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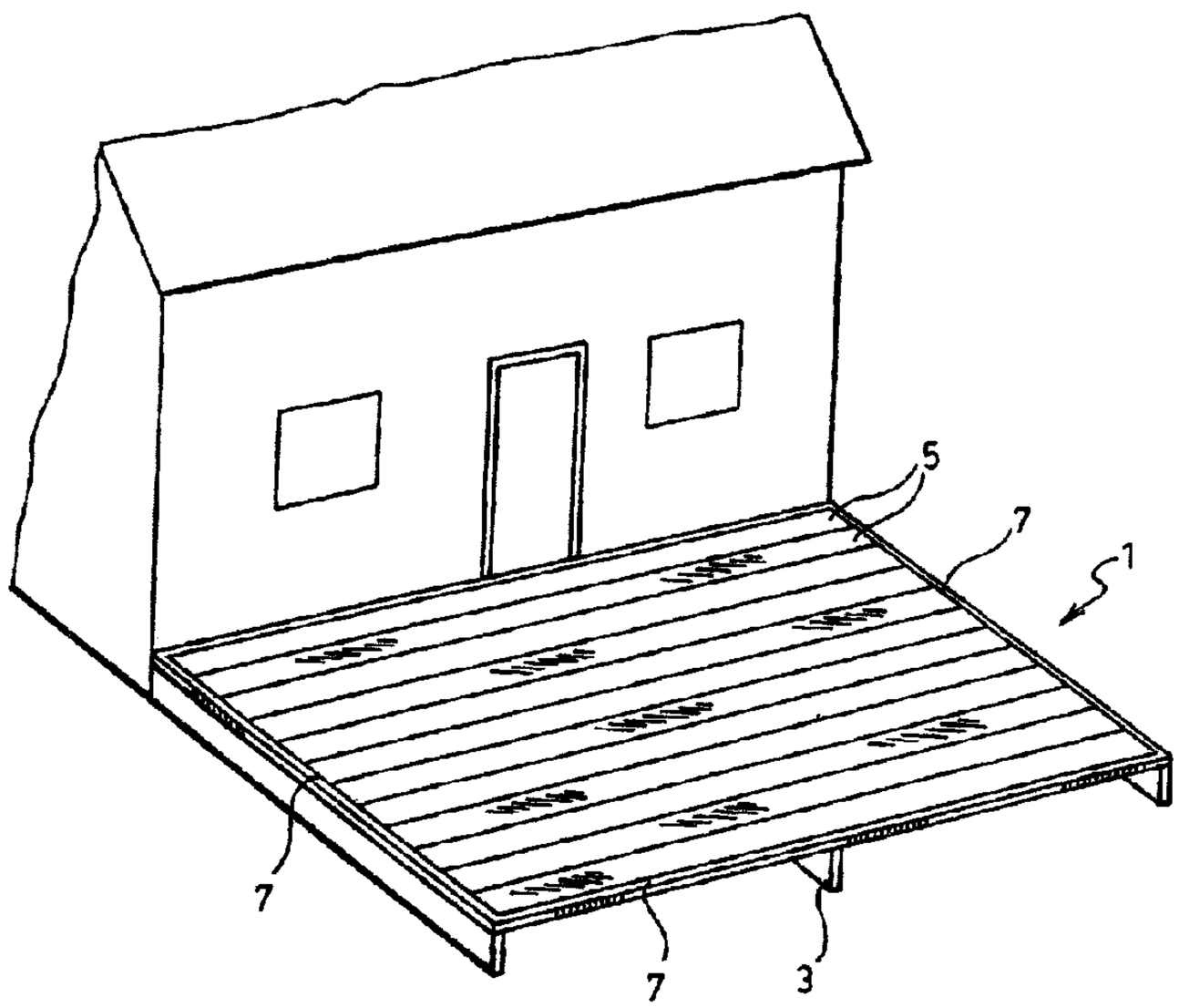
(54) Titre : PLANCHE EN PLASTIQUE AVEC RAINURES DE DRAINAGE ET SURFACE DE RETENUE
(54) Title: PLASTIC DECK BOARD WITH SEPARATED DRAINAGE CHANNEL AND HOLD DOWN SURFACE



(57) Abrégé/Abstract:
The present invention provides a plastic panel assembly such as a plastic deck formed by at least first and second plastic boards. These boards are secured at an interlocked joint of the boards. Both of the boards have the same construction with each board comprising a main body portion having first and second edge regions to opposite sides of the board. The first edge region has a top surface which is a continuation of the top surface of the main body portion of the board. The first edge region also has a first locking part. The second edge region has a bottom surface which is a continuation of the bottom surface of the main body portion of the board and also has a second locking part. The interlocked joint between the boards is formed by engagement of the first locking part of the first edge region of the first board with the second locking part of the second edge region of the second board. The assembly further includes both a moisture drainage channel and a mechanical fastener receiving surface which are separated from one another at the interlocked joint. At least one of the locking parts is provided with a sealing strip to seal the interlocked joint and reduce friction on abutting surfaces.

ABSTRACT OF THE DISCLOSURE

The present invention provides a plastic panel assembly such as a plastic deck formed by at least first and second plastic boards. These boards are secured at an interlocked joint of the boards. Both of the boards have the same construction with each board comprising a main body portion having first and second edge regions to opposite sides of the board. The first edge region has a top surface which is a continuation of the top surface of the main body portion of the board. The first edge region also has a first locking part. The second edge region has a bottom surface which is a continuation of the bottom surface of the main body portion of the board and also has a second locking part. The interlocked joint between the boards is formed by engagement of the first locking part of the first edge region of the first board with the second locking part of the second edge region of the second board. The assembly further includes both a moisture drainage channel and a mechanical fastener receiving surface which are separated from one another at the interlocked joint. At least one of the locking parts is provided with a sealing strip to seal the interlocked joint and reduce friction on abutting surfaces.

PLASTIC DECK BOARD WITH SEPARATED DRAINAGE CHANNEL AND HOLD DOWN SURFACE

RELATED APPLICATION DATA

[0001] This application is a Continuation in part of Serial No. 10/801,886 filed March 16, 2004 .which is pending.

FIELD OF THE INVENTION

[0002] The present invention relates to a plastic panel assembly such as a plastic deck surface or the like formed by interlocking plastic deck boards.

BACKGROUND OF THE INVENTION

[0003] Plastic materials are becoming ever more popular in forming wood substitute products. By way of example, lumber boards used in making wooden decks are now often replaced by plastic deck boards. These plastic deck boards are extremely durable and require very little maintenance. Furthermore, they can be molded to include their own interlocks which eases assembly of a full deck surface using plastic deck boards.

[0004] One example of a plastic deck board used for forming a decking surface is shown in United States Patent 6,324,796. The deck board shown in the '796 patent is provided to its opposite sides with male and female interlock components. When two boards are secured side by side with one another the female interlock component is fitted with a fastening screw to hold one deck board down and then the male interlock component of the other deck board is inserted into the female interlock component of the first deck board. A moisture drainage gutter is then formed at the interlock directly above the screw mounted surface of the one deck board.

[0005] The above interlocking of side by side deck boards as described in United States Patent 6,324,796 is very effective from the standpoint of securing two boards side by side with one another. However, problems may arise in the gutter of the interlock where water could leak past the screw through the

bottom of the gutter onto the support surface for the deck. Typically, this support surface will have a wooden construction and if water continues to seep into the wood over an extended period of time the wood will rot resulting in a loss of integrity of the deck.

SUMMARY OF THE PRESENT INVENTION

[0006] The present invention provides a plastic panel assembly such as a plastic deck formed by at least first and second plastic boards. These boards are secured at an interlocked joint of the boards.

[0007] Both of the boards have the same construction with each board comprising a main body portion having first and second edge regions to opposite sides of the board. The first edge region has a top surface which is a continuation of the top surface of the main body portion of the board. The first edge region also has a first locking part. The second edge region has a bottom surface which is a continuation of the bottom surface of the main body portion of the board and also has a second locking part. The interlocked joint between the boards is formed by engagement of the first locking part of the first edge region of the first board with the second locking part of the second edge region of the second board.

[0008] The assembly further includes both a moisture drainage channel and a mechanical fastener receiving surface which are separated from one another at the interlocked joint.

[0009] According to a preferred aspect of the present invention the moisture drainage channel and the mechanical fastener receiving surface are both formed as part of the second edge region of the board to opposite sides of the second locking part. The first locking part of the adjacent board not only secures with the second locking part but additionally secures within and completes closure of the moisture drainage channel.

[00010] According to a further preferred aspect of the present invention, at least one of the locking parts is provided with a sealing strip to seal the interlocked joint and reduce friction on abutting surfaces.

[00011] As will be understood from the description above the securing of the boards to a support structure by a mechanical fastener is done at a location away from the moisture drainage channel. As such, the drainage channel has a solid non-perforated channel base ensuring that water cannot leak through the channel onto the deck support structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[00012] The above as well as other advantages and features of the present invention will be described in greater detail according to the preferred embodiments of the present invention in which;

[00013] Figure 1 is a perspective view looking down on a building and attached deck assembly built from plastic deck boards according to a preferred embodiment of the present invention;

[00014] Figure 2 is a sectional view through one of the deck boards of the deck assembly of Figure 1;

[00015] Figure 3 is a sectional view showing the interlocking of deck boards of the deck assembly of Figure 1;

[00016] Figure 4 is an enlarged sectional view of the interlocking of Figure 3 showing the sealing strip on the projection;

[00017] Figure 5 is a sectional view showing a starter strip fitted to the deck board of Figure 2;

[00018] Figure 6 is a perspective view of a capping member used

as a perimeter trim in building a plastic assembly according to a further preferred embodiment of the present invention; and

[00019] Figure 7 is a sectional view showing the mounting of the cap member of Figure 5 to a plastic deck board.

DETAILED DESCRIPTION ACCORDING TO THE PREFERRED EMBODIMENTS OF THE PRESENT INVENTION IN WHICH:

[00020] Figure 1 shows a plastic deck assembly generally indicated at 1 to the rear of a building. This plastic deck assembly is mounted atop a support structure 3. The support structure typically comprises a plurality of wooden stringers.

[00021] The deck assembly itself comprises individual plastic deck boards 5 interlocked edge to edge with one another. The deck boards are secured by mechanical fastening means such as self-tapping screws to the support structure 3.

[00022] A perimeter trim 7 is fitted around the outer edge of deck assembly 1.

[00023] Figure 2 shows in detail one of the deck boards 5 from deck assembly 1. The construction of deck board 5 is identical for all of the deck boards.

[00024] Deck board 5 has a molded and preferably extruded construction made in a continuous extrusion operation. Individual boards are then cut from the continuous extrusion at a length sufficient to span a relatively large decking surface. For example, the length of the deck board could be 16 feet for more.

[00025] The plastic material used to make the deck board is one which is sufficiently rigid to be essentially self supporting with ingredients to control thermal expansion and contraction of the board. Preferably, the bulk of the board is made from polyvinyl chloride with additional fiberglass or other thermal

control ingredients in the PVC mix.

[00026] The construction of board 5 comprises a main board portion which spans most of the width of the board. Preferably, the main board portion is a full 6'' wide, although other widths are possible. A first edge region generally indicated at 9 and a second edge region generally indicated at 11 are provided to opposite sides of the main board portion.

[00027] The main board portion includes an upper surface 13 and a lower surface 15 spanned by interior walls 17 of the board. The walls 17 divide the interior confines of the board into a plurality of hollow cells 19 across the board.

[00028] The upper surface 13 of the board in the preferred embodiment as shown is completed with treads or grips 21 which are formed as an integral part of the board. Treads 21 may be capstock material co-extruded with the rest of the board during the extrusion forming process. These treads provide an upper gripping surface on the board which might otherwise be very slippery particularly under wet conditions. As a further benefit, if the treads are formed of a capstock material, such material can be used to provide a colored upper surface on the board. In any event, the provision of treads 21 gives the upper surface of the board a somewhat decorative appearance.

[00029] The key to the present invention resides in how the boards interlock with one another. This is done in a manner to provide both a moisture drainage channel and a mechanical fastening surface which are totally independent of one another. In addition, in a preferred embodiment, a sealing strip is provided on at least one of the abutting surfaces of the joined boards to seal the joint against moisture infiltration. In a particularly preferred embodiment, the sealing strip also allows for reduced friction between the abutting surfaces thereby allowing easier movement and reduced squeaking. The first and second edge regions 9 and 11 have

been designed to provide these benefits of the board.

[00030] Edge region 9 has an upper surface which is a continuation of the upper surface of the main board portion. It also includes a lower wall 23 at a position well above the lower surface of the main board portion. An upwardly opening concave recess 25 is provided in wall 23. Located beside recess 25 is an open region generally indicated at 27 beneath wall 23.

[00031] A generally rounded head portion 29 projects sideways from edge region 9. A concave recess 30 is provided between the head portion 29 and the upper surface of the main board. A diagonal brace 32 is provided in the interior between the recess 30 and the recess 25. This brace 32 aids in supporting the head portion 29 and transfers any loading to the supporting surfaces of the second edge region as will be described below.

[00032] The second edge region 11 comprises a bottom wall 35 which is a continuation of the bottom surface of the main body of the board. A projection 37 extends upwardly from wall 35. This projection which has a convex upper surface 39 terminates well short of the upper surface of the board.

[00033] A channel region 41 above wall 35 is provided to one side of projection 37. Provided to the other side of projection 37 at the extreme outer edge of the board is a laterally extending fin 43. As can be well seen in Figure 3 of the drawings, fin 43 is provided with oval shaped openings 45 which are extended lengthwise of the board. The upper surface of the main board extends over the channel region and is provided with a convex lower projection.

[00034] At least one of the projecting surfaces 29, 39 or 46 or the recesses 25, 30 or 48 are provided with a sealing strip 40 to seal the joint against moisture infiltration as well as to reduce the friction normally encountered in plastic-plastic

contact surfaces. The sealing strip 40 is a flexible cushion type seal which allows movement of the boards during expansion and contraction as well as providing for sealing against moisture infiltration. The sealing strip is a rubber cushion type seal most preferably a dual durometer type rubber seal which is co-extruded onto the relevant abutting surface during the extrusion process for producing the deck board. When the sealing strip is a dual durometer rubber, the harder rubber is adjacent the plastic of the board and the softer rubber is at the surface to provide for a more flexible sealing surface. Preferably at least two of the projecting surfaces 29, 39 or 46 or the recesses 25, 30 or 48 are provided with sealing strips. More preferably, at least two of the projections or recesses in one of the edge regions is provided with the sealing strip, most preferably projections 39 and 46. By providing two sealing strips on the projections a double sealing arrangement is achieved as well as providing for the resilient movement to allow sliding of the abutting surface. By providing the sealing strips on projections of only one edge region the co-extrusion process is also simplified.

[00035] Figure 3 shows two of the boards 75 interlocked edge to edge with one another. The interlocking of these boards is performed in an extremely efficient locking manner. The head portion 29 of the first edge region 9 of the one board is fitted in a downwardly angled position through the open mouth 44 of channel region 41 of the second edge region 11 of the other board. From here the upper convex surface 39 of projection 37 of edge region 11 is placed within the convex recess 25 of the other edge region 9. Once the two boards are in this position the inclined board is then swung down to a horizontal position with the curved recess 25 in wall 23 of edge region 9 locking on the curved top surface 39 of projection 37 in edge region 11 and the head portion 29 engaged in the recess 48 of the lower portion of the upper surface projecting into the opening 41. As can be seen in Figure 3, once this interlocking position has been achieved and with the fin 43 of the board to the left side in Figure 3

already screw mounted to its supporting stringer the board to the right side of Figure 3 can neither pull laterally away from nor tip upwardly relative to the board in the left hand side of Figure 3. As such, the interlocked boards of Figure 3 are particularly suited for forming a stair tread in which foot pressure applied to the edge of the board only serves to reinforce the interlock between boards. In addition, any load on the projection 46 is transferred via brace 32 to projection 39.

[00036] As best seen in Figures 3 to 5 of the drawings, the provision of the sealing strips 40 on at least one of the abutting surfaces provides a cushion between the abutting plastic surfaces allowing for a reduced friction between abutting surfaces to allow the movement of the deck boards 5 as a load is placed on them as well as during expansion and contraction of the boards. This reduces potential squeakiness of the boards 5 as the surfaces rub against one another.

[00037] In addition, owing to the resilient nature of the sealing strip 40, a positive seal against moisture is provided between the abutting surfaces to reduce or eliminate the possibility of water infiltration between the gaps of the two edge regions. Rather any water which collects between the upper surfaces of the two joined boards flows along the joint owing to the tilting of the deck. Should any moisture seep past the upper seal, it would be contained within the moisture drainage channel 49 and would flow along the moisture drainage channel 49 and out the end of the board. Should for any reason water accumulate in the moisture drainage channel, the height of the projection 37 helps in retaining the moisture within the moisture drainage channel. The provision of the second sealing strip on the projection 39 provides a positive seal against moisture seeping past projection 37 and onto the underlying deck of the structure.

[00038] As can be seen in the figures, preferably sealing strip 40 is provided on the projection such that a significant

portion of the plastic to plastic abutting surfaces is cushioned by the sealing strip. Most preferably, particularly with the sealing strip located on projection 39, the sealing strip is dimensioned to cushion all of the potential plastic to plastic abutting surfaces.

[00039] It will be seen in Figure 3 that the head portion 29 of the first edge region 9 locates within and completes the closure of the moisture drainage channel 49 of the second edge region 11. Moisture drainage channel 49 aids in draining away any water that may collect within the boards. This water is typically produced as a result of condensation. However, the water cannot seep through the base of the channel due to its solid nonperforated construction. The solid channel base is provided as a result of securing the board to the stringer at a location away from the moisture drainage channel.

[00040] In order to assist in draining any moisture that may build up within the channel 49, the deck is preferably built at a very slight angle from horizontal thereby tipping the channel from one end to the other. This tilted angling of the deck is extremely minimal so as to not be visibly apparent. Only a very minor tilting is required to cause water under the influence of gravity to flow out of the channel. Furthermore, the interlock formed by the locking part 37 on edge region 11 and the recess 25 of wall 23 on edge region 9 separates drainage channel 49 from fastener receiving fin 43. The first edge region includes an open area on it's under surface i.e., area 27 to receive the mounting screws through the fastener fin without interfering with the interlock.

[00041] The provision of the predrilled holes 45 in fin 43 prevents cracking of the fin when installing the mounting screws.

[00042] The elongated shaping of the mounting holes 45 provides a thermal expansion and contraction control. When the screws are fitted down through the holes 45 they are placed centrally

of the holes leaving space to either side of the screw mount. The boards which may have some tendency to expand and contract lengthwise under very hot and very cold weather conditions respectively are allowed to shift relative to the supporting structure for the deck assembly. This shifting occurs without any buckling or uplifting of the boards from the supporting structure because of the elongated shape of mounting fin openings 98.

[00043] In the event that there is any relative differences in expansion and contraction between adjacent boards the interlock between the boards, although extremely positive in a vertical direction will allow relative axial movement of the boards in the assembly.

[00044] Each of the boards shown in the drawings has a preferred width span of the main board of about 6 inches. This width span does not include the interlock edge regions to both sides of each board. When two boards interlock with one another their combined width span is a full 12 inches, making the design of decks simpler as they can be dimensioned at full foot or half foot sizes.

[00045] Figure 5 of the drawings shows board 5 which will be the first board into a deck assembly as being fitted to a starter strip generally indicated at 51. This starter strip has a very similar construction to the second edge region 11 of the board.

[00046] More particularly, starter strip 51 comprises a top surface 53 and an outer sidewall 55 at right angles to top surface 53. The starter strip 51 further has a bottom surface 57 with a projection 59 having a rounded top 61 protruding upwardly from the bottom surface 57 of the starter strip. The wall recess 25 of edge region 9 rocks on the rounded convex top 61 of projection 59 to locate the head 29 of wall region 9 against the roof of drainage channel 63 in starter strip 51. A securing fin 65 located to the other side of projection 59

from drainage channel 63 is used to secure the starter strip into position before interlocking with board 5. Fin 65 like the fastener receiving fin on the actual board is provided with pre-punched or drilled elongated openings for receiving the sealing mounting screws to secure the starter strip to the support surface.

[00047] As best seen in Figures 2 and 5 of the drawings, small notches 47 are provided at separated locations in the upper surface of the board. These notches in the upper surface of board 5 allow the board to be cut to different widths. This is a feature which would be used where the board needs to fit across a fixed sized surface area that is narrower than the width of the board. The board can then be trimmed at any one of the notches 47 to the required board width. The edge of the board from which the material has been trimmed can then be screwed down through the bottom surface of the remaining board portion.

[00048] Figure 6 of the drawings shows the perimeter trim 7 around the deck assembly 1 of Figure 1. The perimeter trim 7 is preferably made in a continuous extrusion process and cut to desired lengths. It also preferably has the same material makeup as the plastic used in forming the boards.

[00049] The construction of the perimeter trim which has a generally C channel shape comprises a vertical wall 71 and a pair of horizontally extending legs 73 and 75. A rib 77 projects from wall 71 to the interior of trim piece 7. This rib includes a score groove 79 that is used for trimming the rib in the event that it is not needed.

[00050] A further rib 81 having a score groove 83 extends downwardly from the lower leg 75 of trim piece 7.

[00051] As best seen in Figure 7 of the drawings legs 73 and 75 of the trim piece are completed at their outer ends with bevels 85 and 87 inclined downwardly inwardly at the open side

of the channel.

[00052] During the actual formation of trim piece 7 the two legs 73 and 75 are not formed at 90 degrees to the back wall 71 of the trim piece. Rather they are set in a slightly inwardly pinched position where each of the legs is at an angle slightly less than 90 degrees to the back wall 71. The trim piece is however sufficiently flexible to allow the legs to be opened form one another and over the upper and lower surfaces of board 5. The memory of the plastic material in trim piece 7 will cause the legs to want to reassume their naturally formed positions such that the trim piece clamps onto the edge of the board. This produces a very positive interlock between the trim piece and the board. If needed, further securing can be provided by screwing the trim piece at its lower leg 75 upwardly into the undersurface of the board. In this position the screw connection between the trim piece and the board is completely hidden and does not detract from the appearance of the deck.

[00053] As will be seen in Figure 7 rib 77 acts as a spacer or standoff to accurately locate the trim piece on the edge of the board. As a result of the provision of rib 77 a ventilation channel 89 is provided between the trim piece and the board. This ventilation chamber allows the flow of air through the interior cells of the edge to edge boards around the perimeter of the deck assembly. This in turn adds significantly to cooling of the entire deck assembly which even under hot weather conditions remains cool to the touch.

[00054] The provision of the bevels 85 and 87 on the legs 73 and 75 respectively eliminates abrupt or sudden changes between the edge of the perimeter trim and the external surfaces of the board. With the more gradual transition from the perimeter trim to the board surface, there is much less likelihood of jamming an object against the exposed ends of the perimeter trim.

[00055] The downwardly extending rib 81 on the undersurface of leg 75 acts as a drip rail to prevent moisture flowing around the perimeter trim and back onto the wooden stringer assembly supporting the deck assembly. Once again, this substantially reduces rotting of the deck support.

[00056] As will be appreciated from all of the description above a deck or other assembly is quickly and easily put together with an extremely positive interlock between adjacent boards. That interlock is designed such that it can be positively secured by mechanical fasteners to a supporting structure at a location away from the moisture drainage channel of the interlock. Further the assembly or even part of the assembly can easily be dismantled and then reassembled without damaging any of the boards in the assembly. This makes it extremely easy to replace a single board of the assembly without having to take the entire assembly apart.

[00057] The provision of the sealing strips on at least one of the abutting surfaces provides for a positive seal against moisture infiltration between the abutting surfaces thereby reducing or eliminating the possibility of water being able to seep down through the deck onto the supporting structure. In addition, the sealing strips provide a cushion between the abutting plastic surfaces allowing for a reduced friction between the surfaces to allow for movement of the deck board either as a load is placed on them as well as during expansion and contraction of the boards thus reducing potential squeakiness of the boards as the surfaces rub against one another.

[00058] Although various preferred embodiments of the present invention have been described in detail, it will be appreciated by those skilled in the art that variations may be made without departing from the spirit of the invention or the scope of the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A plastic panel assembly formed by at least first and second plastic boards secured at an interlocked joint of said first and second boards, each of said boards having a construction comprising a main body portion with a top surface, a bottom surface, a first edge region and a second edge region, said first edge region having a top surface which is a continuation of the top surface of the main body portion and also having a first locking part, said second edge region having a bottom surface which is a continuation of the bottom surface of the main body portion and also having a second locking part, said interlocked joint being formed by engagement of said first locking part of said first edge region of the first board with said second locking part of said second edge region of said second board, said assembly including both a moisture drainage channel and a mechanical fastener receiving surface which are separated from one another at said interlocked joint, at least one of said first and second interlocking parts being provided with a co-extruded sealing strip at the area of engagement with the other of said first and second locking part.

2. A plastic panel assembly as claimed in Claim 1 wherein said moisture drainage channel has a channel base wall which is formed by said bottom surface of said second edge region of said second board.

3. A plastic panel assembly as claimed in Claim 2 wherein said second locking part of said second edge region comprises an upward projection from said bottom surface of said second edge region said upward projection being provided with a sealing strip, said fastener receiving surface also being formed by said bottom surface of said second edge region, said channel base and said fastener receiving surface being separated from one another by said upward projection.

4. A plastic panel assembly as claimed in Claim 3 wherein said first locking part of said first edge region includes a recessed region which faces downwardly at and receives said upward projection of said second edge region.

5. A plastic panel assembly as claimed in Claim 4 wherein said recessed region has a concave shape and wherein said upward projection has a convex shape, said moisture drainage channel including a channel mouth above said upward projection, said first edge region including a laterally extending head portion which penetrates through said channel mouth and which rocks upwardly into a moisture blocking position within said moisture drainage channel as said recessed region of said first locking part of first edge region is interlocked with said upward projection of said second locking part of said second edge region.

6. A plastic panel assembly as claimed in Claim 5 wherein said channel has a channel roof and said laterally extending head locks with said channel roof.

7. A plastic panel assembly as claimed in Claim 6 wherein said fastener receiver surface comprises a projecting fin having openings therethrough at regular spaced intervals along said fin.

8. A plastic panel assembly as claimed in Claim 7 wherein said openings in said fin have an elongated oval shape.

9. A plastic panel assembly as claimed in Claim 1 wherein said co-extruded sealing strip is of a flexible rubber.

10. A plastic panel assembly as claimed in Claim 9 wherein said co-extruded sealing strip is a dual durometer rubber with the than rubber adjacent the interlocking part on to which the sealing strip is co-extruded.

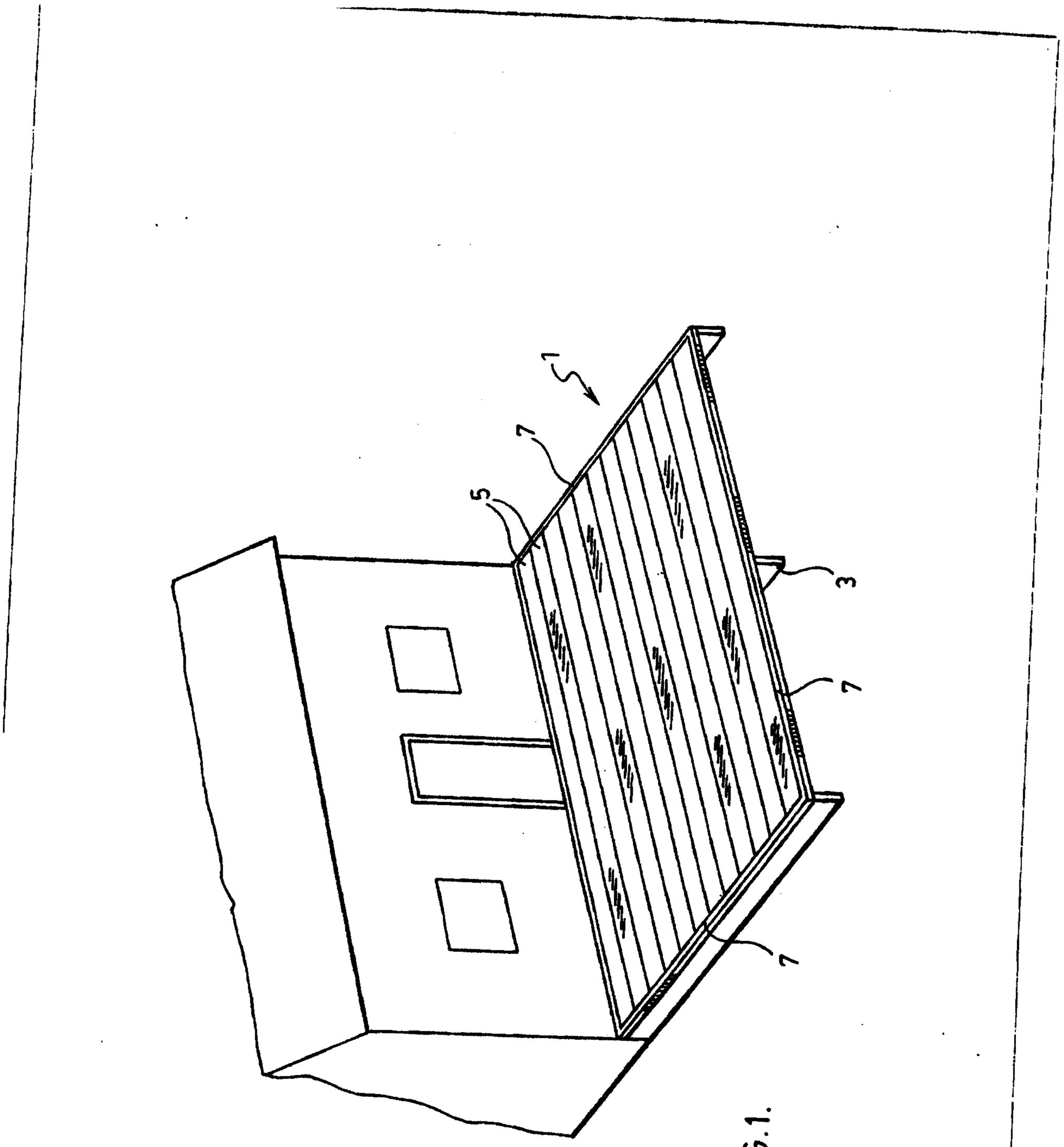


FIG.1.

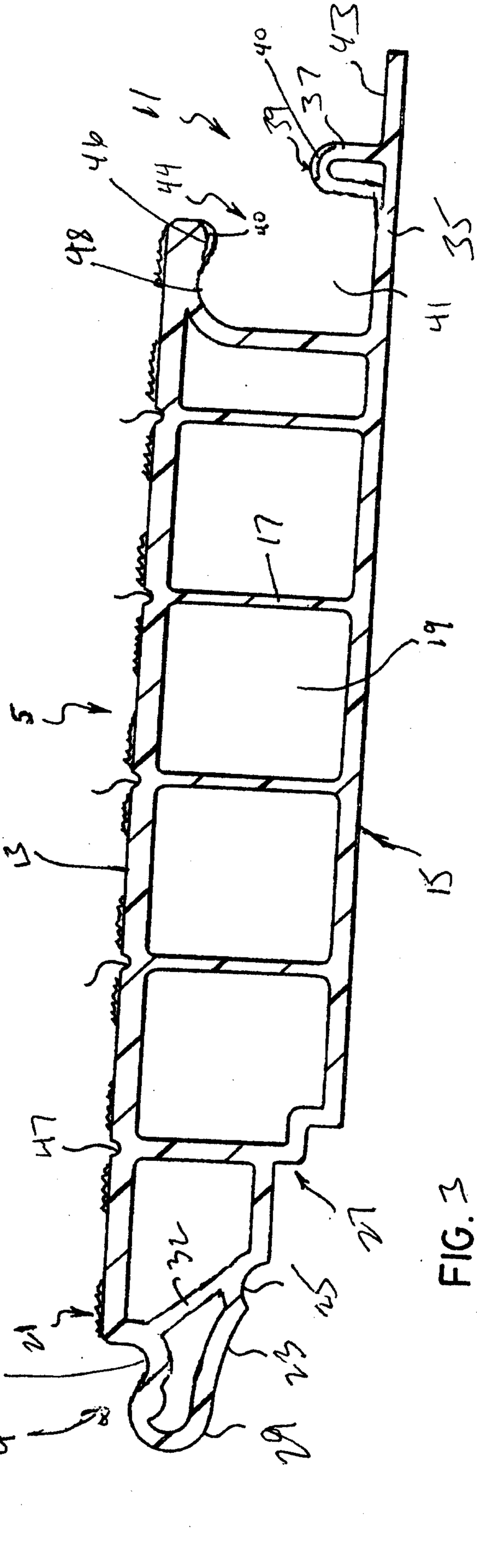

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FIG. 2

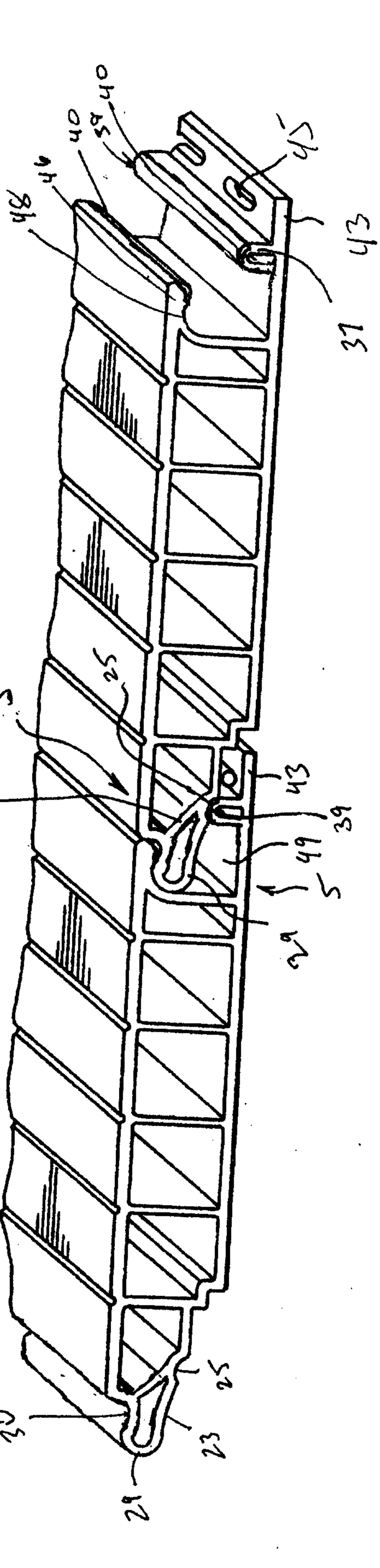
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FIG. 3

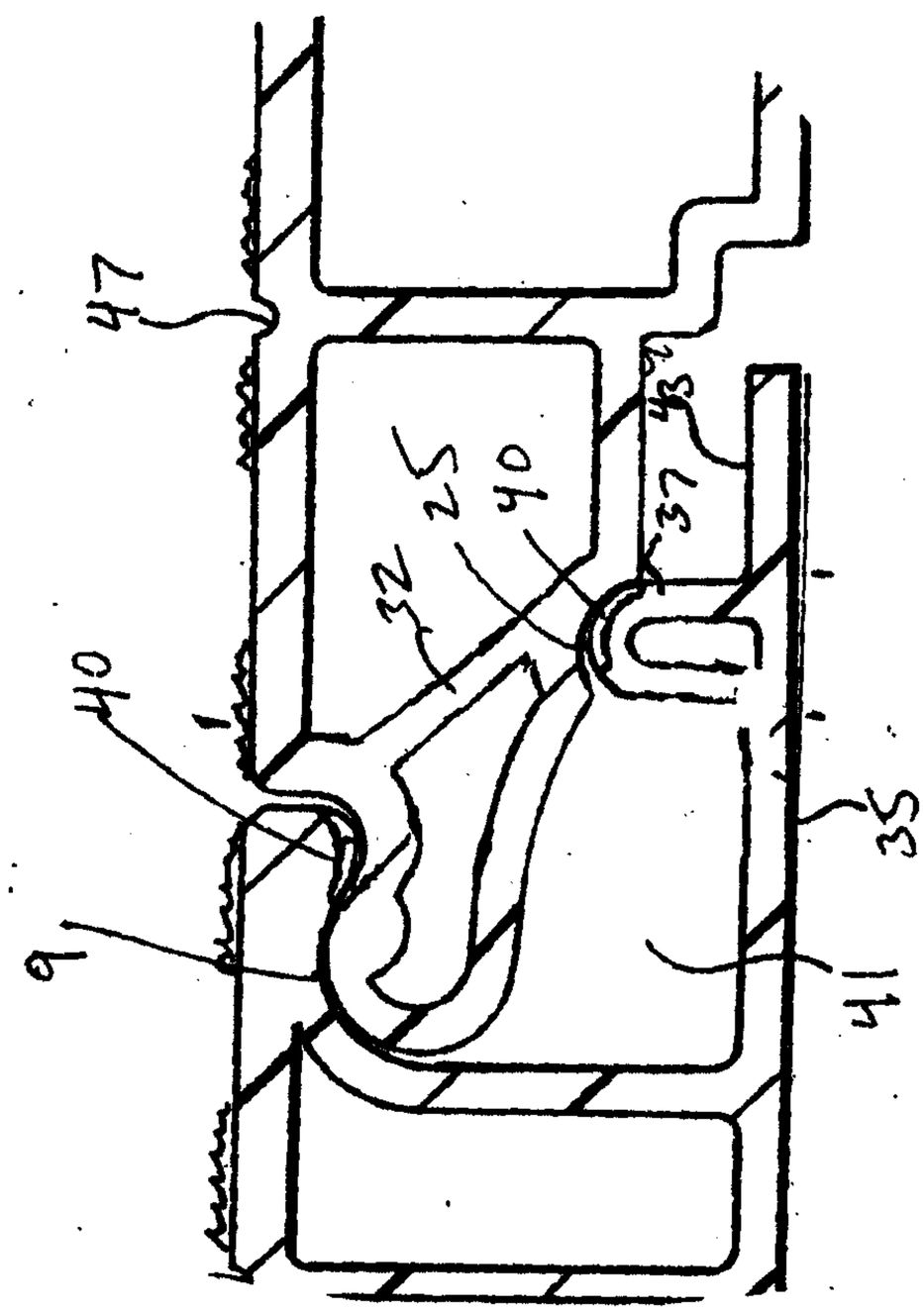


FIG 4

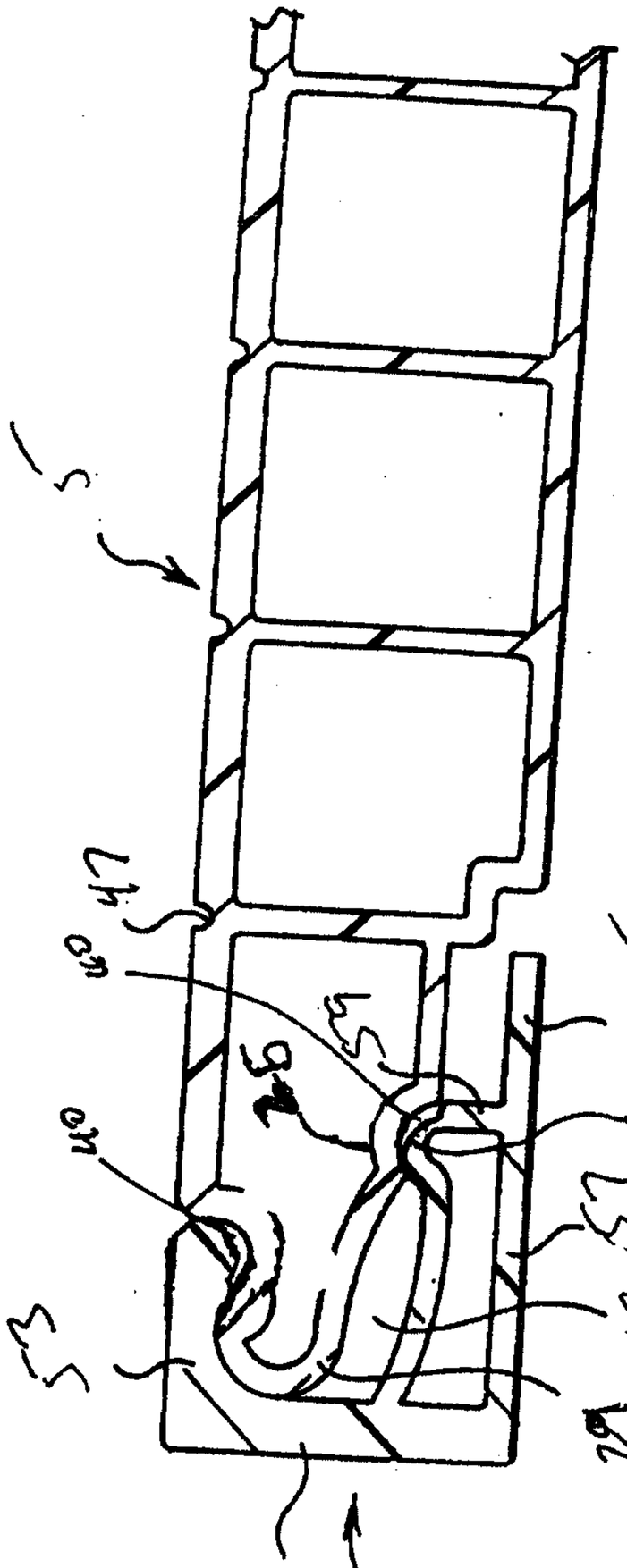


FIG. 5

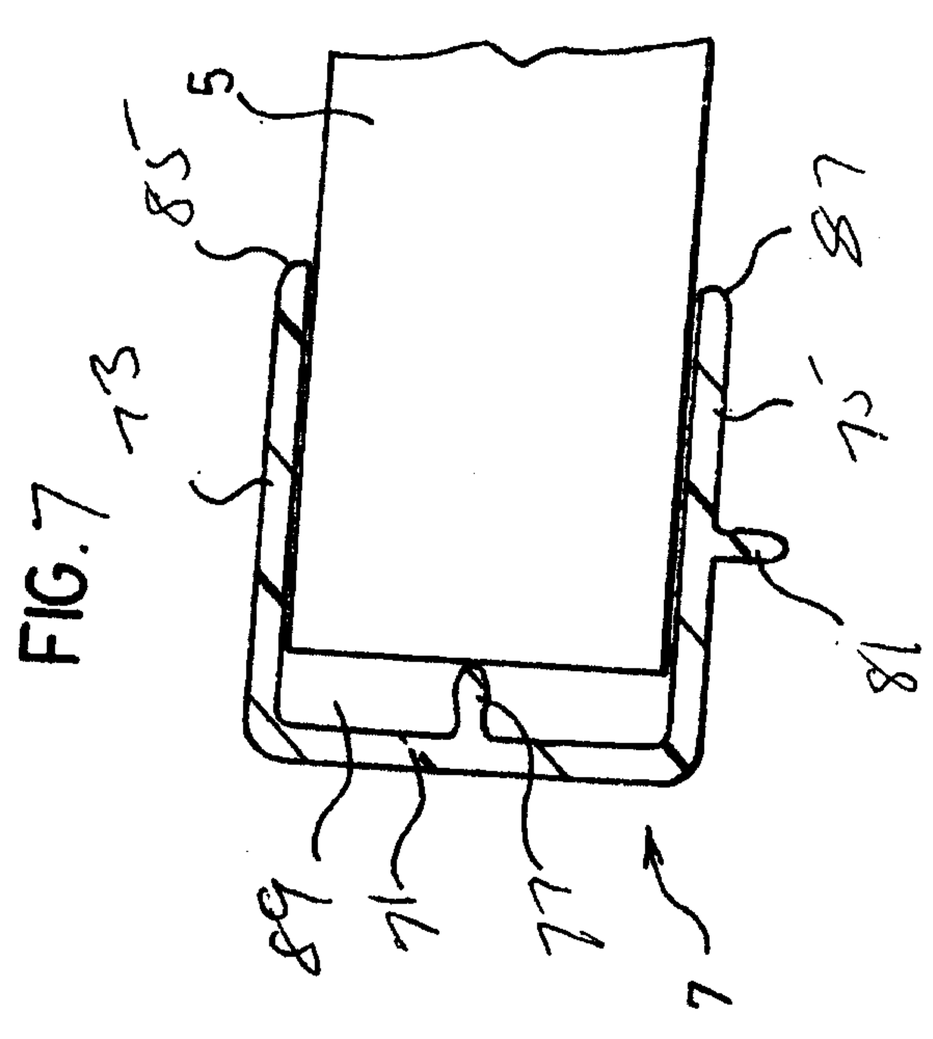


FIG. 7

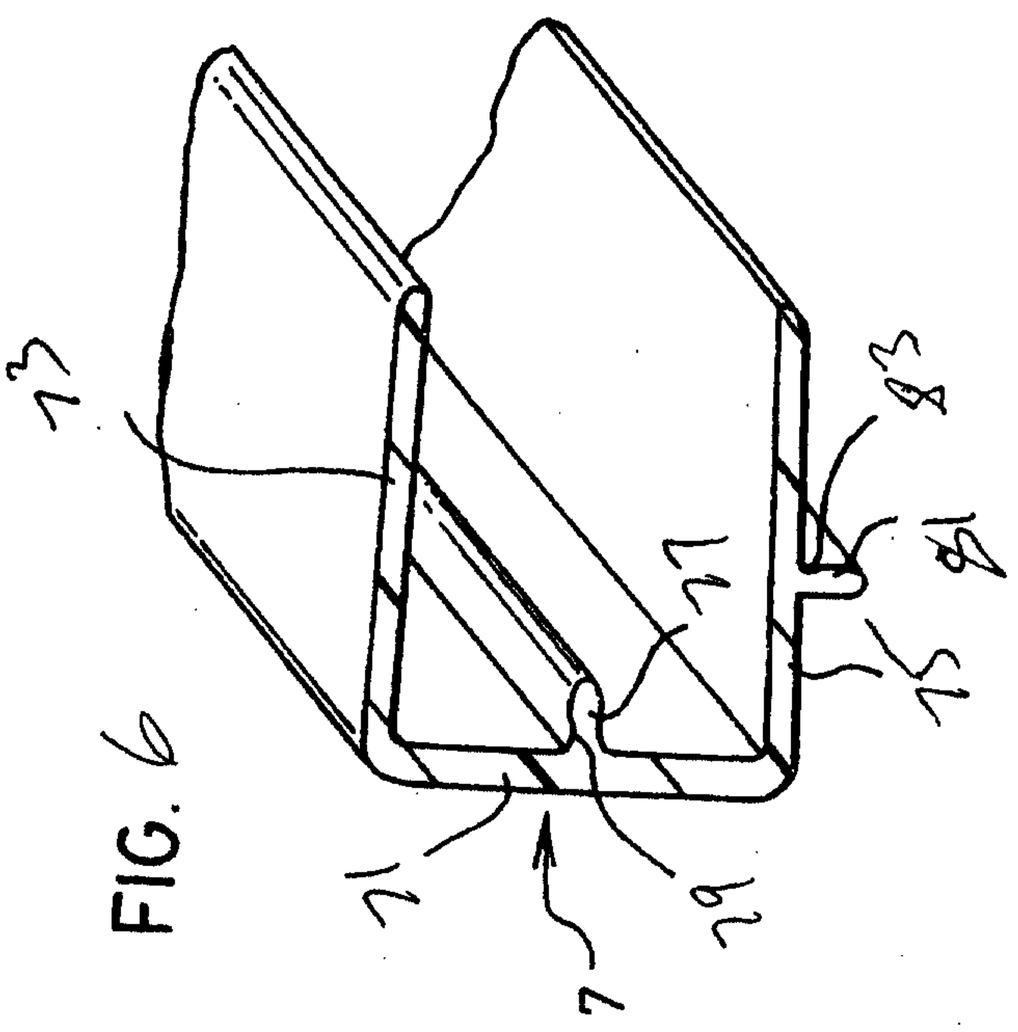
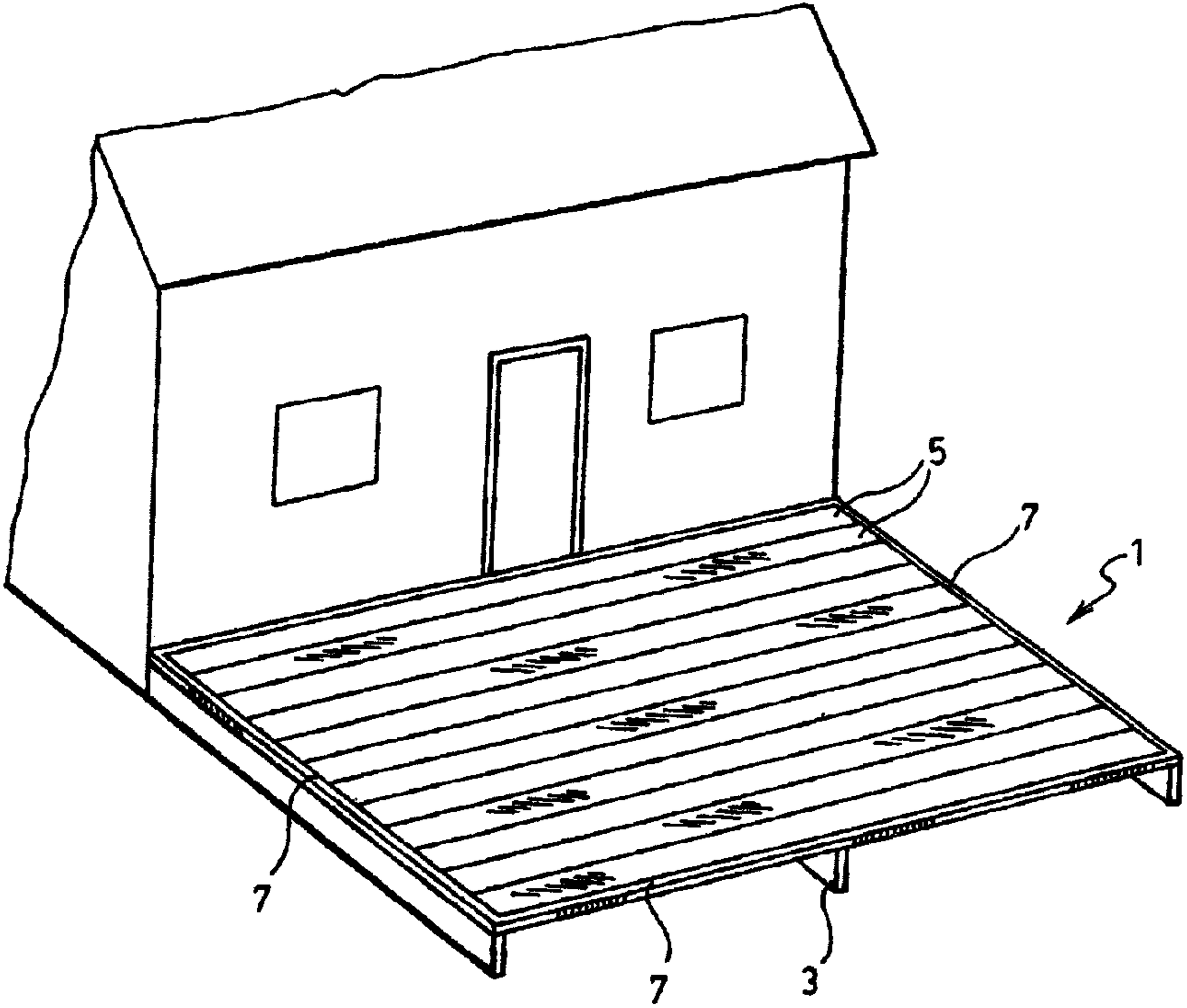


FIG. 9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