

March 19, 1968

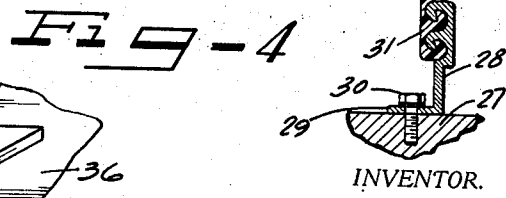
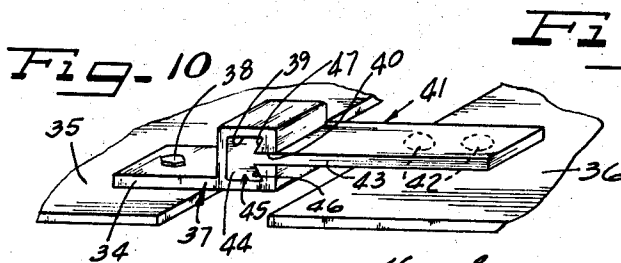
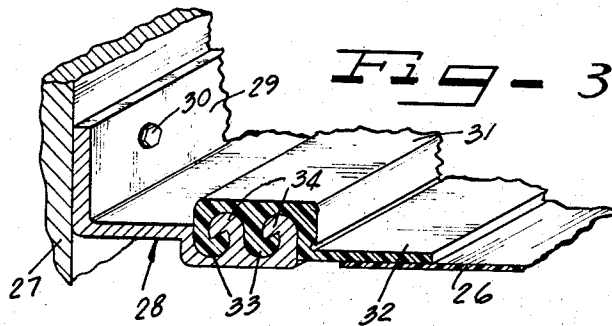
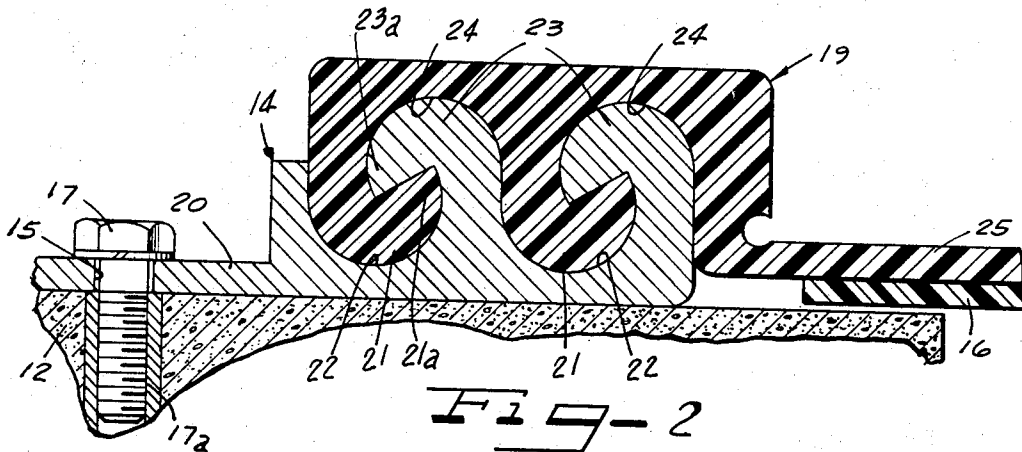
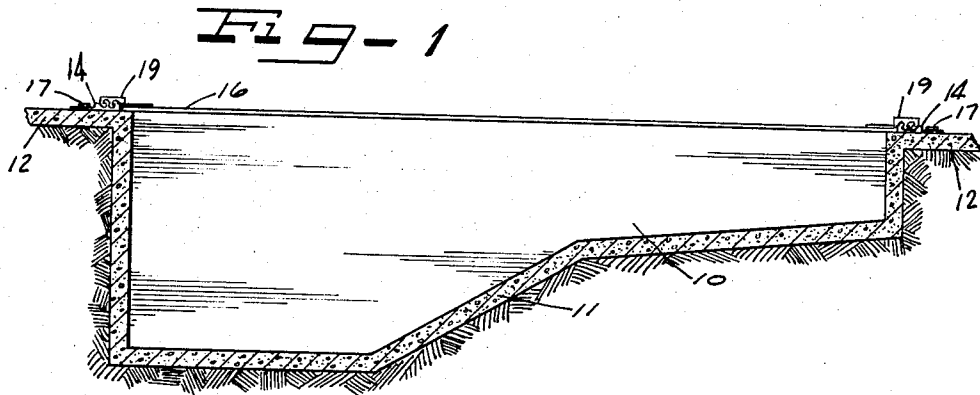
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3,373,464

STRUCTURE FOR ANCHORING FLEXIBLE SHEETING

Filed March 30, 1965

2 Sheets-Sheet 1



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STRUCTURE FOR ANCHORING FLEXIBLE SHEETING

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2 Sheets-Sheet 2

FIG-5

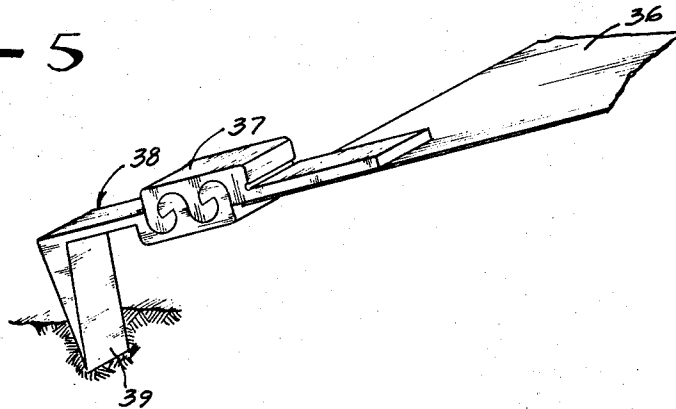


FIG-6

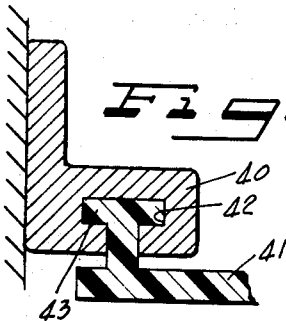


FIG-7

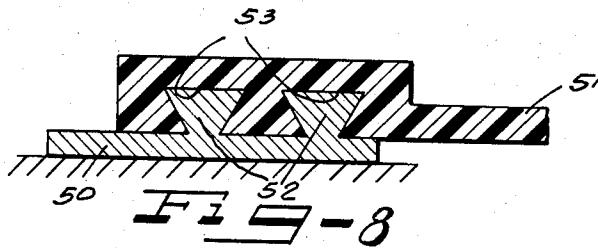
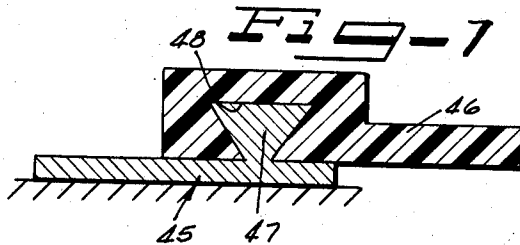
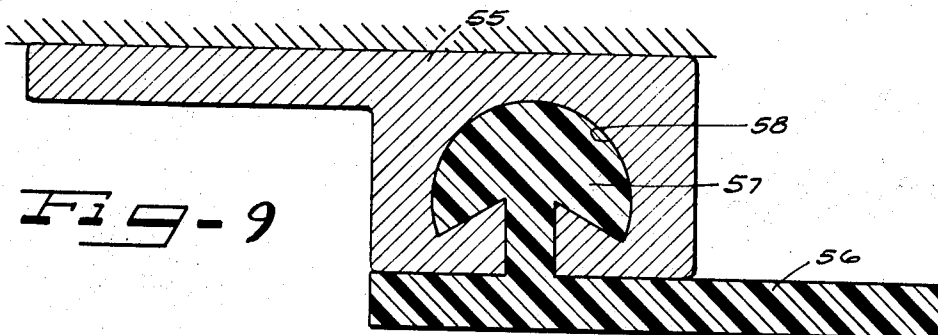


FIG-9



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STRUCTURE FOR ANCHORING FLEXIBLE SHEETING

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ABSTRACT OF THE DISCLOSURE

A fastener device for releasably anchoring a tensioned flexible sheet to an anchoring surface. The device includes a rigid anchor member adapted to be connected fast to the anchoring surface and a flexible attachment member made of elastomeric material adapted to be secured to the flexible sheet. Both the rigid anchor member and the flexible attachment member have complementarily shaped elongated cooperating groove and rib elements formed thereon. The groove and rib elements each comprise a neck portion which extends laterally of the longitudinal axis of the element and an enlarged head portion opening to the neck portion so that the anchor member and the attachment member are releasably interlockable by snap-in engagement of the rib and groove elements. The rib and groove elements extend transversely of the lines of force in the tensioned sheet to resist separation of the anchor and attachment members due to the tension in the sheet.

Summary and objects of the invention

The present invention relates to improvements in structures for anchoring or attaching a sheet to a rigid supporting surface.

More particularly, the invention relates to an improved and inexpensive way of anchoring a sheet form material such as vinyl, polyethylene or coated canvases to the ground or to a hard surface. There is a need for an improved simplified anchoring means for attachment of protective canvases or sheets over such units as swimming pools or other areas to be protected. The sheets or canvases which protect the areas must be easily attached to their anchoring surfaces and be supported stably and securely and yet be easily removed. Many other environments require improved sheet anchoring means such as for attaching protective canvases over a boat or over machinery, attaching tent structure to an earth anchor or protecting building sites or other areas where the canvas must be easily attached and removed with a simplified reliable attachment device.

One arrangement of the invention employs a continuous fastener member and will be herein referred to as a continuous arrangement, and another employs an intermittent member and will be referred to as a non-continuous arrangement.

It is accordingly an object of the present invention to provide an improved attachment means for attaching a flexible sheet form member to a rigid anchor by an attachment means which accommodates rapid and easy attachment and removal and which permits repeated reuse.

A still further object of the invention is to provide an improved anchoring device for attaching the edges of canvases or sheets to a rigid surface with the anchoring device being inexpensive to manufacture and providing strong resistance to dislocation and detachment from forces in the plane of the sheet form member but permit-

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ting removal or reattachment by the application of local forces.

A still further object of the invention is to provide an improved attachment means for attaching a sheet to a rigid surface wherein the portion which is secured to the rigid surface can remain when the sheet is removed and looks attractive without taking up unwanted space.

Yet another object of the invention is to provide an improved attachment structure for attaching sheets to a rigid surface which provides features of improved attachment strength, and features which permit simplified manual attachment and removal.

Other objects, advantages and features will become more apparent with the teaching of the principles of the present invention in connection with the disclosure of the preferred embodiments thereof in the specification, claims and drawings, in which:

FIGURE 1 is an elevational view of a swimming pool with a vertical section being taken through the pool, and illustrating a protective sheet anchored in place by a mechanism embodying the principles of the present invention;

FIGURE 2 is an enlarged detailed sectional view of an anchoring mechanism in accordance with the invention;

FIGURE 3 is a perspective view with portions in section and broken away of a form of anchoring mechanism;

FIGURE 4 is a vertical sectional view of the anchoring mechanism of FIGURE 3; FIGURES 1 to 4 pertaining to said continuous arrangement;

FIGURE 5 is a perspective view of a mechanism utilized to anchor a sheet to the earth, and relates to either the continuous or the non-continuous arrangement;

FIGURES 6-9 illustrate other forms of inter-locking arrangements of the anchoring structure of the invention;

FIGURE 10 is a fragmentary perspective view of a structure exemplary of the non-continuous arrangement.

On the drawings:

FIGURE 1 illustrates a swimming pool 10 formed by a concrete bed or wall in the earth having an open top which is to be protected by a sheet form member or cover sheet 16 when not in use. At the edges of the pool are concrete curbs 12 having upper flat surfaces to which anchor members 14 are secured such as by bolts 17. The anchor members interlockingly receive flexible attachment members 19 which are secured or sealed to the edges of the sheet 16. This structure is shown in detail in FIGURE 2.

The anchor member extends preferably continuously along the edge of the pool and is formed of a rigid non-yieldable material such as metal. The anchor member may be referred to as substantially flat and is provided with an anchoring flange 20 with openings 15 therethrough at spaced intervals to receive the anchoring bolts 17 which are threaded downwardly into a suitable threaded anchor sleeve 17a embedded in the concrete of the curb 12. The anchor member is shown with a flat lower surface so that it lies firmly on the upper flat surface of the concrete curb preventing dirt and water from passing beneath the anchor member 14. The anchor member is shaped with a uniform cross section along its elongate length and in this form can be inexpensively manufactured by acceptable conventional manufacturing processes such as by being extruded. Aluminum is particularly well suited for this use since it is well adapted to extrusion and is non-corrosive and non-rusting.

Projecting laterally upwardly from the anchor member 14 are ribs 23 and upwardly facing grooves 22 are formed beside the ribs 23. The ribs and grooves are sized and shaped to releasably interlockingly receive coacting ribs 21 and grooves 24 of the flexible attachment member 19. The flexible attachment member is also substantially flat and has an attaching web portion 25 which is secured or bonded to sheet 16 such as by being heat sealed thereto by a high frequency or impulse seal, or bonded with cement, or by being sewn to the sheet, or by being attached by other suitable means. In some circumstances, it may be possible to form the flexible attachment member 19 and the sheet is an integral one piece unit but where the sheet is large the needs of the structure can be accommodated better by forming the attachment member separate and suitably securing it to the sheet 16.

While the ribs and grooves can take other shapes, a particularly strong interlocking relationship has been found to be possible wherein hook shaped ribs and grooves are employed as shown by the overhanging or hook shaped portion 21a of the hook 21 and the same shape for an overhanging hook portion 23a for the hook 23.

The flexible resilient attachment member 19 is formed of a suitable flexible material such as vinyl, polyethylene or other plastic, and is well suited to be manufactured inexpensively by an extrusion process. The sheet 16 tends to exert a continuous pulling force due to its stretched tension in a direction away from the anchor member 14 parallel to the plane of the sheet which may be referred to as the force plane. The hooks and grooves interlock laterally of the force plane and provide an unusually strong resistance to separation from the force of the sheet 16. Since the anchor member 14 is rigid, it provides a stable positively located position for supporting the sheet while local tensions in the force plane are assimilated by the resiliency of the flexible attachment member.

For continuous mounting of the sheet in place, the attachment member 19 is joined to the anchor member 14 by applying a progressive local force to the upper surface of the attachment member 19 while holding it in alignment with the anchor member 14. This may be done by moving the bar or other member along the top surface of the attachment member 19 or the ribs and grooves can be pressed into place by the operator moving his shoe along the upper flat surface of the attachment member 19.

FIGURES 3 and 4 illustrate an arrangement for attaching a sheet 26 to a rigid surface 27 which extends at right angles to the force plane of the sheet 26. A rigid anchor member 28 has a laterally extending flange 29 with spaced openings for receiving anchoring bolts 30 which are threaded into the rigid surface 27. A flexible attachment member 31 extends continuously along the edge of the sheet 26, having a web 32 which is bonded to the sheet 26. The flexible attachment member has integral flexible ribs 33 with adjacent grooves and the rigid anchor member 28 has rigid ribs 34 with adjacent grooves so that the anchor member and attachment member can be interlocked. For releasing the sheet the attachment member 31 is pulled laterally to strip the ribs and grooves apart.

FIGURE 5 shows an arrangement for anchoring a sheet 36 to a ground surface. A flexible attachment member 37 is attached along the edge of the sheet 36 and is provided with interlocking rib and groove elements. The rib and groove elements attach to coacting rib and groove elements of an anchor member 38. The anchor member has a laterally extending attachment means in the form of a spade 39 which is sunk into the earth to anchor it in a fixed location. The anchor member has a flat upper surface for driving the spade 39 into the earth. This form is useful in environments such as anchoring tents and the anchor members can be used in the place of tent pegs being locatable at any suitable positions along the lower

edge of the tent. Flexible attachment members such as 37 may be secured at spaced locations or a continuous member can be used so that anchor members 38 can be placed at any location.

FIGURE 6 shows another form utilizing the non-continuous arrangement wherein a rigid anchor member 40 is attached to a rigid surface and receives a flexible attachment member 41 attached to a sheet. Interlocking rib and groove elements of a different form are provided with a rib element 43 being T-shaped and received by a mating T-shaped groove 43 in the anchor member 40. In the embodiments of FIGURES 6-9 wherein a single rib and a single groove are used, for reasons of strength the female member will always be rigid. The location of use will often dictate the arrangement and in an area where dirt and foreign matter accumulates, it is better not to utilize a groove which faces upwardly and to use the rib on the member which faces upwardly. The interlocking rib and groove elements may be positioned on either surface of the anchor member and attachment member but should be located at a location which is accessible to the operator so that he can easily apply interlocking pressure and so that he has room to draw the ribs and grooves apart when the sheet is to be released from the anchor member.

FIGURE 7 illustrates an arrangement wherein an anchor member 45 receives a flexible attachment member 46 for a sheet. A rib 47 on the rigid anchor member is interlocked in a groove 48. The rib has an inverted pyramid shape with flat upper and side surfaces.

FIGURE 8 illustrates an arrangement with double ribs and grooves of a shape similar to FIGURE 7. The anchor member 50 receives a flexible attachment member 51 which has grooves 53 for receiving ribs 52 of the anchor member.

FIGURE 9 shows an arrangement with an anchor member 55 and a flexible attachment member 56. An arrow-head shaped rib and groove arrangement is provided to releasably attach the members with a rib 57 on member 56 received by a groove 58 in member 55.

One structure is particularly well suited for use where attractive unobtrusive attachment members are essential when the sheet is removed. For example, in the structure of FIGURE 2 the rigid anchor member provides an attractive unit which can be permitted to remain at the poolside when the sheet is removed and this design is also well suited for use on machinery or on boats. Remaining rigid anchor member is sufficiently small not to be obtrusive and in fact provides a decorative rib shaped trim member which enhances the appearance of the surface rather than detracts from it.

The structure provides uniform reliable support for the sheet which is continuous and does not provide intermittent support locations which stress the sheet as do other forms of attachments, such as interlocking buttons or snaps. The attachment when continuous also provides a leakproof covering arrangement which is well suited for locations wherein water must be kept out and where intermittent attachment devices, such as heretofore used, permit leakage. Also, continuous support applies less stress on the sheet member so that lighter weight canvases or sheets can be used without tearing due to concentrations of stress at spaced attachment points.

The attachment mechanism is superior in attachment strength since the rigid anchor member provides for improved interlocking relationship with the flexible attachment member. That is, the rigid anchor member provides rigid non-yielding ribs which do not twist or distort for improved continued interlocking relationship and yet resilience is afforded to the interlocking relationship to assimilate minor forces which tend to dislodge the ribs and grooves. Further, the combination of the rigid and resilient interlocking ribs and grooves provide a structure which separates easier since the flexible attachment member can be quickly peeled from the rigid anchor

member by drawing it laterally away from the anchor member. The members are easily interlocked since a force need be only applied to the flexible attachment member and the rigid anchor member provides a non-yieldable backing. This makes it unnecessary to use a slider for attaching and releasing the ribs and grooves.

In FIGURE 10 a form of non-continuous arrangement is illustrated. An anchoring surface 35 supports an anchor member 37 having a flange 34 with an opening there-through for receiving a stud 38 holding the anchor member in place.

The anchor member has a shape providing for a groove with a neck portion 40 and an enlarged portion 39. The enlarged portion extends laterally or axially through the anchor member 37 in a direction parallel to the plane of a sheet form element 36, and laterally of the plane of force in which the sheet form element 36 tends to pull.

For attaching the sheet form element 36 which may be a tarpaulin or tent or similar sheet, an attachment member 41 is connected to the edge of the sheet 36 by bonding areas 42. The bonding arrangement may be provided by adhesive or by a heat seal if the surface of the sheet 36 and attachment member 41 are of thermoplastic or of similar material which can be bonded to other similar material.

The anchor member 37 is usually made of rigid material and attachment member 41 is usually flexible. It is possible however that the same basic material is used for both members with one of them remaining rigid and the other flexible. Such an example is rigid and flexible polyvinylchloride. The anchor member may be made out of materials such as metal or molded hard plastic. The attachment member has a web portion 43 attached to the sheet 36 and a generally T-shaped head portion 44 which fits the enlarged portion 39 of the groove of the anchor member 37. The T-shaped head 44 has lugs of sufficient size that they do not pull through the neck portion 40 of the groove. In a preferred form the groove 39 is of uniform size and shape in an axial direction so that the head 44 of the attachment member can be slid axially into the groove. A small projection 45 may be provided at one end of the groove to aid in holding the head 44 of the attachment member in place and to prevent it from inadvertently slipping axially out of the groove. A similar tooth or projection such as 45 may be provided at the other end of the groove and if the head 44 is of flexible material it will slide over the projection 45 when the unit is assembled but will not inadvertently slip out of the groove.

The T-shaped head 44 in the groove is preferably formed with angular surfaces 46 and 47 at the base of the head 44 to strengthen the attaching relationship between the attachment member and the anchor member.

It is further contemplated that either the anchor member 37 or the attachment member 41 may have continuous attachment members with intermittent interconnecting portions. In other words the flange 34 of the anchor member may be continuous with separate head portions each having a groove 39 for receiving individual heads 44. Also the web portion 43 of the attachment member may be continuous with separate heads for being received by separate anchor members.

The anchor member and attachment member shown in FIGURE 10 may be used individually for attachment or may be used in series for the attachment of the long edge of a sheet to an anchor. In another form of continuous anchor member may be used with a continuous groove and a plurality of flexible attachment members with ribs or heads sliding in the groove.

Thus it will be seen that I have provided an arrangement involving a rigid fastener anchor with a flexible fastener profile received by a groove in the anchor and which may be employed in either a continuous or an intermittent arrangement. The joining of the anchor and

attachment members may be accomplished by pressing the flexible section into the rigid groove or may be joined by inserting one section into the other sideways.

The drawings and specification present a detailed disclosure of the preferred embodiments of the invention, and it is to be understood that the invention is not limited to the specific forms disclosed, but covers all modifications, changes and alternative constructions and methods falling within the scope of the principles taught by the invention.

I claim as my invention:

1. A fastener for releasably securing a sheet of tensioned flexible material lying substantially in a force plane to a rigid anchoring surface comprising,

a rigid anchor member,

means for securely fastening said anchor member to the anchoring surface,

an attachment member made of elastomeric material adapted to be fixedly secured to the sheet of flexible material at one end thereof and releasably attached to the rigid anchor member at the other end thereof,

said members in the assembled state thereof residing substantially in the force plane of the tensioned sheet when the sheet is anchored to the anchoring surface, and

cooperating groove and rib elements formed on said members each being elongated and adapted to extend transversely of the lines of force of the tensioned sheet,

said groove element comprising means forming a groove having a neck portion extending laterally of the longitudinal axis of said groove element and an enlarged head portion opening to said neck portion,

said rib element comprising means forming a rib having a neck portion and an enlarged head portion shaped complementarily to said neck and head portions of said groove element for interlocking snap-in attachment thereto,

the dimensions of said head portions of said groove and rib elements in a direction transversely of the longitudinal axes of said elements being greater than the corresponding dimensions of said neck portions,

the element formed on said anchor member being rigid and having a fixed shape and location,

the element formed on said attachment member being flexible and distortable so that the head portion thereof can be easily squeezed past the neck portion of the rigid element by the application of a lateral force thereto,

whereby said anchor and attachment members may be quickly and easily assembled by a force acting laterally of the longitudinal axes of said elements to cause snap-in assembly of said groove and rib elements, and whereby said attachment member may be quickly and easily released from said anchor member by the application of a lateral force to the attachment member to strip the groove and rib elements from each other.

2. The fastener as defined in claim 1 wherein said groove element is formed on said anchor member.

3. The fastener as defined in claim 1 wherein the cross-sectional configuration of said groove and rib elements are hook shaped in a plane extending normal to the longitudinal axes of said elements.

4. The fastener as defined in claim 1 wherein the cross-sectional configuration of said groove and rib elements are T-shaped in a plane extending normal to the longitudinal axes of said elements.

5. The fastener as defined in claim 1 wherein the cross-sectional configuration of said groove and rib elements are pyramid-shaped in a plane extending normal to the longitudinal axes of said elements and comprise flat upper and side surfaces.

6. The fastener as defined in claim 1 wherein the cross-

sectional configuration of said groove and rib elements are arrowhead-shaped in a plane extending normal to the longitudinal axes of said elements.

References Cited

UNITED STATES PATENTS

796,414	8/1905	Chayes.	
2,496,910	2/1950	Fridolph	160—395 X
2,665,467	1/1954	Bosomworth et al.	24—201
2,715,254	8/1955	Tschappu	24—201 X
2,775,252	12/1956	Finch	135—15
2,810,944	10/1957	Sander	24—201

2,815,809	12/1957	Jacobs et al.	160—368
2,886,481	5/1959	Swan	160—354 X
2,925,862	2/1960	Sundby	160—354
2,956,324	10/1960	Klein	24—230
3,051,232	8/1962	Lamb	160—368
2,943,634	7/1960	Morgan.	
3,172,419	3/1965	Lewis	135—6

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