



(51) International Patent Classification:

B62D 25/20 (2006.01) B62D 33/02 (2006.01)

F16B 5/00 (2006.01) E04F 15/02 (2006.01)

(21) International Application Number:

PCT/AU2018/050468

(22) International Filing Date:

17 May 2018 (17.05.2018)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2017901861 17 May 2017 (17.05.2017) AU

2017901862 17 May 2017 (17.05.2017) AU

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,

CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: DECK PLANK APPARATUS, SYSTEM AND METHOD

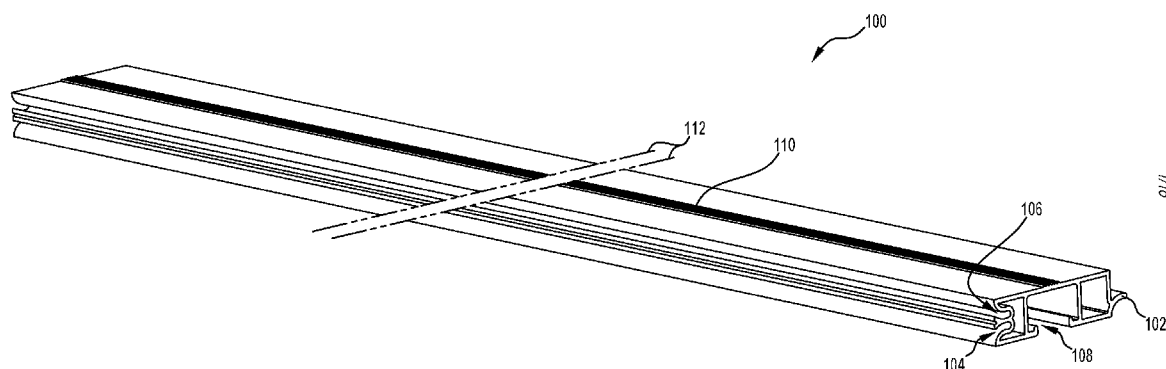


Figure 1

(57) Abstract: A plank (100) suitable for a deck, including at least one of a flange (104, 106) and a slot (102), wherein each at least one flange has a substantially curved cross-sectional shape and the slot has a substantially curved cross-sectional shape substantially complementary to the flange substantially curved cross-sectional shape, and wherein the flange is configured to slide into the slot of an adjacent plank, forming a flange and slot join, such that two or more planks joined together form a deck.



DECK PLANK APPARATUS, SYSTEM AND METHOD

FIELD OF THE INVENTION

[0001] The present invention relates to decks. The invention may be useful for decks and/or tray decks for vehicles, and particularly useful for decks and tray decks for utility type vehicles.

BACKGROUND OF THE INVENTION

[0002] Utility vehicles, sometimes referred to as utes, pick-ups or pick-up trucks, typically are equipped with a tray or tray deck at the rear of the vehicle, which serves to carry loads of various types. The loads may include equipment, sand, gravel and various other kinds of items and materials.

[0003] Some utility vehicles have a flat area, which may be referred to as a tray, a cargo bed or a deck. Other utility vehicles have a flat area which is surrounded by up to four sides to form a container, which may also be referred to variously as a tray or a cargo bed. The sides may be fixed or moveable and may be a combination of fixed and moveable sides. Sometimes the side at the back is referred to as a tail gate.

[0004] In this specification, for consistency and ease of understanding, the vehicle will be referred to as a utility or utility vehicle; the flat area will be referred to as a deck; each of the sides will be referred to as side gates (front, rear, left and right); and the deck and side gates together (whether there be one, two, three or four side gates) will be referred to as a tray deck.

[0005] In some utility vehicles, the sides of the tray deck are fixed in position, the deck and sides forming what is sometimes referred to as a tub. In other utility vehicles, one or more of the sides are moveable between open and closed configurations. In this specification, unless otherwise indicated, the term side gate will refer to a side of a tray deck, wherein the side gate is moveable at least between open and closed positions. Some utility vehicles have side gates which are detachable. Typically, if a utility vehicle tray deck has a front side (usually adjacent a cab of the utility vehicle), the front side is in a fixed position, and in this specification the front side may be referred to as a fixed side or also referred to as a side gate, though it will be understood that the front side is typically in a fixed position.

[0006] Typically, a deck or tray deck will be provided with a utility vehicle when sold to a customer. The type of tray deck is either dictated by the model of the vehicle or there may be a very limited range of options available from which a customer can select.

[0007] It is also possible to buy utility vehicles without a deck or tray deck fitted, and the customer can select a deck or tray deck for their vehicle after purchase, but the customer will have a very limited range of options for a deck or tray deck.

[0008] Further, decks and tray decks are typically manufactured or supplied as a single unit and can be fitted only to one vehicle model or a very limited range of vehicle models. Such units are bulky, which causes them to be inconvenient and expensive to transport, for example, from a place of manufacture to a place where the deck or tray deck is to be fitted to a utility vehicle.

[0009] Many decks and tray decks are not configurable or may have very limited options for configuration. A customer may want to include various features to make a deck or tray deck more suitable for that customer's intended use of the utility vehicle.

[0010] Problems with previous decks and tray decks for utility vehicles may relate to other decks and like devices, for example, in scaffolding.

[0011] It is an object of the present invention to overcome, or at least ameliorate, at least one of the above-mentioned problems in the prior art, and/or to overcome, or at least ameliorate, at least one problem in the prior art, which has not been mentioned above and/or to provide at least a useful alternative to prior art devices, systems and/or methods.

SUMMARY OF THE INVENTION

[0012] In one aspect, the present invention provides a plank suitable for a deck, including:

at least one of a flange and a slot,

wherein each at least one flange has a substantially curved cross-sectional shape and the slot has a substantially curved cross-sectional shape substantially complementary to the flange substantially curved cross-sectional shape, and

wherein the flange is configured to slide into the slot of an adjacent plank, forming a flange and slot join, such that two or more planks joined together form a deck.

[0013] In another aspect, the present invention provides a method for assembling at least two planks to form a deck, each plank including:

at least one of a flange and a slot,

wherein each at least one flange has a substantially curved cross-sectional shape and the slot has a substantially curved cross-sectional shape substantially complementary to the flange substantially curved cross-sectional shape, and

wherein the flange is configured to slide into the slot of an adjacent plank, forming a flange and slot join, such that two or more planks joined together form a deck,

the method including:

joining a second plank to a first plank using the flange and slot to join the first and second planks; and

joining any subsequent plank to a previously joined plank using the flange and slot to join the subsequent plank and previously-joined plank.

SUMMARY OF SOME OPTIONAL EMBODIMENTS OF THE INVENTION

[0014] In some embodiments, each flange is elongate and extends along the entire length of its respective plank, with each slot being configured to receive the elongate flange when slid into it. In other embodiments, the flange may have a toothed form, with each slot having a corresponding toothed form.

[0015] In various embodiments, the substantially curved cross-sectional shape is a circular curve. In such embodiments, the substantially curved cross-sectional shape of the flange will comprise an arc of a notional circle, and similarly the substantially curved cross-sectional shape of each at least one slot will comprise an arc of a notional circle.

[0016] In alternative embodiments, the substantially curved cross-sectional shape is an oval curve. In such embodiments, the substantially curved cross-sectional shape of the flange will comprise an arc of a notional oval, and similarly the substantially curved cross-sectional shape of each at least one slot will comprise an arc of a notional oval. It will be understood that the substantially curved cross-sectional shapes of the flange and the at least one slot may comprise other selected curved shapes different from circular or oval arcs, such as an arc of an egg-shape curve or various spline curves.

[0017] In various embodiments, the substantially curved cross-sectional shape may include non-curved sections. In yet other embodiments, the substantially curved cross-sectional shape may include a plurality of straight sections, each straight section angled with respect to each adjacent straight section so that the plurality of straight sections approximates the arc of a curve. In this regard, the term substantially curved should be understood to include shapes which are not precisely curved, but are approximately curved or close to being curved.

[0018] In some embodiments, the substantial curvature of each at least one slot does not exactly complement the substantial curvature of the flange, such that substantially complementary substantial curvature includes not exactly complementary substantial curvature. In such embodiments, the inexact complementary substantial curvature of the flange and a slot is configured such that it creates a force or friction fit when the flange is slid into the slot due to the flange forcedly contacting at least one side of the slot.

[0019] In some embodiments, the flange includes one or more protrusions depending substantially orthogonally from one or both sides of the flange. The one or more protrusions are configured and arranged on the flange to produce a force or friction fit when the flange is slid into a slot due to the one or more protrusions forcedly contacting at least one side of the slot.

[0020] In some embodiments, each at least one slot includes one or more protrusions depending substantially orthogonally from one or both sides of each at least one slot. The one or more protrusions are configured and arranged in the slot to produce a force or friction fit when the flange is slid into a slot due to the one or more protrusions forcedly contacting at least one side of the flange.

[0021] In some embodiments, the flange includes one or more protrusions depending substantially orthogonally from one or both sides of the flange and each at least one slot includes one or more protrusions depending substantially orthogonally from one or both sides of each at least one slot. The one or more protrusions are configured and arranged on the flange and in the slot to produce a force or friction fit when the flange is slid into a slot due to the one or more protrusions on the flange forcedly contacting at least one side of the slot and due to the one or more protrusions in the slot forcedly contacting at least one side of the flange.

[0022] In some embodiments, each plank may have two slots (a first slot and a second slot) to allow an adjacent plank to be joined to the two-slot plank in two different ways, with each of the first and second slots curving away from a notional central plane between the two slots, the two slots thus curving away from each other. It will be appreciated that such an arrangement allows a

plank to be flipped over, wherein the flipped-over plank will be able to join to an adjacent plank using the same flange and slot join.

[0023] In some embodiments, where a plurality of planks is assembled to form a deck, the planks are each of equal width. In some such embodiments, the planks may be relatively wide or relatively narrow. In other embodiments, the planks may be of differing widths and may include a mixture of relatively wide and relatively narrow planks.

[0024] In various embodiments, each plank may include a grip section such that items placed on the assembled deck when the plank's grip section is upwardly facing will be subject to friction imparted by the grip section to lessen the risk and incidence of sliding. This may be useful when a deck formed from such planks is used for a utility vehicle. When the vehicle is in motion, turning corners, accelerating and/or decelerating the grip sections assist in preventing sliding of a load on the deck. In embodiments, the grip section may be a frictional serration.

[0025] In other embodiments, each plank may include an elongate channel parallel to the plank's elongate axis into which can be fitted a gripping means, such as a rubber strip. In such configurations, when the elongate channel is facing upward in an assembled deck with a gripping means inserted therein, items placed on the assembled deck will be subject to friction imparted by the gripping means to lessen the risk and incidence of sliding when, for example, a utility vehicle using such a deck is in motion, turning corners, accelerating and/or decelerating. The channel can also serve other purposes, such as a means for securing items which are clamped into the channel.

[0026] In this specification, embodiments of the planks and deck formed from those planks are exemplified as being used for forming the deck of a utility vehicle, however, it will be understood that the planks and decks formed from those planks may have wider application, for example, in forming scaffolding and other load bearing surfaces.

[0027] In some alternative embodiments, each plank may have a flange which is angled with respect to a top plane of its respective plank, and each at least one slot of an adjacent plank may be angled with respect to a top plane of their respective plank, such that, where there is a first slot and a second slot, the first and second slots angle away from each other. It will be appreciated that such an arrangement allows a plank to be flipped over, wherein the flipped-over plank will be able to fit to an adjacent plank using the same flange and slot join.

[0028] In embodiments, the method of joining adjacent planks will include a rotating and sliding movement when inserting the flange into the slot.

[0029] In example use of embodiments, when a two or more planks are joined together, one or more of the planks may be secured to a substrate, such as an elongate bar. It has been recognised that by so securing the one or more joined planks to a substrate, each flange inserted into a neighbouring plank's slot can be forced against at least one side of the slot. In this manner, the slot and flange arrangement can be used to provide a means of securing the planks to prevent or ameliorate relative movement between adjoining planks. This arrangement may assist in addressing a problem with other arrangements where adjoining planks suffer from relative movement, thus causing rattling and other problems when subjected to vibrations as may be encountered, for example, when such planks are used to form the deck of a utility vehicle which may be subject to such vibration when the vehicle is in motion on an uneven surface.

[0030] In some embodiments, the deck is suitable to be used with a utility vehicle, and includes a plurality of planks, each plank including at least one of a flange and a slot, wherein the flange is configured to slide into the slot of an adjacent plank, forming a flange and slot join, such that two or more planks joined together form an assembled planar deck area, the deck further including a deck surround having four deck sides, at least two of the deck sides each including a channel for receiving a respective edge part of the planar deck area.

[0031] In further embodiments, the method includes assembling a deck suitable for a utility vehicle, the assembled deck including a plurality of planks, each plank including at least one of a flange and a slot, wherein the flange is configured to slide into the slot of an adjacent plank, forming a flange and slot join, such that two or more planks joined together form an assembled planar deck area, and a deck surround having four deck sides, at least two of the deck sides each including a channel for receiving a respective edge part of the planar deck area, the method further including joining three of the four deck sides to form a partial deck surround with at least two channels into which respective edge parts of each plank can be slid, sliding a first plank edge parts into respective channels of the partial deck surround, joining a second plank to the first plank using the flange and slot join of the first and second planks, joining any subsequent plank to a previously joined plank using the flange and slot join of the subsequent and previously joined planks; and after a last plank has been joined joining the fourth deck side to complete the deck surround.

[0032] In yet other embodiments, the method includes assembling a deck suitable for a utility vehicle, the assembled deck including a plurality of planks, each plank including at least one of a flange and a slot, wherein the flange is configured to slide into the slot of an adjacent plank, forming a flange and slot join, such that two or more planks joined together form an assembled planar deck area, and a deck surround having four deck sides, at least two of the deck sides each including a

channel for receiving a respective edge part of the planar deck area, the method further including joining a second plank to a first plank using the flange and slot join of the first and second planks, and joining any subsequent plank to a previously joined plank using the flange and slot join of the subsequent plank and previously-joined plank, forming the deck surround by joining four deck sides around the joined planks.

[0033] In some embodiments, each two deck sides positioned orthogonally to each other are connected by a deck corner.

[0034] In other embodiments, the deck side forming the rear-most deck side of the deck when placed on a utility vehicle includes one or more lighting modules. The lighting modules may include turning indicators, brake lights and other signalling lights. The rear-most deck side may also include an area adapted to contain a licence plate, which optionally has licence plate lighting. In some such embodiments, the lighting modules and/or licence plate area are located on or in the skirt of the deck side.

[0035] In some embodiments, deck sides forming the left and right sides of the deck when placed on a utility vehicle each include a space for a respective wheel or wheel arch of the utility vehicle. In such embodiments, the wheel arch may form part of the deck.

[0036] In some embodiments, when assembling the deck, sliding a first plank into respective channels of the partial deck surround includes sliding the first plank only partially along the channels such that a portion of the first plank protrudes outwardly from the partial deck surround, and such that the second plank can be readily joined with the first plank using the first and second slot and flange. In this regard, the part of the first plank protruding outwardly from the partial deck surround includes sufficient protrusion of the first plank's slot or flange to allow the second plank's respective flange or slot to be joined thereto. The assembled first and second planks are then slid further along the channels of the partial deck surround such that a portion of the second plank protrudes outwardly from the partial deck surround. It will be understood that this process can be repeated until all planks forming the deck surface have been fitted, with the last plank being joined to the second last plank and slid into the channels of the partial surround such that no part of the last plank protrudes outwardly from the partial surround thus allowing the fourth deck side to be joined to the partial deck surround to complete the deck surround. It will also be understood that, in this embodiment, when the last plank is slid into the channels of the partial deck surround such that no part of the last plank protrudes outwardly from the partial deck surround the first plank will be abutting the end deck side of the partial deck surround, or the first plank will be slid into the channel

of the end deck side (in various embodiments this could be the front or rear end deck side) of the partial deck surround.

[0037] In other embodiments, when assembling the deck, sliding a first plank into respective channels of the partial surround includes sliding the first plank until it abuts the end deck side of the partial deck surround (or the first plank is slid into the channel of the end deck side of the partial deck surround), with the second and subsequent planks being slid along the channels of the partial deck surround until fitting to and abutting against each preceding slid in plank, until the last plank is slid in allowing the fourth deck side to be connected to the partial deck surround to complete the deck surround.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] At least one embodiment of the invention will be described with reference to the following, non-limiting illustrations representing the at least one embodiment of the present invention, in which:

[0039] Figure 1 is a perspective view of a plank deck in accordance with an embodiment of the present invention;

[0040] Figure 2 is an end cross-sectional view of the plank depicted in Figure 1;

[0041] Figure 3 is an end cross-sectional view of a plank which is wider than the embodiment of the plank depicted in Figures 1 and 2;

[0042] Figure 4 is an end cross-sectional view of a plank which is wider than the embodiment of the plank depicted in Figures 1, 2 and 3;

[0043] Figure 5 is an end cross-sectional view of three planks of the embodiment depicted in Figures 1 and 2 being joined together;

[0044] Figure 6 is an end cross-sectional view of three planks of the embodiment depicted in Figures 1 and 2 being joined together, with one plank in a flipped-over configuration;

[0045] Figure 7 is an end cross-sectional view of three planks of the embodiment depicted in Figures 1 and 2 joined together forming a deck with a rubber strip inserted in each plank's channel, two other planks are shown in partial view either side of the deck;

[0046] Figure 8 is an end cross-sectional view of three planks of the embodiment depicted in Figures 1 and 2 joined together forming a deck with one plank in a flipped-over configuration and having an eyelet device clamped into its channel, two other planks are shown in partial view either side of the deck;

[0047] Figure 9 is an end cross-sectional view of three planks of the embodiment depicted in Figures 1 and 2 joined together forming a deck with two planks in a flipped-over configuration and having a rubber strip inserted in one flipped-over plank's channel, and having a bracket clamped into the other flipped-over plank's channel, two other planks are shown in partial view either side of the deck;

[0048] Figure 10 is a rear perspective view of a utility vehicle rear end with a deck in accordance with an embodiment of the present invention;

[0049] Figure 11 is a partially-exploded rear perspective view of parts of a deck in accordance with an embodiment of the present invention;

[0050] Figure 12 is a partially-exploded rear perspective view of parts of a deck partially assembled in accordance with an embodiment of the present invention;

[0051] Figure 13 is a partially-exploded rear perspective view of parts of a deck partially assembled progressed from that shown in Figure 3 in accordance with an embodiment of the present invention;

[0052] Figure 14 is a rear cross-sectional view of a part of a deck in accordance with an embodiment of the present invention;

[0053] Figure 15 is a rear perspective view of parts of a deck being assembled in accordance with an embodiment of the present invention;

[0054] Figure 16 is a rear perspective view of parts of a deck being assembled progressed from Figure 7 in accordance with an embodiment of the present invention;

[0055] Figure 17 is a rear perspective view of parts of a deck being assembled progressed from Figure 16 in accordance with an embodiment of the present invention; and,

[0056] Figure 18 is a rear perspective view of parts of a deck being assembled progressed from Figure 17 in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF SOME EMBODIMENTS

[0057] Figure 1 shows an example embodiment of a plank 100 having curved flanges and slots. On the plank, there is a single elongate flange 102 along the side of the plank and parallel to the plank's elongate axis. The flange has a curvature in the cross-section orthogonal to the plank's elongate axis. Each plank also has a first slot 104 and a second slot 106 on an opposite side of the plank from the flange 102. The slots have a curvature in their cross-section orthogonal to the plank's elongate axis, and so it will be readily understood that the flange of one plank is adapted to slide into one or other of the slots in an adjacent plank, when those planks are being connected or joined to each other. It will also be understood that the curvature of the flanges and slots necessitates a rotating-sliding movement of one plank with respect to its adjacent plank when connecting or joining the planks together.

[0058] The first slot 104 and the second slot 106 in the plank curve away from each other, and are perhaps describable as being mirrored about an axis of symmetry between each slot. With each first slot 104 curving downwardly and each second slot 106 curving upwardly (as shown in Figure 1), it will be appreciated that an adjacent and to-be-joined plank having a flange 102 curving upwardly will only complement and can therefore only slide into the downwardly curved first slot 104. However, it will be appreciated that a plank can be flipped over such that its flange is curving downwardly in which case the flange only complements and can only slide into the upwardly curved second slot 106. In this way, a user of the planks has a choice as to which side of the plank is presented to a deck surface when assembling the deck.

[0059] The broken parallel lines 112 mid-way along the plank 100 indicate that the plank may be of any suitable length.

[0060] It is thought that the curved cross-sectional shape of the flange and curve of each plank may provide a more secure join between adjacent planks. The curvature, necessitating the rotating-sliding movement when joining adjacent planks, provides an alternative method of joining planks, and it will be recognised that prior art planks are typically joined together using a straight cross-sectioned flange and slot arrangement, which involves a straight (non-rotating) sliding motion to join adjacent planks.

[0061] It will be understood that, in some embodiments, a plank could have only one slot and would therefore be joinable to an adjacent plank in only one configuration, without the flipped-over configuration. The embodiments depicted in the Figures of the present specification each have two slots and so accommodate the flipped-over configurations of planks when forming a deck.

[0062] Figure 2 shows an end cross-sectional view of the plank 100 depicted in Figure 1. More easily seen in Figure 2 is the flange 102 shown in this Figure as protruding from the right side of the plank, and curved upwardly. On the left of the plank is the first slot 104 and second slot 106, with the first slot curved downwardly and the second slot curved upwardly. Also shown is the plank channel 108, the long axis of which is parallel to the long axis of the plank.

[0063] The plank 100 has a serration 110 shown in Figure 2 on the top surface, the ridges of the serration, in this embodiment, along the length of the plank. In other embodiments, the serration may be discontinuous so as to have multiple serration areas along the length of the plank 100. The serration is a friction inducing device which assists in preventing loads from sliding when the plank, in part, forms a load bearing surface, for example, in the deck of a utility vehicle. Other friction inducing devices could also be used, for example, a sandpaper like surface or rubber compounds adhered to the plank.

[0064] Figure 3 shows a plank 200 which is wider than the plank 100 of Figure 1. Similarly, the plank 200 has a flange 202, along with a first slot 204 and a second slot 206, allowing the wider plank to be flipped over for joining with other planks. The plank 200 has two channels 208 shown with openings to the bottom of the plank. A wider plank may optionally have only one channel, or more than two channels. The plank also has two serrations 210, each located on an opposite side of the plank to a corresponding channel 208.

[0065] Figure 4 shows a plank 300, which is wider again than the plank 200 shown in Figure 2. The plank 300 has a flange 302, two slots 304, 306, four channels 308 and four serrations 310. It will be understood that this wider plank 300 operates in a same or similar way to the narrower planks 100, 200 depicted in Figures 1 and 2.

[0066] When forming a deck from a plurality of planks, it is possible to select from a number of desired widths of plank. The widths of planks shown in Figures 2, 3 and 4 are examples only, and it will be appreciated that the planks can have a range of many different widths.

[0067] Figure 5 shows an operation or method of joining planks 100A, 100B and 100C together to form a deck 500A. Planks 100A and 100B are shown in Figure 5 as already joined via the first slot 104A in plank 100A and the flange 102B of plank 100B. Plank 100C is shown as being joined to plank 100B, with the flange 102C being inserted into the first slot 104B of plank 100B. Plank 100C is being moved with a rotating-sliding motion indicated by arrow 114, which enables the flange 102C to slide into the slot 104B. Due to the configuration selected for plank 100C, the rotating-sliding motion is in an upward direction as depicted in Figure 5.

[0068] In Figure 5, each plank 100A, 100B, and 100C is shown placed in the deck 500A in the same orientation, with the channels 108A, 108B, and 108C of each plank shown with their channel openings at the bottom of each plank, and with the serrations 110A, 110B, and 110C shown on the top of each plank.

[0069] Figure 6 is similar to Figure 5, but with plank 100C in a flipped-over configuration and being joined to plank 100B via flange 102C of plank 100C sliding into the second slot 106B in plank 100B. In Figure 6, the rotating-sliding motion for joining plank 100C to plank 100B is in a downward direction due to the curve direction of the flange 102C and the second slot 106B into which that flange must slide.

[0070] With the plank 100C in a flipped-over configuration, the channel 108C of that plank will open to the top of the plank 100C, when it is joined with planks 100B and 100A to form deck 500B. As will be seen in following Figures, the channel has a number uses.

[0071] Figure 7 shows three planks (full cross-section) 100A, 100B and 100C in a deck 500C. two partially depicted planks are shown to the right and left of the deck 500C. In this example embodiment, each of the planks is in a flipped-over configuration with their respective channels 108A, 108B, and 108C opening to the top of the deck 500C.

[0072] Each channel has a rubber strip 120, which is inserted into its respective channel opening and held securely therein by a friction fit, with downwardly protruding arms abutting edges of each channels opening. Each rubber strip has a curved top and presents a frictional surface to assist with preventing loads on the deck 500C from sliding.

[0073] It will be appreciated that the term “flipped-over” is a relative description, and it could be alternatively viewed that a plank is “flipped-over” when its channel is open to the bottom of a deck. In this regard, the term “flipped-over” is being used in this specification as a convenient description and should not be read as a limiting feature for the configuration of planks in a deck.

[0074] Figure 8 shows planks 100A, 100B, and 100C in a different configuration in deck 500D. Plank 100B is flipped over, with its channel 108B open to the top of deck 500D. a strap eyelet 800 is located in the channel, and is maintained in position when a strap (not shown) is tensioned and causes the anchor base 802 of the eyelet 800 to frictionally engage with rails 804 and 806 adjacent the channel opening.

[0075] Figure 9 shows yet another example use of the planks 100A, 100B, and 100C in deck 500E, wherein both planks 100B and 100C are in a flipped-over configuration. The channel 108C of plank 100C has a rubber strip 120 inserted therein, and the channel 108B of plank 100B has an angle bracket 130 secured therein by a bolt 132 and anchor nut 134 arrangement.

[0076] It will be appreciated that the feature of planks each having at least two configurations, one configuration being flipped-over with respect to the other configuration, allows each plank to provide at least two options for presenting surfaces to the top of a deck. In this specification, the planks have been depicted with serrations on one surface and the opening of a channel on the other surface. However, it will be understood that these are merely example embodiments, and each plank could have different features from serrations and channel openings present on its two surfaces.

[0077] Figure 10 shows a rear part of a utility vehicle 600 with a deck 602 fixed to the vehicle's rear undercarriage. The deck has a deck surface 604, which may be suitable for carrying a range of loads, for example, tools, bricks, gravel, sand, bikes and many other items or materials. The deck surface is formed from a plurality of planks 100, which are joined to form a planar deck. Around the outside of the planks and deck surface is the deck surround 618, which is formed from four deck sides and four deck corners.

[0078] In Figure 10 the deck side 608 is a right side when viewing the deck 602 from the rear of the vehicle 600. There is also shown the rear deck side 610, which incorporates a licence plate area 611 and lighting modules 613. The right deck side 608 and the rear deck side 610 are joined via a deck corner 612. Also shown in Figure 10 is a front right deck corner and a rear left deck corner.

[0079] In this embodiment, the deck accommodates a wheel arch 614 for the vehicle wheel 616.

[0080] Figure 11 shows an embodiment of parts of a deck 602 where the planks 100 are being slid into a partially-assembled deck surround 618, with yet to be inserted planks toward the rear of a partially-assembled deck surround 618. The partially-assembled deck surround includes a left deck side 620, a right deck side 608, the front deck side 622, but without its rear deck side joined. The present deck sides (608, 620 and 622) are joined by deck corners 612.

[0081] Left and right deck sides 608, 620 each include a space 624 for accommodating the wheel arches 614.

[0082] Also shown in Figure 11 are the deck side channels, with a channel 626 in the right deck side 608, a channel 628 in the left deck side 620, and a channel 630 in the front deck side 622. Each plank's two respective end edge parts slide into the right and left channels 626, 628, with the front-most plank having its front elongate edge slid into the front deck side channel 630.

[0083] Figure 12 shows a progression of the deck 602 assembly with front-most planks 100 slid into the channels 626, 628 and 630 of the deck sides forming the partially-assembled deck surround 618, and the rear-most four planks yet to be slid into the partially-assembled deck surround.

[0084] Figure 13 shows the rear deck side 610 which is joined to the partially-assembled deck surround 618 when all the planks 100 are slid into the partially-assembled deck surround, the joining of the rear deck side 610 with the partially-assembled deck surround 618 forming the complete deck surround 618, and thus forming the deck 602.

[0085] Figures 11, 12 and 13 depict an embodiment of the present invention where the planks 100 can be slid into the channels of the partial deck surround 618 and each two planks 100 joined to each other while both of the two planks are located in the channels 626, 628 of the left and right deck sides 608 and 620. The flanges and slots of the planks are configured such that the joining occurs with a rotating and sliding movement.

[0086] Figure 14 shows a detail of an end part of a plank 100 with its respective edge part slotted into the channel 626 of the right deck side 608. The right deck side, being shown in cross-section, more clearly depicts parts of the deck side, including a skirt 642 depending from the channel 626. The skirt forms an outer appearance of the deck 602 which may be shaped and coloured to be pleasing to the eye. The deck side 608 also includes flattened channels with a top flattened channel 632, and a side flattened channel 634 each located towards an upper part of the deck side. There is also depicted a bottom flattened channel 636 located towards a lower part of the deck side and having a slightly different cross-sectional profile from the other flattened channels 632 and 634. The flattened channels are suitable for accommodating a number of items which can be clamped or otherwise held in the flattened channels.

[0087] Figure 14 also shows horseshoe shaped cross-section clipping channels 638 and 640, which can be useful for clipping the deck side to structures, for example structures on the utility vehicle.

[0088] Figures 15 to 18 show steps in assembling a deck with planks as depicted earlier Figures. It will be understood that for Figures 15 to 18 only the right deck side 608 is shown, but the other end

of the planks, 100A, 100B, and 100D, depicted in those Figures will slide into channel 628 of left deck side 620 in a partial deck surround 618.

[0089] In Figure 15 there is shown a first plank 100A, which is moved towards and to be slid into channel 626 in deck side 608, with channel 626 having a bottom lip 627 on which the planks 100 rest when slid into the channel. Following plank 100A there is plank 100B. Plank 100A has an upwardly curved flange 102A shown on the front side of the plank, along with a first downwardly curved slot 104A and a second upwardly curved slot 106A. Also shown in Figure 15 is a second plank 100B, like plank 100A, having a flange 102B, a first slot 104B and a second slot 106B.

[0090] When assembling a deck 602 using planks 100A and 100B, the first plank 100A is slid into channel 626 of the right deck side 608 (and into channel 628 of the left deck side 620, not shown in Figure 15) with a rear part of the first plank 100A left protruding from the back of the partial deck surround 618 (in other words, protruding from the respective deck side channels 626 and 628).

[0091] As shown in Figure 16, the first plank 100A has a rear part protruding, which allows the second plank 100B to be joined to the first plank via the curved slot and flange join. In this regard, flange 102B is slid into slot 104A with a rotating-sliding movement, such that the first and second planks become joined (refer to Figure 17). It will be understood that the rotation of the rotating-sliding movement is in an upward direction as depicted in Figure 16. The joined first plank 100A and second plank 100B are then slid along the channels 626 (and 628, not shown in Figure 16), so that a rear part of the second plank 100B is protruding therefrom and thus presented for connection with a third plank 100D (refer to Figure 17).

[0092] The third plank 100D is shown in Figure 17 as being flipped over with respect to the first and second planks 100A and 100B. In this way, the third plank's channel 108D is presenting upwardly and open to the deck surface 604 when the deck 602 is assembled. The flange 102D of third plank 100D is curved downwardly and therefore only complements and only slides into second upwardly curved slot 106B in the second plank 100B. It will be understood that the joining or connecting of the third plank 100D to the second plank 100B involves a rotating-sliding movement, wherein the rotation is in a downward direction as shown in Figure 17.

[0093] Figure 18 shows the joined planks (first plank 100A, second plank 100B and third plank 100D) are slid further along channels 626 and 628 (not shown in Figure 18) until a rear part of the third plank 100D remains protruding rearwardly from the partial deck surround 618. It will be appreciated that the same or similar action can be used to join all subsequent planks to form the deck surface 604 in the deck 602. When the final plank is joined, and the deck surface slid along

until the first plank 100A abuts the front deck side 622 (or a front edge part of the first plank 100A slides into the channel 630 of the front deck side), then the final plank should be able to be slid fully into the channels 626, 628 so the rear deck side 610 can be joined to the partial deck surround to form the complete deck surround 618.

[0094] It will be appreciated that though the present invention and its embodiments have been described with reference to a tray or tray deck in a utility vehicle, the invention and embodiments can be applied to other devices and applications, such as in scaffolding platforms.

[0095] Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

[0096] The reference to any prior art in this specification is not and should not be taken as an acknowledgement or any form of suggestion that the prior art forms part of the common general knowledge.

Claims:

1. A plank suitable for a deck, including:

at least one of a flange and a slot,

wherein each at least one flange has a substantially curved cross-sectional shape and the slot has a substantially curved cross-sectional shape substantially complementary to the flange substantially curved cross-sectional shape, and

wherein the flange is configured to slide into the slot of an adjacent plank, forming a flange and slot join, such that two or more planks joined together form a deck.
2. A plank according to claim 1, wherein the flange is elongate and extends along the entire length of its respective plank, with each slot being configured to receive the elongate flange when sild into the slot.
3. A plank according to claim 1, wherein the flange has a toothed form, with each slot having a corresponding toothed form.
4. A plank according to any one of the preceding claims, wherein the substantially curved cross-sectional shape is any one of a circular curve, an oval curve, a spline curve, and an egg-shaped curve.
5. A plank according to any one of claims 1 to 3, wherein the substantially curved cross-sectional shape includes non-curved sections.
6. A plank according to any one of claims 1 to 3, wherein the substantially curved cross-sectional shape includes a plurality of straight sections, each straight section angled with respect to each adjacent straight section so that the plurality of straight sections approximates the arc of a curve.
7. A plank according to any one of the preceding claims, including two slots, each slot having a substantially curved cross-sectional shape substantially complementary to the flange substantially curved cross-sectional shape, the two slots allowing an adjacent plank to be joined to the two-slot plank in two different ways, with each of the two slots curving away from a notional central plane between the two slots, wherein the two slots curve away from each other.

8. A plank according to any one of the preceding claims, including a grip section such that items placed on the assembled deck, when the plank grip section is upwardly facing, will be subject to friction imparted by the grip section to ameliorate sliding of items with respect to the deck.
9. A plank according to any one of the preceding claims, including an elongate channel parallel to the plank elongate axis into which can be fitted a gripping means, such as a rubber strip.
10. A plank according to any one of the preceding claims, wherein the flange includes one or more protrusions depending substantially orthogonally from one or both sides of the flange.
11. A plank according to any one of the preceding claims, wherein each at least one slot includes one or more protrusions depending substantially orthogonally from one or both sides of each at least one slot.
12. A method for assembling at least two planks to form a deck, each plank including:
 - at least one of a flange and a slot,
 - wherein each at least one flange has a substantially curved cross-sectional shape and the slot has a substantially curved cross-sectional shape substantially complementary to the flange substantially curved cross-sectional shape, and
 - wherein the flange is configured to slide into the slot of an adjacent plank, forming a flange and slot join, such that two or more planks joined together form a deck,the method including:
 - joining a second plank to a first plank using the flange and slot to join the first and second planks; and
 - joining any subsequent plank to a previously joined plank using the flange and slot to join the subsequent plank and previously-joined plank.
13. A method for assembling at least two planks according to claim 12, wherein joining the second plank to the first plank includes a rotating and sliding movement when inserting the flange into the slot.

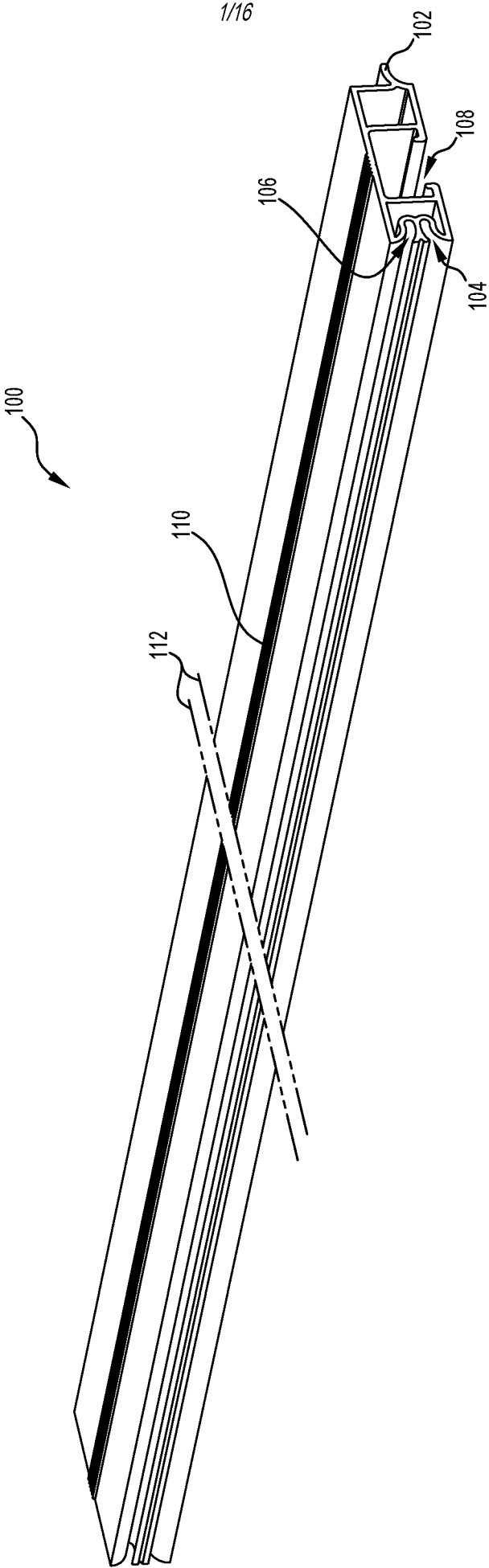


Figure 1

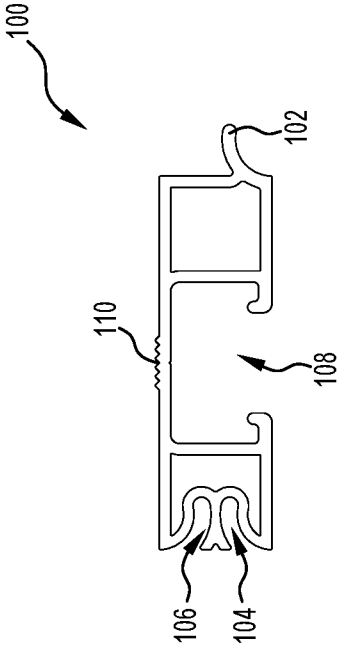


Figure 2

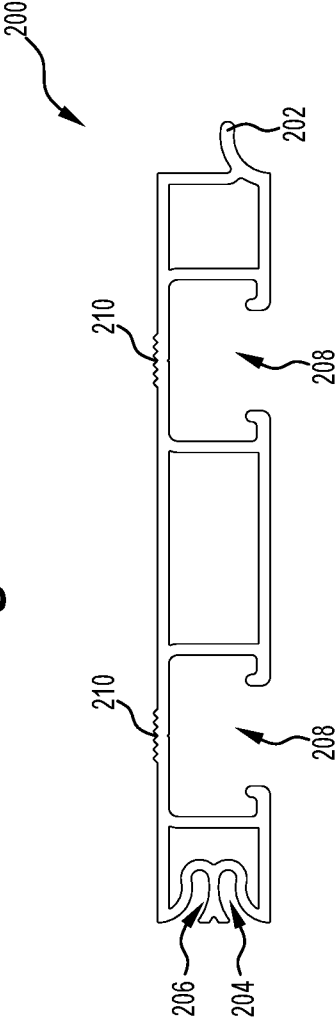


Figure 3

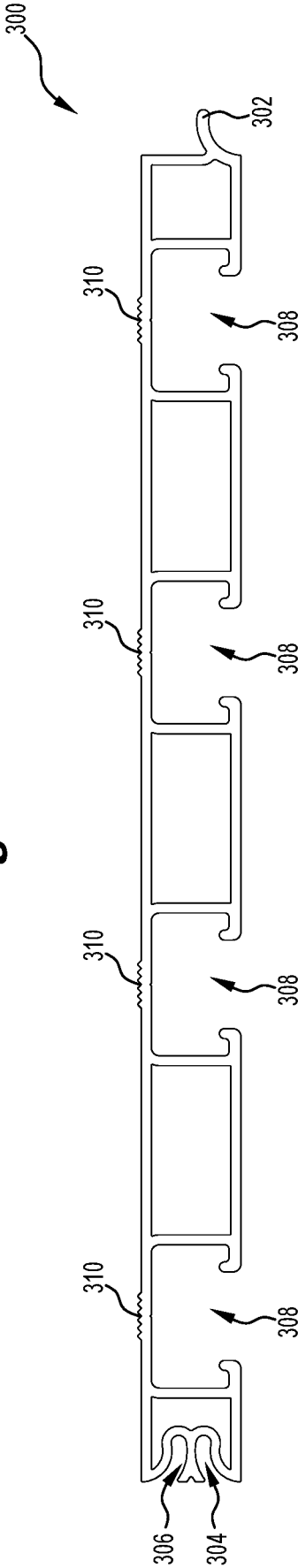


Figure 4

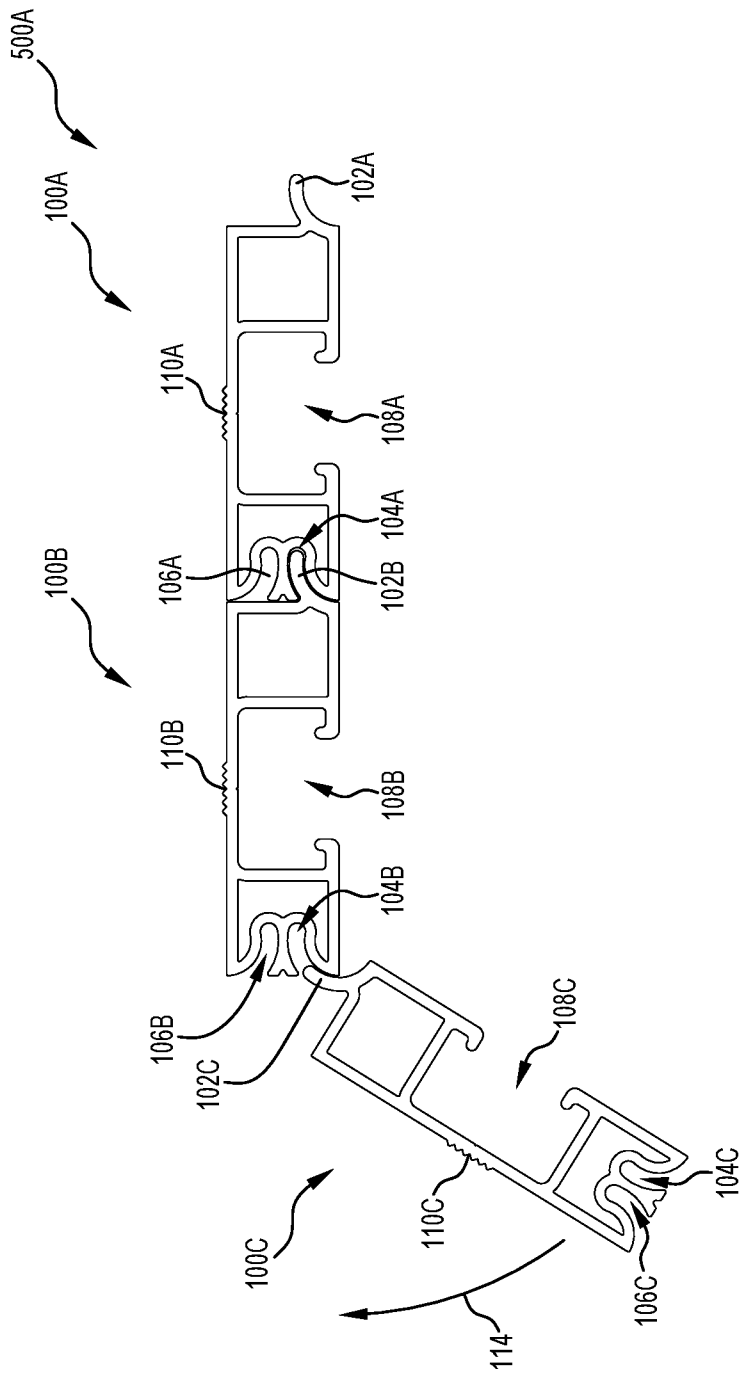


Figure 5

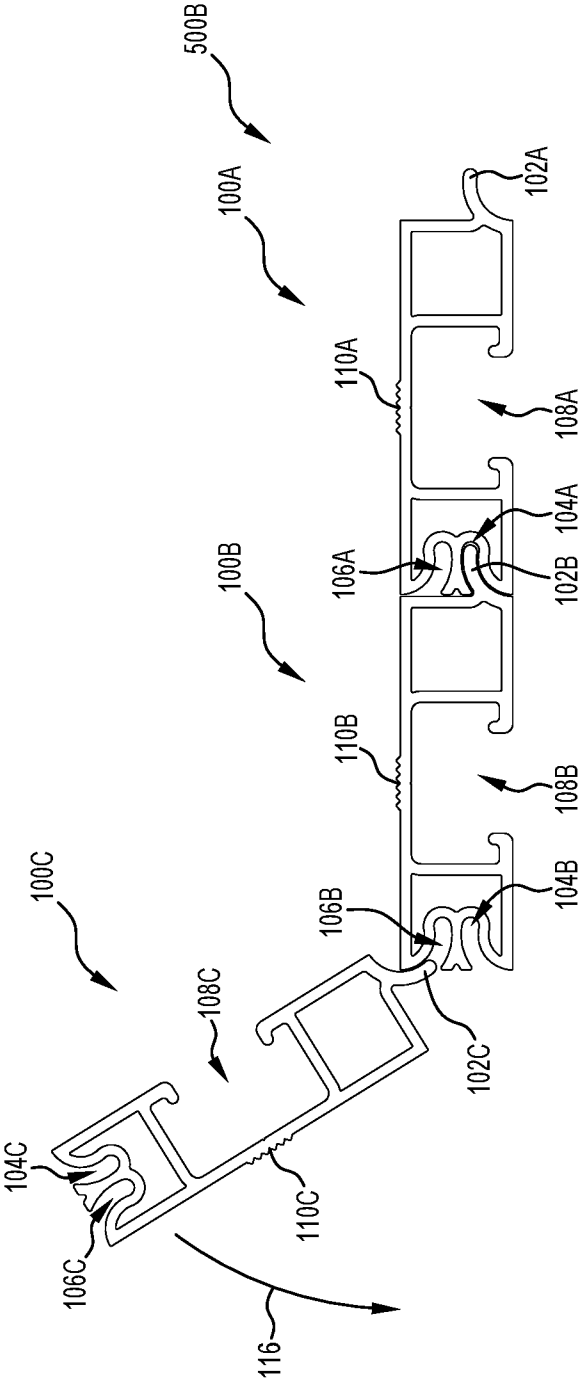


Figure 6

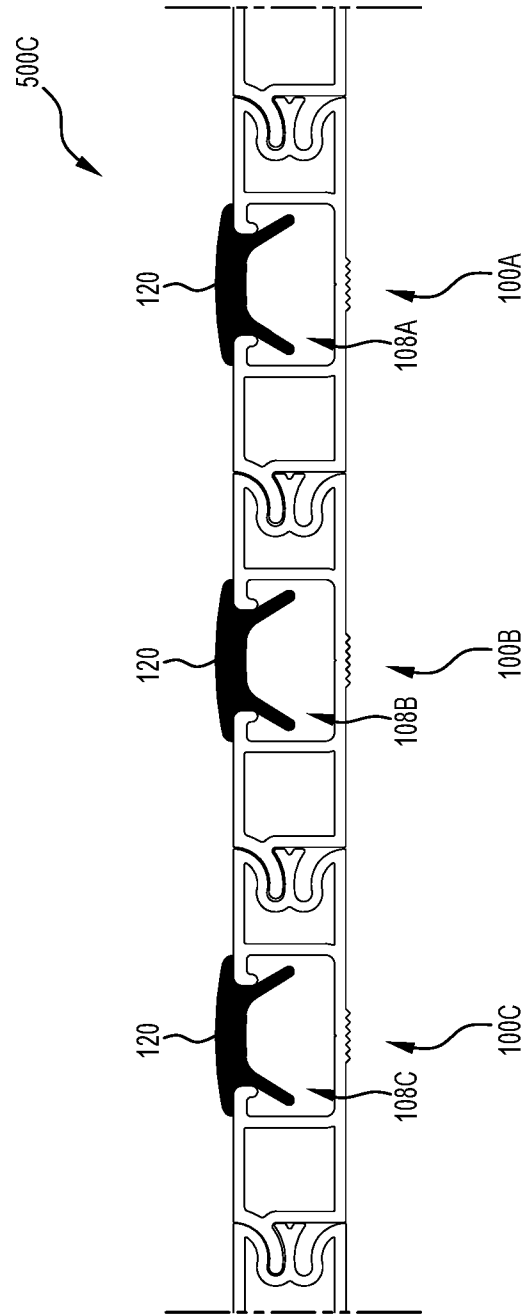


Figure 7

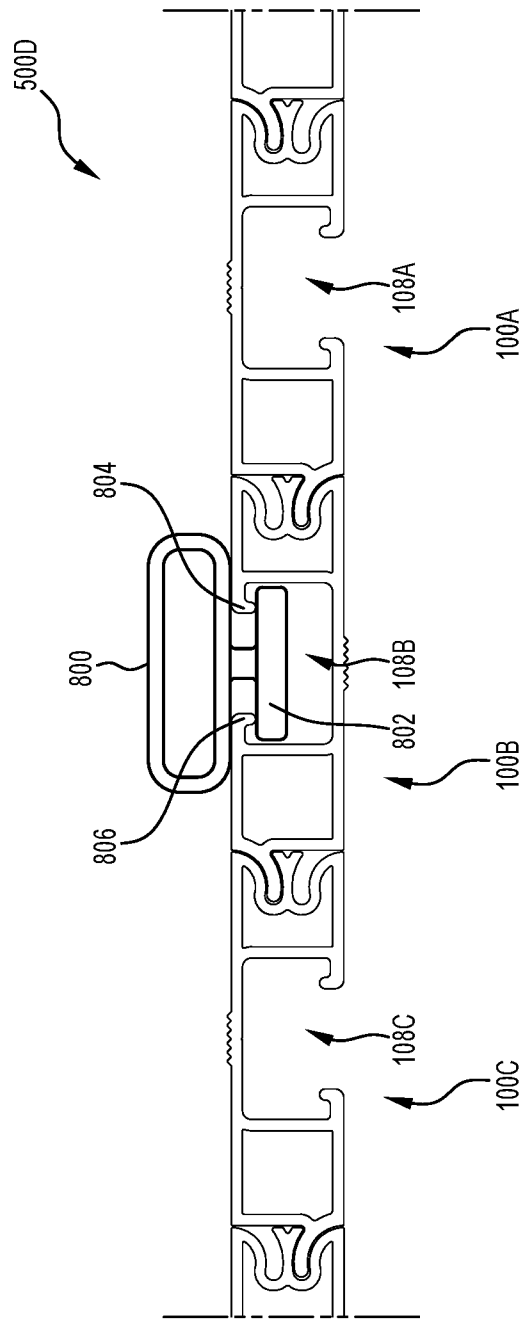


Figure 8

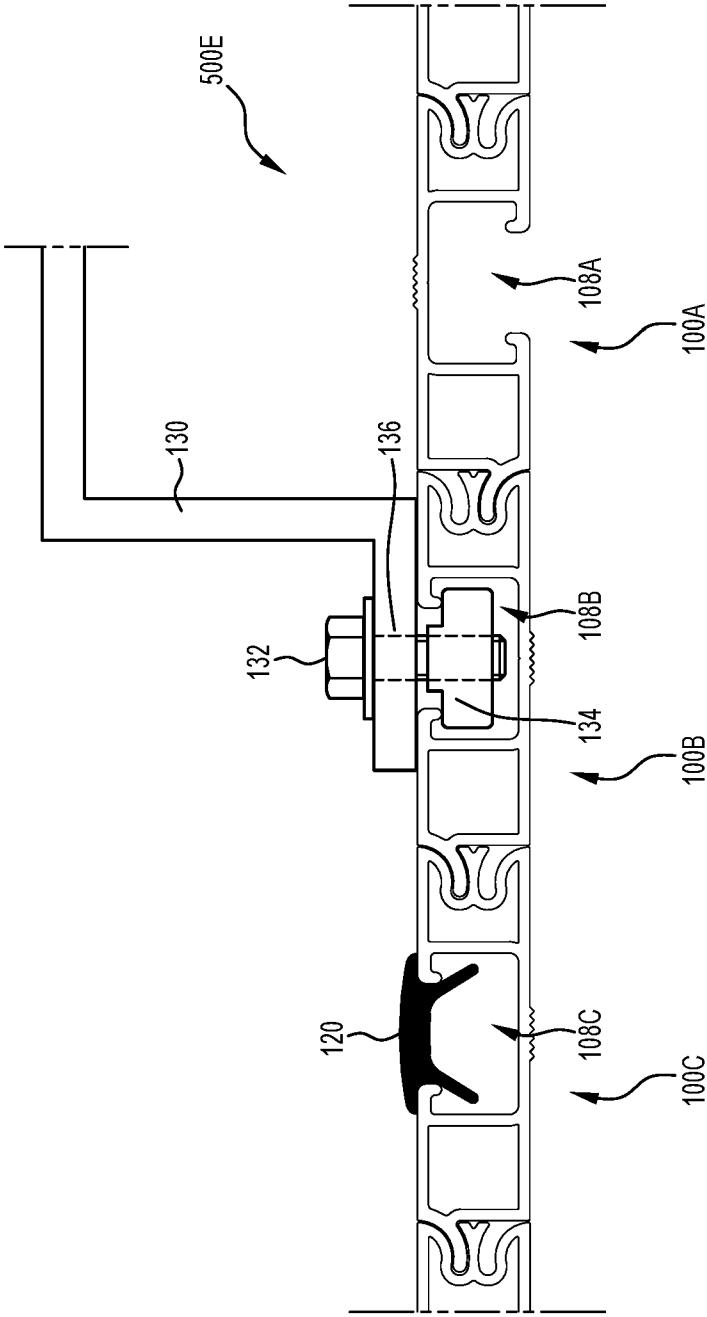


Figure 9

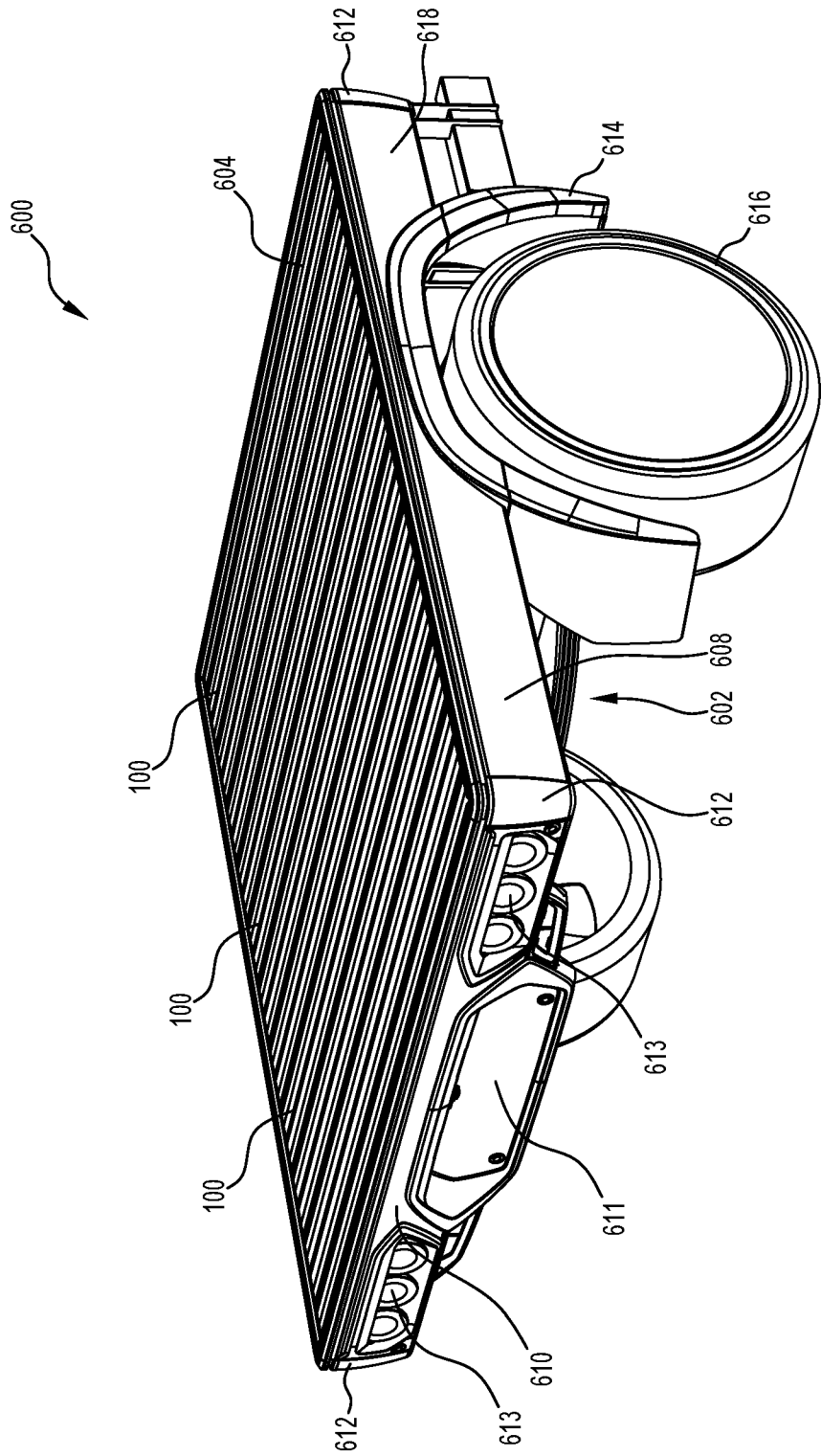


Figure 10

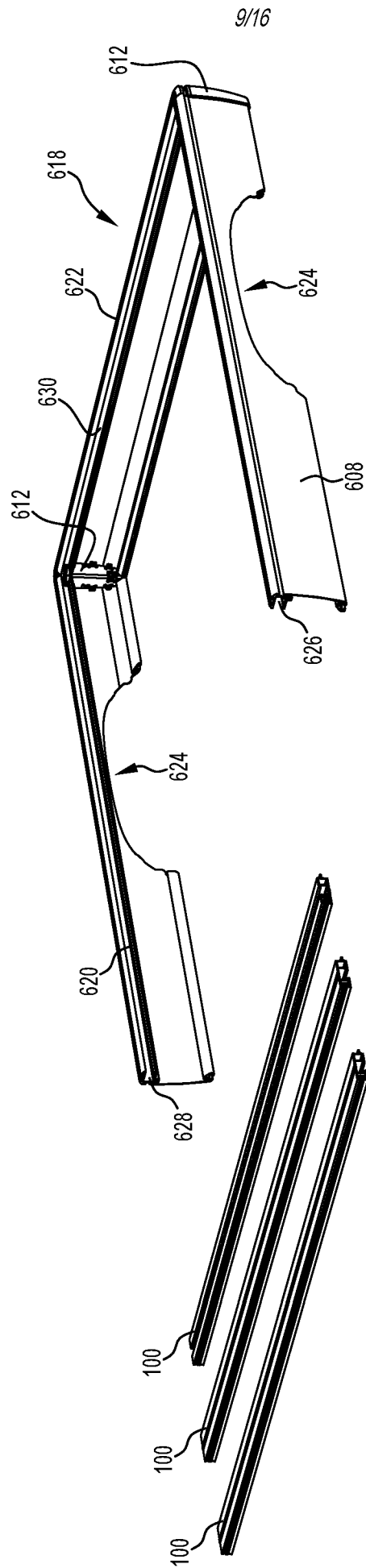


Figure 11

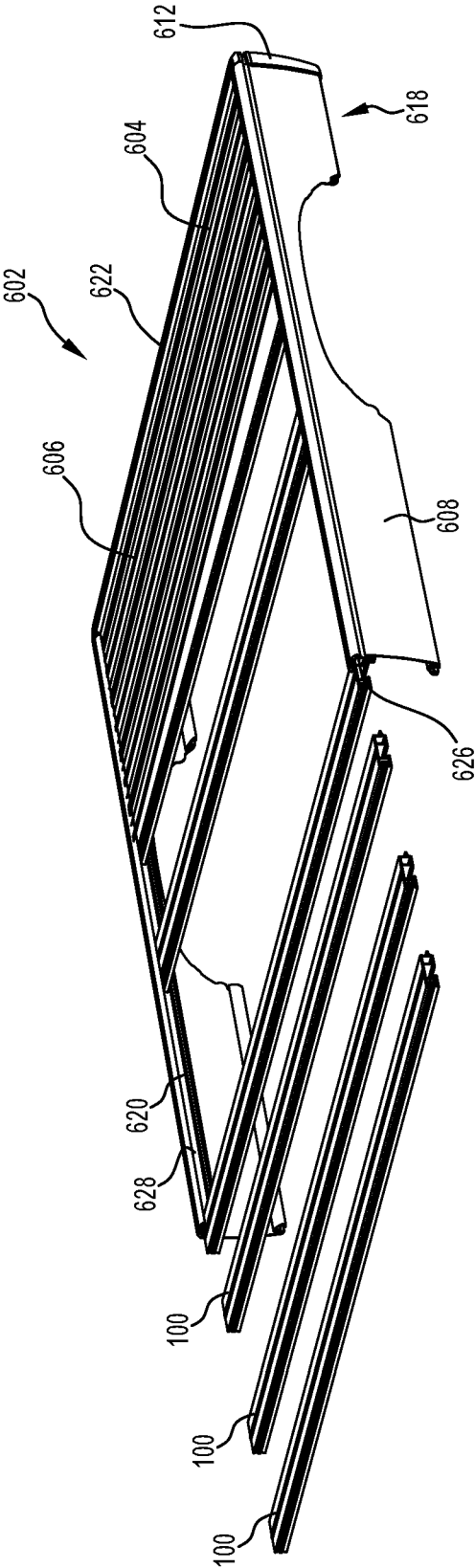


Figure 12

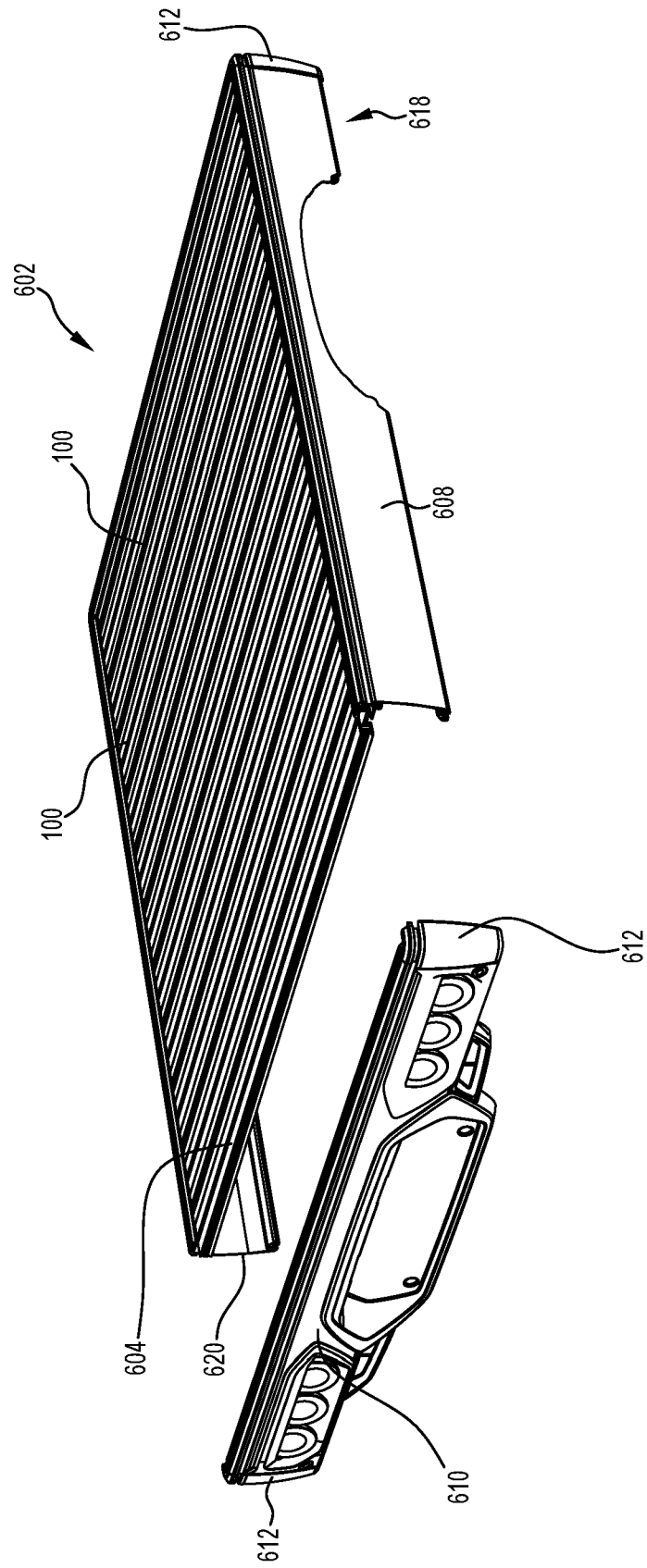


Figure 13

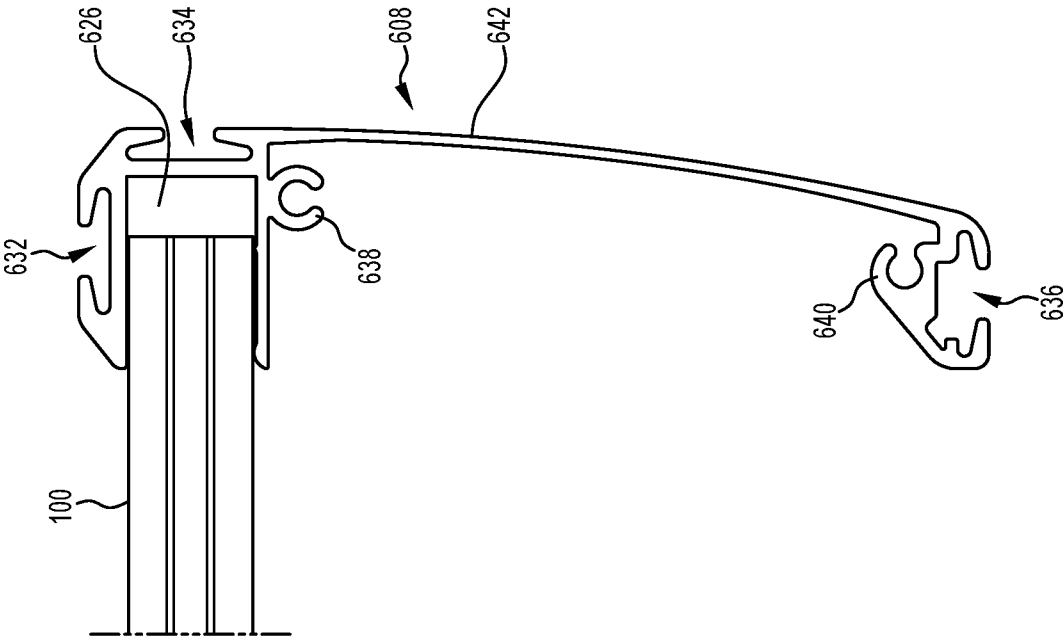


Figure 14

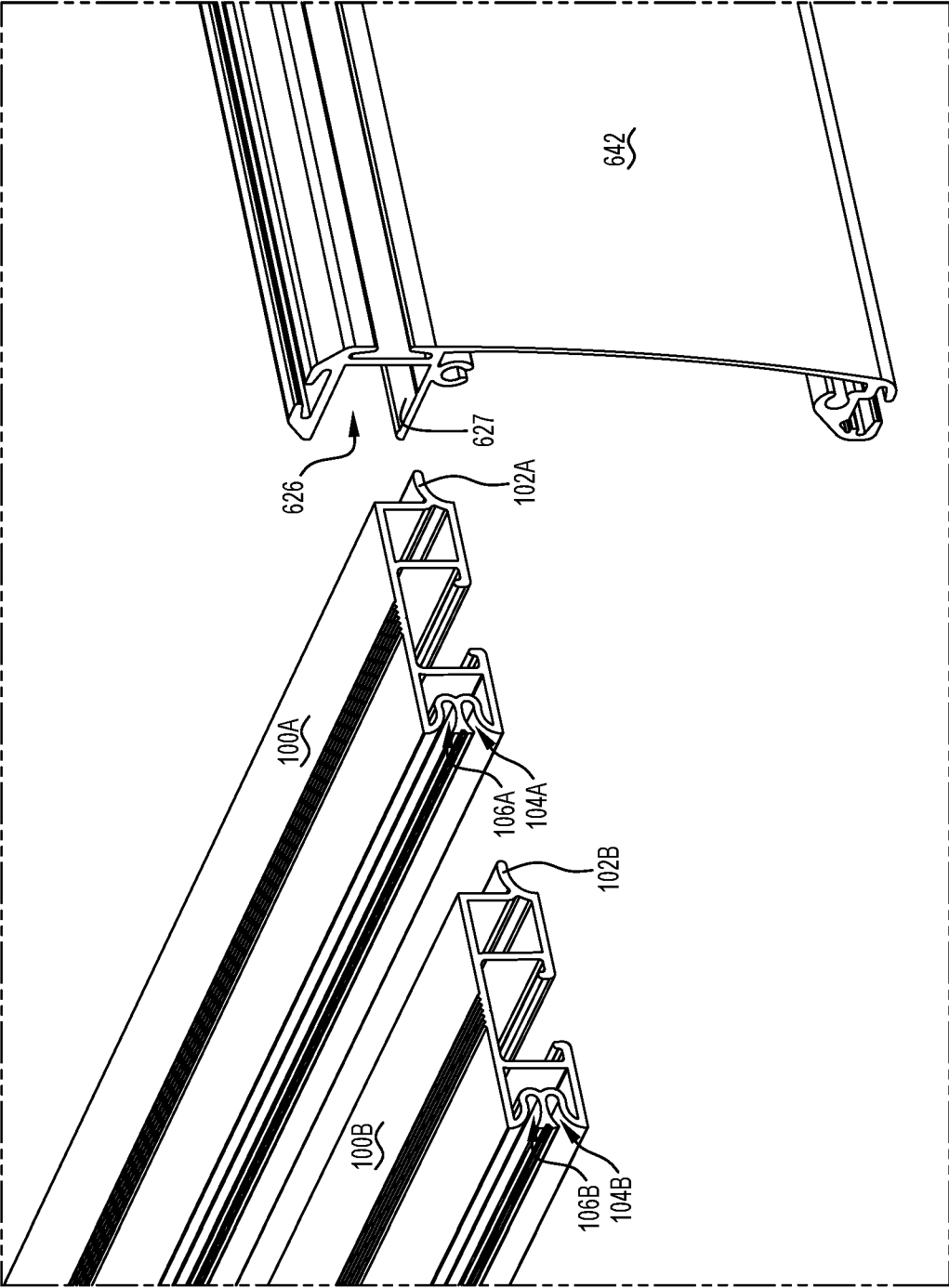


Figure 15

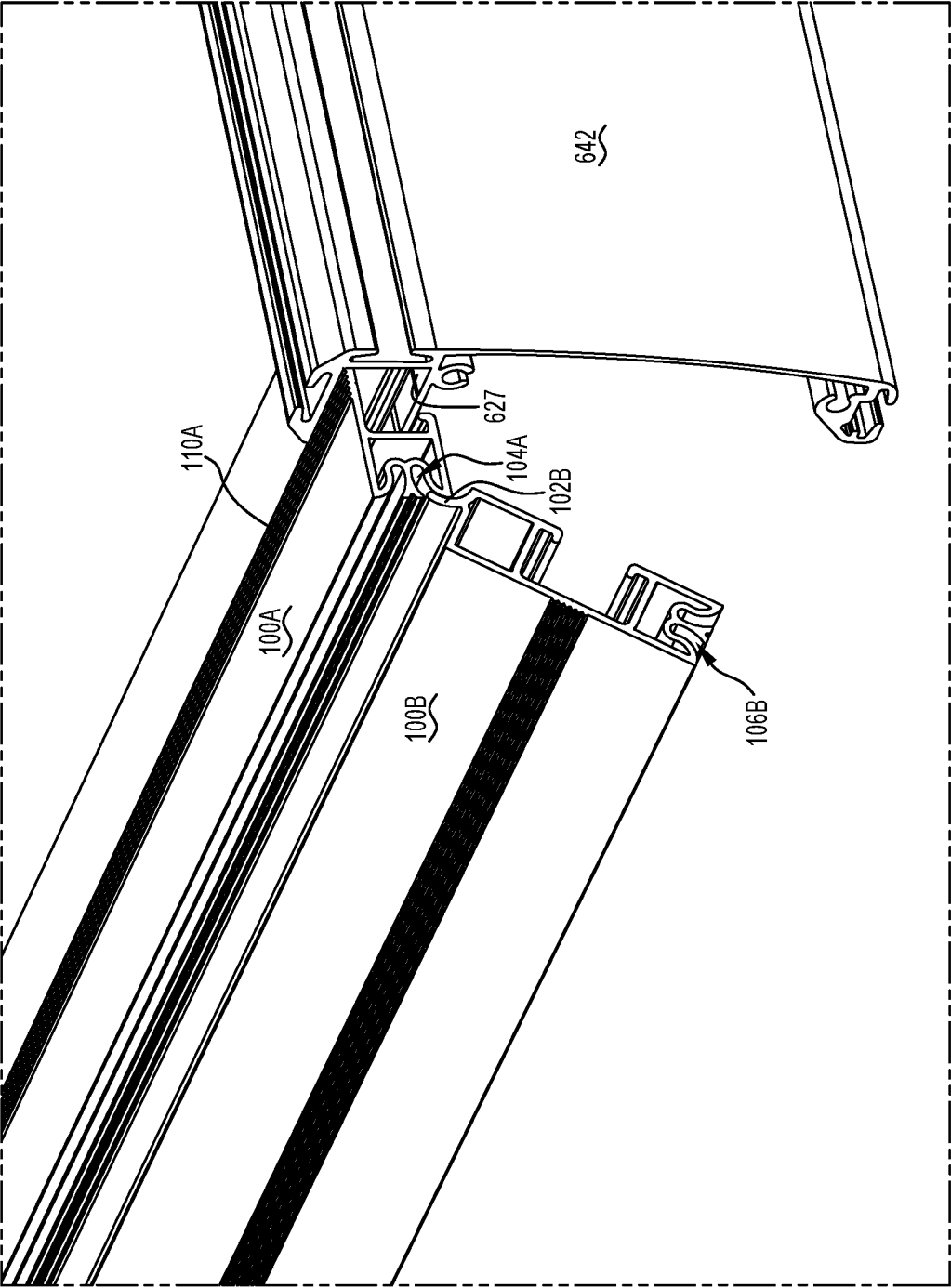


Figure 16

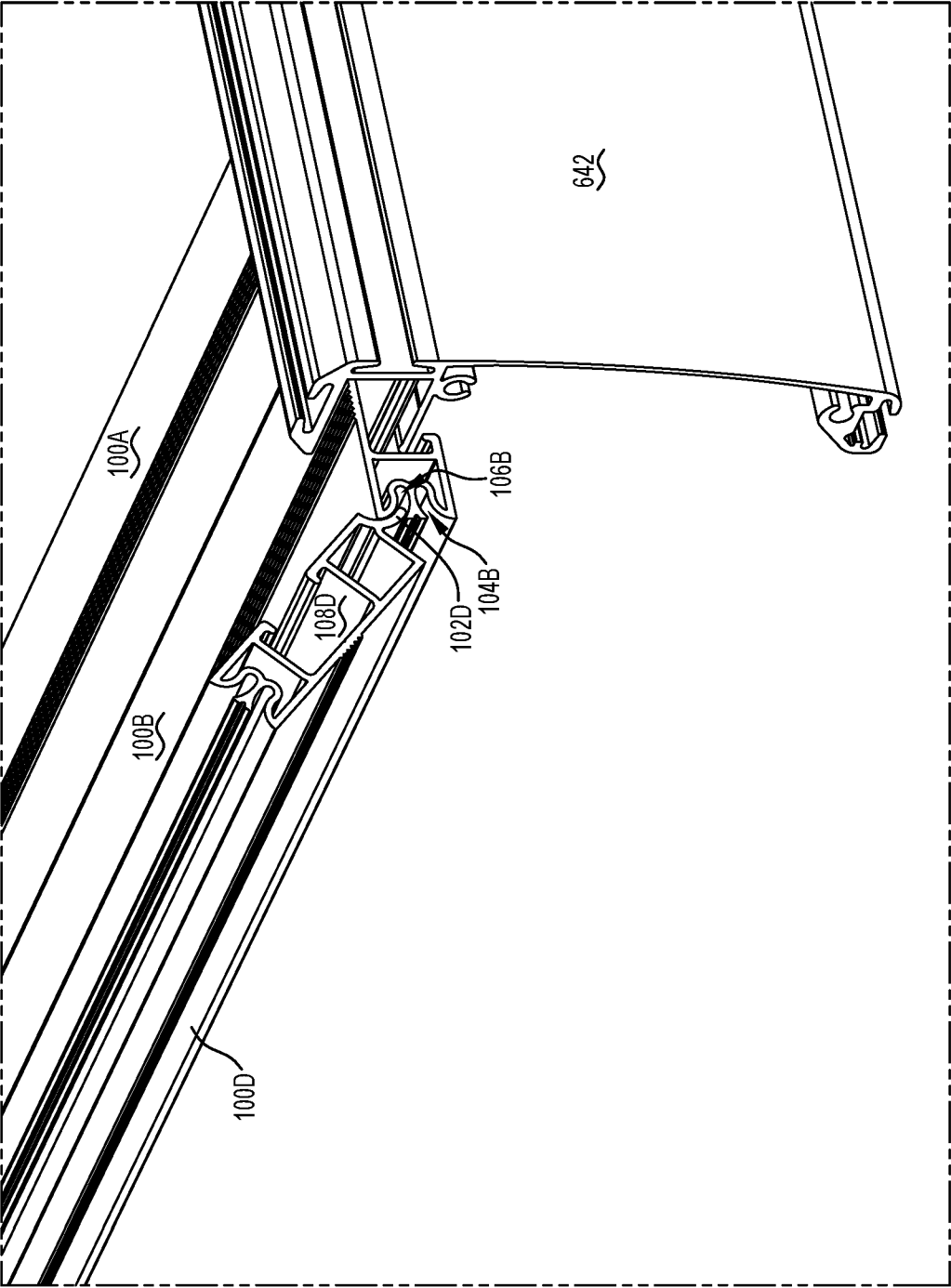


Figure 17

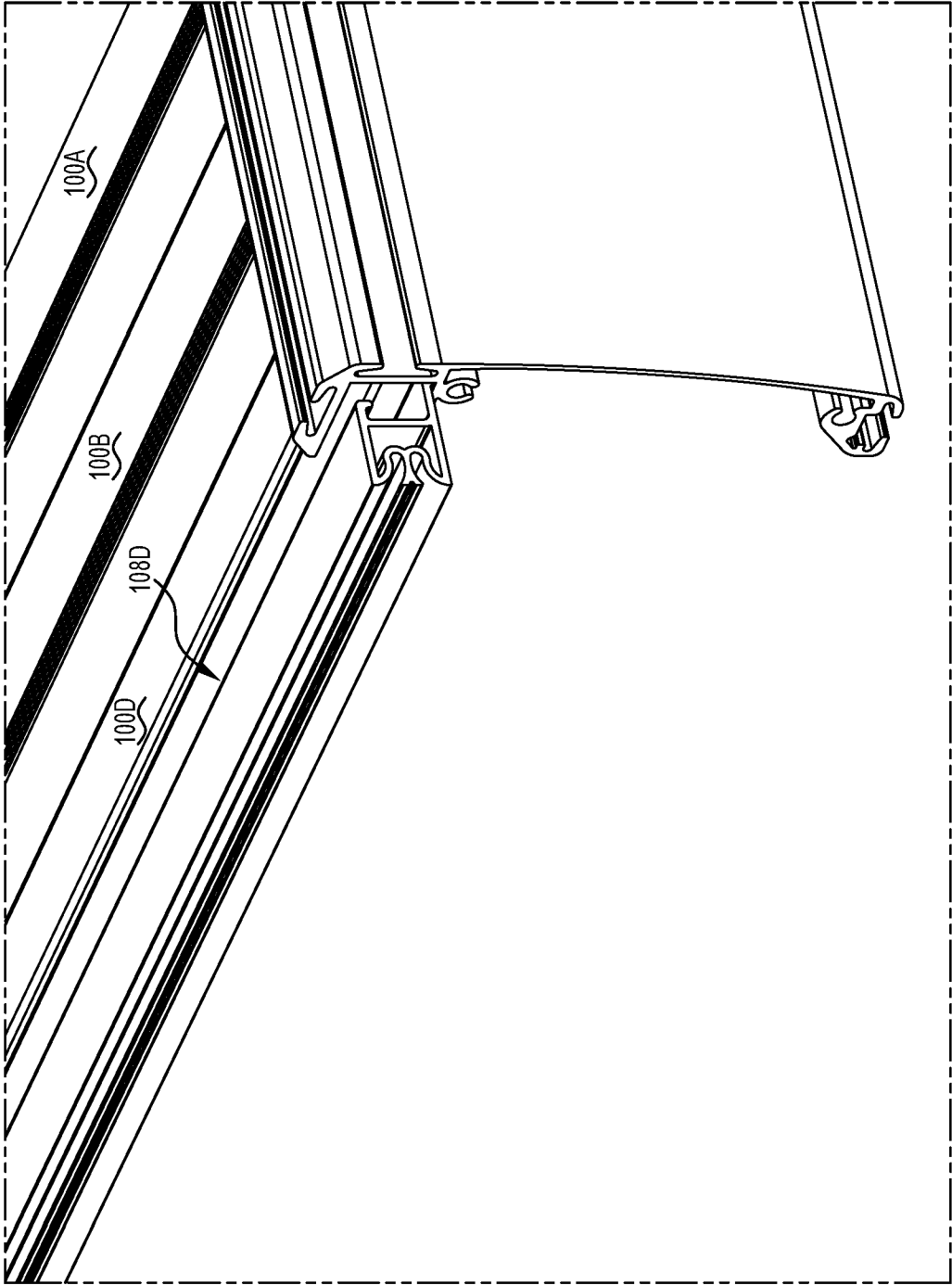


Figure 18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2018/050468

A. CLASSIFICATION OF SUBJECT MATTER

B62D 25/20 (2006.01) F16B 5/00 (2006.01) B62D 33/02 (2006.01) E04F 15/02 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

A) Database: PATENW; IPC/CPC: F16B5/00, F16B5/0012, E04B2/46, E04F15/02038, B62D25/20, B62D33/02, B60P7/00, E04F2201/01, E04F2201/02, E04F2201/03, E04F2201/04; Keywords: SLOT, GROOVE, CHANNEL, FLANGE, TONGUE, PROJECTION, CURVATURE, ARCH, CONCAVE, EXTRUDED, ALUMINUM, METAL, PLASTIC - and other like terms;

B) Database: Espacenet; IPC/CPC: F16B5/0012, F16B5/0016; Keywords: TONGUE AND GROOVE and other similar terms and/or combination;

C) Database: Google/Google Images; Keywords: TONGUE AND GROOVE and other similar terms and/or combination;

Applicant/Inventor name searched in Espacenet, Auspat, and internal databases provided by IP Australia

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	



Further documents are listed in the continuation of Box C



See patent family annex

* "A"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier application or patent but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search
2 August 2018

Date of mailing of the international search report
19 July 2018

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INTERNATIONAL SEARCH REPORT		International application No.
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		PCT/AU2018/050468
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0362148 B1 (METRA METALLURGICA TRAFILATI ALLUMINIO S.p.A.) 20 April 1994 Fig 1, 6-10; Col 3	1-2, 4-7, 10-13
X	US 6658808 B1 (DOHERTY et al.) 09 December 2003 Abstract; Fig 1-3; Col 3	1, 3, 12
X	US 2644552 A (MACDONALD) 07 July 1953 Fig 9-10; Col 1 and 6	1, 12
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X	US 2004/0090036 A1 (SCHILLINGER et al.) 13 May 2004 Abstract; Fig 3; Para [0010, 0019, 0020]	1, 8-9, 12
X	GB 2537640 A (LINDBERG GLOBAL LTD) 26 October 2016 Fig 4; Page 7 & 11	1, 7, 12

Form PCT/ISA/210 (fifth sheet) (January 2015)

INTERNATIONAL SEARCH REPORT		International application No.	
Information on patent family members		PCT/AU2018/050468	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
Patent Document/s Cited in Search Report		Patent Family Member/s	
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		KR 100813369 B1	12 Mar 2008
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GB 2537640 A	26 October 2016	GB 2537640 A	26 Oct 2016
End of Annex			
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001. Form PCT/ISA/210 (Family Annex)(January 2015)			