



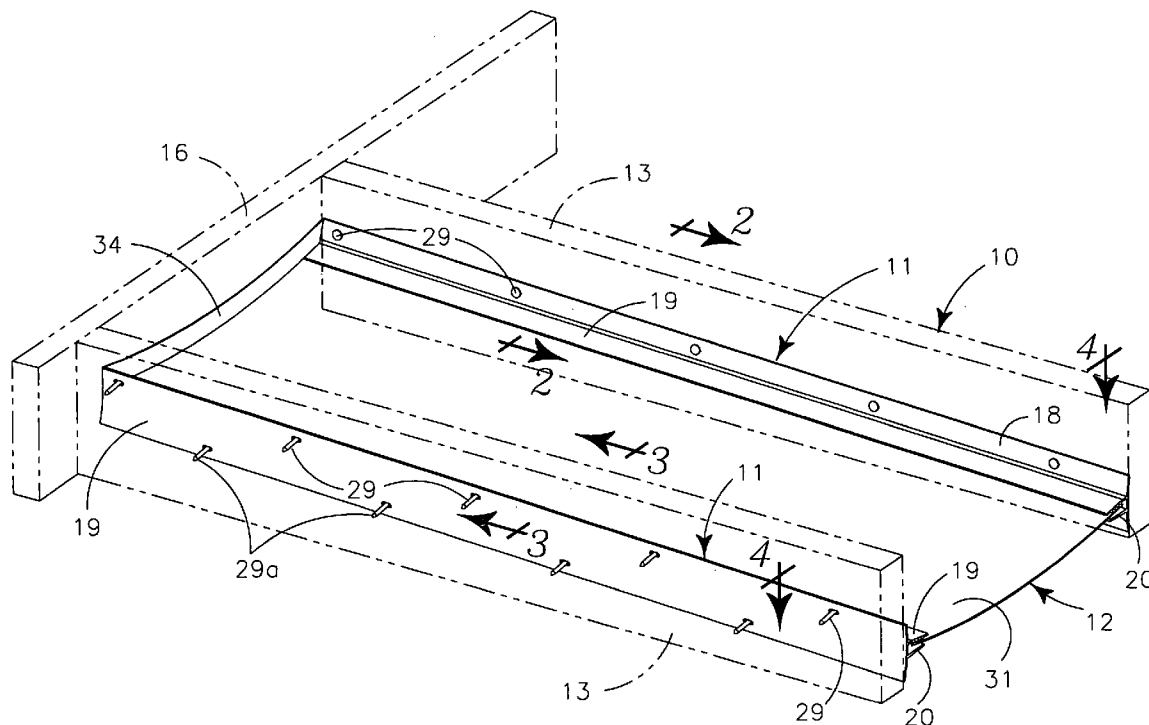
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(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0252151 A1****Kindred**(43) **Pub. Date:****Nov. 17, 2005**(54) **UNDER DECK DRAINAGE SYSTEM**(52) **U.S. Cl.** ..... **52/650.3**(76) **Inventor:** **David J. Kindred, Spokane, WA (US)**(57) **ABSTRACT**

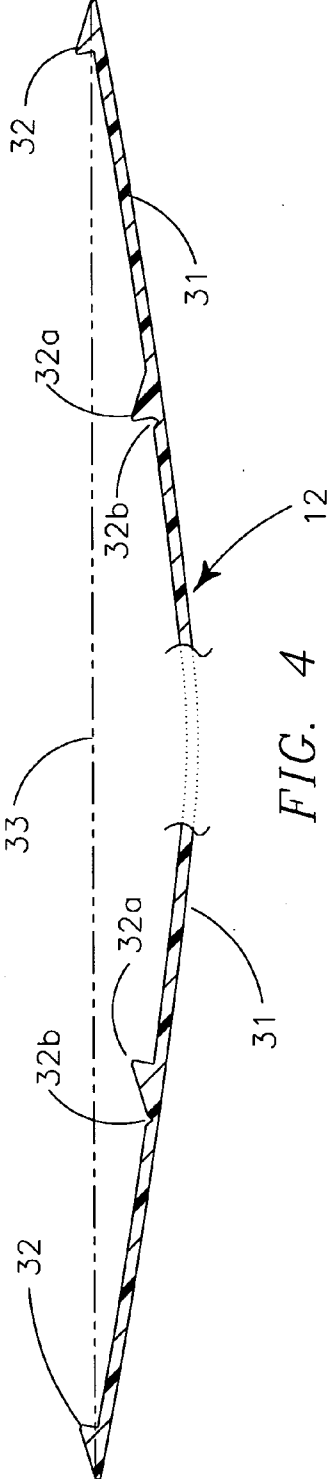
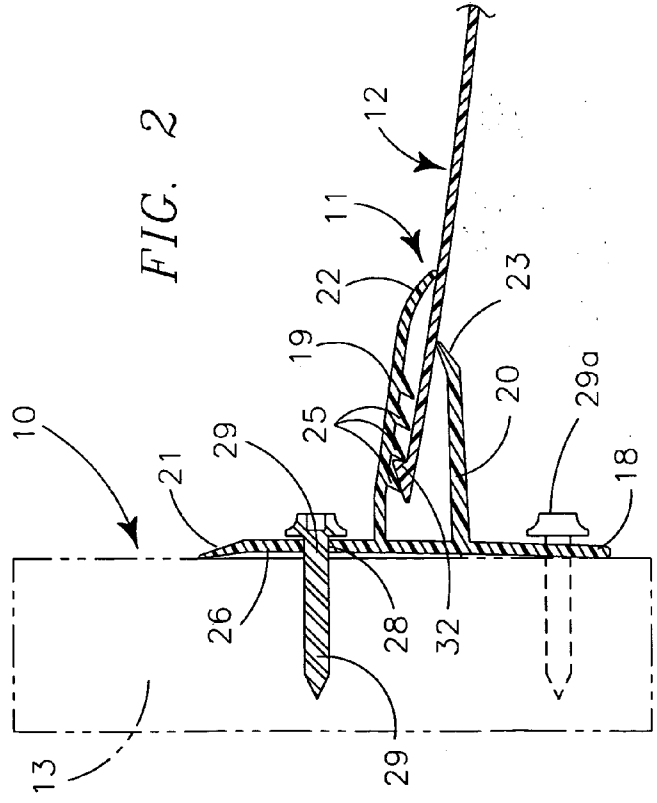
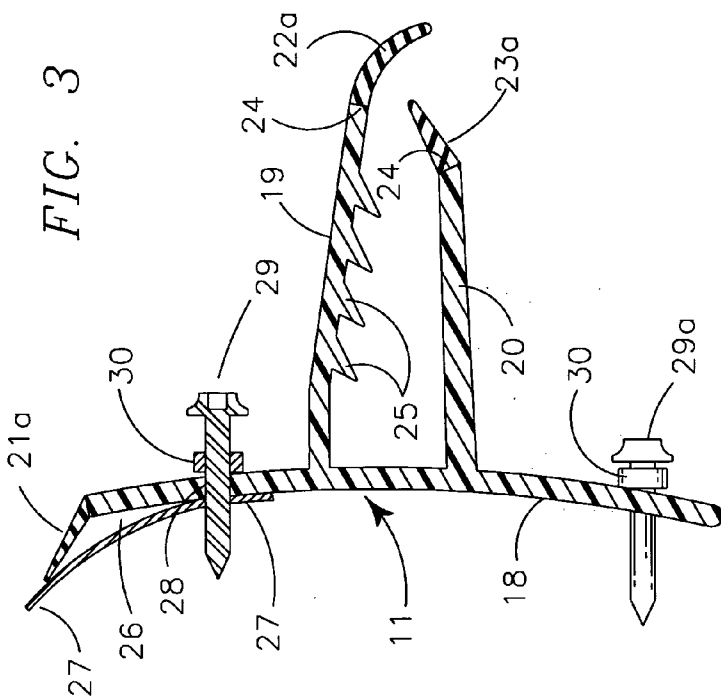
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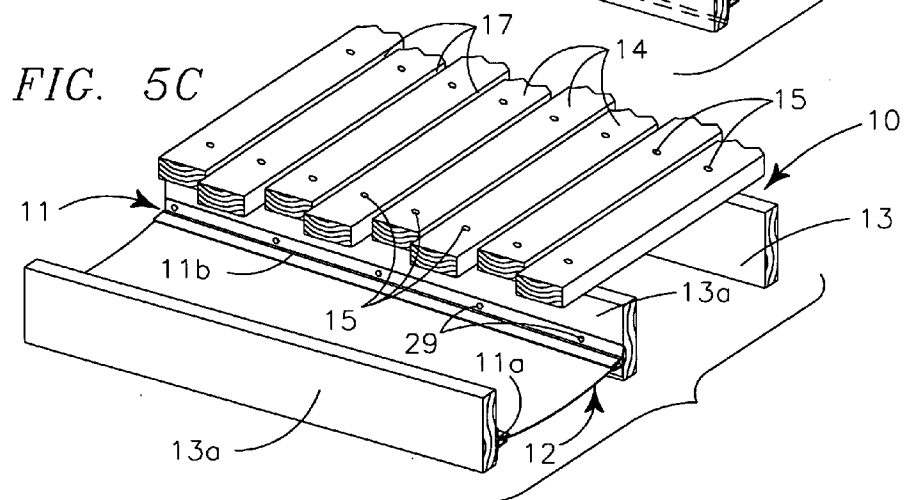
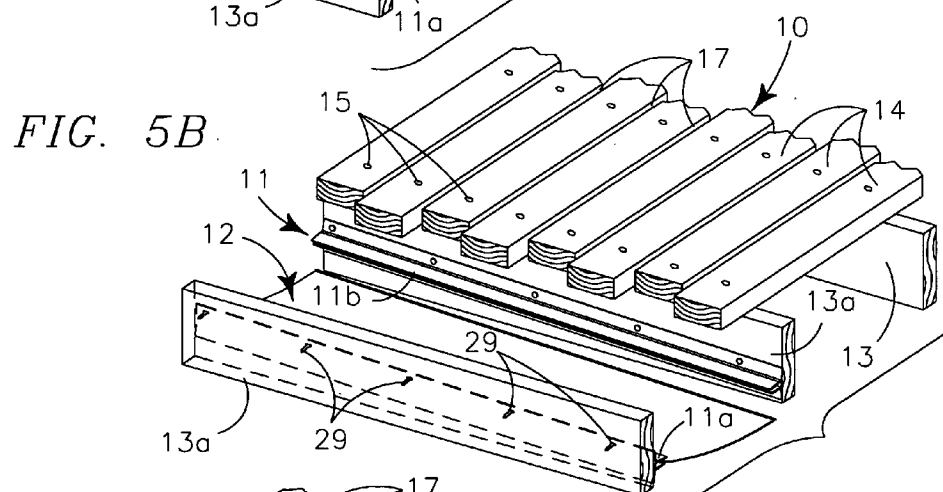
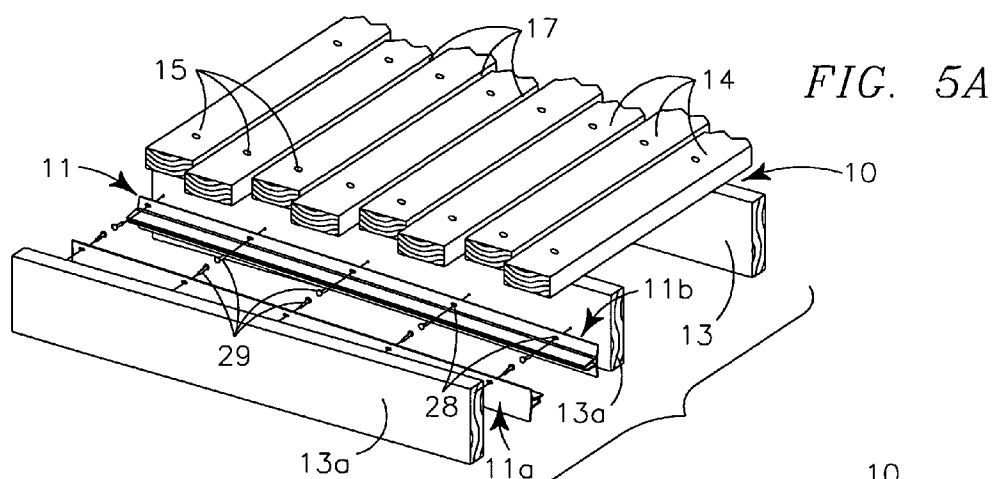
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SPOKANE, WA 992013898**(21) **Appl. No.:** **10/846,909**(22) **Filed:** **May 17, 2004****Publication Classification**(51) **Int. Cl.<sup>7</sup>** ..... **E04D 1/36**

An under deck drainage system for a fluidly pervious deck of light frame construction provides paired spacedly opposed elongate fastening brackets, carried on adjacent surfaces of opposed pairs of deck supporting joists, with a downwardly curving drainage panel extending therebetween to receive and transport drainage to a deck edge perpendicular to the joists. The fastening brackets are sealed against the joists carrying them and provide two vertically spaced fastening arms that sealably engage the edges of the drainage panel carried therebetween in a releasable, positionally maintainable interconnection of opposed tooth-like fastening ridges carried by the drainage panel edges and the fastening arms.









## UNDER DECK DRAINAGE SYSTEM

### BACKGROUND OF INVENTION

#### RELATED APPLICATIONS

[0001] There are no applications related hereto heretofore filed in this or in any foreign country by the Applicant.

#### FIELD OF INVENTION

[0002] My invention relates generally to light frame structures and more particularly to a drainage system for placement under a fluidly pervious deck to remove drainage from beneath the deck to an outer deck edge.

### BACKGROUND AND DESCRIPTION OF PRIOR ART

[0003] Decks in light frame construction commonly are supported spacedly above a surface such as from the floor level of a half or second story of a main structure having its first story at or below earth level. Such decks are commonly formed with spaced horizontal joists extending outwardly from the main structure to support surfacing boards extending angularly to the joist in a closely spaced array so that fluidic and other smaller solid environmental debris may be passed downwardly through spaces between the surfacing boards to be wasted in some fashion beneath the deck, commonly on a structural surface therebeneath or on the surface of the earth. Such deck construction has become popular in modern light frame architecture, but notwithstanding its popularity this deck construction commonly limits and disrupts the use of space beneath an elevated deck, which often is not desirable. This problem has been recognized in the past and responsively various solutions have heretofore been proposed, such primarily as forming the surfacing of an elevated deck in a fashion that is impervious to fluid and secondarily as providing under deck drainage systems. Despite the lengthy developmental history of solutions to under deck drainage problems, the past solutions have not adequately nor completely resolved all problems and various problems still remain. The instant invention provides an under deck drainage system to further alleviate or resolve various of these remaining problems.

[0004] Principal among problems remaining with prior under deck drainage systems are firstly, that such drainage systems are not sealed, or if sealed are not adequately sealed, so as to prevent leakage from the drainage system either on the surface beneath the serviced decks or on the deck structures that support the drainage system and secondly, that such drainage systems are difficult to install and positionally maintain in operative mode in either new construction or especially in existing construction.

[0005] The instant drainage system provides two elongate strip-like fastening brackets carried on the proximal facing surfaces of each adjacent pair of joists supporting a fluidly permeable deck structure. Each fastening bracket has a vertical body that is fastened to the joist carrying it and this body structurally carries two elongate fastening arms extending outwardly from the supporting joist with each fastening arm angulated inwardly toward but spacedly distant from the other to define a channel between the fastening arms with a narrower outer portion to receive one of the opposed edges of an elongate drainage panel extending

between the associated pair of fastening brackets. One such drainage structure is carried between each opposed pair of joists supporting a deck, or so many thereof as are desired to have a drainage system.

[0006] The vertical body of the fastening bracket that is adjacent to a supporting vertical joist surface, preferably but not necessarily, has an upper edge portion that is more resilient than the remaining fastening bracket therebelow to aid in providing a seal of the upper edge of the vertical body against the surface of the supporting joist. The fastening bracket vertical body is of a somewhat, arcuate shape with its upper and lower edges adjacent the supporting joist and its medial portion extending spacedly away therefrom, to allow the effective placement of a semi-plastic sealant between the upper portion of the vertical body and the adjacent joist surface to assure sealing if the resilient upper edge of the bracket body does not completely seal against the joist supporting it. The vertical body of the fastening bracket is fastened in its upper portion to the supporting joist by fasteners extending therebetween, such as nails, screw nails or screws positioned spacedly below the more resilient upper edge portion to make sealing more certain. The fasteners may carry sealing gaskets on at least one side of the vertical body of the fastening bracket to prevent moisture access from the drainage system elements through fastener holes to the joist supporting the fastening bracket.

[0007] The fastening of the lateral edges of drainage panels extending between the fastening arms of adjacent supporting fastening brackets is adjustable within limits for ease of placement of the drainage panels, but after placement the fastening substantially prevents accidental removal. This fastening is accomplished by interfitting angular toothed structures that allow motion of the lateral edges of the drainage panel laterally outwardly in discreet intervals toward each fastening bracket, but prevent a return motion of the drainage panel lateral edges inwardly away from the bracket strips holding them by reason of the tooth angulation.

[0008] Previously existing under deck drainage systems that have provided paired opposed strip type fastening brackets carrying a drainage panel therebetween generally have not provided water impervious joints between the bracket strips and the drainage panel, but rather have relied only on the gravity influenced motion of fluid to prevent leakage between the interconnected adjacent surfaces of the fastening bracket strips and the drainage panels. To provide a water tight seal of the lateral edge portions of the instant drainage panels in the associated fastening bracket strips, in a first preferred species the spacedly opposed vertical fastening arms are angulated toward each other as they extend from the bracket body and the outer end portions of the fastening arms are formed of resiliently deformable material of less rigidity than the material forming the portion of the fastening arms adjacent the body. This less rigid material at the outer edges of the fastening arms is angulated inwardly toward the opposed fastening arm to further aid in forming a water tight seal between the fastening arms and the lateral portions of a drainage panel carried therebetween.

[0009] An additional problem associated with prior under deck drainage systems, and especially those of a retrofittable type, has been the difficulty of installation which in the past has generally been accomplished by professional mechanics

and has required the expenditure of substantial time and effort. This potential problem is generally greater in direct proportion to the efficiency of the seal between the drainage panel and its associated fastening brackets, and well may be at least one reason that various prior under deck drainage systems have not provided such a seal or at least such an efficient seal. The instant drainage system has been specifically created to provide its efficient sealing properties while yet making the installation process of the system more simple than that of prior systems. The less rigid and more resilient outer end portions of the opposed fastening arms of the fastening brackets make the insertion of the edges of a drainage panel therebetween easier than with fastening strips not having this feature. The drainage panel insertion process is also aided by providing a fastening tooth on only one side of the edge of a drainage panel and fastening teeth on only the adjacent surface of the fastening arm of the fastening bracket, and by making the upper fastening arms slightly longer than the lower fastening arms of each fastening bracket.

[0010] The ease of insertion of the instant drainage panels is further enhanced by the arcuate nature of the drainage panels, as though the drainage panel is formed from semi-rigid plastic material it still retains sufficient resilient deformability so that the panel width increases as the medial downwardly extending arcuate portion of the panel is moved upwardly to aid insertion of the lateral edges of the panel in the adjacent fastening brackets to carry it. The simplicity of installation of my under deck drainage system not only aids a professional installer in providing simpler, less time consuming and resultantly less expensive installation, but also aids the do-it-yourself homeowner installer in installing the system without professional assistance.

[0011] My under deck drainage system differs from prior under deck drainage systems in at least the foregoing aspects, but in setting forth the foregoing differences it is not intended to limit the nature, breadth or scope of the instant invention except as is set forth in the claims hereinafter made.

#### SUMMARY OF INVENTION

[0012] The instant under deck drainage system provides drainage for a deck of light frame construction having spaced parallel joists supporting a fluidly permeable surface. The system has a plurality of opposed pairs of elongate fastening brackets, having a vertical body fastenable on the adjacent vertical sides of each pair of spacedly adjacent joists, with a downward angulation outwardly toward the deck edge perpendicular to the joists at which drainage is desired to be directed. A plurality of drainage panels having a downwardly arcuate cross-sectional shape extend and are releasably fastened between each opposed pair of fastening brackets. Each fastening bracket has a vertical body with an arcuate cross-sectional shape having curvature extending away from the vertical surface of the joist carrying it. The fastening bracket has a less rigid resiliently deformable upper edge to seal against the adjacent surface of the supporting joist. Two spacedly adjacent fastening arms are carried in the vertically medial portion of the fastening bracket body to extend somewhat horizontally away from the body in a spaced and angulated relationship toward each other. Each outer edge portion of each fastening arm defines a less rigid resiliently deformable edge portion to seal

against a drainage panel carried between associated fastening arms and one of the fastening bracket arms defines a plurality of spaced tooth-like ridges angulated toward the fastening bracket body to cooperate in providing releasable fastening of the lateral edge of a drainage panel between the fastening arms of the fastening bracket.

[0013] Each drainage panel has a downwardly extending arcuate cross-sectional configuration and a width sufficient to fastenably extend between the fastening arms of a pair of opposed cooperating fastening brackets. Each side edge of the drainage panel defines at least one tooth-like ridge angulated inwardly away from the fastening bracket to carry it to cooperate with the fastening ridges defined by the adjacent fastening bracket arms to allow the edge of the drainage panel to be moved inwardly between the fastening bracket arms but prevent outward motion of the panel edge, once installed, from between the fastening arms.

[0014] The upper edge portion of the side of the fastening bracket body adjacent a supporting joist may carry a strip of adhesive sealant to aid in temporarily positionally maintaining the fastening bracket on the supporting joist while the fastening bracket is being permanently fastened and to further aid in sealing the adjacent surfaces of the fastening bracket body and the supporting joist.

[0015] In creating such a system it is:

[0016] A principal object to provide a new and novel under deck drainage system for a fluidly permeable deck of light frame construction that is sealed to the deck under-structure to transport fluidic material passing through the deck surface to a deck edge without allowing drainage of the fluidic material on the surface beneath the deck.

[0017] A further object is to provide such a drainage system that has elongate fastening brackets, carried on the proximal vertical surfaces of each adjacent pair of deck joists, that have more resilient upper edges to seal the upper edges of the brackets against the surface of the joists supporting them.

[0018] A further object is to provide such a drainage system that has elongate fastening brackets with a curvilinear body extending in its medial portion away from the supporting joist to selectively carry adhesive caulking material between the joist and the upper portion of the fastening bracket body to aid sealing of the interface between the joist and upper portion of the body and to temporarily positionally maintain the fastening bracket on the joist to aid permanent fastening.

[0019] A further object is to provide such a drainage system having fastening brackets with two fastening arms, extending away from the body distally from the joist supporting it, with more resilient outer end portions angulating toward each other to seal upon a drainage panel carried therebetween.

[0020] A further object is to provide such a drainage system having fastening arms, at least one of which has a plurality of spaced angulated tooth-like ridges extending parallel its length to receive at least one angulated tooth-like interfitting ridge defined in the edge portion of a drainage panel to be carried thereby to allow the drainage panel to be moved inwardly between the fastening arms but prevent the drainage panel from being accidentally moved outwardly from therebetween.

[0021] A still further object is to provide such a drainage system that has a drainage panel defining at least one angulated tooth-like ridge at each elongate edge to fastenably interfit with the tooth-like ridges of the fastening arms of paired opposed fastening brackets and extend therebetween.

[0022] A still further object is to provide such a drainage system that has a drainage panel of downwardly curving arcuate cross-section, the medial portion of which can be moved upwardly to move partially constrained panel edges away from each other to aid fastenable establishment of the panel edges between fastening arms of a cooperating pair of spacedly adjacent fastening brackets.

[0023] A still further object is to provide such a drainage system that is of rugged and durable nature, of simple and economic manufacture, of easy installation and maintenance and otherwise well suited to the uses and purposes for which it is intended.

[0024] Other and further objects of my invention will appear from the following specification and accompanying drawings which form part hereof. In carrying out the objects of my invention, however, it is to be understood that its essential features are susceptible of change in design and structural arrangement with only preferred and practical embodiments of the best known mode being illustrated in the accompanying drawing as is required. My invention is not intended to be limited by the stated or unstated objects or purposes, but rather only as limited in the claims herein made.

#### BRIEF DESCRIPTION OF DRAWINGS

[0025] In the accompanying drawings which form a part hereof and wherein like numbers of reference refer to similar parts throughout:

[0026] FIG. 1 is an isometric view of a portion of my under deck drainage system fastened between two adjacent joists of a deck structure that is partially shown in phantom outline.

[0027] FIG. 2 is an enlarged cross-sectional view of FIG. 1 taken on the line 2-2 thereon in the direction indicated by the arrows.

[0028] FIG. 3 is an enlarged cross-sectional view through a second species of fastening bracket of my drainage system, taken on a line such as 3-3 on FIG. 1 in the direction indicated by the arrows.

[0029] FIG. 4 is an enlarged partial cross-sectional view through the drainage panel of my drainage system of FIG. 1, taken on the line 4-4 thereon in the direction indicated by the arrows.

[0030] FIGS. 5A, 5B and 5C are similar isometric views showing the process of installation of my under deck drainage system between joists of a deck structure.

#### DESCRIPTION OF PREFERRED EMBODIMENT

[0031] My invention generally provides a plurality of elongate fastening brackets 11 supported in cooperating pairs on adjacent vertical surfaces of each adjacent pair of joists of deck 10 to carry drainage panels 12 between each cooperating pair of the fastening brackets 11 to drain fluidic

material passing downwardly through the surface of deck 10 and transport the drained fluidic material to a deck edge at the outer ends of the joists for further disposition.

[0032] A portion of the type of deck 10 with which my drainage system may be used is shown in FIGS. 1 and 5. The deck 10 provides a plurality of parallel spaced joists 13, extending outwardly from support on an associated support structure (not shown) that extends spacedly above the earth or other supporting structure beneath the deck. The joists 13 normally extend substantially perpendicularly outwardly from the associated support structure and may be supported in cantilever fashion from the associated support structure, by header 16 carried by that structure, by intermediate posts and beams (not shown) or in other known fashions, so long as the under surfaces of the joists 13 are accessible for installation of my drainage system. Commonly in present day light frame construction the joists 13 will be boards of nominal two inch thickness with a depth of six to twelve inches. Decking boards 14 cover the joists to provide a deck surface. The decking boards 14 commonly are of nominal two inch thickness and usually have a width not much greater than two to three times their thickness to lessen the probability of warpage, most commonly with a nominal width of four to six inches. The decking boards 14 are oriented in a parallel array angulated to the longer dimension of joists 13, most commonly perpendicular to the joists 13 supporting them. The decking boards 14 are fastened to the upper edges of the joists 13 by fasteners 15 extending therebetween, most commonly nails, screw nails or screws. The decking boards 14 must extend between at least two adjacent joists 13 for support and commonly they extend between a plurality of adjacent joists in random lengthwise patterning. The decking boards 14 generally are spaced from each other by a space varying from one-eighth to three-eighths inch to allow for expansion, drainage and passage of small particulate debris between the decking boards 14 and therebelow for disposition. Decks 10 of this construction are common in modern day light frame architecture for both utilitarian and aesthetic purposes and it is with such decks that my under deck drainage system is usable.

[0033] Fastening brackets 11 are elongate strip-like members having the same cross-sectional configuration throughout. The fastening brackets 11 each have an arcuate vertically extending body 18 structurally carrying vertically spaced upper fastening arm 19 and lower fastening arm 20 extending from the vertically medial inner convexly curved surface of the body 18 in an angulated array with outer portions closer than inner portions. The upper edge of vertical body 18 defines tapering upper edge seal 21 angulated in an outward direction distal from the fastening arms 19,20. The outer edge portions of upper fastening arm 19 and lower fastening arm 20 each define inwardly tapering resilient sealing edges, 22 and 23 respectively, that are angulated toward each other. The sealing edges 21,22,23 all taper outwardly to provide an outer edge that is thinner than the inner base and the sealing edges, preferably but not necessarily, are formed of more resilient material than the body 18 and fastening arms 19,20 supporting them. The sealing edges 21,22,23 are joined to the elements 18,19,20 supporting them by known methods of unitary formation, adhesion, thermal welding or the like, depending upon the nature of the materials of formation, but preferably are joined in a single extrusion process by known means for

forming a butt type joint **24** for ease of manufacture. Preferably but not necessarily, one fastening arm **19,20** is slightly shorter than the other as this construction makes the insertion of a lateral edge of drainage panel **12** between the two fastening arms **19,20** more easy.

[0034] A medial portion of the lower surface of upper fastening arm **19** defines a plurality of tooth-like fastening ridges **25** angulated outwardly toward the body **18** to cooperate with at least one similar fastening ridge defined by the lateral edge of a drainage panel **12** to be carried by the fastening bracket **11**. The upper portion of the outer joist-facing arcuate surface of vertical body **18**, preferably but not necessarily, carries an elongate strip of pre-established sealant compound **26** which also is of an adhesive nature. If this strip of sealant compound **26** is provided in the manufacturing process, it is covered by removable protective covering **27** to assure positional maintenance and protection of the sealant compound prior to use. The vertical body **18** may define elongately spaced fastening holes **28** to aid the placement of fasteners **29** during the installation process, but such holes are not necessary and may not be desirable if sealant compound **26** is established in the manufacturing process and would be exposed by such fastening holes. Fasteners **29** for placement in holes **28** preferably are provided with at least one resilient sealing grommet **30** on at least one side of the body **18** to assure a fluid tight seal between the fasteners **29** and the body **18**. If pre-established fastening holes **28** are provided with pre-established sealant compound **26**, the sealing grommet **30** may be pre-established in holes **28** in the manufacturing process and conveniently have a relatively thin membrane (not shown) sealing the fastener hole defined by the grommet **30**.

[0035] Drainage panel **12** is an elongate member having a uniform cross-sectional configuration throughout and may be of any desired length. Body **31** of the drainage panel **12** has a downward curvature to direct fluid entering from either side of the upper surface of the panel **12** to a medial position. The nature of this downward curvature aids in the installation of my system and is somewhat critical in its configuration. Preferably a cross-section through body **31** defines an arc of a circular or elliptic configuration depending in its medial portion approximately two to four inches below cord **33** extending from the lateral edge portions when those lateral end portions are eighteen to twenty-four inches apart. The length of the cord **33** extending between the lateral edges of the body **31** is slightly less, by approximately one-half to two inches, than the distance between the proximal facing surfaces of the vertical bodies **18**, at a point between the fastening arms **19,20** of a pair of adjacent fastening brackets **11** that are to support the drainage panel **12** to allow positioning and positional maintenance of the drainage panel **12** between two opposed fastening brackets **11**.

[0036] Both lateral edges of drainage panel body **31** define one or more elongate inwardly angulated tooth-like fastening ridges **32** configured to cooperatively interfit with the fastening ridges **25** of the upper fastening arms **19** of fastening brackets **11**, as shown FIG. 2. The outer end portion of fastening ridge **32** is angulated in an outward direction to aid insertion between fastening arms **19,20** of fastening brackets **11**. One such fastening strip **32** is normally sufficient to fasten each edge of a drainage panel **12** in the fastening bracket **11** carrying it and preferably only

one such fastening strip **32** is used, as it is easier to fasten a single fastening strip **32** in the fastening strips **25** of a fastening bracket **11** than it is to fasten a drainage panel **12** having multiple fastening strips. The apex of the fastening strip **32** may be somewhat truncated to provide easier insertion between the fastening arms **19,20** of the fastening brackets **11** and to provide a fastening strip having greater strength, rigidity and durability by reason of its truncated configuration.

[0037] The instant deck draining system has been engineered so that the fastening brackets **11** and drainage panels **12** may be formed by extrusion molding to allow these elements to be formed with any reasonable length and to provide a uniform cross-section for joining the ends of fastening brackets or drainage panels to each other by a butt type joint or a simple double female type joint fixture of known design. Preferably the fastening brackets **11** and drainage panels **12** are formed of polymeric or resin plastic material such as polyvinyl resins, and especially polyvinyl chloride. This thermal plastic material in its more rigid types may form the body structures **18,19,20** of the fastening brackets **11** and the drainage panels **12** and in its more plasticized types may form the sealing edges **21,22,23** provided by the fastening brackets **11**. Such formation may be carried out in a single extrusion process with an appropriately designed die and polyvinyl chloride plastic having varying amounts of plasticizer as heretofore known in the plastic extrusion arts. Other known resins and polymeric plastics and other known forming processes may be used for the purposes of my invention, however, and remain within its spirit, essence and scope.

[0038] The sealing grommets **30** may be of commercially available types formed of softer polyvinyl plastics, rubber or other materials having similar characteristics that are known for similar purposes.

[0039] Having described the structures of my under deck drainage system, its installation and function may be understood.

[0040] Firstly the various structural elements of the system are formed as hereinbefore specified and drainage panels **12** are selected with a chord distance between their lateral edges of approximately one to two inches less than the perpendicular linear distance between the adjacent surfaces of an adjacent pair of joists supporting a deck that is to carry the drainage system.

[0041] As seen in FIG. 5A, fastening brackets **11** are established on the adjacent vertical surfaces of a pair of adjacent joists **13a**. The fastening brackets **11** are preferably unitary throughout their length and are established in coplanar mirror image array with a downward angling slope toward the deck edge selected for drainage of approximately two inches in twelve feet. This positioning may easily be established by initial measurement and creation of a chalk line to indicate the position of the upper or lower edge of each fastening bracket **11**. The cover **27** then is removed from adhesive sealant **26**, if sealant is pre-established on fastening brackets **11**, and the fastening brackets **11** are temporarily supported in proper fastening position on the supporting joists carrying them by manually adhering the sealant **26** on the supporting joist **13a**. After being positioned the fastening brackets **11** are permanently fastened by inserting fasteners **29** through sealing grommets **30** and holes **28**,

if the holes **28** are previously established. If holes **28** are not pre-established in fastening brackets **11**, the fasteners **29** are merely inserted through the upper medial portion of vertical body **18** of each fastening bracket **11** in the normal fashion appropriate for such fasteners, by driving or screwing as required. In fastened condition the upper edge portion of each fastening bracket and sealing edge **21** should be closely adjacent the underlying surface of joist **13a** carrying the fastening bracket **11**, as illustrated in **FIG. 2**.

[0042] After establishment of a pair of opposed fastening brackets **11a**, **11b** on the proximal vertical surfaces of a pair of adjacent joists **13a**, a first lateral edge portion of drainage panel **12** is inserted between the outer end portions of fastening arms **19,20** of fastening bracket **11a** and the first edge of the drainage panel **12** is moved inwardly between fastening arms **19,20** so that the fastening ridge **32** becomes engaged with one of fastening ridges **25** carried by upper fastening arm **19** of the fastening bracket **11a**, as illustrated in **FIGS. 2 and 5B** and, preferably with the fastening ridge **32** engaged in a medial fastening ridge **25** of the first fastening bracket **11a**. With the drainage panel **12** in this position the free second lateral edge of the drainage panel **12** is moved upwardly and inwardly toward the first lateral edge to bring the second lateral edge to a position for insertion between the fastening arms **19,20** of the second opposed fastening bracket **11b**. The medial portion of the drainage panel **12** is then moved upwardly to cause the second lateral edge of the drainage panel **12** to move into the channel defined between the upper and lower fastening arms **19,20** of the second fastening bracket **11b** so that the fastening ridge **32** of that second lateral edge is fastenably engaged outwardly of one of the fastening ridges **25** on the under surface of the upper fastening arm **19** of the second fastening bracket **11b**. This procedure is carried out along the length of the drainage panel **12** until the drainage panel **12** is completely installed between the two adjacent fastening brackets **11a,11b**. The installation procedure proceeds in the same fashion between each additional adjacent pair of joists **13**.

[0043] Preferably in using my under deck drainage system the lengths of fastening brackets **11** and drainage panels **12** is such that these members may extend along the total length of joists **13** of the deck **10** to be drained, so that no joinder of portions of the fastening brackets **11** and drainage panels **12** will be required, to avoid the possibility of the development of leaks at points of joinder. If shorter lengths of these members **11,12** are joined to form a needed length of a drainage system member **11,12**, the joints between either of the members **11,12** may be sealed with known double female joining fixtures, sealing compounds presently used in drainage systems or both. If desired the inner end portion of drainage panel **12** may be sealed on the surface of adjacent header **16** by use of commercially available sealing compounds or by use of an end bracket **34** (**FIG. 1**) of known design that fits over the inner end portion of the drainage panel **12** and provides an inner surface that abuts on the header **16**.

[0044] Though the instant drainage system is not generally designed or intended to allow removal of drainage panels **12** once installed in fastening brackets **11**, it is possible to remove the installed drainage panels **12**. To do this the lower arm **20** or upper fastening arm **19** of the fastening bracket **11** may be manually manipulated with an elongate prying tool,

such as screw driver or putty knife, to move downward or upward respectively so that the fastening strip **32** at that edge of the drainage panel **12** may move downwardly sufficiently to come out of engagement with the fastening ridge **25** of the upper fastening arm **19** engaging it. This process may be continued successively along an edges of the drainage panel **12** until the panel is free from the adjacent fastening brackets **11a,11b**. The fastening brackets **11** and drainage panels **12** of my system, when formed from polyvinyl chloride of medial density and lineal polymerization to approximately one-tenth inch thickness, are sufficiently resiliently deformable to allow this deformation without damage and the elements thereafter have sufficient retentent memory to return substantially to their original configuration in a relatively short period of time.

[0045] It is to be noted that if the length of drainage panels **12** is slightly shorter than the length of the joist on which they are supported, any material draining along the drainage panel will be deposited downwardly by gravity spacedly inside a header board forming the outer edge of a deck **10**. This drainage effluent may be collected in ordinary eave troughs of present day commerce for further transport to some point more distant from the outer deck edge for disposition.

[0046] It is further to be noted that although the instant drainage system has been indicated as preferably being formed of somewhat resiliently deformable plastic material having a retentent memory, that reference is not intended to be limiting and the system may equally well be formed from more rigid material such as sheet metals that are thin enough to be sufficiently deformable for installation and that have sufficient elasticity to return substantially to its initial configuration after deformation.

[0047] The foregoing description of my invention is necessarily of a detailed nature so that a specific embodiment of its best known mode may be set forth as required, but it is to be understood that various modifications of detail, rearrangement and multiplication of parts might be resorted to without departing from its spirit, essence or scope. The invention is intended to be limited only by the claims herein made.

[0048] Having thusly described my invention, what I desire to protect by Letter Patent, and

1. A drainage system for a deck, having an underlying framework of parallel spaced joists supporting a fluidly permeable deck surface, to collect and remove drainage from beneath the deck surface and transport the drainage to a deck edge perpendicular to the joists, comprising in combination:

a plurality of opposed cooperating pairs of elongate fastening brackets carried on the proximal vertical surfaces of each adjacent pair of joists, each said fastening bracket having

a vertically extending arcuate body formed of resiliently deformable material with the medial portion of the vertical body extending away from the joist carrying it,

an upper fastening arm and a spacedly adjacent lower fastening arm extending spacedly away from the fastening bracket body and distally from the joist supporting the fastening bracket, with at least one of

said fastening arms angulated to extend toward the other fastening arm in a direction distal from the fastening bracket body and wherein at least one said fastening arm defines at least one fastening ridge angled in a direction toward the body, and

each of said fastening brackets carried on the supporting joists in substantially co-planar array angling downwardly toward the deck side perpendicular to the joists, whereat drainage is to be moved; and a plurality of elongate drainage panels having side edges extending between each opposed cooperating pair of fastening brackets, each said drainage panel having

an arcuate cross-section extending downwardly from each side edge to a depending medial portion, and

each side edge defining at least one fastening ridge, to extend between the fastening arms of opposed pairs of fastening bracket to fastenably engage the at least one cooperating fastening ridge of the at least one fastening arm of each cooperating pair of fastening brackets.

**2.** The drainage system of claim 1 further characterized by the upper edge portion of the body of each fastening bracket having an upper edge seal with an outwardly tapering wedge-like configuration angulated toward the supporting joist, said upper edge seal being formed of flexibly resilient material having less rigidity than the remaining portion of the body of the fastening bracket to seal the upper edge portion of the body on the supporting joist.

**3.** The drainage system of claim 1 further characterized by the outer edge portion of the upper fastening arm of each

fastening bracket having an upper fastening arm seal with an outwardly tapering wedge-like configuration, angulated toward the lower fastening arm and formed of flexibly resilient material having less rigidity than the remaining portion of the upper fastening arm to seal the outer edge portion of the upper fastening arm on a drainage panel carried therebeneath.

**4.** The drainage system of claim 1 further characterized by a outer edge portion of the lower fastening arm of each fastening bracket having a lower edge seal with an outwardly tapering wedge-like configuration, angulated toward the upper fastening arm and formed of flexibly resilient material having less rigidity than the remaining portion of the lower fastening arm to seal the outer edge portion of the lower fastening arm on the drainage panel carried thereabove.

**5.** The drainage system of claim 1 having a plurality of spaced fasteners extending through the body of the fastening brackets and into the supporting joist with a grommet carried about the fasteners on at least one side of the body of the fastening brackets to seal the orifice in the body through which the fasteners pass.

**6.** The drainage system of claim 1 wherein the fastening brackets further have an elongate strip of adhesive sealant material carried by the joist facing side of the body of each fastening bracket, said adhesive sealant material covered by a removable protective cover extending over the exposed surface thereof.

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