least one of the first counterpart of the first connecting and the second counterpart of the first connecting structure is deflected while the inserting is being effected; and

at least one of: (a) the first counterpart of the second connecting structure and (b) the second counterpart of the second connecting structure is resiliently deformable, such that at least one of the first counterpart of the second connecting structure and the second counterpart of the second connecting structure is deflected while the inserting is being effected;

while the connection of the first counterpart of the first connecting structure and the second counterpart of the first connecting structure is established by the first interaction, the first counterpart of the first connecting structure and the second counterpart of the first connecting structure are co-operatively configured to oppose a deflection, of at least one of the first counterpart of the first connecting structure and the second counterpart of the first connecting structure, that is effective for defeating the first interaction; and

while the connection of the first counterpart of the second connecting structure and the second counterpart of the second connecting structure is established by the second interaction, the first counterpart of the second connecting structure and the second counterpart of the second connecting structure are co-operatively configured to oppose a deflection, of at least one of the first counterpart of the second connecting structure and the second counterpart of the second connecting structure, that is effective for defeating the second interaction.

8. The fence section of claim **7**, wherein for each one of the at least two connection systems:

at least one of the first counterpart of the first connecting structure and the second counterpart of the first connecting structure is biased into the first interaction, and at least one of the first counterpart of the second connecting structure and the second counterpart of the second connecting structure is biased into the second interaction.

9. The fence section of claim **7**, wherein for each one of the at least two connection systems:

the first counterpart of the first connecting structure is resiliently deformable between:

a first position for permitting the insertion of the vertical member, through the horizontal rail via the respective rail aperture, and

a second position for effecting the first interaction with the second counterpart of the first connecting structure;

and

the first counterpart of the second connecting structure is resiliently deformable between:

a first position for permitting the insertion of the vertical member, through the horizontal rail via the respective rail aperture, and

a second position for effecting the second interaction with the second counterpart of the second connecting structure.

10. The fence section of claim **7**, wherein for each one of the at least one vertical member: the connection of the vertical member to the at least two horizontal rails is exclusively via the at least two connection systems.

11. The fence section of claim **7**, wherein the at least two horizontal rails are of plastic material and the at least one vertical member is of plastic material.

12. The fence section of claim **7**, wherein:

the first counterpart of the first connecting structure and the first rail sidewall are integrally formed within a unitary one-piece construction; and

the first counterpart of the second connecting structure and the second rail sidewall are integrally formed within a unitary one-piece construction.

13. The fence section of claim **7** wherein:

the second counterpart of the first connecting structure includes a first slot;

the second counterpart of the second connecting structure includes a second slot;

the first interaction includes an extension of the first counterpart of the first connecting structure into the first slot; and

the second interaction includes an extension of the first counterpart of the second connecting structure into the second slot.

14. A kit for assembling a fence, comprising:

at least two horizontal rails, each one of the at least two horizontal rails including a longitudinally-extending wall extending lengthwise of the horizontal rail and laterally between first and second rail sidewalls that depend from the longitudinally-extending wall and are spaced apart from one another, wherein the longitudinally-extending wall includes at least one rail aperture; and

at least one vertical member;

wherein:

the at least two horizontal rails and the at least one vertical member are co-operatively configured such that, for at least one of the at least one vertical member:

the vertical member is connectible to the at least two horizontal rails for obtaining an assembly wherein each one of the at least two horizontal rails is connected to the vertical member by a respective connection system such that at least two connection systems are provided;

each one the at least two connection systems includes a first connecting structure and a second connecting structure;

the first connecting structure includes a first counterpart that is connectible to a second counterpart, wherein the first counterpart of the first connecting structure is defined by the first rail sidewall and the second counterpart of the first connecting structure is defined by the vertical member;

the second connecting structure includes a first counterpart that is connectible to a second counterpart, wherein the first counterpart of the second connecting structure is defined by the second rail sidewall and the second counterpart of the second connecting structure is defined by the vertical member;

the second counterpart of the first connecting structure, the second counterpart of the second connecting

structure, and the vertical member are integrally formed within a unitary one-piece construction;

the connection of the first counterpart of the first connecting structure to the second counterpart of the first connecting structure is establishable by a first interaction between the first counterpart of the first connecting structure and the second counterpart of the first connecting structure, and the connection of the first counterpart of the second connecting structure to the second counterpart of the second connecting structure is establishable by a second interaction between the first counterpart of the second connecting structure and the second counterpart of the second connecting structure;

for each one of the at least two horizontal rails, the connection with the vertical member is establishable in response to insertion of the vertical member through the horizontal rail via a respective rail aperture, wherein:

at least one of: (a) the first counterpart of the first connecting structure, and (b) the second counterpart of the first connecting structure, is resiliently deformable, such that at least one of the first counterpart of the first connecting structure and the second counterpart of the first connecting structure is deflected while the inserting is being effected, and at least one of: (a) the first counterpart of the second connecting structure, and (b) the second counterpart of the second connecting structure is resiliently deformable, such that at least one of the first counterpart of the second connecting structure and the second counterpart of the second connecting structure is deflected while the inserting is being effected;

while the connection of the first counterpart of the first connecting structure and the second counterpart of the first connecting structure is established by the first interaction, the first counterpart of the first connecting structure and the second counterpart of the first connecting structure are co-operatively configured to oppose a deflection, of at least one of the first counterpart of the first connecting structure and the second counterpart of the first connecting structure, that is effective for defeating the first interaction; and

while the connection of the first counterpart of the second connecting structure and the second counterpart of the second connecting structure is established by the second interaction, the first counterpart of the second connecting structure and the second counterpart of the second connecting structure are co-operatively configured to oppose a deflection, of at least one of the first counterpart of the second connecting structure and the second counterpart of the second connecting structure, that is effective for defeating the second interaction.

15. The kit of claim **14**, wherein:

at least one of the first counterpart of the first connecting structure and the second counterpart of the first connecting structure is biased into the first interaction in response to alignment of the first counterpart of the first connecting structure with the second counterpart of the first connecting structure, and at least one of the first counterpart of the second connecting structure and the second counterpart of the second connecting structure is biased into the second interaction in response to alignment of the first counterpart of the second connecting structure with the second counterpart of the second connecting structure.

16. The kit of claim **15**, wherein:

the at least one of the first counterpart of the first connecting structure and the second counterpart of the first connecting structure, that is biased into the first interaction, includes the first counterpart of the first connecting structure, such that the first counterpart of the first connecting structure is resiliently deformable between:

a first position for permitting the insertion of the vertical member through the horizontal rail via the respective rail aperture, and

a second position for effecting the first interaction with the second counterpart of the first connecting structure;

and

the at least one of the first counterpart of the second connecting structure and the second counterpart of the second connecting structure, that is biased into the second interaction, includes the first counterpart of the second connective structure, such that the first counterpart of the second connecting structure is resiliently deformable between:

a first position for permitting the insertion of the vertical member through the horizontal rail via the respective rail aperture, and

a second position for effecting the second interaction with the second counterpart of the second connecting structure.

17. The kit of claim **14**, wherein for at least one of the at least one vertical member, connection to the at least two horizontal rails is exclusively via the at least two connection systems.

18. The kit of claim **14**, wherein:

the at least two horizontal rails are of plastic material; and

the at least one vertical member is of plastic material.

19. The kit of claim **14**, wherein:

the first counterpart of the first connecting structure, and the first rail sidewall, are integrally formed within a unitary one-piece construction; and

the first counterpart of the second connecting structure, and the second rail sidewall, are integrally formed within a unitary one-piece construction.

20. The kit of claim **14**, wherein:

the second counterpart of the first connecting structure includes a first slot and the first interaction includes an extension of the first counterpart of the first connecting structure into the first slot; and

the second counterpart of the second connecting structure includes a second slot and the second interaction includes an extension of the first counterpart of the second connecting structure into the second slot.

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