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(54) BRICK FORMLINER APPARATUS AND SYSTEM

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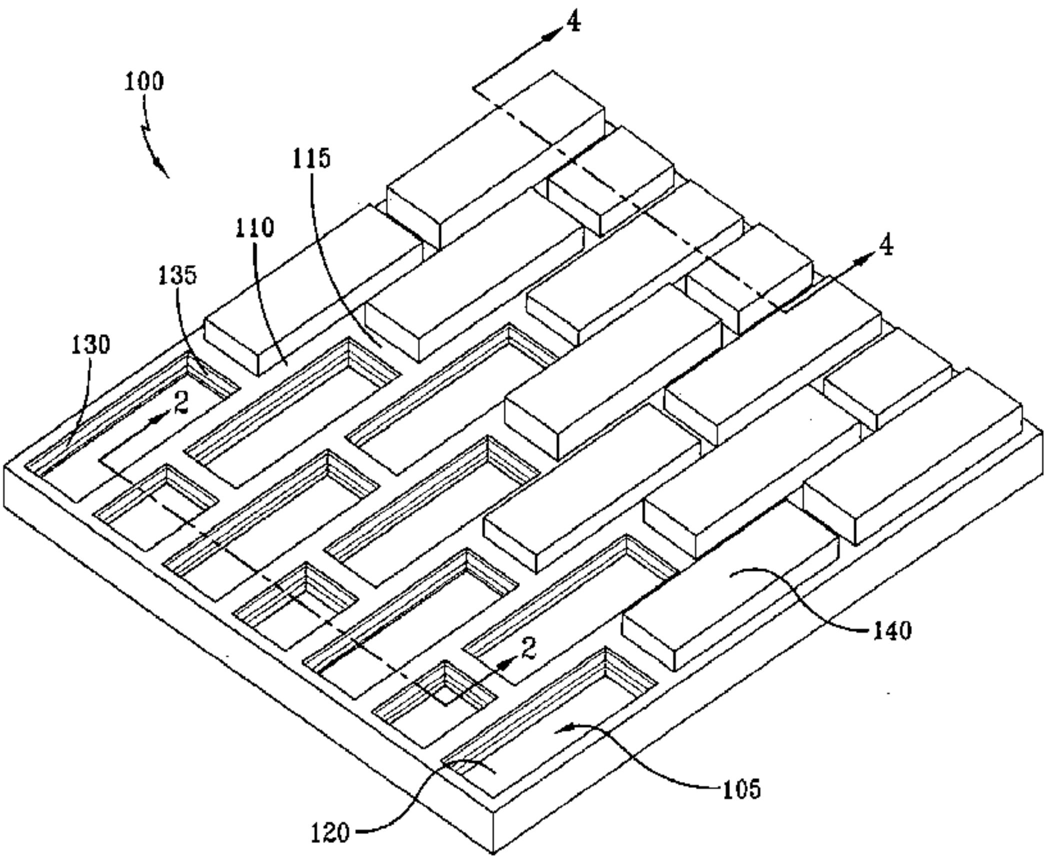
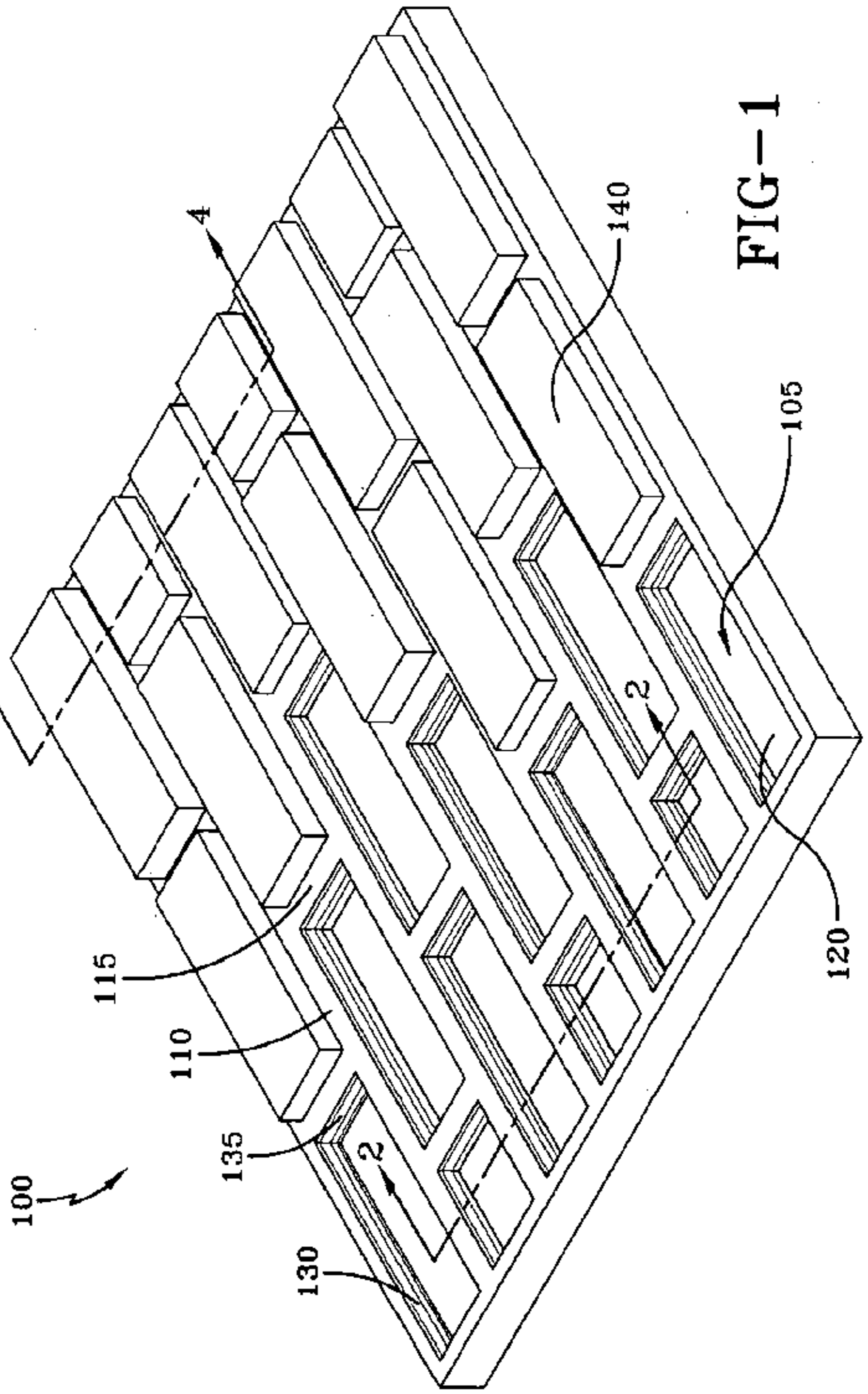
(57) ABSTRACT

The present invention is a formliner apparatus comprising a plurality of substantially planar layers. The formliner further comprises a plurality of ribs extending in a direction away from the substantially planar layers and defining a plurality of recesses within the formliner in conjunction with the substantially planar layers, each of the plurality of ribs extending to a preselected rib plane. The present invention further comprises at least one resilient ridge on each rib defining each recess, each at least one resilient ridge extending into an adjacent recess, wherein each substantially planar layer is substantially parallel with the rib plane and located a preselected variance depth distance from the rib plane, each variance depth distance for at least some of the substantially planar layers being preselected from a preselected variance depth distance range, wherein each preselected variance depth distance not being equal to every other variance depth distance.





FIG—1

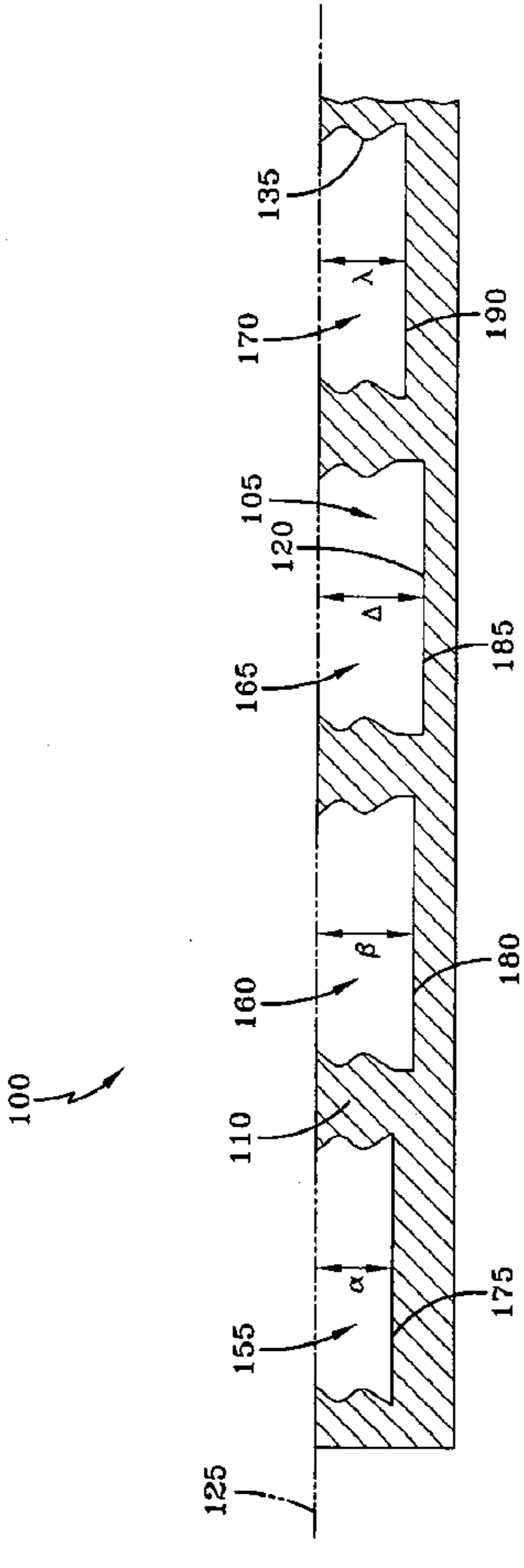
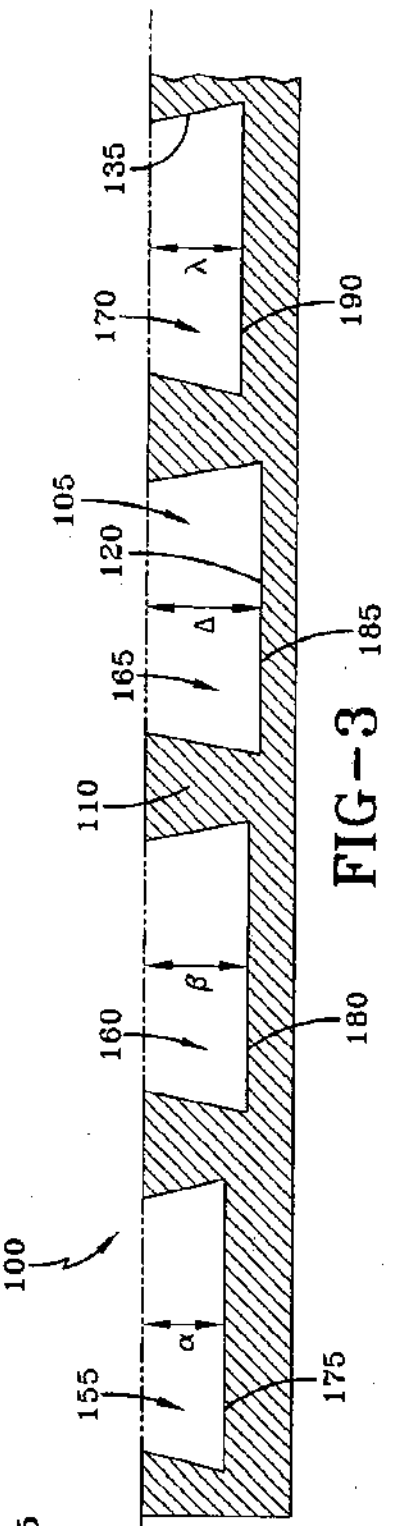
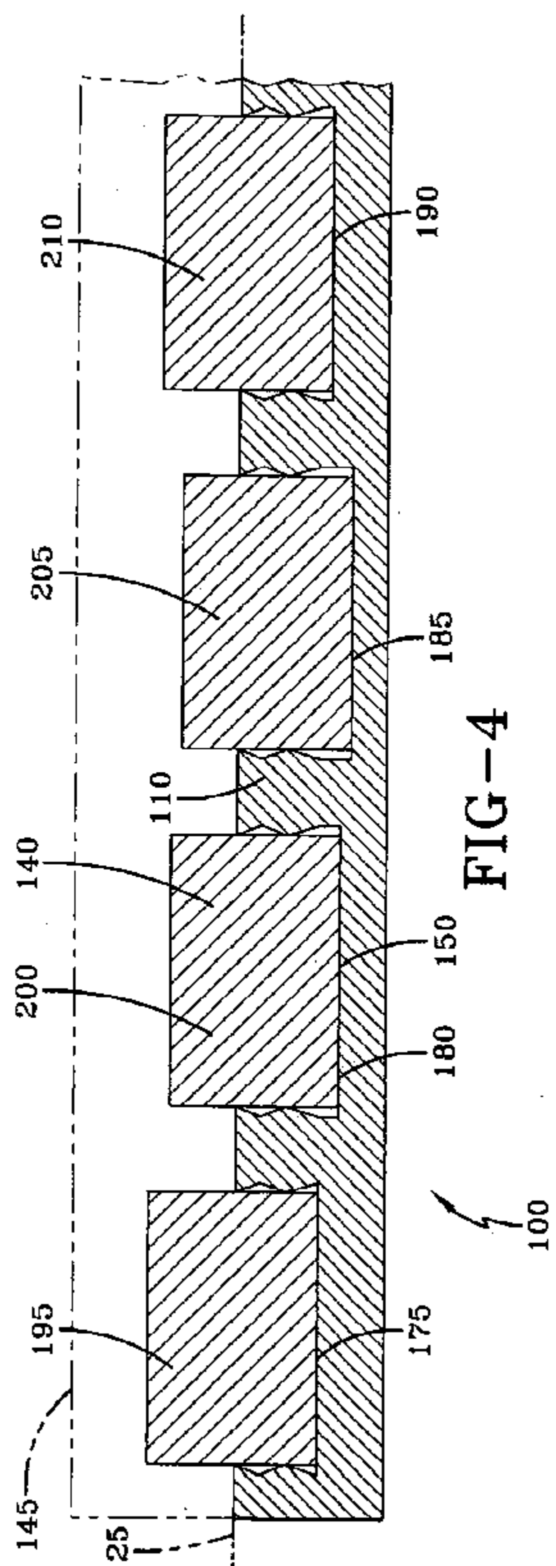


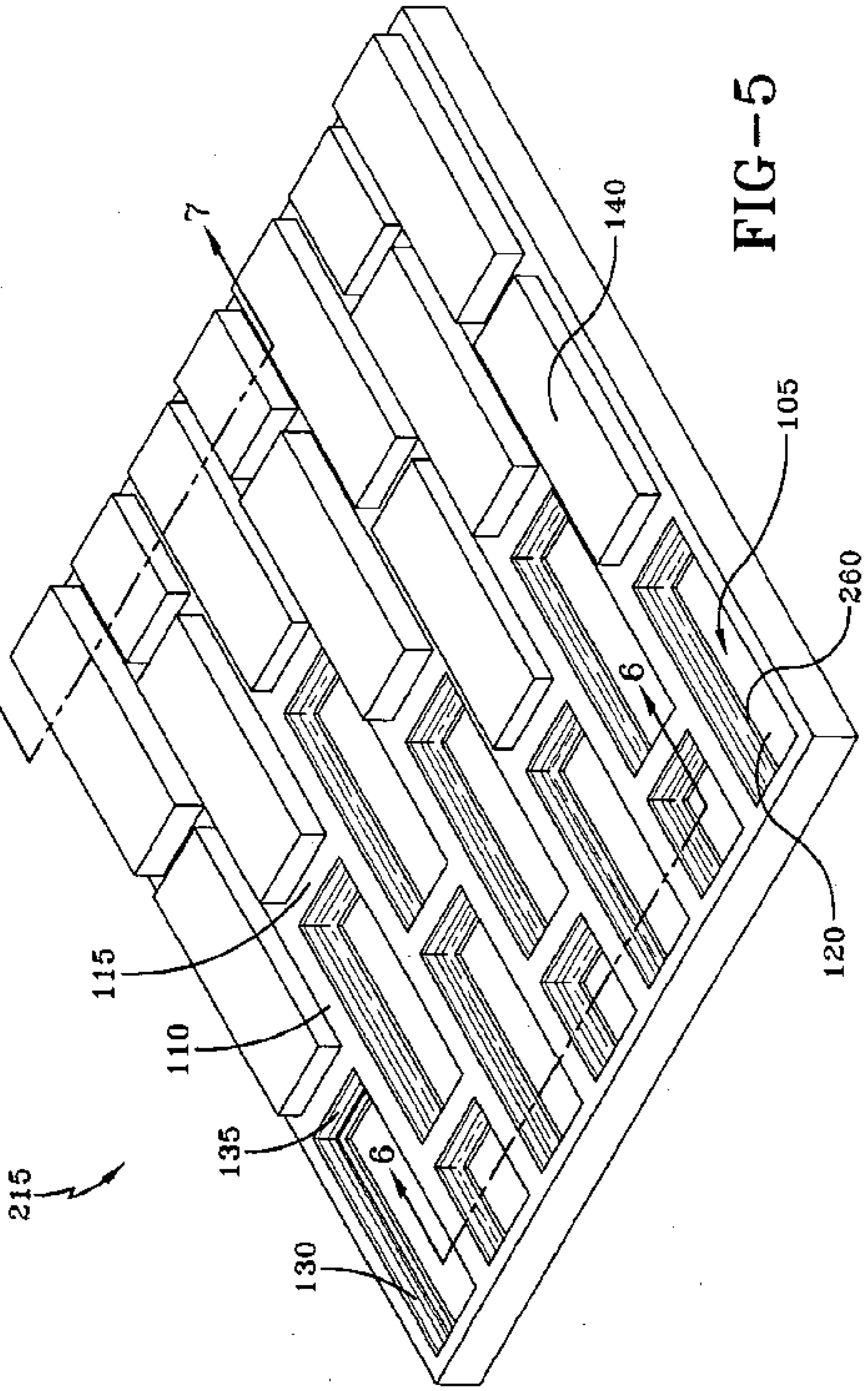
FIG-2


135
170
λ
190
105
120
Δ
185
165
110
β
160
180
100
α
155
175
125

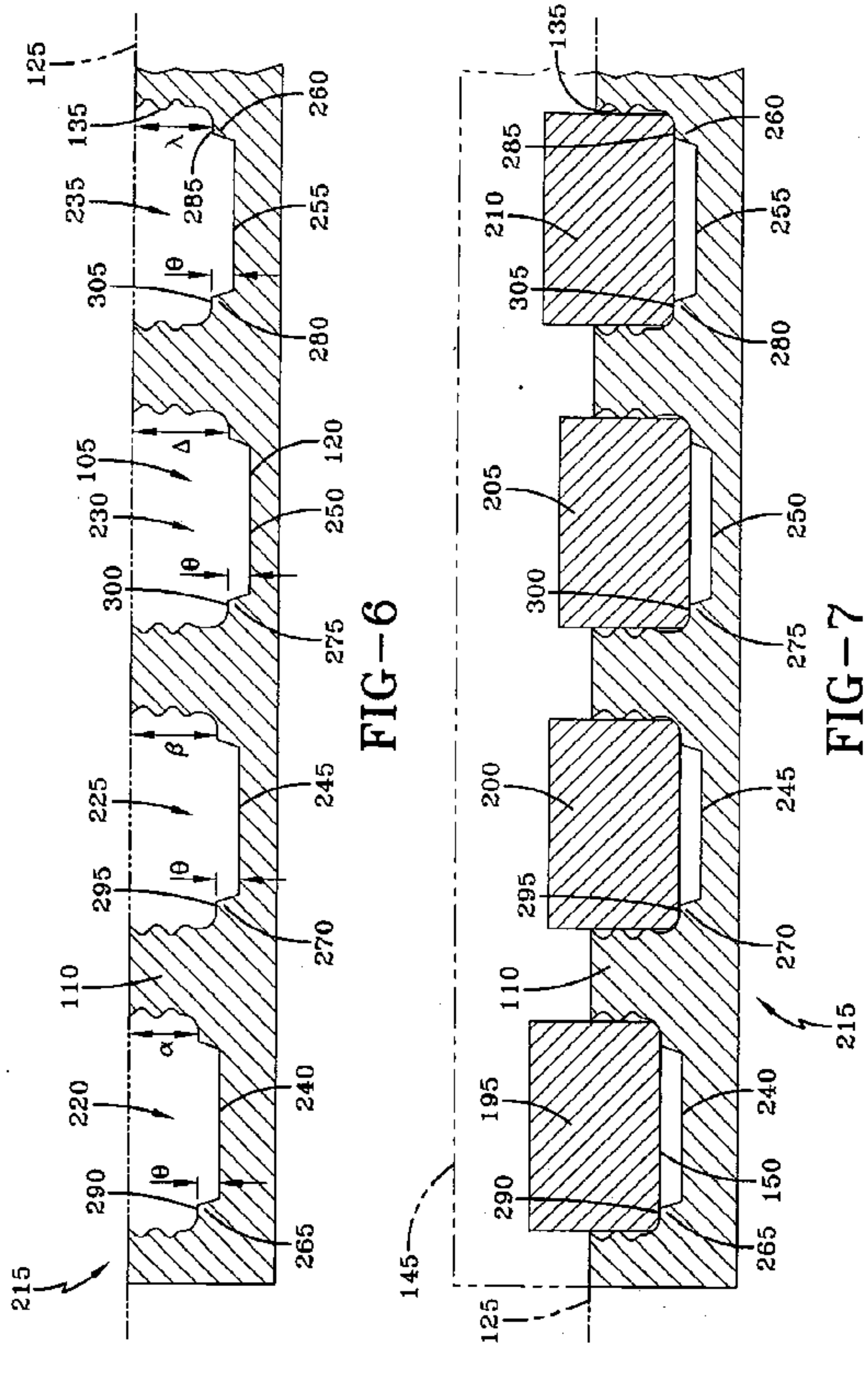
FIG—3

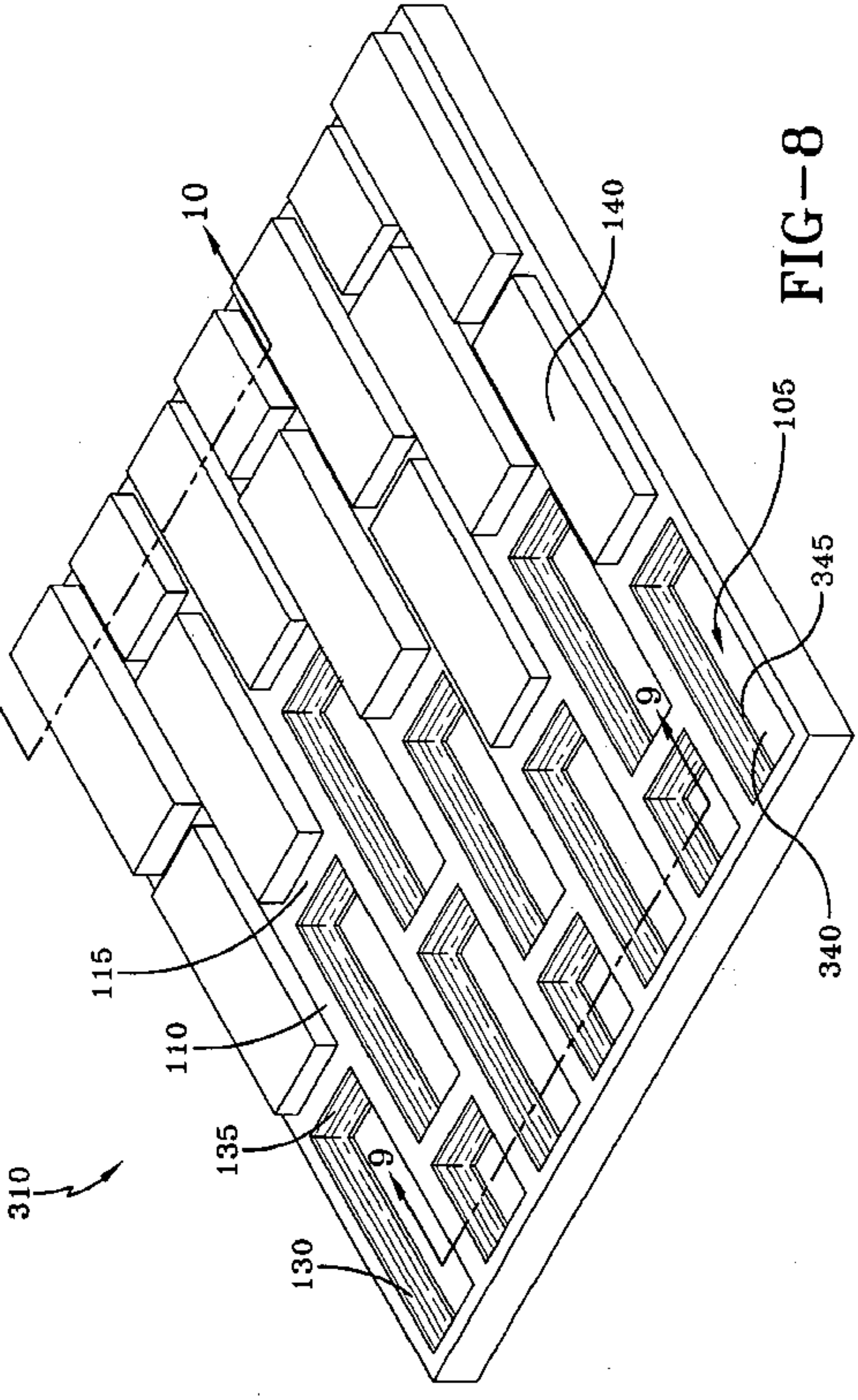

210
190
205
185
110
140
150
200
180
100
195
175
145
125

FIG—4

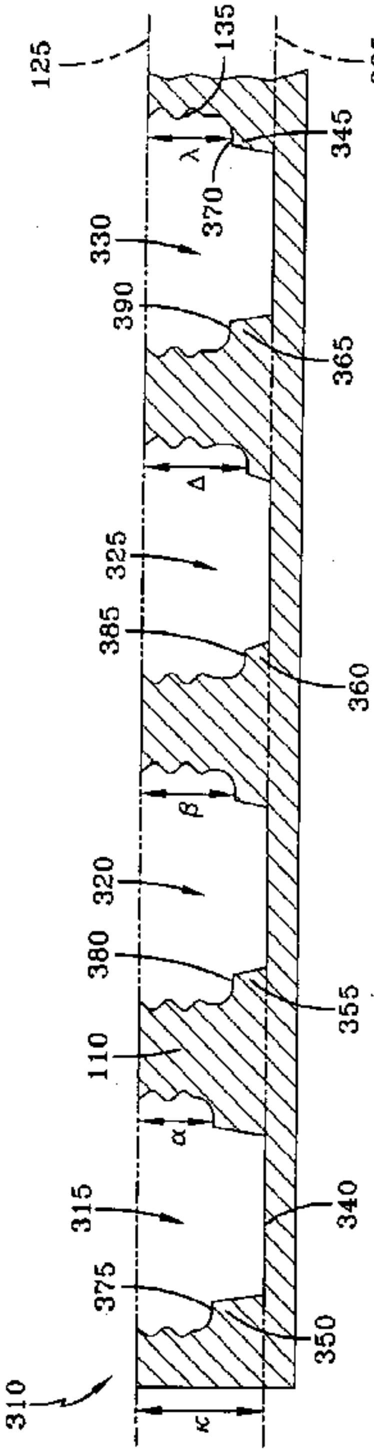


FIG—5

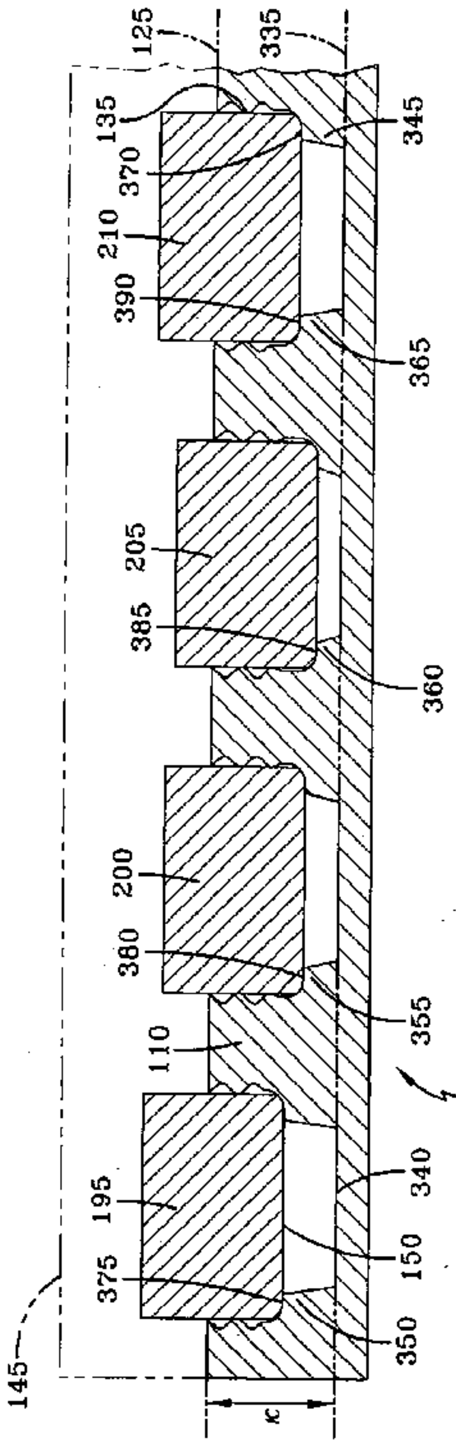

FIG—6
FIG—7
125
135
260
235
285
255
305
280
105
230
120
250
300
275
225
245
295
270
110
220
240
290
265
215
210
205
200
195
150
145
λ
θ
Δ
β
α



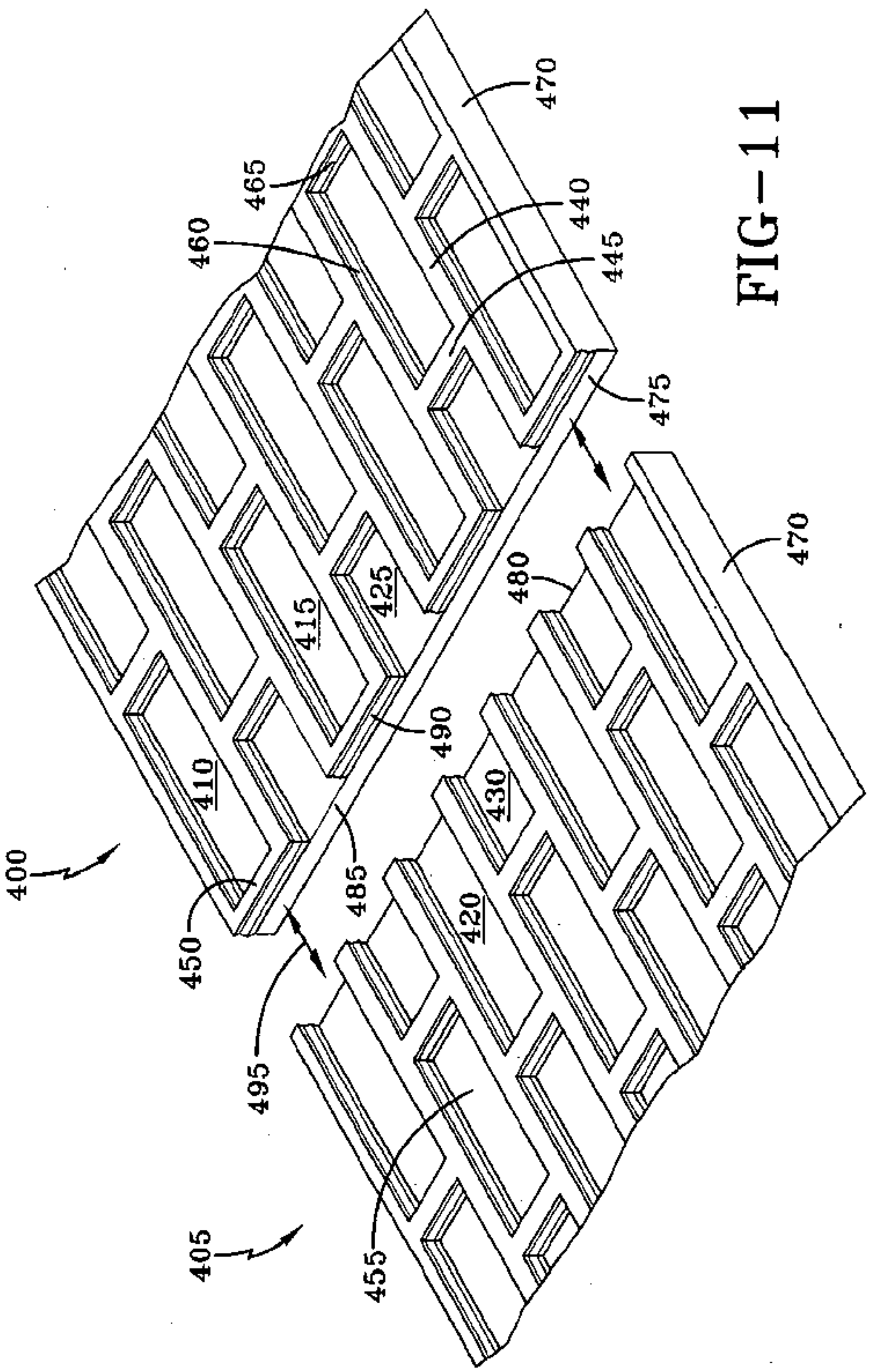
FIG—8


125
135
335
345
370
λ
330
390
365
Δ
325
385
360
β
320
380
355
110
α
315
340
375
350
310
κ

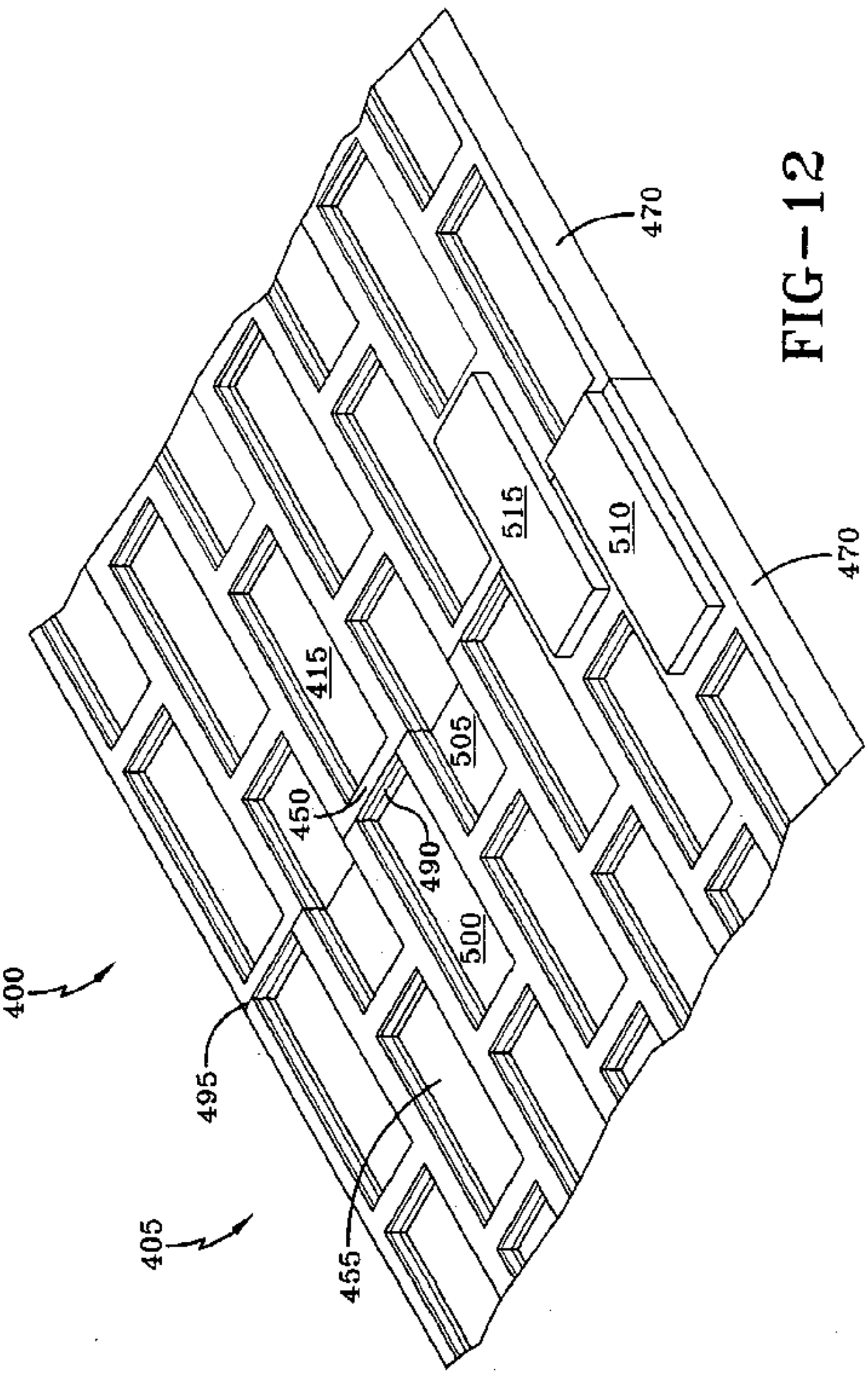
FIG—9


125
335
135
345
370
210
390
365
205
385
360
200
380
355
110
310
195
340
150
375
350
145
κ

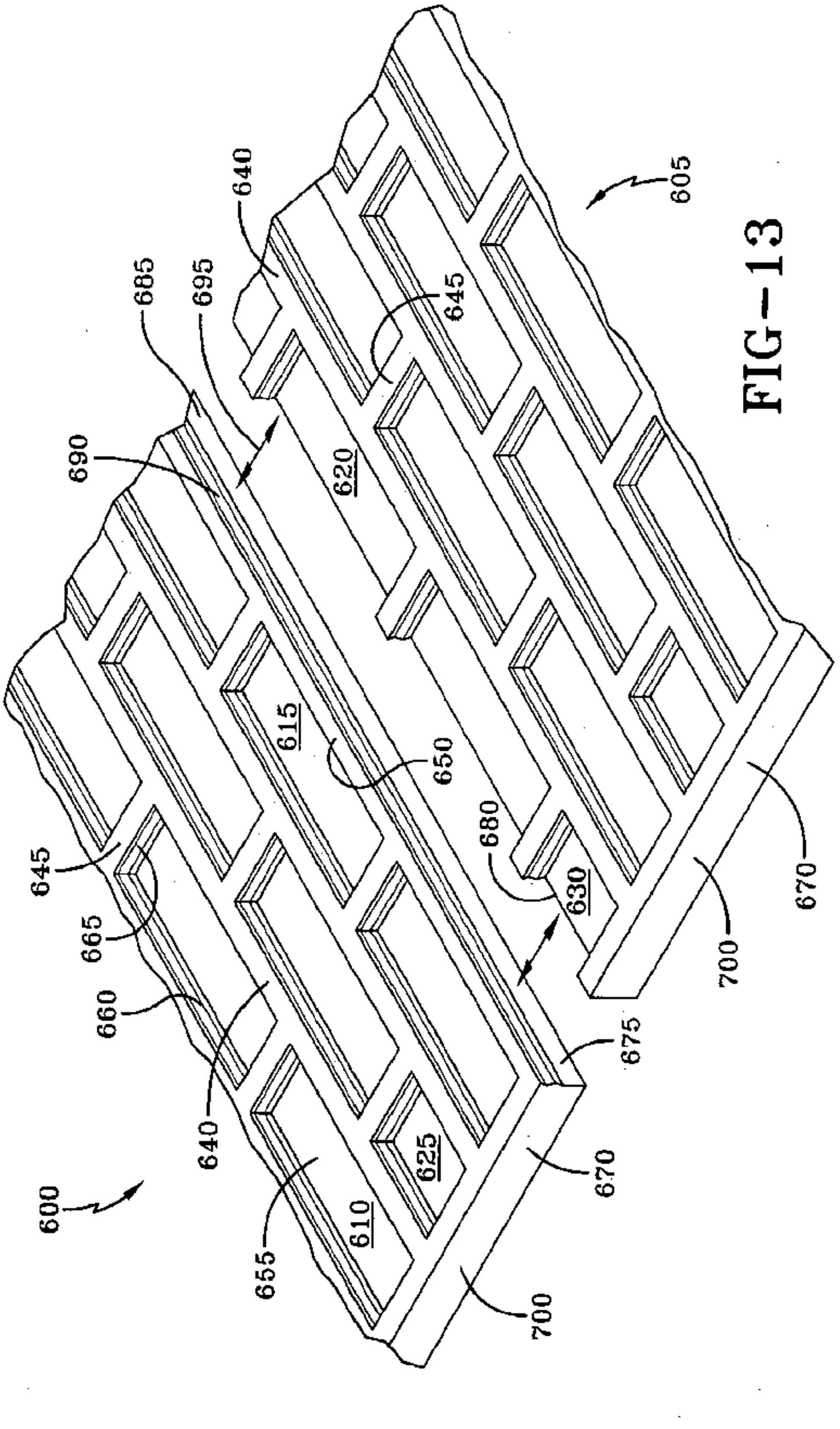
FIG—10


470
465
460
440
445
475
470
480
415
425
490
410
430
400
485
450
420
495
405
455

FIG—11



FIG—12


600
605
610
615
620
625
630
640
645
650
655
660
665
670
675
680
685
690
695
700

FIG—13

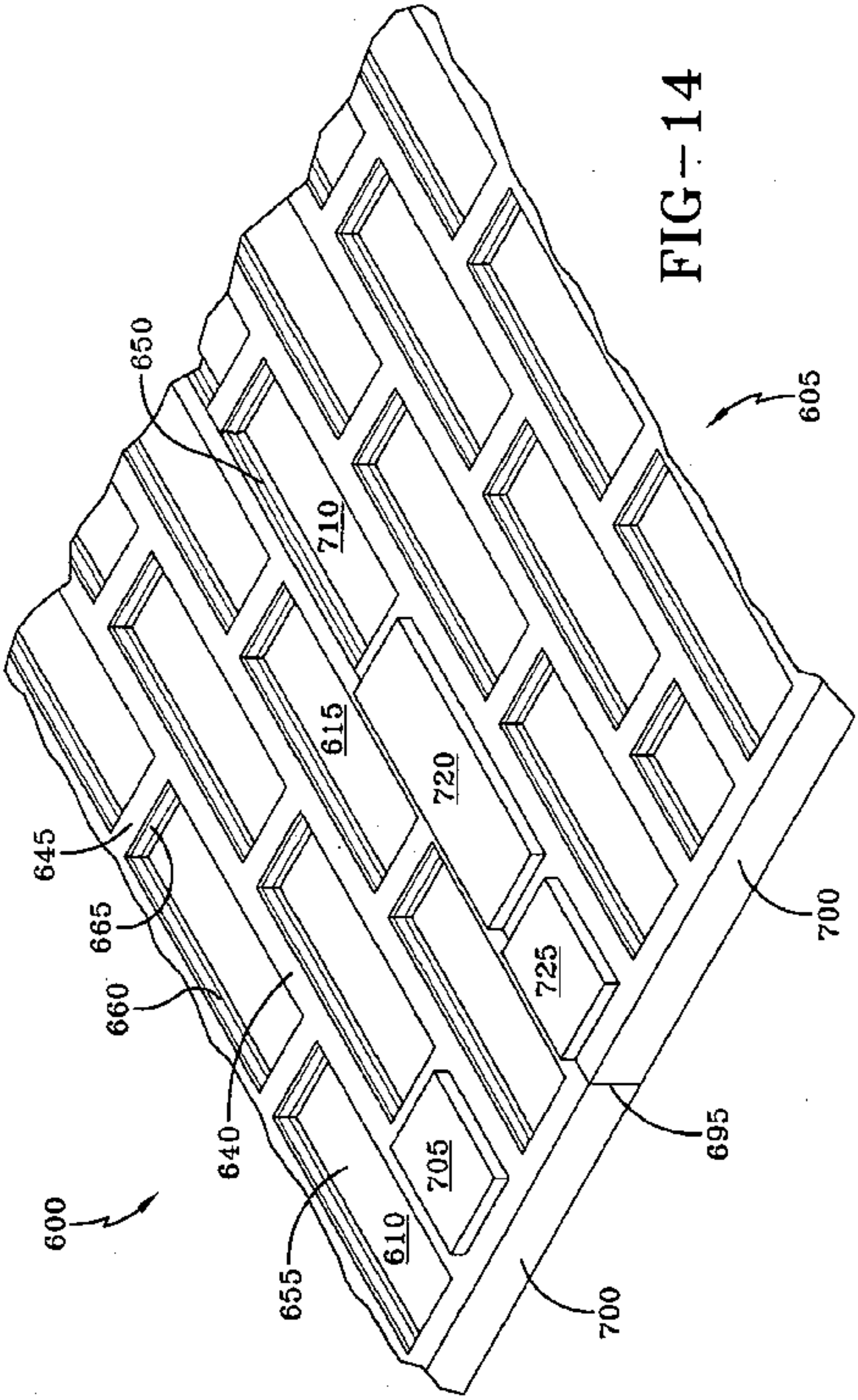

600
605
610
615
640
645
650
655
660
665
695
700
700
705
710
720
725

FIG-14

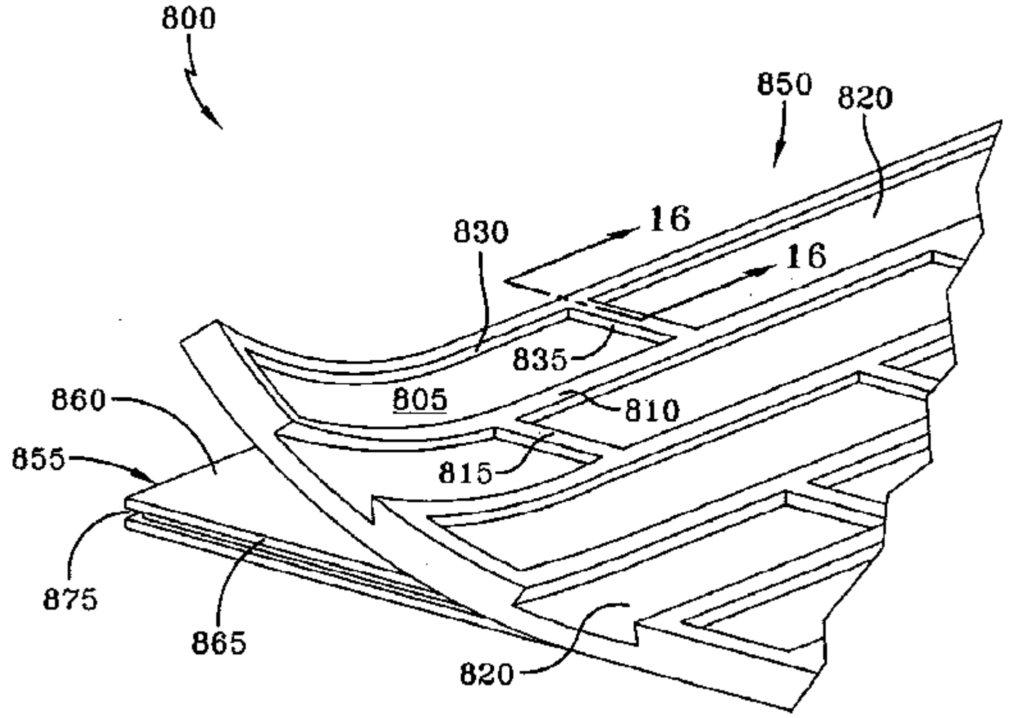

800
850
820
830
16
16
835
805
810
860
855
815
875
865
820

FIG-15

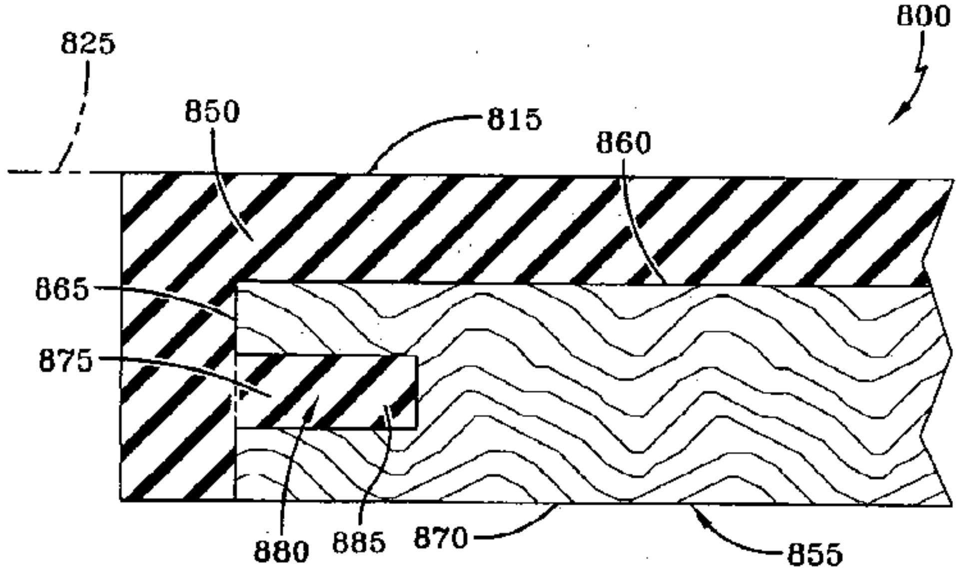

825
800
850
815
860
865
875
880
885
870
855

FIG-16

BRICK FORMLINER APPARATUS AND SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. patent application Ser. No. 11/099,347 filed Apr. 5, 2005, claiming priority to U.S. Provisional Patent Application No. 60/650,934, filed Feb. 8, 2005, entitled "FORMLINER APPARATUS," both of which are hereby incorporated by reference in their entirety.

FIELD OF THE INVENTION

[0002] The present invention relates generally to formliners and, more particularly, to a brick formliner apparatus that uses substantially randomly positioned brick depths.

BACKGROUND OF THE INVENTION

[0003] Architectural designs for various types of construction, including buildings and bridges, call for the use of brick in the walls of buildings. Although of little structural importance in modern construction projects, brick walls continue to be used for decorative architectural purposes. However, making walls entirely of brick and mortar has become relatively expensive in recent years in comparison to poured concrete. One development that has reduced the cost of brick walls has been the use of decorative thin bricks, which are cast into concrete wall panels. Such decorative bricks are significantly thinner than normal bricks and therefore are significantly less expensive than normal bricks per square foot of wall coverage.

[0004] However, since decorative bricks cannot be made into a regular brick wall, a new type of technology was required. In order to cast the decorative bricks into the concrete walls, polymer brick formliners were developed, which have a plurality of brick-receiving recesses. The brick-receiving recesses are designed to hold the decorative bricks in place during the casting of concrete walls. The brick-receiving recesses are formed into the formliners in regular brick patterns, with each recess having the same depth distance, so as to create a clean and organized brick appearance in the final panel product. Such formliners are first placed on a surface capable of supporting the weight of the formliners, decorative bricks, and poured concrete. Decorative bricks are then placed into the formliners and concrete is cast on top of the decorative bricks and formliners.

[0005] Unfortunately, the clean and organized appearance of the final brick-lined concrete panel has resulted in an unforeseen aesthetic problem. The use of such formliners in the manufacture of buildings has resulted in a very consistent appearance in such look for such prefabricated wall sections. One purpose that drove the development of brick formliners was the creation of a wall that had the appearance of hand-laid brick, without the extra cost associated with hand-laid brick. Normally, the use of manual labor in the laying of brick walls results in a brick wall in which some bricks extend further out of the wall than other bricks, as a result of normal human imprecision in construction. However, the regularity and precision of the thin brick placement, which is the result of the use of such polymer brick formliners, has resulted in the mass production of brick lined concrete panels that appear as though they have been manufactured by a machine rather than built up by hand.

[0006] The general construction and function of formliner apparatuses are well known in the art. Such formliners include the formliner described in U.S. Pat. No. 3,602,476 to Iragorri, assigned to San-Vel Concrete Corporation, which is incorporated by reference herein in its entirety, the formliner described in U.S. Pat. No. 6,164,037 to Passeno, which is incorporated by reference herein in its entirety, and the formliner described in U.S. Pat. No. 6,041,567 to Passeno, which is incorporated by reference herein in its entirety.

[0007] Formliners are often used modularly, such that several formliners must be lined up end to end or top to bottom in order to hold sufficient numbers of bricks or other elements for a wall. The joints between such formliners are often simply planar joints butted next to one another. When cementitious material is applied to the surface of such joints, the cementitious material may flow through the planar joints, resulting in extra time and labor to clean up the cementitious material that flowed through the planar joints.

[0008] Formliners are often used with plywood backing, which is either cured into or glued into the main portion of the formliner. Such plywood is provided to add additional structural strength and stability to the formliner. However, such plywood may become dislodged during the use of the formliner, particularly if the formliner is used numerous times.

[0009] What is needed is a new type of formliner that can be used to manufacture a brick wall that has the appearance that it was built by hand, rather than manufactured with a brick formliner. What is also needed is a formliner that prevents the flow of cementitious material. What is also needed is a formliner that provides better structural stability. The present invention provides this advantage as well as other related advantages.

SUMMARY OF THE INVENTION

[0010] The present invention is a formliner apparatus comprising a plurality of substantially planar layers. The formliner further comprises a plurality of ribs extending in a direction away from the substantially planar layers and defining a plurality of recesses within the formliner in conjunction with the substantially planar layers, each of the plurality of ribs extending to a preselected rib plane. The present invention further comprises at least one resilient ridge on each rib defining each recess, each at least one resilient ridge extending into an adjacent recess, wherein each substantially planar layer is substantially parallel with the rib plane and located a preselected variance depth distance from the rib plane, each variance depth distance for at least some of the substantially planar layers being preselected from a preselected variance depth distance range, wherein each preselected variance depth distance is not equal to every other variance depth distance.

[0011] The present invention is also a formliner comprising a plurality of substantially planar layers. The present invention further comprises a plurality of ribs extending in a direction away from the substantially planar layers and defining a plurality of recesses within the formliner in conjunction with the substantially planar layers, each of the plurality of ribs extending to a preselected rib plane. The formliner further comprises at least one resilient ridge on each rib defining each recess, each at least one resilient ridge extending into an adjacent recess; wherein at least one pad is positioned in at least two of the recesses, each at least one pads comprising a pad surface, each pad surface being positioned a preselected pad variance distance from each substantially planar surface in the at least one of the recesses, each pad surface being located a preselected pad depth distance from each respective at least substantially planar surface, wherein each preselected pad variance depth distance is not equal to every other pad variance depth distance.

[0012] The present invention is also a formliner comprising a plurality of substantially planar layers. The formliner further comprises a plurality of ribs extending in a direction away from the substantially planar layers and defining a plurality of recesses within the formliner in conjunction with the at least substantially planar layers, each of the plurality of ribs extending to a preselected rib plane, at least one exterior rib being positioned at an exterior edge of a formliner, the at least one exterior rib having an exterior side and an interior side, the interior side facing one of the recesses, the exterior side facing away from the recesses. The formliner further comprises at least one internal resilient ridge on each rib defining each recess, each at least one internal resilient ridge extending into an adjacent recess. The formliner further comprises at least one external resilient ridge on the exterior side of the at least one exterior rib, the at least one external resilient ridge facing away from the recesses.

[0013] The present invention is also a formliner comprising a main portion, the main portion comprising a plurality of substantially planar layers, a plurality of ribs extending in a direction away from the substantially planar layers and defining a plurality of recesses within the formliner in conjunction with the substantially planar layers, each of the plurality of ribs extending to a preselected rib plane, and at least one resilient ridge on each rib defining each recess, each at least one resilient ridge extending into an adjacent recess. The formliner also comprises a backing portion, the backing portion comprising a body, wherein at least one notch is formed in a substantial portion of the body, wherein an extension of the main portion extends into the at least one notch.

[0014] An advantage of the present invention is that the depth distances of at least substantially planar recess surfaces are varied, providing a brick veneer wall manufactured with the formliner of the present invention with the appearance of hand laid brick.

[0015] Another advantage of the present invention is that a brick veneer wall manufactured with the formliner of the present invention has a substantially seamless appearance of cementitious material after application without subsequent clean-up operation.

[0016] Another advantage of the present invention is that a backing is more firmly attached to a main section of a formliner, reducing the chances that the backing will be dislodged during use.

[0017] Other features and advantages of the present invention will be apparent from the following more detailed description of the preferred embodiment, taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. 1 is a perspective view of an embodiment of the formliner of the present invention with substantially random and at least substantially planar recess surface depth distances.

[0019] FIG. **2** is a cross-sectional view of the formliner of FIG. 1 taken along line **2-2**.

[0020] FIG. **3** is an alternate cross-sectional view of the formliner of the present invention taken along line **2-2**.

[0021] FIG. **4** is a cross-sectional view of the formliner of FIG. **1** with bricks disposed in the formliner recess taken along line **4-4**.

[0022] FIG. **5** is a perspective view of another embodiment of the formliner of the present invention with substantially random and at least substantially planar recess surface depth distances and pads.

[0023] FIG. **6** is a cross-sectional view of the formliner of FIG. **5** taken along line **6-6**.

[0024] FIG. **7** is a cross-sectional view of the formliner of FIG. **5** with bricks disposed in the formliner recesses taken along line **7-7**.

[0025] FIG. **8** is a perspective view of yet another embodiment of the formliner of the present invention with at least substantially planar recess surfaces with substantially random pad thicknesses.

[0026] FIG. **9** is a cross-section view of the formliner of FIG. **8** taken along line **9-9**.

[0027] FIG. **10** is a cross-sectional view of the formliner of FIG. **8** with bricks disposed in the formliner recesses taken along line **10-10**.

[0028] FIG. **11** is a perspective view of another embodiment of the formliners of the present invention showing two formliners at prior to forming a transverse joint.

[0029] FIG. **12** is a perspective view of the formliners of FIG. **11** after forming the transverse joint.

[0030] FIG. **13** is a perspective view of an embodiment of the formliners of the present invention showing two formliners prior to forming a lateral joint.

[0031] FIG. **14** is a perspective view of the formliners of FIG. **13** after forming the lateral joint.

[0032] FIG. **15** is a fragmentary view in perspective showing an embodiment of the formliner of the present invention.

[0033] FIG. **16** is cross sectional view of the formliner of FIG. **15** taken along the line **16-16**.

[0034] Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

DETAILED DESCRIPTION OF THE INVENTION

[0035] The present invention is a formliner apparatus, one embodiment of which is shown in FIG. 1. A brick formliner **100** is formed with a series of recesses **105**, which are separated by and defined by lateral ribs **110** and interconnecting transverse ribs **115**. The recesses **105** are shown in the figures in a brick running bond configuration, the configuration in which bricks are conventionally applied to walls. Such running bond configuration is only used to illustrate the features of the present invention and is not intended to limit the scope of the invention. Any other formliner configuration known in the art may also be used with the present invention, such as, for example flemish bond, basket weave, herringbone, etc. At the base of each recess **105** is an at least substantially planar recess surface **120**. The lateral ribs **110** and transverse ribs **115** extend from the at least substantially planar recess surfaces **120** to a rib plane **125** (shown in FIG. **2**). While the present invention is described using rectangular thin bricks **140**, it should be understood that the present invention works with any shape or size of brick or other element to be assembled into a wall or other construction element.

[0036] The formliner **100** is preferably manufactured from an elastomeric material, such as rubber or any other resilient polymer of sufficient strength that it is compatible with cementitious material. In a preferred embodiment, the formliner comprises cured polymer made from liquid precursors. In a most preferred embodiment, the formliner comprises cured sulfide RTV liquid rubber made from two liquid precursors. The formliner 100 is molded and cured as known in the art.

[0037] The formliner embodiments described herein may have any functional dimensions as known in the art for formliners. While FIGS. **1-16** are not drawn to exact scale, these figures show the concepts set forth herein. For example, brick formliner 100 may be about 8 feet wide by 4 feet long by ⅝ inch deep.

[0038] Referring to FIGS. **1-4**, ach of the lateral ribs **110** is provided with at least one resilient protrusion or ridge **130**, on every side of the lateral ribs facing a recess **105**. The at least one ridge **130** extends from the lateral ribs **110** into the recesses **105**. In addition, each of the transverse ribs **115** is provided with at least one resilient protrusion or ridge **135** on every side of the transverse ribs **115** facing a recess **105**, which also extends from the lateral ribs **110** into the recesses **105**. As known in the art, and as shown in FIG. **4**, the at least one ridge **130**, **135** engage and seal an adjacent surface of a brick **140** or other similar construction element, such as stone, tiles, stone slabs or other similar block elements, to prevent cementitious material **145**, shown in phantom in FIG. **4**, from flowing into the interior of the recess **105** and contacting the front faces **150** of the bricks **140** (or other element). Each brick **140** is snugly and sealingly received in each recess **105**. Preferably, but optionally, the structure and number of the at least one lateral ridge **130** is substantially identical to the structure and number of the at least one transverse ridge **135**. It is preferred that more than one lateral ridge **130** be present on each lateral rib **110** for each recess **105** and more than one transverse ridge **135** be present on each transverse rib **115** for each recess **105**. For all embodiments set forth herein, in a preferred embodiment, the number of lateral ridges **130** for each lateral rib **110** for each recess **105** is in the range of from 1 to about 6 and the number of transverse ridges **135** for each transverse rib **115** for each recess **105** is in the range of from 1 to about 6. In a more preferred embodiment, the number of lateral ridges **130** for each lateral rib **110** for each recess **105** is in the range of from 1 to about 4 and the number of transverse ridges **135** for each transverse rib **115** for each recess **105** is in the range of 1 to about 4.

[0039] However, optionally, as shown in the alternate cross-section in FIG. **3**, which is similar to the cross-section of FIG. **2**, only one simple angular lateral ridge **130** extending from each lateral rib **110** and one simple angular transverse ridge **135** extending from each transverse rib **115** may be used for each recess **105**. In such a simple angle configuration, the portion of the lateral ridge **130** which extends furthest into the recess **105**, is located at the rib plane **125** and the portion of the lateral ridge **130**, which extends the least into the recess **105**, is located at the at least substantially planar recess surface **120**.

[0040] As shown in FIGS. **1-4**, each at least substantially planar layer recess surface **120** is preferably disposed at a substantially randomly preselected variance depth distance from the rib plane **125**, such that every substantially randomly preselected variance depth distance is not identical to every other substantially randomly preselected variance depth distance. Each substantially random preselection described herein may be substantially randomly preselected by any means known in the art, for example, but not limited to a programmed random number generator on a computer. The substantially randomly preselected variance depth distance for each at least substantially planar recess surface **120** is substantially randomly preselected from a preselected variance depth distance range. The upper and lower limits of the preselected variance depth distance range are dependent upon the thickness of the brick **140** (or other element). The smallest value of the variance depth distance range cannot be too small or the brick **140** (or other construction element) will not be effectively sealed into the recess **105** by the at least one lateral resilient ridge **130** and the at least one transverse resilient ridge **135**, which can result in cementitious material adhering to the front face **150** of the brick **140**. The largest value of the variance depth distance range cannot be too large or the brick (or other construction element) will not extend far enough out beyond the rib plane **125** of the formliner **100** to effectively adhere into the cementitious material **145**. For example, if thin brick **140** is selected for use with a particular formliner **100**, and the thin brick **140** has profile outline dimensions of about 7½ inch long by about 3½ inch wide by about ½ inch thick, the variance depth distance range would be in the range of about ⅛ inch to about ¼ inch to achieve proper functioning of the formliner **100**.

[0041] In a preferred embodiment, each variance depth distance is substantially randomly preselected from a preselected set of variance depth distances, the set of variance depth distances comprising a preselected number of discrete preselected variance depth distances. In a preferred embodiment, the number of variance depth distances in the set is in the range of from 2 to about 5. In a more preferred embodiment, the number of variance depth distances in the set is 4. Each variance depth distance is substantially randomly preselected such that every substantially randomly preselected variance depth distance from the set is not identical to every other substantially randomly preselected variance depth distance from the set. One exemplary embodiment is shown in FIG. **2** and FIG. **3**, where the variance depth distance set includes four discrete variance depth distances, represented as α, β, Δ, and λ. In the embodiments shown in FIGS. **1-4**, the largest depth distance is Δ, the next largest depth distance is β, the next largest depth distance is λ, and the shortest depth distance is α. For the use with thin brick **140** having dimensions of about 7½ inches long by about 3½ inch wide by about ½ inch thick, exemplary values for α, β, Δ, and λ are about ⅛ inch, about ¹¹⁄₃₂ inch, about ⁹⁄₃₂ inch, and about ³⁄₁₆ inch respectively as such symbols are used herein.

[0042] A first recess **155** has a variance depth distance of α, such that an at least substantially planar recess surface **175** is a depth distance of a from the rib plane **125**. A second recess **160** has a variance depth distance of β, such that an at least substantially planar recess surface **180** is a depth distance of β from the rib plane **125**. A third recess **165** has a variance depth distance of Δ, such that an at least substantially planar recess surface **185** is a depth distance of Δ from the rib plane **125**. A fourth recess **170** has a variance depth distance of λ, such that an at least substantially planar recess surface **175** is a depth distance of λ from the rib plane **125**. Bricks **140** installed into the formliner **100** are shown in cross-section in FIG. **4**. As in FIG. **2**, FIG. **4** shows four separate recesses with bricks **140**, each recess again having a variance depth distance, one each of α, β, Δ, and λ. Cementitious material **145** is shown in phantom. A first brick **195** is shown positioned against at least substantially planar recess surface **175**, which is a depth distance α from the rib plane **125**. A second brick **200** is shown positioned against at least substantially planar recess surface **180**, which is a depth distance β from the rib plane **125**. A third brick **205** is shown positioned against at least substantially planar recess surface **185**, which is a depth distance Δ from the rib plane **125**. The fourth brick **210** is shown positioned against at least substantially planar recess surface 210, which is a depth distance λ from the rib plane **125**.

[0043] During normal construction, after the bricks **140**, **195**, **200**, **205**, **210** are installed in the formliner, cementitious material **145** is poured into a structure, or form as known in the art, against the formliner **100** and bricks **140**, **195**, **200**, **205**, **210** to create a wall or other structure with the appearance of a hand laid brick wall (or other structure). As the cementitious material **145** cures, the bricks **140**, **195**, **200**, **205**, **210** are sealed within against the cementitious material. Once the cementitious material has sufficiently cured to retain the bricks **140**, **195**, **200**, **205**, **210**, the formliner **100** is removed from the cementitious material **145** and the bricks **140**, **195**, **200**, **205**, **210** leaving the bricks **140**, **195**, **200**, **205**, **210** set within the cementitious material **145**.

[0044] As is evident from the cementitious material in phantom **145**, once the formliner **100** is removed, the brick **205** that was positioned against the deepest at least substantially planar recess surface **185** extends the furthest out from the cementitious material **145** as measured from rib plane **125**. The brick **200** that was positioned against the next deepest at least substantially planar recess surface **180** extends the next furthest out from the cementitious material **145** as measured from rib plane **125**. The brick **210** that was positioned against the next deepest at least substantially planar recess surface 190 extends the next furthest out from the cementitious material **145** as measured from rib plane 125. The brick **195** that was positioned against the shallowest at least substantially planar recess surface 175 extends the least out from the cementitious material **145** as measured from rib plane **125**. Such variance in the extensions of the bricks **140**, **195**, **200**, **205**, **210** out from the cementitious material **145** results in a wall (or other construction element) with the appearance of a hand-laid brick wall rather than the appearance of a brick veneer wall that was manufactured with a conventional formliner **100**.

[0045] In another alternate embodiment of the present invention, each of the variance depth distances for each at least substantially planar recess surface is substantially randomly preselected from a set of variance depth distances, the set of variance depth distances comprising a preselected number of discrete preselected variance depth distances. In a preferred embodiment, the number of variance depth distances in the set is in the range of from 2 to about 5. In a more preferred embodiment, the number of variance depth distances in the set is 4. The preselected variance depth distances for each at least substantially planar recess surfaces are substantially randomly preselected from the set of variance depth distances such that each discrete variance depth distance in the set of variance depth distances is preselected for a substantially similar number of at least substantially planar recess surfaces as every other discrete variance depth distance.

[0046] In another alternate embodiment of the present invention, each of the variance depth distances for each at least substantially planar recess surface is substantially randomly preselected from a set of variance depth distances, the set of variance depth distances comprising a preselected number of discrete preselected variance depth distances. In a preferred embodiment, the number of variance depth distances in the set is in the range of from 2 to about 5. In a more preferred embodiment, the number of variance depth distances in the set is 4. The preselected variance depth distance for each at least substantially planar recess surface are substantially randomly preselected from the set of variance such that each discrete variance depth distance is used for at least one of the at least substantially planar recess surfaces.

[0047] In another alternate embodiment of the present invention, each variance depth distance for each at least substantially planar recess surfaces is non-randomly preselected from a preselected variance depth distance range so as to create the appearance of hand laid brick in the wall or other structure, such that each variance depth distance for each at least substantially planar recess surface is not identical to every other variance depth distance. In another alternate embodiment, each variance depth distance for each at least substantially planar recess surface is non-randomly preselected from a set of discrete preselected variance depth distances ranges so as to create the appearance of hand-laid brick in the wall or other structure, such that each discrete variance depth distance is used for at least one of the at least substantially planar recess surfaces. In a preferred embodiment, the number of variance depth distances in the set is in the range of from 2 to about 5. In a more preferred embodiment, the number of variance depth distances in the set is 4.

[0048] In an alternate embodiment of the present invention, as shown in FIGS. **5-7**, a formliner **215** is shown with recesses **105**, lateral ribs **110**, transverse ribs **115**, at least substantially planar recess surfaces **120**, a rib plane **125**, at least one lateral resilient ridge **135**, and bricks **140** as described above for the embodiments shown in FIGS. **1-4**. The formliner **215** also comprises at least one pad **260**, positioned in each recess **105**, each at least one pad **260** having a height of θ measured from where the at least one pad **260** meets the at least substantially planar recess surface **120** to the top of the at least one pad surface **285**.

[0049] The formliner **215** is preferably manufactured from an elastomeric material, such as rubber or any other resilient polymer of sufficient strength that it is compatible with cementitious material. In a preferred embodiment, the formliner comprises cured polymer made from liquid precursors. In a most preferred embodiment, the formliner comprises cured sulfide RTV liquid rubber made from two liquid precursors. The formliner **215** is molded and cured as known in the art.

[0050] The formliner **215** is preferably manufactured from an elastomeric material, such as rubber or any other resilient polymer of sufficient strength that it is compatible with cementitious material. In a preferred embodiment, the formliner comprises cured polymer made from liquid precursors. In a most preferred embodiment, the formliner comprises cured sulfide RTV liquid rubber made from two liquid precursors. The formliner **215** is molded and cured as known in the art.

[0051] Each at least one pad **260** is preferably unitary with each at least substantially planar recess surface **120**. Each pad **260** extends from each at least substantially planar surface **120** a preselected depth distance θ. The depth distance θ is dependent upon the size of the bricks. For example, for a brick **140** having dimensions of about 7½ inches long by about 3½ inch wide by about ½ inch thick, an exemplary value for θ is about ⅛ inch. In an alternate embodiment, each at least one pad **260** is made separately from the formliner **215** and is placed in each recess **105** and connected thereto.

[0052] Each at least one pad **260** may be of any functional geometry, as long as the at least one pad **260** is able to support the entire brick **140** and the superimposed cementitious material **145**. FIGS. **5-7** illustrate one embodiment of the at least one pad **260**, where the at least one pad **260** extends around the entire perimeter of each at least substantially planar recess surface **120**. Any number of at least one pads **260** may be present in each recess **105** as desired. The use of the at least one pad **260** in each recess **105** reduces the total amount of material required for the formliner **215**.

[0053] Each pad surface **285** is preferably a substantially randomly preselected pad variance depth distance from the rib plane **125**, such that every substantially randomly preselected pad variance depth distance is not identical to every other substantially randomly preselected pad variance depth distance. The substantially randomly preselected pad variance depth distance for each pad surface **285** is substantially randomly preselected from a preselected pad variance depth distance range. The upper and lower limits of the preselected pad variance depth distance range are dependent upon the thickness of the brick **140** (or other element). As described above for the other embodiments, the smallest value of the pad variance depth distance range cannot be too small or the brick **140** (or other construction element) will not be effectively sealed into the recess **105** by the at least one lateral resilient ridge **130** and the at least one transverse resilient ridge **135**, which can result in cementitious material **145** adhering to the front face **150** of the brick **140**.

[0054] The largest value of the pad variance depth distance range cannot be too large or the brick (or other construction element) will not extend far enough out beyond the rib plane **125** of the formliner **215** to effectively adhere into the cementitious material **145**. For example, if thin brick **140** is selected for use with a particular formliner **215**, with the brick **140** having dimensions of about 7½ inch long by about 3½ inch wide by about ½ inch thick, the value of θ is about ⅛ inch being used in the formliner **215** of the present invention, the pad variance depth distance range would be in the range of about ¼ to about ⅛ to achieve proper functioning of the formliner **215**.

[0055] In a preferred alternate embodiment, each pad variance depth distance is substantially randomly preselected from a preselected set of pad variance depth distances, the set of pad variance depth distances comprising a preselected number of discrete preselected pad variance depth distances. Each pad variance depth distance is substantially randomly preselected such that every substantially randomly preselected pad variance depth distance from the set is not identical to every other substantially randomly preselected pad variance depth distance from the set. In a preferred embodiment, the number of pad variance depth distances in the set is in the range of from about 2 to about 5. In a more preferred embodiment, the number of pad variance depth distances in the set is 4.

[0056] One exemplary embodiment is shown in FIGS. **5-7**, where the pad variance depth distance set includes four pad discrete variance depth distances, represented as α, β, Δ, and λ. As in the previous embodiments, in the embodiments shown in FIG. 5-7, the largest depth distance is Δ, the next largest depth distance is β, the next largest depth distance is λ, and the shortest depth distance is α. FIG. **6** is a cross section of FIG. **5**, showing four separate recesses without bricks, each recess having a different pad variance depth distance, one each of α, β, Δ, and λ.

[0057] A first recess **220** has a pad variance depth distance of α, such that a pad surface **290** of the at least one pad **265** is a depth distance of α from the rib plane **125**. The at least substantially planar surface **240** is a depth distance of α plus θ from the rib plane **125**. A second recess **225** has a pad variance depth distance of β, such that a pad surface **295** of the at least one pad **270** is a depth distance of β from the rib plane **125**. The at least substantially planar surface **245** is a depth distance of β plus θ from the rib plane **125**. A third recess **230** has a pad variance depth distance of Δ, such that a pad surface **300** of the at least one pad **275** is a depth distance of Δ from the rib plane **125**. The at least substantially planar surface **250** is a depth distance of Δ plus θ from the rib plane **125**. A fourth recess **235** has a pad variance depth distance of λ, such that a pad surface **305** of the at least one pad **280** is a depth distance of λ from the rib plane **125**. The at least substantially planar surface **255** is a depth distance of λ plus θ from the rib plane **125**.

[0058] Bricks **140** installed into the formliner **215** are shown in cross-section in FIG. **7**, shows four separate recesses with bricks **140**, each recess again having a pad variance depth distance, one each of α, β, Δ, and λ. Cementitious material **145** is shown in phantom. A first brick **195** is shown positioned against pad surface **290**, which is a depth distance α from the rib plane **125**. A second brick **200** is shown positioned against pad surface **295**, which is a depth distance β from the rib plane **125**. A third brick **205** is shown positioned against pad surface **300**, which is a depth distance Δ from the rib plane **125**. A fourth brick **210** is shown positioned against pad surface **305**, which is a depth distance λ from the rib plane **125**.

[0059] During normal construction, after the bricks **140**, **195**, **200**, **205**, **210** are installed in the formliner **215**, cementitious material **145** is poured into a structure, or form as known in the art, against the formliner **215** and bricks **140**, **195**, **200**, **205**, **210** to create a wall or other structure with the appearance of a hand laid brick wall (or other structure). As the cementitious material **145** cures, the bricks **140**, **195**, **200**, **205**, **210** are sealed within the cementitious material **145**. Once the cementitious material **145** is sufficiently cured to retain the bricks **140**, **195**, **200**, **205**, **210**, the formliner **215** is removed from the cementitious material **145** and the bricks **140**, **195**, **200**, **205**, **210** leaving the bricks **140** **195**, **200**, **205**, **210** set within the cementitious material **145**.

[0060] As is evident from the cementitious material **145** shown in phantom in FIG. **7**, once the formliner **215** is removed, the brick **205** that was positioned against the deepest pad surface **300** extends the furthest out from the cementitious material **145** as measured from rib plane **125**. The brick **200** that was positioned against the next deepest pad surface **295** extends the next furthest out from the cementitious material **145** as measured from rib plane **125**. The brick **210** that was positioned against the next deepest pad surface **305** extends the next furthest out from the cementitious material **145** as measured from rib plane **125**. The brick **195** that was positioned against the shallowest pad surface **290** extends the least out from the cementitious material **145** as measured from rib plane **125**. Such variance in the extensions of the bricks **140**, **195**, **200**, **205**, **210** out from the cementitious material **145** results in a wall (or other construction element) with the appearance of a hand-laid brick wall rather than the appearance of a brick wall that was manufactured with a conventional formliner.

[0061] In another alternate embodiment of the present invention, as shown in FIGS. 8-10, a formliner 310 is shown with recesses 105, lateral ribs 110, transverse ribs 115, at least substantially planar recess surfaces 120, a rib plane 125, at least one lateral resilient ridge 135, and bricks 140 as described above for the embodiments shown in FIGS. 1-4. Each at least substantially planar recess surface 340 is at least substantially coextensive with a recess surface plane 335. Each recess surface plane 335 is positioned a preselected depth distance κ from the rib plane 125. Each recess 105 also contains at least one pad 345, each pad has a pad surface 370. For the use with brick 140 having dimensions of about 7½ inches long by about 3½ inch wide by about ½ inch thick, an exemplary values for κ is about ⅜ inch. For bricks 140 having different dimensions, the value of κ may be larger or smaller than about ⅜ inch, but is limited by the fact that κ may not be so large that the structural integrity of the formliner 310 is reduced to the point where the formliner 310 ceases to be functional.

[0062] The formliner 310 is preferably manufactured from an elastomeric material, such as rubber or any other resilient polymer of sufficient strength that it is compatible with cementitious material. In a preferred embodiment, the formliner comprises cured polymer made from liquid precursors. In a most preferred embodiment, the formliner comprises cured sulfide RTV liquid rubber made from two liquid precursors. The formliner 310 is molded and cured as known in the art.

[0063] Each at least one pad 345 is preferably unitary with each at least substantially planar recess surface 340. In an alternate embodiment, each at least one pad 345 is made separately from the formliner 310 and is placed in each recess 105 and connected thereto.

[0064] Each pad surface 370 is preferably a substantially randomly preselected pad variance depth distance from the rib plane 125, such that every substantially randomly preselected pad variance depth distance is not identical to every other substantially randomly preselected pad variance depth distance. The substantially randomly preselected pad variance depth distance for each pad surface 370 is substantially randomly preselected from a preselected pad variance depth distance range. The upper and lower limits of the preselected pad variance depth distance range are dependent upon the thickness of the brick 140 (or other element). As described above for the other embodiments, the smallest value of the pad variance depth distance range cannot be too small or the brick 140 (or other construction element) will not be effectively sealed into the recess 105 by the at least one lateral resilient ridge 130 and the at least one transverse resilient ridge 135, which can result in cementitious material adhering to the front face 150 of the brick 140.

[0065] The largest value of the pad variance depth distance range cannot be too large or the brick (or other construction element) will not extend far enough out beyond the rib plane 125 of the formliner 310 to effectively adhere into the cementitious material 145.

[0066] In a preferred alternate embodiment, each pad variance depth distance is substantially randomly preselected from a preselected set of pad variance depth distances, the set of pad variance depth distances comprising a preselected number of discrete preselected pad variance depth distances. In a preferred embodiment, the number of pad variance depth distances in the set is in the range of from 2 to about 5. In a more preferred embodiment, the number of pad variance depth distances in the set is 4. Each pad variance depth distance is substantially randomly preselected such that every substantially randomly preselected pad variance depth distance from the set is not identical to every other substantially randomly preselected pad variance depth distance from the set.

[0067] One exemplary embodiment is shown in FIGS. 8-10, where the pad variance depth distance set includes four discrete pad variance depth distances, represented as α, β, Δ, and λ. As in the previous embodiments, in the embodiments shown in FIG. 8-10, the largest depth distance is Δ, the next largest depth distance is β, the next largest depth distance is λ, and the shortest depth distance is α. FIG. 9 is a cross section of FIG. 8, showing four separate recesses without bricks, each recess having a different pad variance depth distance, one each of α, β, Δ, and λ.

[0068] A first recess 315 has a pad variance depth distance of α, such that a pad surface 375 of at least one pad 350 is depth distance of α from the rib plane 125. The pad surface 375 is a depth distance of κ minus α from recess surface plane 335. A second recess 320 has a pad variance depth distance of β, such that a pad surface 380 of the at least one pad 355 is a depth distance of β from the rib plane 125. The pad surface 380 is a depth distance of κ minus β from the rib plane 125. A third recess 325 has a pad variance depth distance of Δ, such that a pad surface 385 of the at least one pad 360 is depth distance of Δ from the rib plane 125. The pad surface 385 is a depth distance of κ minus Δ from the rib plane 125. A fourth recess 330 has a pad variance depth distance of λ, such that a pad surface 390 of the at least one pad 365 is a depth distance of λ from the rib plane 125. The pad surface 390 is a depth distance of κ minus λ from the rib plane 125.

[0069] Bricks 140 installed into the formliner 310 are shown in cross-section in FIG. 10. FIG. 10 shows four separate recesses with bricks 140, each recess again having a pad variance depth distance, one each of α, β, Δ, and λ. Cementitious material 145 is shown in phantom. The first brick 195 is shown positioned against pad surface 375, which is a depth distance α from the rib plane 125. The second brick 200 is shown positioned against pad surface 380, which is a depth distance β from the rib plane 125. The third brick 205 is shown positioned against pad surface 385, which is a depth distance Δ from the rib plane 125. The fourth brick 210 is shown positioned against pad surface 390, which is a depth distance λ from the rib plane 125.

[0070] During normal construction, after the bricks 140, 195, 200, 205, 210 are installed in the formliner 310, cementitious material 145 is poured into a structure, or form as known in the art, against the formliner 310 and bricks 140, 195, 200, 205, 210 to create a wall or other structure with the appearance of a hand laid brick wall (or other structure). As the cementitious material 145 cures, the bricks 140, 195, 200, 205, 210 are sealed within the cementitious material. Once the cementitious material is sufficiently cured to retain the bricks 140, 195, 200, 205, 210, the formliner 310 is removed from the cementitious material 145 and the bricks 140, 195, 200, 205, 210 leaving the bricks 140, 195, 200, 205, 210 set within the cementitious material 145.

[0071] As is evident from the cementitious material in phantom 145, once the formliner 310 is removed, the brick 205 that was positioned against the deepest pad surface 385 extends the furthest out from the cementitious material **145** as measured from rib plane **125**. The brick **200** that was positioned against the next deepest pad surface **380** extends the next furthest out from the cementitious material **145** as measured from rib plane **125**. The brick **210** that was positioned against the next deepest pad surface **390** extends the next furthest out from the cementitious material **145** as measured from rib plane **125**. The brick **195** that was positioned against the shallowest pad surface **375** extends the least out from the cementitious material **145** as measured from rib plane **125**. Such variance in the extensions of the bricks **140**, **195**, **200**, **205**, **210** out from the cementitious material **145** results in a wall (or other construction element) with the appearance of a hand-laid brick wall rather than the appearance of a brick veneer wall that was manufactured with a conventional formliner.

[0072] Another embodiment of the formliners the present invention is shown in FIG. **11** and FIG. **12**. Formliners are regularly modular in assembly, such that several formliners are butted up against one another and enclosed by a suitable framework in order to achieve the desired result. For example, if the formliners are produced such that they are 4' high by 8' long, but the length of a wall that is to be assembled using the formliner is 24' long, then three separate formliners would need to be laid side by side in order to achieve the 24' length. Ordinarily, it is desired to cast relatively large panels and a number of the templates are butted together When two formliners **400**, **405** are assembled to lay side by side, a joint **495** is present between the two formliners. The present invention limits that amount of cementitious material that will flow between and/or through the formliners **400**, **405** during use.

[0073] The formliners **400**, **405** are preferably manufactured from an elastomeric material, such as rubber or any other resilient polymer of sufficient strength that it is compatible with cementitious material. In a preferred embodiment, the formliners comprise cured polymer made from liquid precursors. In a most preferred embodiment, the formliner comprise cured sulfide RTV liquid rubber made from two liquid precursors. The formliners **400**, **405** are molded and cured as known in the art.

[0074] Two formliners **400**, **405** are shown generally in a perspective view in FIG. **11** with their joint **495** exploded so that it can readily be seen how the two formliners **400**, **405** are joined together during use. The formliners **400**, **405** are formed with a series of recesses **410**, which are separated by and defined by lateral ribs **440** and interconnecting transverse ribs **445**, **450**. Recesses **410**, **415**, **420**, **425**, **430** are shown in FIG. **11** and FIG. **12** in a brick running bond configuration. Such running bond configuration is only used to illustrate the features of the present invention and is not intended to limit the scope of the invention. Any other formliner configuration known in the art may also be used with the present invention, such as, for example flemish bond, basket weave, herringbone, etc. At the base of each recess **410**, **415**, **420**, **425**, **430** is an at least substantially planar recess surface **455**. The lateral ribs **440** and transverse ribs **445**, **450** extend from the at least substantially planar recess surfaces **455** to define the recesses **410**.

[0075] Each of the lateral ribs **440** is provided with at least one resilient protrusion or ridge **460**, on every side of the lateral ribs **440** facing a recess **410**, **415**, **420**, **425**, **430**, which extends from the lateral ribs **440** into the recesses **410**, **415**, **420**, **425**, **430**. In addition, each of the transverse ribs **445**, **450** is provided with at least one protrusion or ridge **465**, on every side of the transverse ribs **445**, **450** facing a recess **410**, **415**, **420**, **425**, **430**, which also extend from the transverse ribs **445**, **450** into the recesses **410**, **415**, **420**, **425**, **430**. These at least one resilient protrusions or ridges **460**, **465** function as described above as for the at least one resilient protrusion or ridge **130**, **135** for FIGS. **1-4**. In a preferred embodiment, a plurality of resilient protrusions or ridges **460**, **465** are present on every side of the lateral ribs **440** and transverse ribs **445**, **450** facing a recess **410**, **415**, **420**, **425**, **430**.

[0076] While the present invention is described using rectangular recesses **410**, which are designed to receive rectangular bricks (or other construction elements), it should be understood that the present invention works with any shape or size of brick or other element to be assembled into a wall or other construction element. In normal wall construction, for which the running bond configuration is selected, most of the recesses are, or as explained further herein when the formliners **400**, **405** are butted next to each other during use, become, enclosed full sized recesses, which are designed to receive a full sized brick (or other construction element). However, as is known in the art, some of the recesses at the end of the formliners will be enclosed half sized recesses to receive half sized bricks (or other elements).

[0077] Lateral exterior edges **470** and transverse exterior edges **475**, **480** form the exterior boundaries of the formliners **400**, **405** at and adjacent to the joint **495**. The formliners **400**, **405** are shown as generally in the form of a rectangular prism, but other shapes are also covered by the present invention, including more complex shapes that would be required due to complex building (or other structure) designs. The structure of the first formliner **400** at and adjacent to the transverse exterior edge **475** at the joint **495** is distinct from the structure of the second formliner **405** at and adjacent to the transverse exterior edge **480** at the joint **495**.

[0078] The formliner **400**, **405** structure at and adjacent to transverse exterior edges **475**, **480** are configured so that the pattern of the recesses **410**, shown in FIG. **11** and FIG. **12** as a running bond pattern, of the formliners **400**, **405** is continuous across the joint **495** and so as to limit the flow of cementitious material through the joint **495** during the use of the formliners **400**, **405**. Such limitation of the flow of cementitious material through the joint **495** is accomplished through the specific configurations of the areas at and adjacent to the transverse exterior edges **475**, **480**.

[0079] As a function of the exemplary running bond configuration and the straight joint **495**, the first formliner **400** has two types of recesses **415**, **425** at and adjacent to the joint **495**. The first type of recess **415** is a full sized recess, which is fully enclosed by lateral ribs **440** and transverse ribs **445**, **450** including exterior transverse ribs **450** located at the joint **495**. At the joint **495**, the transverse ribs **450** have exterior edges **485**, each of which have at least one exterior transverse resilient ridge **490**, which extends away from the recess **415** which is enclosed, in part, by the exterior transverse rib **450**. The second type of recess **425** is only partially enclosed by two lateral ribs **440** and one transverse rib **445** and is slightly more than half the size of a full sized recess **415**. In a preferred embodiment, there are a plurality of exterior transverse resilient ridges **490**.

[0080] The second formliner **405** also has two types of recesses at and near the joint **495**. The first type of recess **420** is a full sized recess, but is only partially enclosed by two lateral ribs **440** and one transverse rib **445**. The second type of recess **430** is also only partially enclosed by two lateral ribs

440 and one transverse rib 445 and is slightly less than half the size of a full sized recess 420, making the recess 430 smaller than the larger opposite recess 425.

[0081] As shown in FIG. 12, when the two formliners 400, 405 are butted next to one another during use, the formliners 400, 405 are aligned so that the exterior transverse ribs 450 of the first formliner 400 completes the enclosure of the first type of recesses 420 in the second formliner 405, creating a fully enclosed recess 500, which results in the at least one exterior transverse resilient ridge 495 serving as an at least one resilient ridge for the enclosed recess 500. The formliners 400, 405 are also aligned so that the second types of recesses 425, 430 matingly abut each other to create a fully enclosed full sized recess 505.

[0082] When bricks (or other elements) 510, 515 are installed as known in the art into the abutted formliners 400, 405 during use, the bricks are snugly and sealingly received by the recesses 500, 505 substantially the entire joint 495 is sealed against cementitious material passing through the joint 495. For exemplary purposes, only two bricks 510, 515 are shown, although during use all recesses would contain bricks (or other elements). For the portion of the joint 495 positioned at the location of the now fully enclosed recess 500, the at least one exterior transverse resilient ridge 490 acts as a seal against the brick present in a now fully enclosed recess 500, preventing the flow of cementitious material into and/or through that portion of the joint 495.

[0083] For the portion of the joint 495 located between the larger partial recess 425 of the first formliner 405 and the smaller partial recess 430 of the second formliner 405, a brick 515 itself overlaps the joint 495 in the now full sized recess 505, with the brick 515 sealing the portion of the joint 495 that runs through recess 505, preventing the flow of cementitious material into and/or through that portion of the joint 495. The prevention of such flow of cementitious material is important as it reduces and/or eliminates the excess cementitious material that otherwise covers the bricks (or other elements) after the formliners 400, 405 are removed from the wall or other structure. Such excess cementitious material must be cleaned off of the bricks in order to create a proper appearance, adding extra expense to the construction.

[0084] Another embodiment of the formliners of the present invention is shown in FIG. 13 and FIG. 14. As mentioned above, formliners are regularly modular in assembly, such that several formliners are butted up against one another and enclosed by a suitable framework in order to achieve the desired result. For example, if the formliners are produced such that they are 4' high by 8' long, but the height of a wall that is to be assembled using the formliners is 12' high, then three separate formliners would need to be laid top to bottom to achieve the 12' height. Ordinarily, it is desired to cast relatively large panels and a number of the templates are butted together. When two formliners 600, 605 are assembled to lay top to bottom, a joint 695 is present between the two formliners. The present invention limits the amount of cementitious material that will flow between and/or through the formliners 600, 605 during use.

[0085] The formliners 600, 605 are preferably manufactured from an elastomeric material, such as rubber or any other resilient polymer of sufficient strength that it is compatible with cementitious material. In a preferred embodiment, the formliners comprise cured polymer made from liquid precursors. In a most preferred embodiment, the formliner comprise cured sulfide RTV liquid rubber made from two liquid precursors. The formliners 600, 605 are molded and cured as known in the art.

[0086] Two formliners 600, 605 are shown generally in a perspective view in FIG. 13 with their joint 695 exploded so that it can readily be seen how the two formliners 600, 605 are joined together during use. The formliners 600, 605 are formed with a series of recesses 610, 615, 620, 625, 630, which are separated by and defined by lateral ribs 640, 650 and interconnecting transverse ribs 645. The recesses 610, 615, 620, 625, 630 are shown in FIGS. 13 and 14 in a brick running bond configuration. Such running bond configuration is only used to illustrate the features of the present invention and is not intended to limit the scope of the invention. Any other formliner configuration known in the art may also be used with the present invention, such as, for example such as, for example flemish bond, basket weave, herringbone, etc. At the base of each recess 610, 615, 620, 625, 630 is an at least substantially planar recess surface 655. The lateral ribs 640, 650 and transverse ribs 645 extend from the planar recess surfaces 655 to define the recesses 610, 615, 620, 625, 630.

[0087] Each of the lateral ribs 640 is provided with at least one resilient protrusion or ridge 660, on every side of the lateral ribs 640, 650 facing a recess 610, 615, 620, 625, 630, which extends from the lateral ribs 640, 650 into the recesses 610, 615, 620, 625, 630. In addition, each of the transverse ribs 645 is provided with one or more resilient protrusions or ridges 665, on every side of the transverse ribs 645 facing a recess 610, 615, 620, 625, 630, which also extend from the transverse ribs 645 into the recesses 610, 615, 620, 625, 630. These at least one resilient protrusions or ridges 660, 665 function as described above as for FIGS. 1-4. In a preferred embodiment, a plurality of resilient protrusions or ridges 665 are present on every side of the lateral ribs 640, 650 and transverse ribs 645 facing a recess 610, 615, 620, 625, 630.

[0088] While the present invention is described using rectangular recesses 610, 615, 620, 625, 630, which are designed to receive rectangular bricks 705, 720, 725 (or other construction elements), it should be understood that the present invention works with any shape or size of brick or other element to be assembled into a wall or other construction element. In normal wall construction, for which the running bond configuration is selected, most of the recesses are, or as explained further herein when the formliners 600, 605 are butted next to each other during use, become enclosed full sized recesses 710, which are designed to receive a full sized brick (or other construction element). However, as is known in the art, some of the recesses at the end of the formliners will be enclosed half sized recesses 625, 630 to receive half sized bricks 705, 725 (or other elements) as shown in FIG. 14.

[0089] Lateral exterior edges 675, 680 and transverse exterior edges 670 form the exterior boundaries of the formliners 600, 605 at and adjacent to the joint 695. The formliners 600, 605 are shown as generally in the form of a rectangular prism, but other shapes are also covered by the present invention, including more complex shapes that would be required due to complex building (or other structure) designs. The structure of the first formliner 600 at and adjacent to the lateral exterior edge 675 at the joint 695 is distinct from the structure of the second formliner 605 at and adjacent to the lateral exterior edge 680 at the joint 695.

[0090] The formliner 600, 605 structure at and adjacent to lateral exterior edges 675, 680 are configured so that the pattern of the recesses 610, 615, 620, 625, 630, shown in FIG.

13 and FIG. 14 as a running bond pattern, of the formliners 600, 605 is continuous across the joint 695 and so as to limit the flow of cementitious material through the joint 695 during the use of the formliners 600, 605. Such limitation of the flow of cementitious material through the joint 695 is accomplished through the specific configurations of the areas at and adjacent to the lateral exterior edges 675, 680.

[0091] As a function of the exemplary running bond configuration and the straight joint 695, the first formliner 600 has one type of recesses 615 at and adjacent to the joint 695. The first formliner also has another type of recess, namely a half-recess 625, but half-recess 625 is not located at the joint 695. The first type of recess 615 is a full sized recess, which is fully enclosed by lateral ribs 640, 650 and transverse ribs 645 including exterior lateral rib 650 located at the joint 695. At the joint 695, the lateral rib 650 has an exterior edge 675, and which at least one exterior transverse resilient ridge 690, which extends away from the recess 615 which are enclosed, in part, by the exterior lateral rib 650. In a preferred embodiment, there are a plurality of exterior transverse resilient ridges 690. In an alternate embodiment, there is one exterior transverse resilient ridge 690.

[0092] The second formliner 605 has two types of recesses at and near the joint 695. The first type of recess 620 is a full sized recess, but is only partially enclosed by two transverse ribs 645 and one lateral rib 640. The second type of recess 630 is also only partially enclosed by two transverse ribs 645 and one lateral rib 640 and is about half the size of a full sized recess 620.

[0093] As shown in FIG. 14, when the two formliners 600, 605 are butted next to one another during use, the formliners 600, 605 are aligned so that the exterior lateral rib 650 of the first formliner 600 completes the enclosure of the first and second types of recesses 620, 630 in the second formliner 605, creating fully enclosed recesses 710, which results in the at least one exterior lateral resilient ridge 690 serving as an at least one resilient ridge for the enclosed recesses 710.

[0094] When bricks (or other elements) 720, 725 are installed as known in the art into the abutted formliners 600, 605 during use, at least substantially the entire joint 695 is sealed against cementitious material passing through the joint 695. For exemplary purposes, only two bricks 720, 725 are shown at the joint 695, although during use all recesses would contain bricks (or other elements). For the portion of the joint 695 positioned at the location of the now fully enclosed recesses 710, the at least one exterior transverse resilient ridge 690 acts as a seal against the brick present in a now fully enclosed recess 700, preventing the flow of cementitious material into and/or through that portion of the joint 695. For the remaining portion of the joint 695, the at least one exterior lateral resilient ridge 690 acts as a seal against the lateral exterior edge 680.

[0095] The prevention of such flow of cementitious material is important as it reduces and/or eliminates the excess cementitious material that covers the bricks (or other elements) after the formliners 600, 605 are removed from the cured wall or other structure. Such excess cementitious material must be cleaned off of the bricks in order to create a proper appearance, adding extra expense to the construction.

[0096] The formliner set shown in FIG. 11 and FIG. 12 is exemplary for formliners where the joint 495 is positioned transversely. The formliner set shown in FIG. 13 and FIG. 14 is exemplary for formliners where the joint 695 is positioned laterally. As provided by the present invention, any formliner may contain both lateral joints 495 and transverse joints 695 as set forth in FIGS. 11-14, providing the ability to use multiple formliners to be used modularly together to create walls and other architectural objects having both significant heights and widths. Such formliners may combine the elements of exemplary formliners 400, 405, 600, and 605 described herein to achieve the desired architectural result.

[0097] Another embodiment of a formliner 800 of the present invention is shown in FIG. 15 in a fragmentary view in perspective and a cross-section of the formliner of FIG. 15 taken along line 15-15 is shown in FIG. 16. A formliner 800 is shown generally in a perspective view. A main portion 850 of formliner 800 is preferably manufactured from an elastomeric material, such as rubber or any other resilient polymer of sufficient strength that it is compatible with cementitious material. In a preferred embodiment, the formliner comprises cured polymer made from liquid precursors. In a most preferred embodiment, the formliner comprises cured sulfide RTV liquid rubber made from two liquid precursors. The formliner 800 is molded and cured as known in the art.

[0098] The formliner 800 is formed with a series of recesses 805, which are separated by and defined by lateral ribs 810 and interconnecting transverse ribs 815. The recesses 805 are shown in the figures in a brick running bond configuration, the configuration in which bricks are conventionally applied to walls. Such running bond configuration is only used to illustrate the features of the present invention and is not intended to limit the scope of the invention. Any other formliner configuration known in the art may also be used with the present invention, such as, for example flemish bond, basket weave, herringbone, etc. At the base of each recess 805 is a at least substantially planar recess surface 820. The lateral ribs 810 and transverse ribs 815 extend from the at least substantially planar recess surfaces 820 to a rib plane 825.

[0099] Each of the lateral ribs 810 is provided with at least one resilient protrusion or ridge 830, on every side of the lateral ribs facing a recess 805, which extend from the lateral ribs 810 into the recesses 805. In addition, each of the transverse ribs 815 is provided with at least one resilient protrusion or ridge 835, on every side of the transverse ribs 815 facing a recess 805, which also extends from the lateral ribs 810 into the recesses 805. As known in the art, the at least one ridges 830, 835 are used engage and seal an adjacent surface of a brick (not shown) or other similar construction element, such as stone, tiles, stone slabs or other similar block elements, to prevent cementitious material, from flowing into the interior of the recess 805 and contacting the front faces of the bricks (or other element). The recess 805 has a geometry such that is able to snugly receive a brick (or other element). Preferably the structure and number of the at least one lateral ridge 830 is substantially identical to the structure and number of the at least one transverse ridge 835. Optionally, the structure and number of the at least one lateral ridge 830 is substantially identical to the structure and number of the at least one transverse ridge 835. It is preferred that there are from one to about six lateral ridges 830 present on each lateral rib 810 and that there are from one to about six transverse ridges 835 present on each transverse rib 815 for each recess 805. In a more preferred embodiment there are from one to about four lateral ridges 830 present on each lateral rib 810 and from one to about four transverse ridges 835 present on each transverse rib 815 for each recess.

[0100] The formliner comprises two separate portions, a main portion 850 and a backing 855, which adds additional structural support to the main portion **850**. The backing **855** is preferably cast into the formliner **800** during manufacture as known in the art. The backing **855** has a geometry such that the backing **855** fits within the main portion **850** without interfering with the function of the recesses **805**. Alternately, the backing **855** may be glued or otherwise sealed into the formliner **800** after production of the main portion **850**.

[0101] Generally the backing **855** has a generally similar geometry to that of the formliner **800**. As shown in the exemplary embodiment of FIG. **15** and FIG. **16**, both the formliner **800** and the backing **855**, which can be composed of wood or plywood, are both generally in the shape of a rectangular prism. The dimensions of the backing **855** are preferably smaller than the dimensions of the formliner **800**, as the main portion **850** of the formliner **800** is positioned around the periphery of the backing **855**. As an example, if the formliner is about 4' long by about 8' wide by about 1¼ inch thick, then an functional backing would be about 3' 11" wide by about 7' 11" long by about 0.75" thick. The backing **855** comprises a material selected from the group consisting of plywood, wood, metal, plastic, a non-wood composite material, and combinations thereof and is less flexible than the formliner **800**. Alternately, the backing **855** can be constructed of any composite material having sufficient strength and thickness. The backing **855** is preferably comprised of plywood.

[0102] As shown in FIG. **15** and FIG. **16**, the backing **855** comprises sidewalls **865**, a top surface **860** and a bottom surface **870**. The backing also has a notch **875**. The notch **875** extends at least through at least a substantial portion of one of the sidewalls **865**. The presence of the notch **875** enables the backing **855** to be held into the formliner **800** more readily than if the formliner **800** did not have a notch **875**. In a preferred embodiment, the notch is present in the entire portion of all the sidewalls **865**.

[0103] It is to be understood that the at least one notch **875** may be of any functional geometry, as long as it makes it less likely that the backing **855** will be dislodged from the main portion **850** during formliner **800** use and as long as the presence of the notch does not reduce the structural stability and/or the structural integrity of the formliner **800**. In a preferred embodiment, the notch **875** has a substantially rectangular cross-section **880**. In a preferred embodiment, the number of notches **875** is preselected from the range of from 1 to about 6. In a more preferred embodiment, there is one contiguous notch **875**.

[0104] In a preferred embodiment, where the main portion **850** is a polymeric material made from liquid precursors some of polymeric precursor of material for the main portion **850** flows into at least the notch **875** during the manufacture of the formliner **800** and cures within the notch **875**. During use, as the formliner **800** is manipulated, the backing **855** is less likely to be dislodged from the main portion **850** as an extension **885** of the main portion **850** extends into the backing **855**.

[0105] In a preferred embodiment, the backing **855** comprises at least one layer of plywood and has a thickness in the range of about ½ inch to about 3 inches. In a more preferred embodiment, the number of layers of plywood is in the range of from 1 to about 6. In an even more preferred embodiment, the number of layers of plywood is in the range of from 1 to 2. In a most preferred embodiment, the backing **855** has a thickness of about 0.75 inch and there is one notch **875** having a cross-sectional area of about 0.125 inch. Preferably, for the wood and plywood embodiments, the ratio of the cross-sectional thickness to the thickness of the backing is substantially proportional to both the height of the notch and the depth distance of the notch. For a backing **855** which is about 3 inches thick, the notch could be as wide as about 2 inches and as deep as about 1 inch, while for a backing having a thickness of about ¾ inch, the notch could be as wide as about ¼ inch and as deep as about ½ inch without a reduction in structural stability or structural integrity. In a preferred embodiment in which a number of layers of plywood are used, there is preferably one notch **875** through all of the sidewalls **865** of a layer of plywood that is positioned furthest from the recesses **805**.

[0106] While the invention has been described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.

What is claimed is:

1. A brick formliner apparatus, comprising:

a first formliner having a plurality of brick receiving recesses and a plurality of ribs; and

a formliner joint;

wherein the plurality of ribs at least partially defines the plurality of brick receiving recesses of the first formliner; and

wherein the formliner joint is configured to at least partially define a brick receiving recess formed by the first formliner and an adjacent second formliner.

2. The formliner apparatus of claim **1**, wherein the plurality of ribs includes a plurality of substantially lateral ribs and a plurality of substantially transverse ribs.

3. The formliner apparatus of claim **2**, wherein the plurality of ribs includes an exterior rib positioned at an exterior edge of the formliner.

4. The formliner apparatus of claim **3**, wherein the exterior rib includes an exterior side and an interior side, the interior side facing the plurality of brick receiving recesses and the exterior side facing away from the plurality of brick receiving recesses.

5. The formliner apparatus of claim **1**, wherein the formliner joint is a lateral formliner joint.

6. The formliner apparatus of claim **1**, wherein the formliner joint is a transverse formliner joint.

7. The formliner apparatus of claim **1**, wherein the formliner joint is further defined by an exterior ridge on an exterior side of an exterior rib of the plurality of ribs.

8. The formliner apparatus of claim **7**, wherein the exterior side of the exterior rib includes at least one external resilient ridge, the at least one external resilient ridge facing away from the plurality of brick recesses.

9. The formliner apparatus of claim **1**, further comprising the second formliner.

10. The formliner apparatus of claim **9**, further comprising a framework enclosing the first formliner and the second formliner.

11. The formliner apparatus of claim 9, wherein the formliner joint limits cementitious from flowing through the first formliner and the second formliner.

12. The formliner apparatus of claim 9, wherein a pattern of the plurality of recesses is continuous from the first formliner to the second formliner across the formliner joint.

13. A formliner system, comprising:

a first formliner;

a second formliner;

a plurality of brick receiving recesses forming a pattern extending from the first formliner to the second formliner; and

a plurality of ribs defining the plurality of brick receiving recesses, wherein the ribs establish a formliner joint at an interface of the first and second formliners to define at least one brick receiving recess spanning from the first formliner to the second formliner.

14. The formliner system of claim 13, wherein the plurality of ribs includes a plurality of substantially lateral ribs and a plurality of substantially transverse ribs.

15. The formliner system of claim 14, wherein the plurality of ribs includes an exterior rib positioned at an exterior edge of the first formliner.

16. The formliner system of claim 15, wherein the exterior rib includes an exterior side and an interior side, the interior side facing the plurality of brick receiving recesses and the exterior side facing away from the plurality of brick receiving recesses.

17. The formliner system of claim 13, further comprising a framework enclosing the first formliner and the second formliner.

18. The formliner system of claim 13, wherein the formliner joint limits cementitious from flowing through the first formliner and the second formliner.

19. The formliner system of claim 13, wherein a pattern of the plurality of recesses is continuous from the first formliner to the second formliner across the formliner joint.

20. A formliner apparatus, comprising:

a plurality of substantially planar layers;

a plurality of lateral and transverse ribs extending in a direction away from the substantially planar layers and defining a plurality of recesses within the formliner in conjunction with the substantially planar layers, at least one exterior rib being positioned at an exterior edge of the formliner, each recess sized to receive an individual thin brick or a fraction thereof;

the at least one exterior rib having an exterior side and an interior side, the interior side facing one of the recesses, the exterior side facing away from the recesses;

at least one internal resilient ridge on each rib defining each recess, each at least one internal resilient ridge extending into an adjacent recess; and

at least one external resilient ridge on the exterior side of the at least one exterior rib, the at least one external resilient ridge facing away from the recesses, an exterior ridge on a first exterior side of the formliner configured to provide a formliner joint that defines a brick receiving recess in conjunction with a first adjacent formliner.

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