PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 :
E04B 1/38, B27H 1/00
B25G 3/36, B32B 1/00, 3/28

A1

(11) International Publication Number: **WO 94/01632**

(43) International Publication Date: 20 January 1994 (20.01.94)

(21) International Application Number: PCT/US93/06545

(22) International Filing Date: 13 July 1993 (13.07.93)

(30) Priority data:

07/912,774	13 July 1992 (13.07.92)	US
08/016,892	12 February 1993 (12.02.93)	US

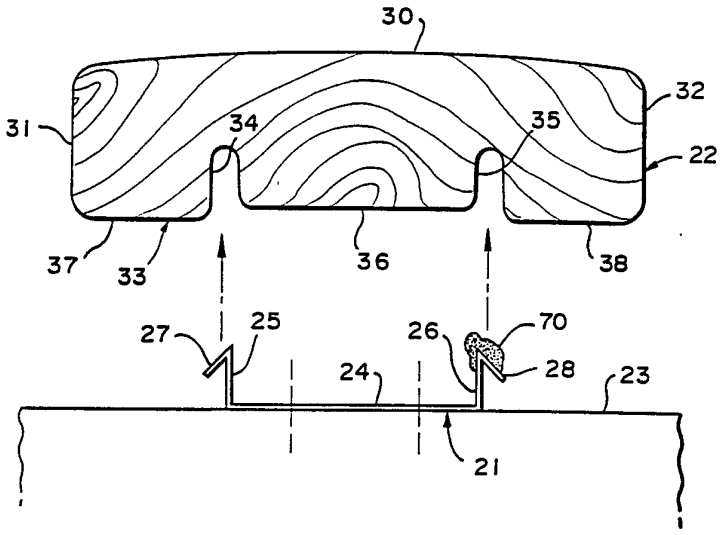
(71)(72) Applicant and Inventor: NYSTROM, Ron [US/US]; 7216 Backlick Road, Springfield, VA 22153 (US).

(74) Agent: LAMBERT, Dennis, H.; Nath, Lambert & Amberly, 1835 K Street N.W., Suite 750, Washington, DC 20006 (US).

(81) Designated States: AT, AU, BB, BG, BR, CA, CH, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, US, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: DECKING BOARD AND ASSEMBLY CLIP



(57) Abstract

A decking board (22) having a convex curved top surface (30) for shedding water but which is comfortable to stand and walk on. The curvature of the top surface (30) is selected such that the board (22) retains a convex top surface (30) even after warping during use, and in one construction utilizes a clip (21) system to secure the board (22) to an underlying support (23). The decking board (22) incorporates grooves (34, 35) for cooperation with laterally extending flanges (27, 28) on the clip (21) to secure the board (22) to the clip (21) without requiring the use of separate fasteners extended through the board (22). Fasteners are extended through the clip (21) and into a support member (23) to secure the clip (21) and thus the board (22) to a support member (23). In a preferred form of the invention, the clip (21) has a pair of upstanding hook-like projections (27, 28) which engage in a pair of spaced apart grooves (34, 35) in an undersurface of the board (22) to secure the board (22) to a support (23). The curved board (22) of the invention also reduces the amount of waste or rejected material during the manufacturing process because of the elimination of bark edges during the milling process, and the grooves (34, 35) in the bottom surface (33) of one form of the invention serve not only to attach the board (22) to the clip (21) but also function as drying channels for circulation of air when the boards (21) are stacked on top of one another.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	**FR**	France	**MR**	Mauritania
AU	Australia	**GA**	Gabon	**MW**	Malawi
BB	Barbados	**GB**	United Kingdom	**NE**	Niger
BE	Belgium	**GN**	Guinea	**NL**	Netherlands
BF	Burkina Faso	**GR**	Greece	**NO**	Norway
BG	Bulgaria	**HU**	Hungary	**NZ**	New Zealand
BJ	Benin	**IE**	Ireland	**PL**	Poland
BR	Brazil	**IT**	Italy	**PT**	Portugal
BY	Belarus	**JP**	Japan	**RO**	Romania
CA	Canada	**KP**	Democratic People's Republic of Korea	**RU**	Russian Federation
CF	Central African Republic			**SD**	Sudan
CG	Congo	**KR**	Republic of Korea	**SE**	Sweden
CH	Switzerland	**KZ**	Kazakhstan	**SI**	Slovenia
CI	Côte d'Ivoire	**LI**	Liechtenstein	**SK**	Slovak Republic
CM	Cameroon	**LK**	Sri Lanka	**SN**	Senegal
CN	China	**LU**	Luxembourg	**TD**	Chad
CS	Czechoslovakia	**LV**	Latvia	**TG**	Togo
CZ	Czech Republic	**MC**	Monaco	**UA**	Ukraine
DE	Germany	**MG**	Madagascar	**US**	United States of America
DK	Denmark	**ML**	Mali	**UZ**	Uzbekistan
ES	Spain	**MN**	Mongolia	**VN**	Viet Nam
FI	Finland				

DECKING BOARD AND ASSEMBLY CLIP

Technical Field of the Invention:

This invention relates to building constructions. More particularly, the invention relates to a unique decking board and fastening clip system for use in constructing a floor or other structure, and to a construction assembly and method.

Background of the Invention:

A variety of specialized flooring materials have been developed for interior and exterior use. Indoor applications are especially varied, including everything from granite and marble to hardwoods and rubber compositions. Hardwood floors for interior use typically range from individual, unfinished strips or boards that are sanded and stained or otherwise finished after being installed, to pre-finished boards and various parquet styles. The individual boards, in particular, used in hardwood flooring usually have stress relief channels cut in their underside, and tongue and groove configurations along the side edges. The major developments in interior hardwood flooring, however, have been related to the use of durable finishes, and not to the basic structural design of the wood strips.

Wood flooring materials for exterior use, such as in decks and the like, have undergone very little change since their introduction. Up until fairly recently, wood flooring for exterior use was typically found on covered porches, and was not used in constructions fully exposed to weather conditions. These floors were very close in structure and appearance to interior flooring, and generally included tongue and groove construction and other features used indoors. The same boards might even be used both indoors and outdoors, for example, with a painted surface on the boards used outdoors to aid in resisting weather.

Construction materials and methods for exterior decks and porches changed dramatically with the advent of chemically treated lumber, which enabled exterior structures to be fully exposed to the weather. The chemically treated lumber used in these structures makes them weather-resistant, and provides much greater flexibility in architectural style than previously used materials for exterior construction.

However, very little change has been made in the basic design of the wood building materials used in such exterior constructions. For instance, flooring or decking used in exterior decks comes in limited configurations, typically 2X4 and/or 2X6 or 2X8 lumber, and so-called 5/4 decking boards. All of these flooring materials are essentially rectangular in cross-sectional configuration. Additionally, the 5/4 decking boards have slightly rounded top edges.

In conventional flooring materials, the top and bottom horizontal surfaces of these flooring materials are flat and planar. As a result, water tends to stand on the surface of the decking material, causing it to deteriorate more quickly than it otherwise would. Heretofore, the solutions to this problem included spacing the decking boards so that water can drain between them, and frequent treatment with water-proofing materials.

Another proposed solution to this problem is found in U. S. patent number 482,536 for a Walk and Bridge Plank that has a concave top surface for shedding water. The extent of convexity of the upper surface is not mentioned other than to say that it is sufficient to maintain a convexity even after the board cups or warps during use. Based on the curvature shown in the drawings, and especially with reference to figure 2, it is believed that the extent of curvature or convexity in this patent is too great to function comfortably as a decking surface. In other words, the curvature is such that it would be readily discernible when stood or walked upon.

Further, the process used to cut such lumber from logs can produce inferior product on the outermost boards, often leading to scrap.

Consequently, there is need for an exterior decking board that is shaped to shed or drain water, and which possesses all the desireable attributes of conventional decking materials, such as ease of use and handling, low cost, and comfort, and which at the same time can result in better utilization of material as the boards are cut from a log.

Further, conventional building construction techniques, especially in the construction of a deck or floor surface, rely upon the use of nails or screws and the like passed downwardly through the exposed face surface of the decking or flooring boards and into an underlying support or frame for securing the boards to the frame. This method is not only time consuming, but results in a flooring surface that is blemished by the exposure of many fasteners extended through the top surface of the floor. Moreover, in exterior deck constructions these exposed fasteners provide numerous small traps for collecting and holding water, and define channels for flow of water into and through the boards, thus accelerating deterioration of the decking. Further, the nails used to fasten exterior decking boards tend to work loose over time, becoming raised above the deck surface and creating a safety hazard.

Interior hardwood flooring typically uses a tongue and groove construction, in which fasteners such as nails are extended diagonally downward through one edge of each board and into a supporting surface, leaving an unblemished upper surface. However, such flooring requires the exercise of considerable skill and care to avoid damaging the boards when the nails are being driven into place. Moreover, stresses are developed in the flooring as the wood expands and contracts upon changes in moisture content, and cupping, warping, splitting and other faults can result.

A variety of different building components, fastening clips, brackets and the like have been devised in the prior art in an effort to solve some of

the problems associated with flooring constructions as discussed above. Examples of some such clips are shown in U.S. patent Nos. 3,713,264, 4,620,403 and 5,027,573. Some of these constructions require the use of additional supporting structure or adapters that are shaped to accommodate the clips, and/or require that fasteners such as nails and the like be extended into the flooring boards either through the clips or separately therefrom to properly secure the boards. Further, some of the prior art clip designs do not remain properly engaged with the board when the board dries out and shrinks following installation. Still other prior art clip designs are complicated to make and use and are relatively expensive.

Accordingly, there is also need for a simple and inexpensive construction that uses a clip for securing two or more building components together, and especially in the construction of flooring, wherein separate fasteners are not required to be engaged with the flooring material to secure it in place.

Description of the Invention:

Accordingly, it is an object of this invention to provide a board for use in constructing flooring, wherein the board is shaped to shed water from its upper surface and which, at the same time, is comfortable to walk and stand on.

Another object is to provide a decking board for use in exterior deck constructions, wherein the board has a convex upper surface to shed water, but which at the same time is comfortable to stand and walk on, and which includes a concave configuration in its bottom surface to facilitate stacking of the boards one on top of the other during storage and handling.

A further object of the invention is to provide a decking board which is shaped to shed water from its upper surface, and which also yields a

superior product when cut from a log, reducing the amount of scrap in the outermost boards cut from a log.

These and other objects and advantages of the invention are achieved by shaping at least the top surface of a board through cutting or milling and the like so that the board has a very slightly rounded convex upper surface sloping off to each side of the board for shedding water. The extent of curvature is such that the board will still retain convexity on the upper surface even after the board has been in use and has warped. Conventional boards, on the other hand, will cup when they have warped.

In one embodiment, the board has a concave bottom surface shaped complementally to the top surface to facilitate stacking of the boards on top of one another. The shaped top surface also results in a board configuration which enables more usable boards to be obtained from a log, and the shaped bottom surface lends a slight cushioning effect to the board. In another form, the board has stress-relief channel means formed in its bottom surface to prevent warping of the board.

In accordance with another form of the invention, a construction assembly is provided that uses a clip to secure the decking board to a support surface. This clip assembly method can also be used to secure a first building component to a supporting structure without requiring any separate fasteners to be extended into the first building component.

The construction assembly of the invention is simple and economical to make and use, and especially facilitates the construction of a flooring surface such as a deck floor or the like, although it could also be used to secure panels or other building components to a supporting surface and/or to one another.

In a preferred form of the invention, the assembly includes a clip adapted to secure a first building component, such as a decking board or the like, either directly on supporting floor joists or on top of an already existing flooring surface. The clip in this form of the invention has an

elongate body adapted to lie flat on the supporting surface, with upstanding hook-shaped projections on opposite ends for engagement in complemental grooves on the adjacent surface of a first building component to be secured to the supporting surface. In use, the clip is secured to the supporting surface by one or more suitable fasteners extended through it and into the supporting surface, and the building component to be secured thereby is then placed over the clip, with grooves in the building component aligned with the hook-like projections. The building component is then pressed downwardly over the clip, or a series of aligned clips, so that the hook-like projections are engaged in the grooves and the building component thereby secured to the supporting surface.

The fastening clip of the invention provides a quick and easy assembly method for securing one building component to another building component, and especially for securing decking to a support structure. The invention is also suited for use in resurfacing existing decks without requiring that the old deck surface be removed. A deck floor constructed in accordance with the invention is free of unsightly fasteners extended through its exposed face surface, and is enabled to expand and contract upon gain or loss of moisture without excessive stress being induced therein, thereby prolonging its life.

Brief Description of the Drawings:

The foregoing, as well as other objects and advantages of the invention will be apparent from the following detailed description when considered in conjunction with the accompanying drawings, wherein like reference characters designate like parts throughout the several views, and wherein:

Fig. 1 is a top perspective view, with portions broken away, of a pair of boards embodying the invention shown in stacked relationship on top of one another;

Fig. 2 is a transverse sectional view of a decking board incorporating the features of the invention;

Fig. 3 is an end view of a plurality of decking boards according to the invention, shown installed in side-by-side relationship on a frame;

Fig. 4 is a somewhat schematic transverse sectional view of a log, showing the relationship to the outer surface of the log of several outer boards to be cut from it, illustrating a variety of ways in which the invention can lead to better utilization of material in the log;

Fig. 5 is an end view similar to figure 2 of an embodiment of the invention in which stress relief channels are formed in the underside of the board;

Fig. 6 is a fragmentary top perspective view of a portion of a deck constructed in accordance with that form of the invention using an assembly clip, and wherein the stress relief channels in the underside of the board also serve as means for attachment of the fastening clips to the board;

Fig. 7 is a fragmentary plan view of a portion of the deck constructed in accordance with the form of the invention shown in figure 6;

Fig. 8 is an enlarged, exploded, fragmentary end view of a decking board and clip embodying the form of the invention shown in figures 6 and 7;

Fig. 9 is a transverse view in section taken along line 9-9 in figure 7, showing the board and clip of figure 8 in assembled relationship to one another;

Fig. 10 is a view in section taken along line 10-10 in figure 7;

Fig. 11 is an end view of a pair of boards in accordance with the invention, showing the relationship of the boards when they are stacked on top of one another;

Fig. 12 is a fragmentary, enlarged plan view of the invention shown in figure 6, with the decking extending at a right angle to the supporting floor joists;

Fig. 13 is a fragmentary, enlarged plan view showing the invention with the decking extending at a 45° angle to the floor joists; and

Fig. 14 is a fragmentary plan view of a portion of a deck constructed in accordance with figure 13.

Best Mode of Carrying Out the Invention:

Referring more specifically to the drawings, a board in accordance with the invention is shown generally at **10** in figures 1-3. In figure 1, two such boards are shown in stacked relationship one on top of the other. The board specifically shown and described herein has generally the size and shape of a so-called 5/4 decking board, with rounded top side edges **11** and **12** each having a radius of curvature **r** of about one-quarter of an inch. The board **10** differs slightly in width **w** and thickness **t** from a standard decking board, however, in that it has a width of only about 5 inches and a thickness of about 1 ⅜ inches.

More importantly, the board of the invention has a slightly rounded upper surface **13** that slopes gradually off to either side of the center of the board, defining a convex surface that promotes the running off of water. This surface may have a radius of curvature R_1, for example, of about 24 inches.

Further, in a preferred construction the board also has a complementally shaped concave bottom surface **14** with a radius of curvature R_2 of about 24 inches, placed to leave two relatively flat side panels **c** and **d** along opposite edges of the board.

The curved top surface has a total fall or drop **a** from the center to each side edge of about ⅛ of an inch, and the curved bottom surface

similarly has a total recess **b** from the plane of the two side panels to the deepest part at the center of the board of about ⅛ of an inch.

When stacked on top of one another, as shown in figure 1, the boards essentially nest within one another, with the two side panels on a top board resting on the curved outer edge portions of a subadjacent board to produce an arrangement that enables multiple boards to be stacked with essentially the same stability as conventional, flat boards. In this connection, it should be noted that the curved surfaces may be dimensioned so that the entire adjacent curved surfaces of two stacked boards are in full contact with one another, or they may be dimensioned so that just the side panels of a top board engage on the top curved surface of a bottom board.

In use, the boards are installed in close-fitting, side-by-side relationship to one another on a frame, by using fasteners **F** extended through the boards and into the frame. Other types of fastening methods may be used if desired. As depicted in figure 3, a small clearance space **S** is provided beneath the boards when they are installed, which provides a slight cushioning effect to the flooring surface made with the boards.

In tests conducted using the flooring of the invention, it has been found that the slightly rounded upper surface of the boards provides a comfortable surface on which to stand and/or walk.

Figure 4 shows the relationship of the outermost boards **B** cut from a log **L**. Since these outermost boards are very near the bark or softer outer surface of the log, they frequently have defects extending along their side edges which can result in these boards being scrapped. Boards **10a** and **10b** made in accordance with the invention, however, have these outer longitudinal edges rounded off, which many times results in removal of the softer material or defects commonly found in conventional boards, thus reducing the amount of scrap in these boards and utilizing more of the material in the log.

In figure 5, a modification is shown at **10'**. In this form of the invention, a pair of stress relief cuts or channels **15** and **16** are made along the underside **14'** of the board to minimize cupping or warping of the board.

Another form of the invention is indicated generally at **20** in figures 6-14. In this form of the invention, specially shaped attaching clips **21** cooperate with specially shaped decking boards **22** to secure the decking boards on an underlying support structure, such as floor joists **23**.

The attaching clips **21** each have a flat body **24** with upstanding hook-like projections **25** and **26** on opposite ends thereof, including downturned flanges **27** and **28**. The body **24** has one or more openings **29** formed therethrough for receiving fasteners, such as nails or screws, not shown, to secure the clip on a flat surface. In the embodiment illustrated, the clip is secured on the upper edge of a floor joist. Alternatively, the clip could be secured on any flat surface, such as a pre-existing deck. The latter structure could be used, for example, to resurface an older deck without requiring the old decking material to be removed.

The decking boards **22** each have a slightly rounded convex top surface **30**, opposite side edges **31** and **32**, and a specially configured bottom surface **33**. More particularly, and as seen best in figures 7, 8 and 9, the bottom surface of each board has a pair of parallel, longitudinally extending grooves **34** and **35** spaced inwardly from the side edges thereof. Each groove has a depth slightly greater than the height of the hook-like projections on the clip, and a width slightly less than the width of the projection and flange, whereby the projection can penetrate fully into the groove and the downturned flange will engage or bite into the side of the groove (see figure 9), resisting removal of the projection from the groove.

Further, and as seen best in figures 7, 8 and 11, the longitudinal center portion **36** between the grooves on the bottom surface of each board is undercut or recessed an amount to receive the body of the clip without interference, so that the entire bottom side of the board will lie flat

against the clip body and support surface, respectively. This undercut portion **36** also has approximately the same depth relative to the side edge portions **37** and **38** of the bottom surface that the central portion **39** of the top surface is elevated relative to the side edge portions of the board. Accordingly, and as shown in figure 11, the boards can be stacked on top of one another and will be supported in the middle and at both side edges, thereby eliminating wobble and stabilizing the boards when stacked.

It will be noted that by turning the hooks **25** and **26** outwardly relative to the body **24** of the clip, the hooks will be directed toward the thicker side edge portions of the board, thereby providing greater strength to the connection. However, it should be understood that the hooks could be directed inwardly relative to the body **24** for engaging the inner sides of the grooves, if desired.

Further, as shown in figure 7, the clips **21** have a substantial width so that they can be used in spanning relationship to the joint between two abutted ends of a pair of adjacent boards **22a** and **22b**, with the hooks engaging in the grooves of each board to secure the ends of the boards relative to one another.

Still further, and as depicted in figures 12 and 14, the clips may be pivoted or rotated on the supporting surface so that the boards may be extended diagonally rather than orthogonally to the support.

With further reference to figure 13, and to figure 12, the clip **21'** may have a narrower width than that shown in figures 6-11. However, this narrower clip would not obtain as extensive a grip on the board as the first form of the invention, and would not be as effective in spanning the joint between two adjoining boards.

It should be appreciated that the invention described and illustrated herein may be secured on top of relatively narrow support members, such as floor joists, or against any other flat surface, such as an existing deck or a wall surface or the like. Further, the clips and associated groove

structures on the boards for cooperation with the clips may be incorporated in any structural element desired, including panelling or framing members to secure them together and/or to one another.

When the clips are used outdoors, such on an exterior deck, they may be made of galvanized metal or other suitable material such as plastic. Other materials may be used in their construction, depending upon the desired use.

Further, the boards illustrated and described herein are especially adapted for use as exterior decking boards and may be suitably chemically treated for weather resistance. Additionally, the boards preferably have a unique cross-sectional configuration to facilitate shedding of water and to aid in treating and drying the boards during and after manufacture. For instance, the top surface of the boards have a convex curvature to promote run-off of water, and the curvature is selected in relation to the width of the boards so that they are comfortable to walk and stand on, while still having enough curvature that they will not cup on their top surface even if they should warp following prolonged use. For instance, it is recommended that decking boards be installed with their bark side up (the growth rings being convex in an upward direction), and the natural tendency is for the boards to warp in this same direction, whereby the top surface cups. The deck board of the invention preferably has a radius of curvature on its top surface of about 24 inches, and at least within the range of from about 18 inches to about 36 inches.

In one example, the boards have a width of about five inches, a thickness of about one and three-eighths inches and a radius of curvature of the convex top surface of about twenty four inches.

It should be understood, however, that the boards need not have any particular shape in order to incorporate the assembly clip of the invention disclosed herein, and may consist of otherwise conventional rectangular boards, such as 2X4 or 2X6 dimension lumber.

It will be noted that the grooves formed in the bottom surface of the boards not only serve to provide stress relief but also function to facilitate the drying process of the boards by providing a greater surface area and defining spaces for circulation of air when the boards are stacked. The grooves in the forms of the invention described herein provide that function but are intended primarily as a means of attaching the boards to the clip.

In a specific example of the form of invention shown in figures 6-14, the boards have a width, thickness and radius of curvature on the top surface as discussed above. In addition, the slots **34** and **35** are spaced inwardly from the respective side edges by a distance of one and one-quarter inches, are one-quarter inch wide, and two inches apart at their inner sides or edges. Further, they are five-eighths of an inch deep, as measured from the bottom of the side edge portions of the board, and the center section of the board bottom surface is recessed one-eighth of an inch. The top and bottom corners of the board have a one-quarter inch radius of curvature, and the edges formed by the slots **34** and **35** have a one-eighth inch radius of curvature.

The body **24** of clip **21** has a width of one and one-half inches and a length of two inches, or just slightly less, and the hook-like projections **25** and **26** at its opposite ends are from one-half to five-eighth of an inch high or long. The downturned flanges on the upper ends of the projections are approximately one-quarter inch long and extend downwardly at an angle of about 45°.

If desired, a construction adhesive **70** may be placed in the groove or on the flange of the clip as illustrated in the right hand side of figures 8 and 9 to effect a more secure connection and insure that the board does not work loose from the clip over a period of time.

While the invention has been illustrated and described in detail herein, it is to be understood that various modifications may be made therein without departing from the spirit and scope of the invention, as defined by the appended claims.

What is claimed is:

1. A board for use in constructing a flooring surface for exterior use, said board having a top surface, a bottom surface and opposite side edges, said top surface being slightly rounded or curved from a longitudinal center line thereof downwardly toward each side edge, thereby defining a convex top surface for shedding water, and said bottom surface having a concave configuration for nesting engagement with the top surface of another board so that a plurality of the boards may be stacked one on top of the other with the stability of conventional boards having flat top and bottom surfaces.

2. A board as claimed in claim 1, wherein:

both the top and bottom surfaces of the board are curved or rounded, with the concave curved surface on the bottom of a board being shaped complementally to the convex curved surface on the top of the board.

3. A board as claimed in claim 2, wherein:

the radius of curvature of the top surface of the board is approximately five times as great as the width of the board.

4. A board as claimed in claim 3, wherein:

the radius of curvature of the bottom surface of the board is approximately five times as great as the width of the board.

5. A board as claimed in claim 1, wherein:

said board comprises a pressure-treated decking board.

6. A board as claimed in claim 5, wherein:

both the top and bottom surfaces of the board are curved or rounded, with the concave curved surface on the bottom of a board being shaped complementally to the convex curved surface on the top of the board.

7. A board as claimed in claim 6, wherein:

the radius of curvature of the top surface of the board is approximately five times as great as the width of the board.

8. A board as claimed in claim 7, wherein:

the radius of curvature of the bottom surface of the board is approximately five times as great as the width of the board.

9. A board as claimed in claim 8, wherein:

the board comprises a 5/4 decking board having a width of about five inches and a thickness of about one and three-eighths inches, and said radius of curvature of the top surface results in a difference in level between the longitudinal center of the board and its opposite side edges of about one-eighth of an inch.

10. A board as claimed in claim 9, wherein:

said radius of curvature of the bottom surface results in a difference in level between the longitudinal center of the board and its opposite side edges of about one-eighth of an inch.

11. A board as claimed in claim 1, wherein:

the concave configuration of the bottom surface of the board extends over less than the entire width of the board, leaving a relatively narrow, flat surface along each side edge of the bottom surface of the board.

12. A board as claimed in claim 11, wherein:

both the top and bottom surfaces of the board are curved or rounded, with the concave curved surface on the bottom of the board being shaped complementally to the convex curved surface on the top of the board.

13. A board as claimed in claim 12, wherein:

the radius of curvature of the top surface of the board is approximately five times as great as the width of the board.

14. A board as claimed in claim 13, wherein:

the radius of curvature of the bottom surface of the board is approximately five times as great as the width of the board.

15. A decking board for use in constructing a flooring surface for exterior use, said board having a top surface, a bottom surface and opposite side edges, said top surface being slightly rounded or curved from a longitudinal center line thereof downwardly toward each side edge, thereby defining a convex top surface for shedding water, and said bottom surface having a plurality of elongate grooves formed therein to define stress-relief channels and prevent cupping or warping of the board.

16. A board as claimed in claim 15, wherein:

the bottom surface of the board has a radius of curvature approximately five times as great as the width of the board.

17. A board as claimed in claim 16, wherein:

the board comprises a 5/4 decking board having a width of about five inches and a thickness of about one and three-eighths inches, and said radius of curvature of the top surface results in a difference in level between the longitudinal center of the board and its opposite side edges of about one-eighth of an inch.

18. A construction system for securing a decking board to an underlying support, comprising:

an assembly clip having a body with means to receive fasteners therethrough for securing the clip to a surface of said underlying support, said clip having at least one laterally extending flange thereon in spaced relationship to said surface of said support; and

said decking board having a longitudinally extending groove in a surface thereof in a position to receive said flange on the clip when the board is placed against said underlying support surface, whereby said flange engaged in said groove holds said board to said underlying support without requiring the use of separate fasteners extended through said board.

19. A construction system as claimed in claim 18, wherein:

said clip body is adapted to lie flat against said support surface and has opposite ends extending away from the support surface, each end terminating in a laterally extending flange, said ends and flanges defining a pair of spaced apart hook-like projections; and

said decking board has a pair of spaced apart, parallel grooves in a bottom surface thereof, said grooves adapted to receive said hook-like projections when the board is placed over said clip and onto said underlying support surface, the flanges of said hook-like projections biting into the side of the respective grooves to prevent withdrawal of the projection from the groove and thereby holding the board to the clip and support surface.

20. An assembly clip for securing a first construction member to a support member, wherein the first construction member has a pair of spaced apart, parallel grooves formed in one surface thereof, said clip comprising:

a substantially flat, rectangularly shaped body adapted to lie flat against said support member and having opposite ends projecting transversely from the body, said ends terminating in laterally extending flanges defining hook-like projections for engagement in grooves in a first

construction member to secure the first construction member to the clip, and means in the body for receiving fasteners to secure the clip to a support member.

21. A decking board for use in constructing a deck floor, said decking board having a top surface, a bottom surface and opposite side edges, said top surface being convex and having a radius of curvature so that it will shed water and at the same time will present a comfortable surface to walk and stand on, and said bottom surface having a central portion that is recessed so that a plurality of the boards may be stacked one on top of the other and the convex top surface of one board will be accommodated in the recessed bottom surface of a superadjacent board, said boards contacting one another at central and side edge portions to lend stability to a stack of said boards, and defining air circulating spaces to facilitate drying of a plurality of stacked boards.

FIG. 1

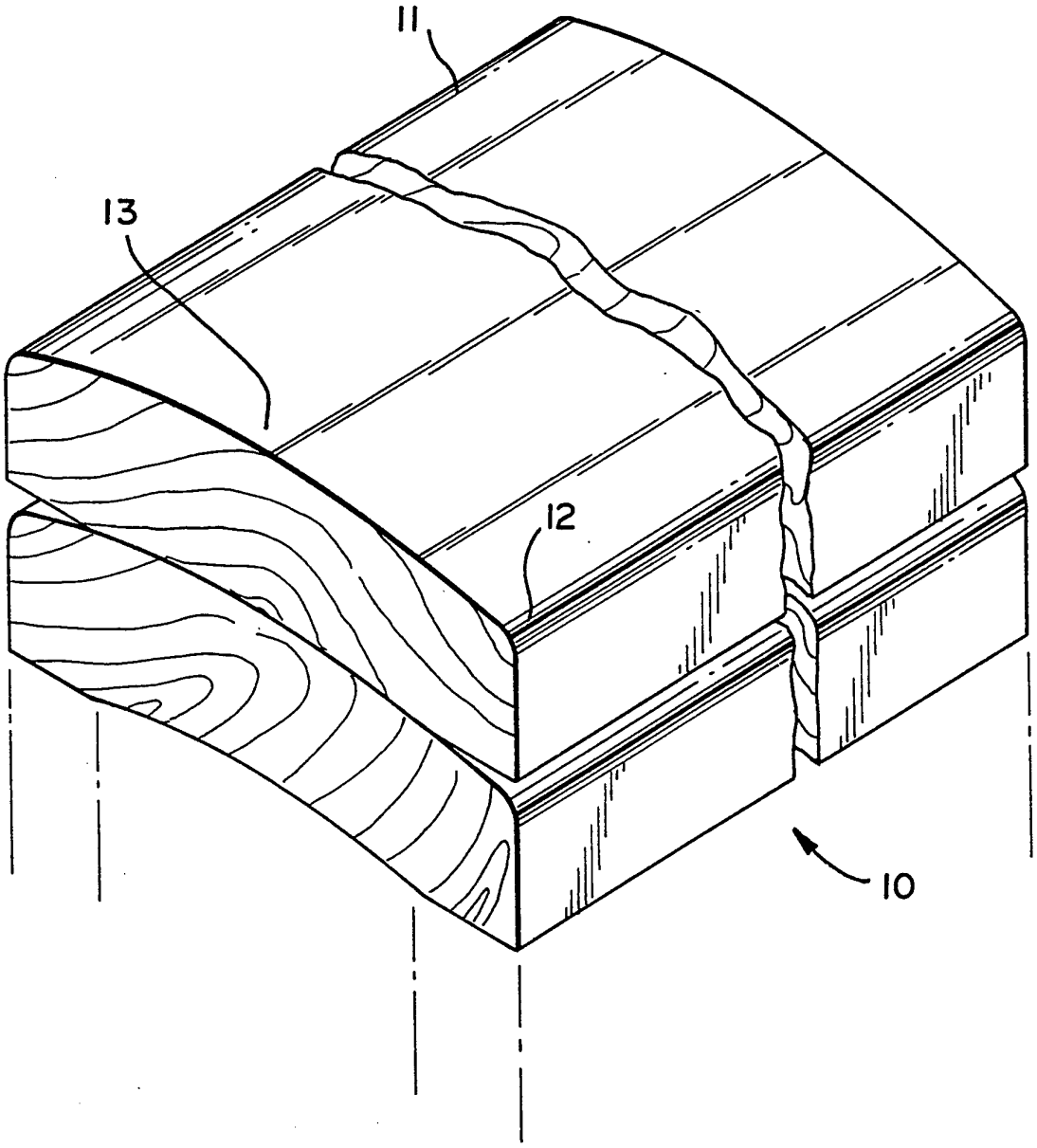
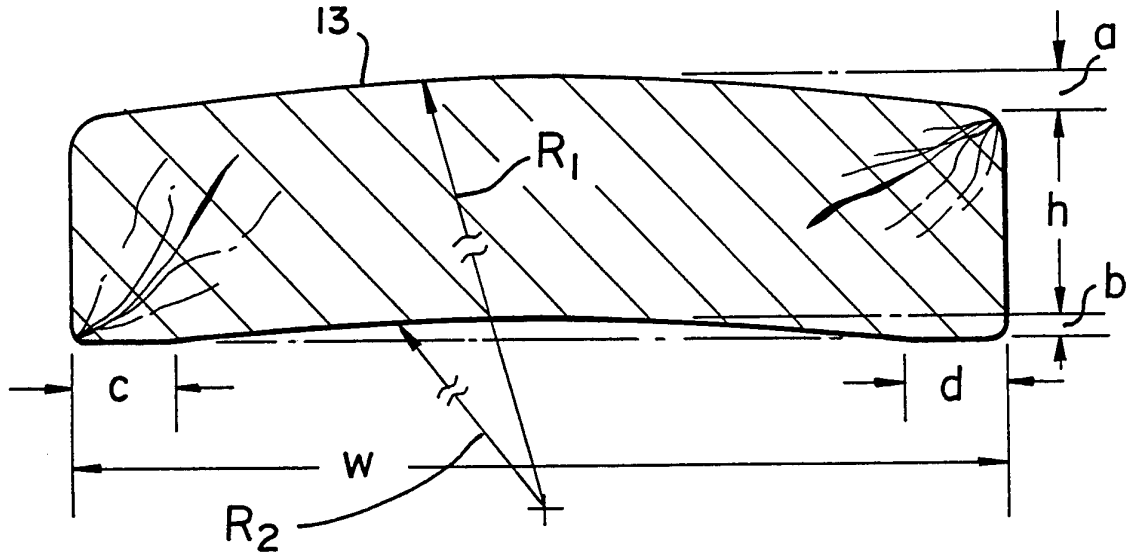


FIG. 2



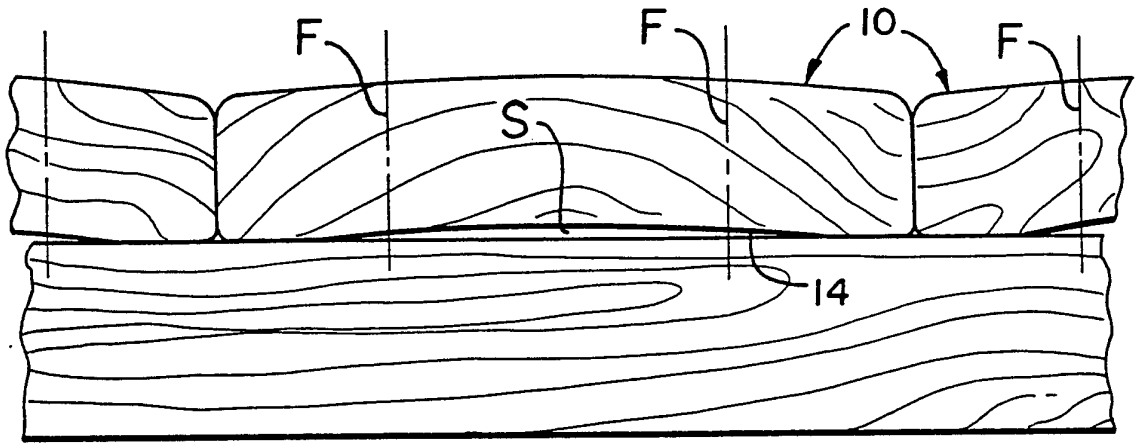


FIG. 3

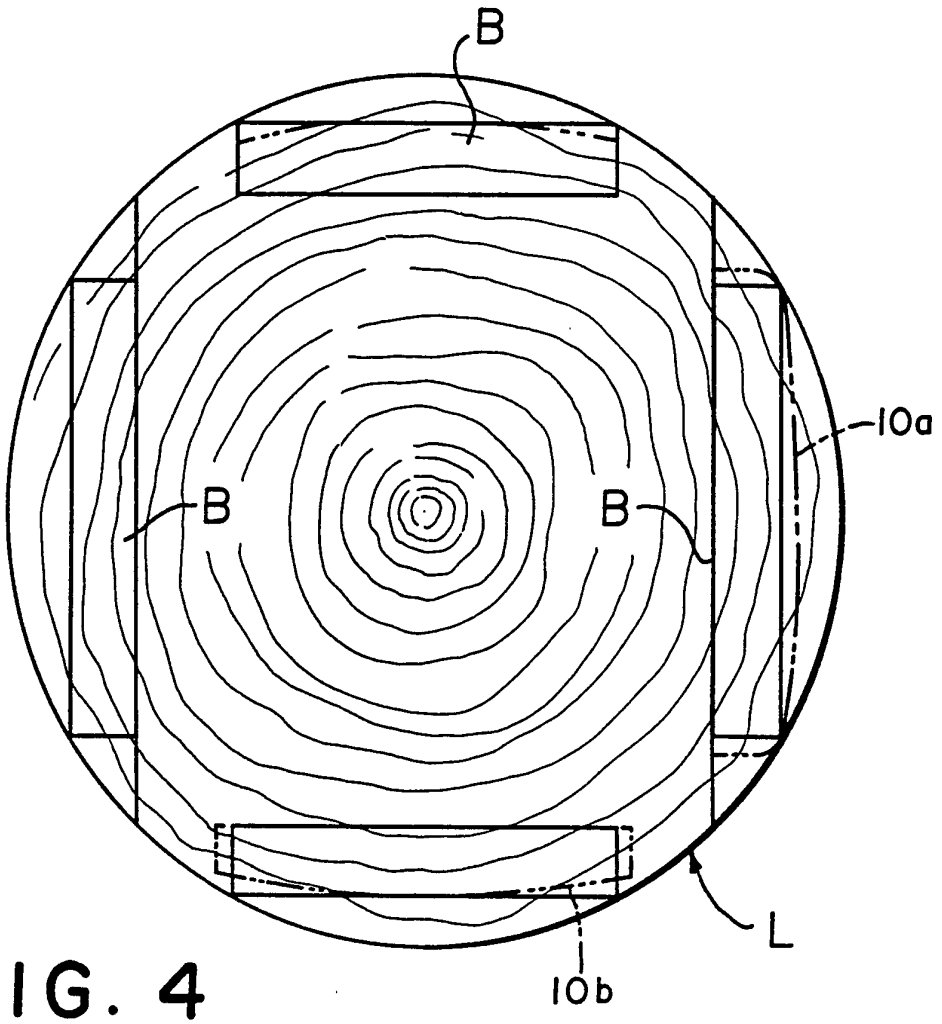


FIG. 4

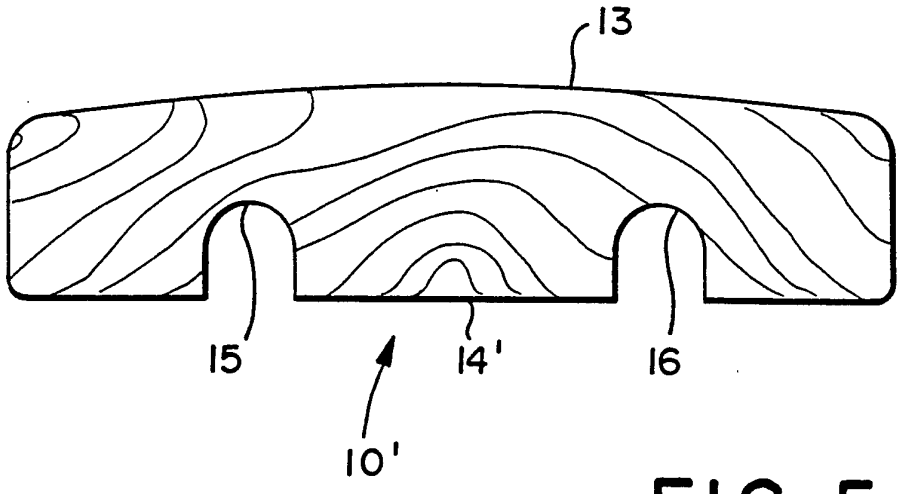


FIG. 5

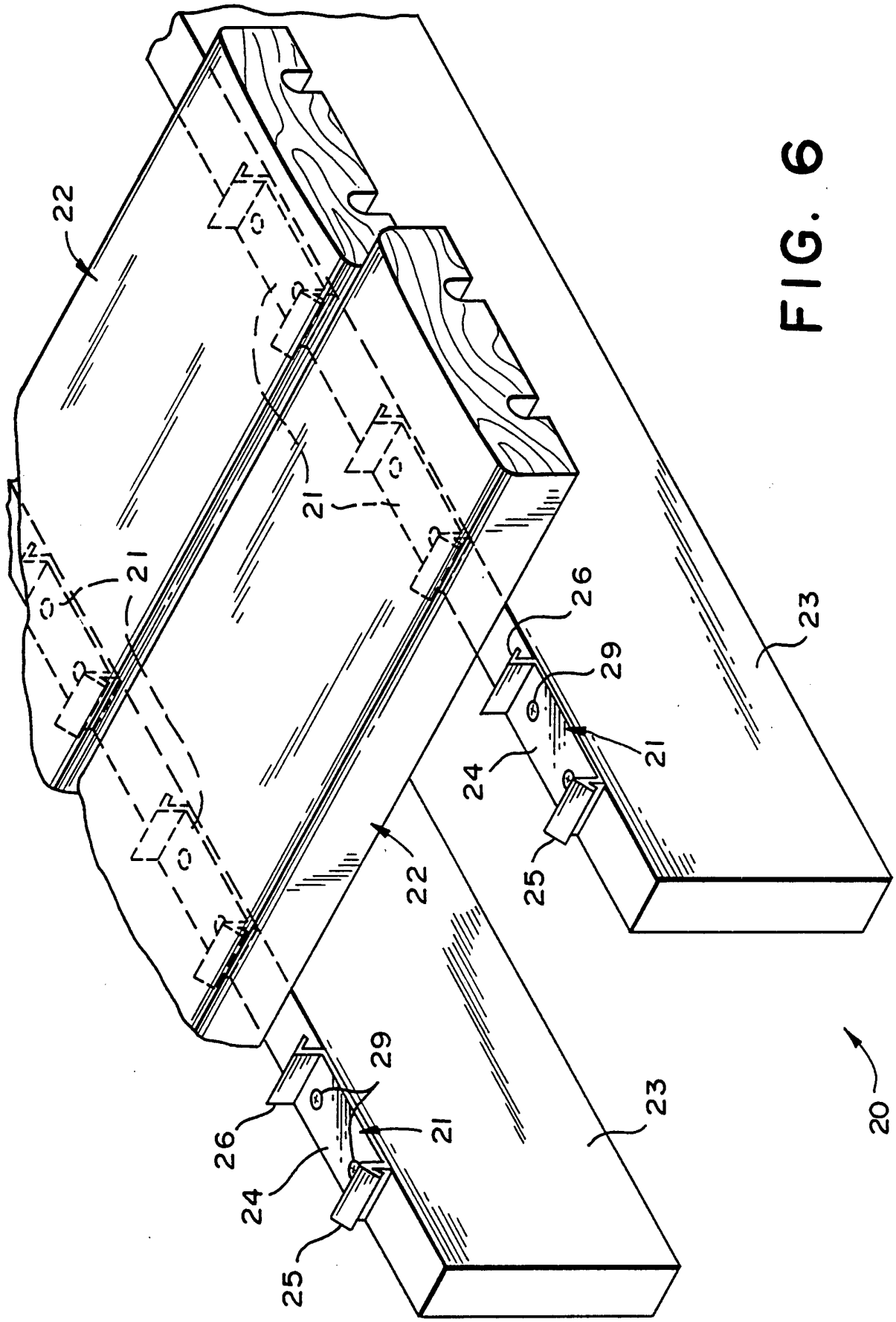


FIG. 6

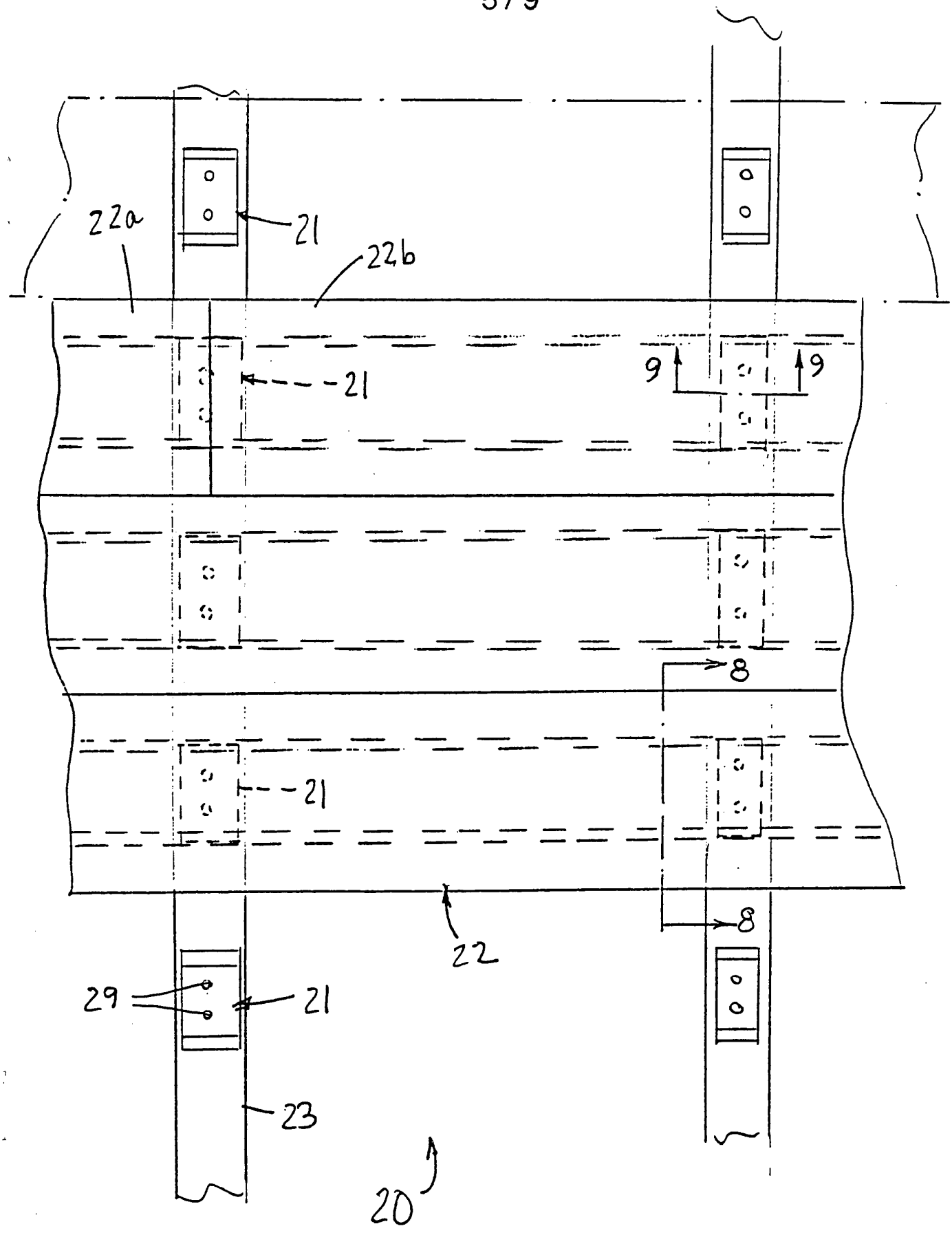


FIG. 7.

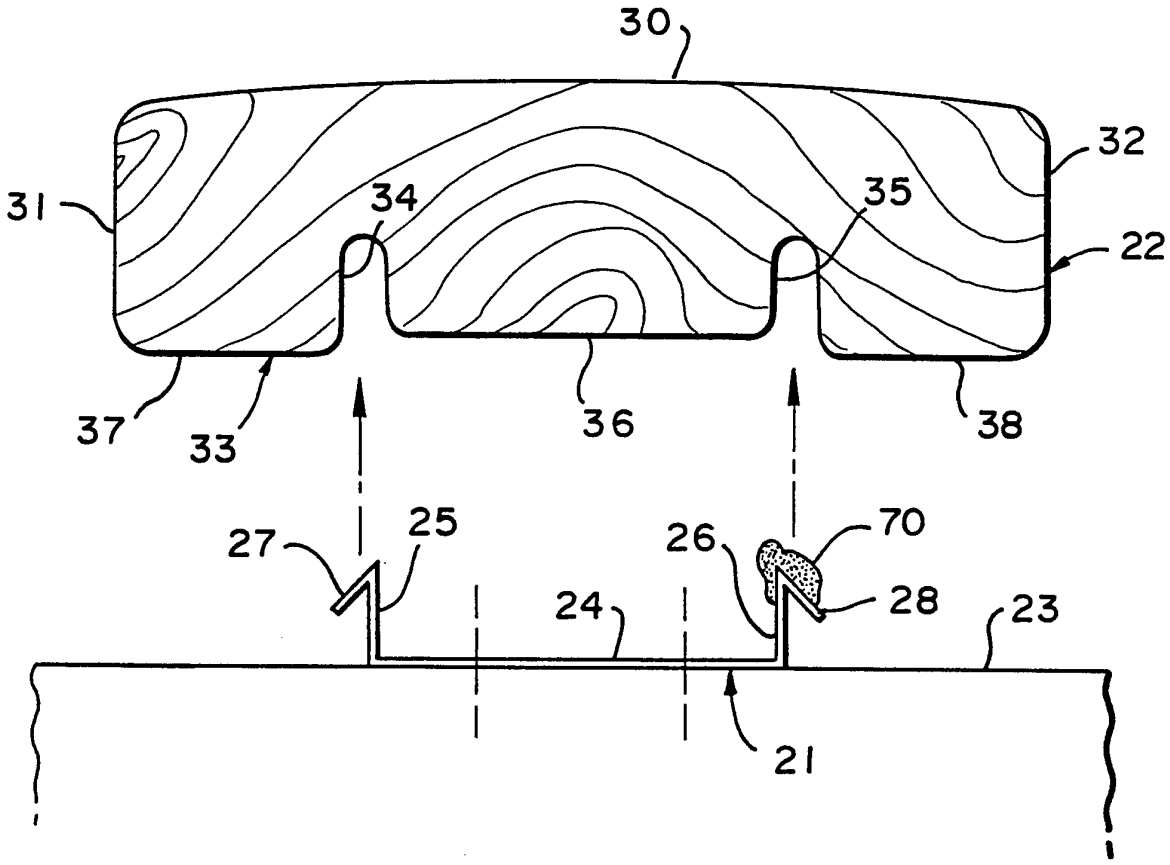

30
31
32
34
35
22
37
33
36
38
27
25
26
70
28
24
23
21

FIG. 8

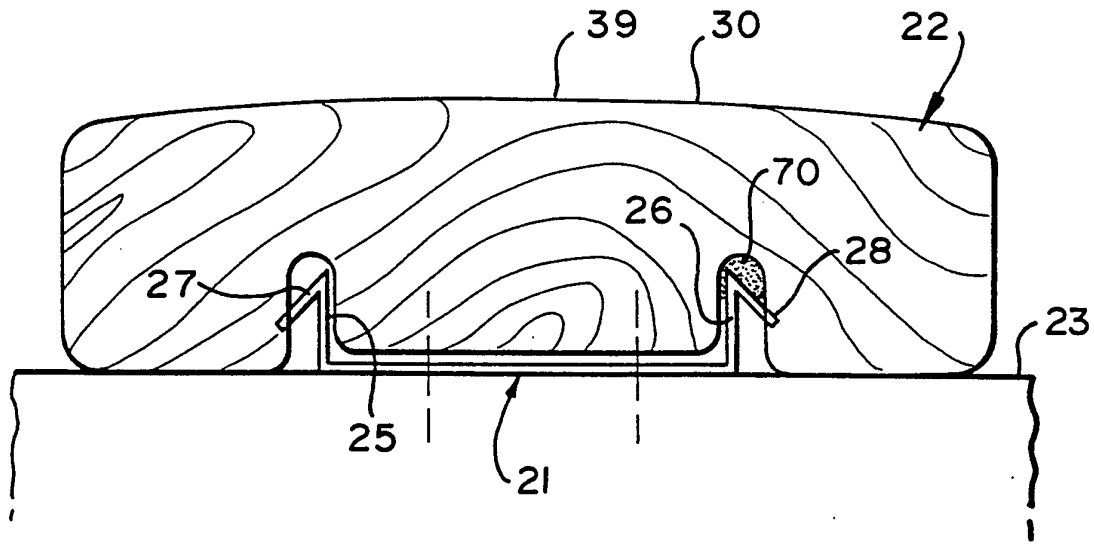

39
30
22
70
26
28
27
23
25
21

FIG. 9

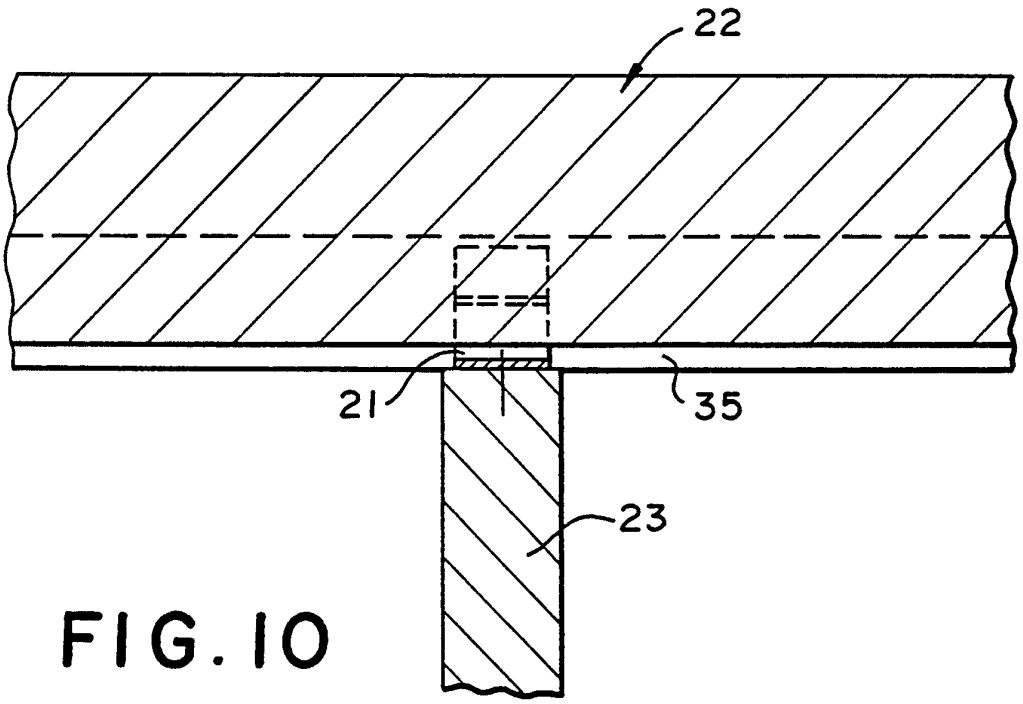


FIG. 10

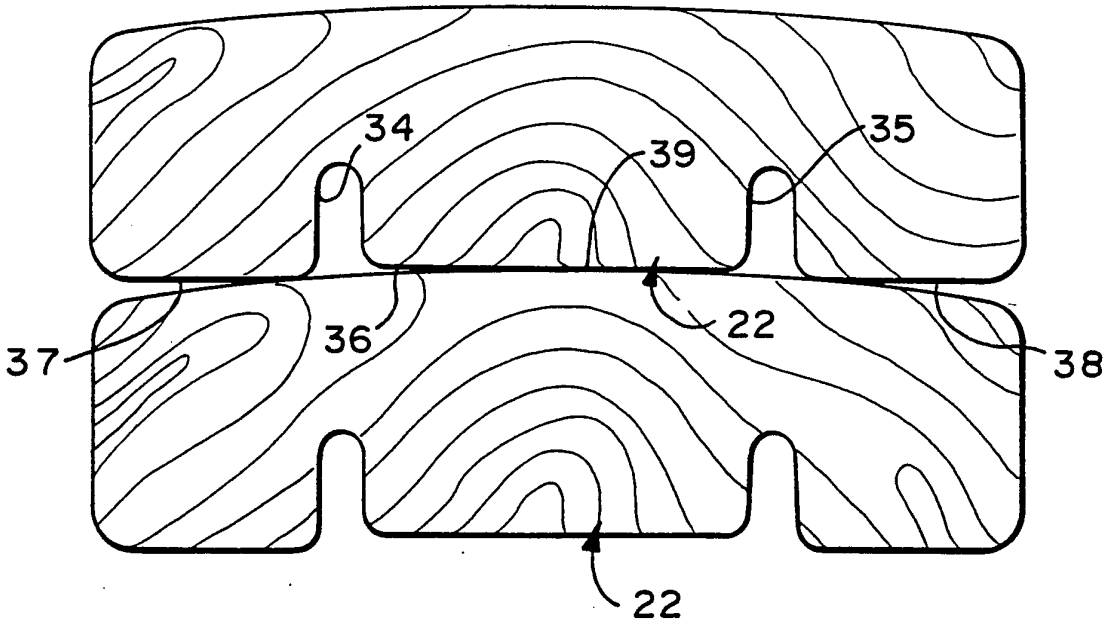


FIG. 11

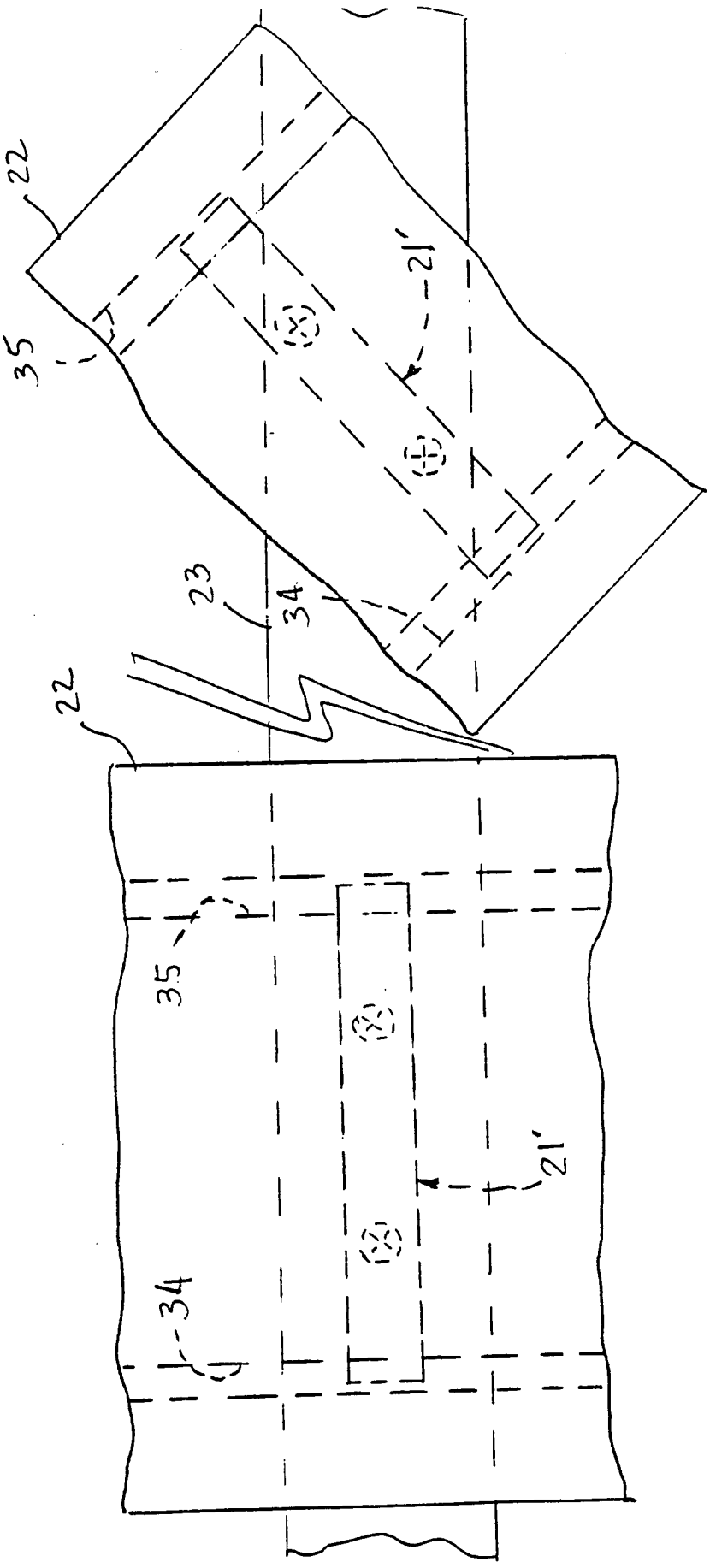


FIG. 13

FIG. 12

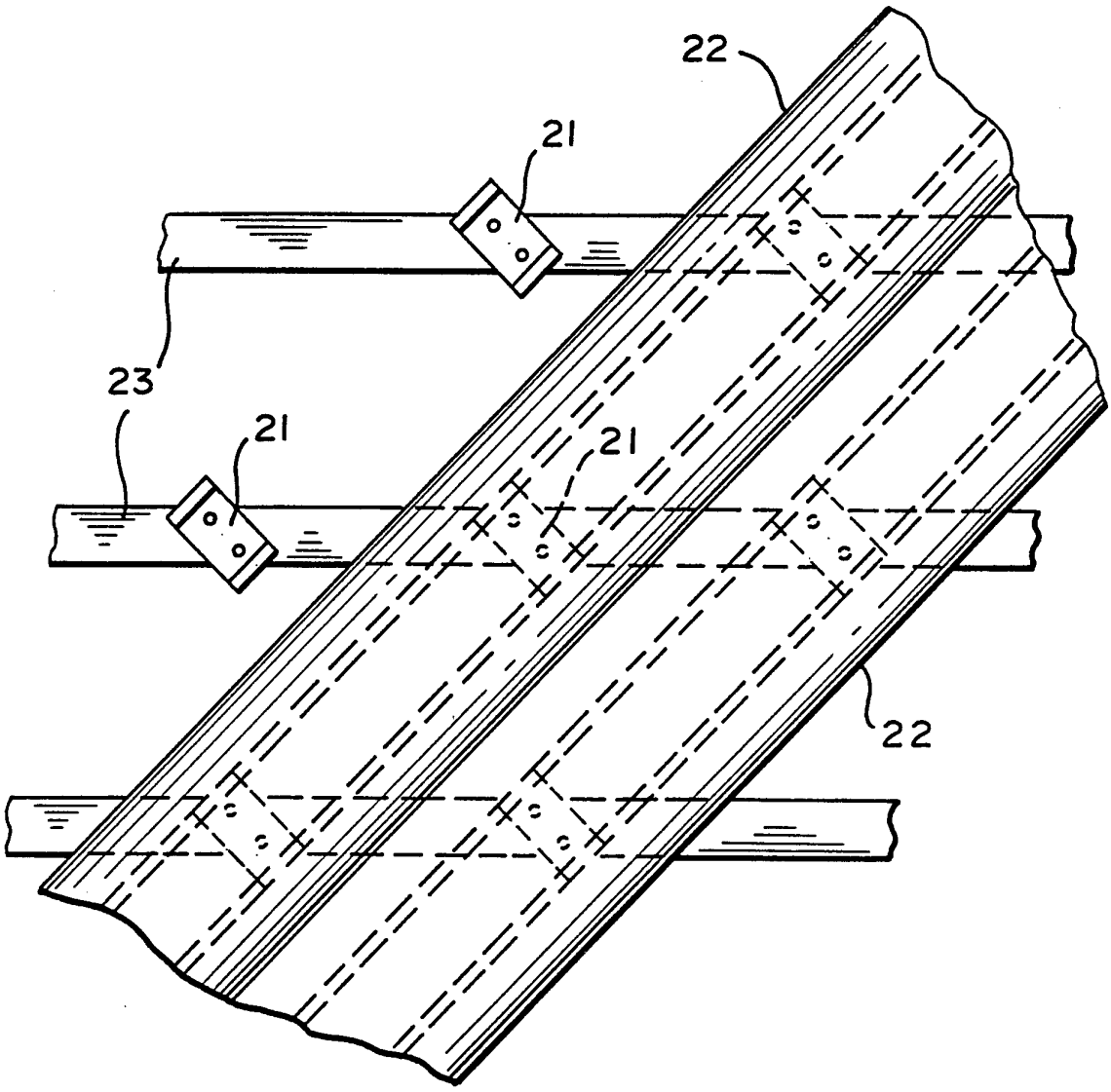


FIG. 14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US93/06545

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) : E04B 1/38; B27H 1/00; B25G 3/36; B32B 1/00, 3/28

US CL :Please See Extra Sheet.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US, A, 4,395,858 (GWYTHER) 02 AUGUST 1983. See entire document.	18-20 --- 15-17
X --- Y	CH, A, 610 970 (BLANC & CO GMBH) 15 MAY 1979. See entire document.	18-20 --- 15-17
X --- Y	US, A, 4,189,881 (HAWLEY) 26 FEBRUARY 1980. See entire document.	20 --- 18, 19
X --- Y	US, A, 3,590,541 (EPSTEIN) 06 JULY 1971. See entire document.	20 --- 18, 19

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be part of particular relevance

"E" earlier document published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
02 September 1993	12 OCT 1993
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. NOT APPLICABLE	Authorized officer DONALD J. LONEY Telephone No. (703) 308-2351

Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US93/06545

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US, A, 1,593,297 (GILMER) 20 JULY 1926. See entire document.	20 -------- 18, 19
Y	US, A, 3,287,203 (ELMENDORF) 22 NOVEMBER 1966. See entire document.	15-17
Y	US, A, 482,536 (ZAGELMEYER) 13 SEPTEMBER 1892. See entire document.	1-17, 21
Y	US, A, 5,059,474 (YOSHIDA) 22 OCTOBER 1991. See entire document.	1-17, 21
A	US, A, 3,724,154 (COOKSON) 03 APRIL 1973. See entire document.	18-20
A	US, A, 3,299,601 (CHIVILLE) 24 JANUARY 1967. See entire document.	18-20
A	US, A, 239,846 (RING) 05 APRIL 1881. See entire document.	18-20

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US93/06545

A. CLASSIFICATION OF SUBJECT MATTER:
US CL :

52/386, 387, 391, 480, 489, 512, 546, 549, 550, 551, 552; 144/254, 256.3, 270, 359; 403/387, 397; 404/46; 428/50, 99, 167, 172, 174, 192

B. FIELDS SEARCHED
Minimum documentation searched
Classification System: U.S.

52/386, 387, 391, 480, 489, 512, 546, 549, 550, 551, 552; 144/254, 256.3, 270, 359; 403/387, 397; 404/46; 428/50, 99, 167, 172, 174, 192