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(54) **MULTIPLE BARBED PLATE WITH FASTENER**

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**Related U.S. Application Data**

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**Publication Classification**

(51) **Int. Cl.**[7] ..... **E04B 5/00**; E04C 5/00

(52) **U.S. Cl.** ..... **52/698**

(57) **ABSTRACT**

A two-piece fastener plate and fastener assembly and method of securing a roof membrane to a roof deck wherein the fastener is reinforced with concentric dome-shaped ribs separated by concentric depressions or dimples. The concentric depressions or dimples are provided with multiple triple or quadruple barbs for gripping the roof membrane when the fastener secures the roof membrane to the roof deck.

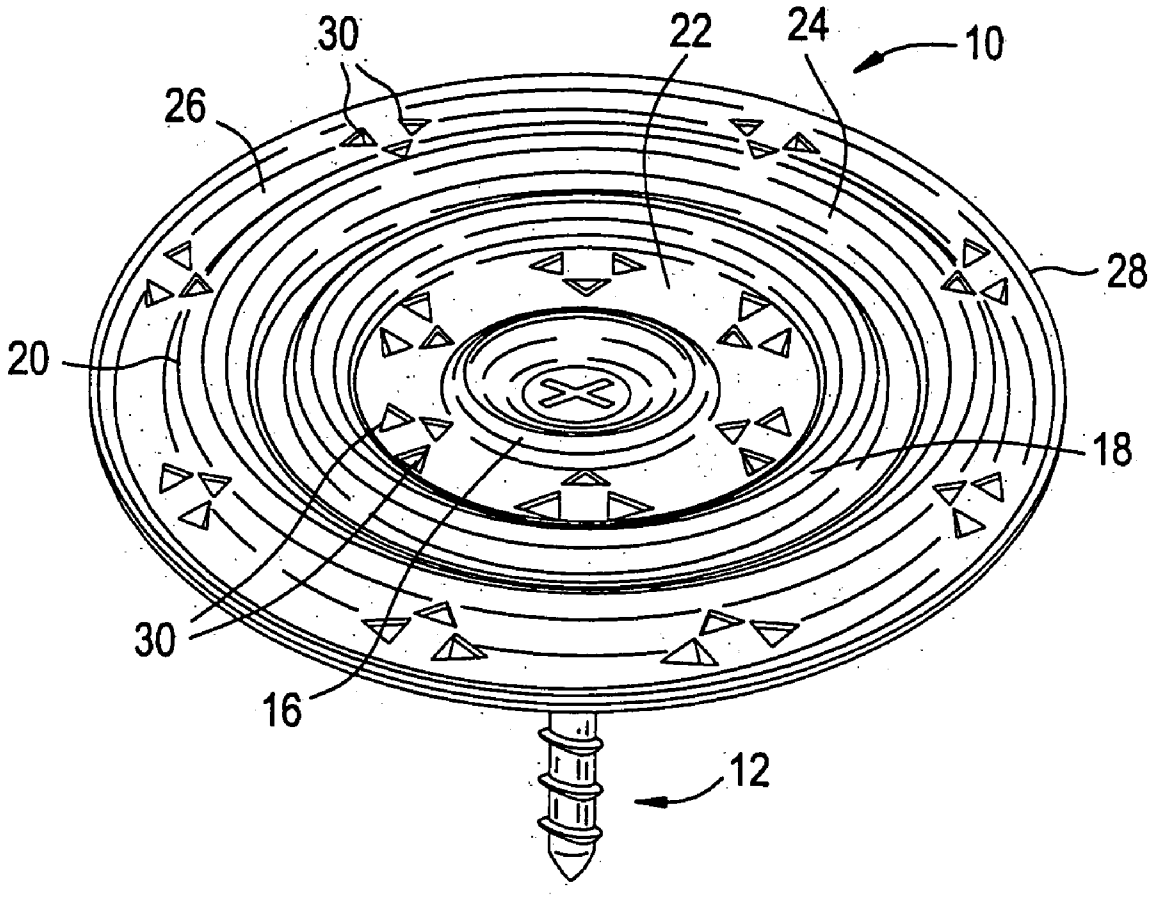


FIG. 1

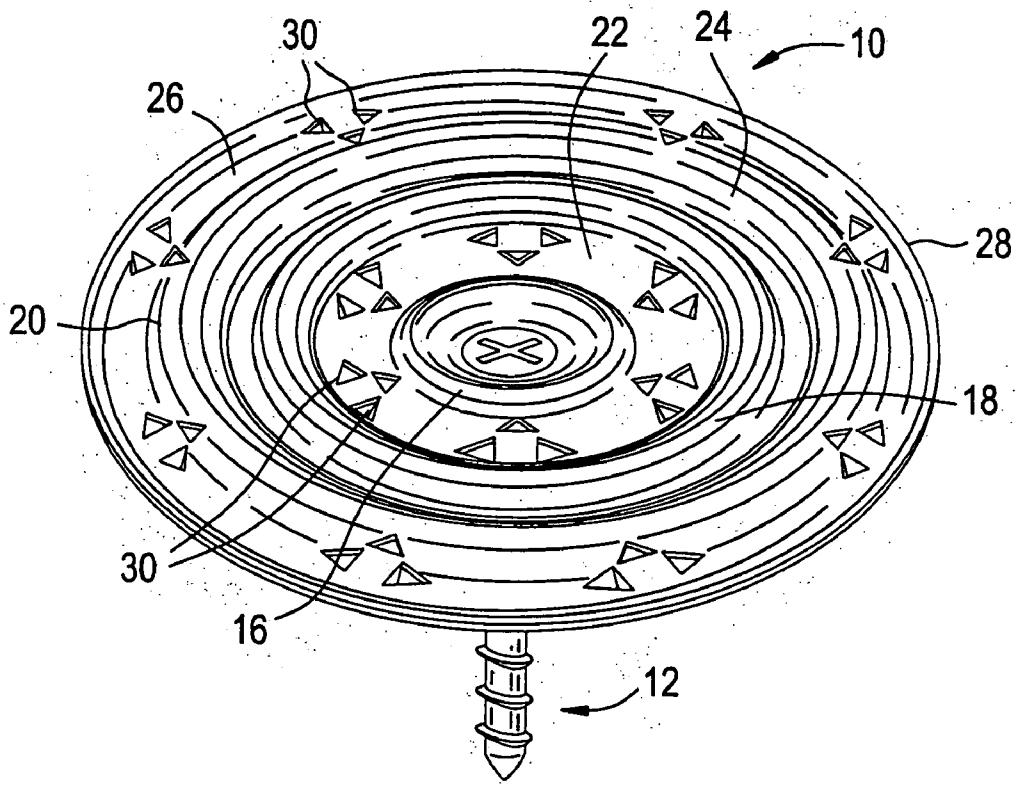



FIG. 2

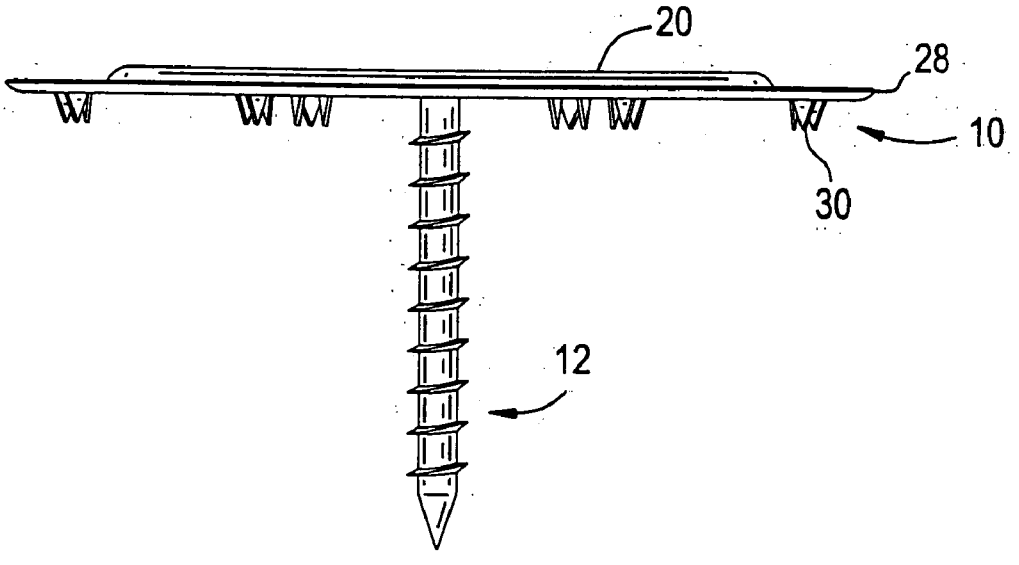


FIG. 3

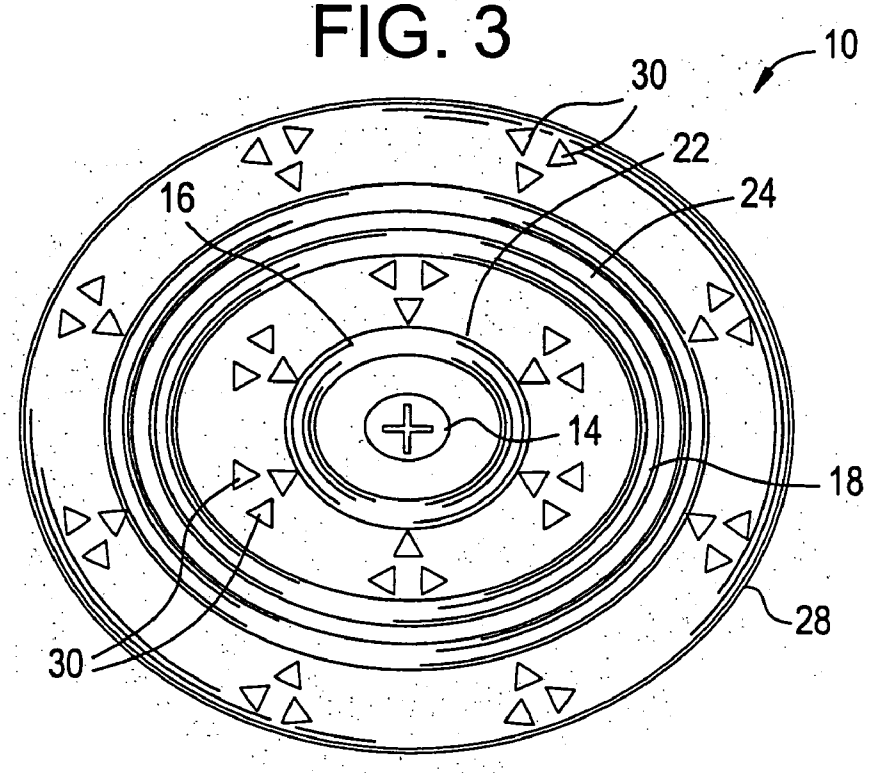



FIG. 4

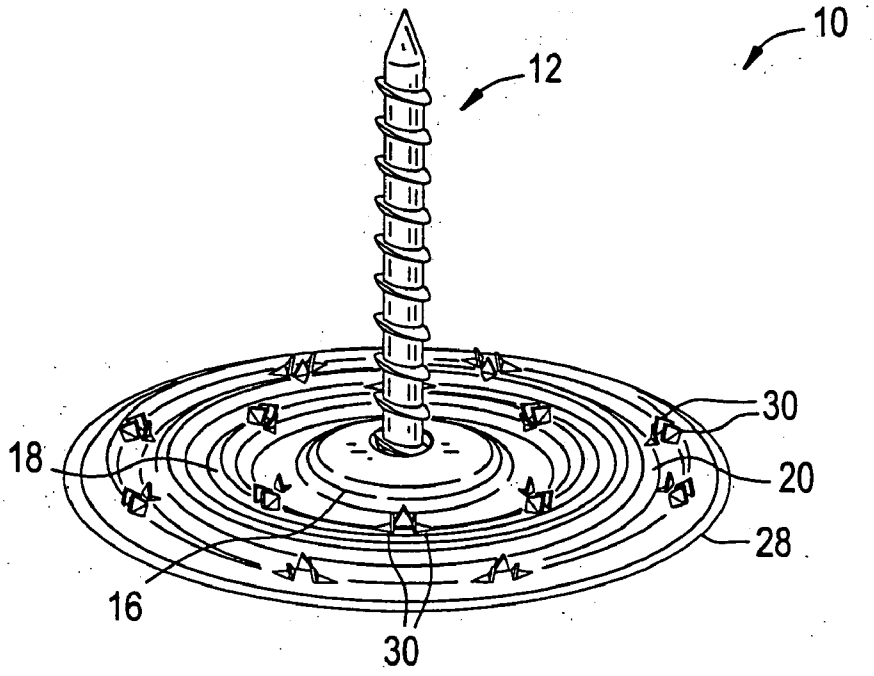


FIG. 5

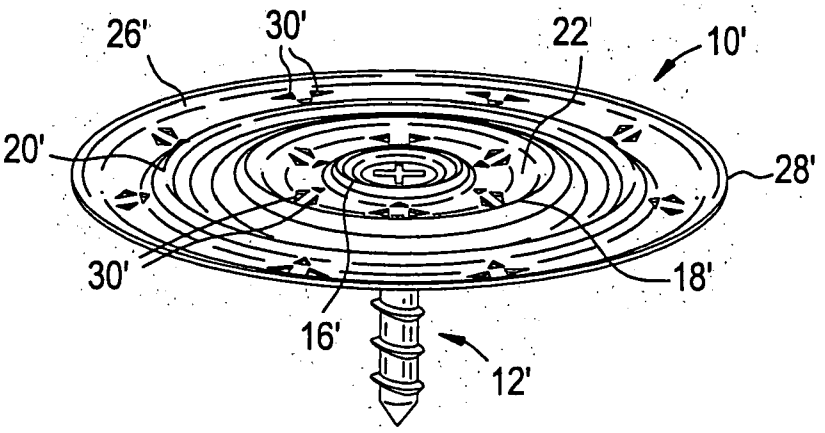



FIG. 6

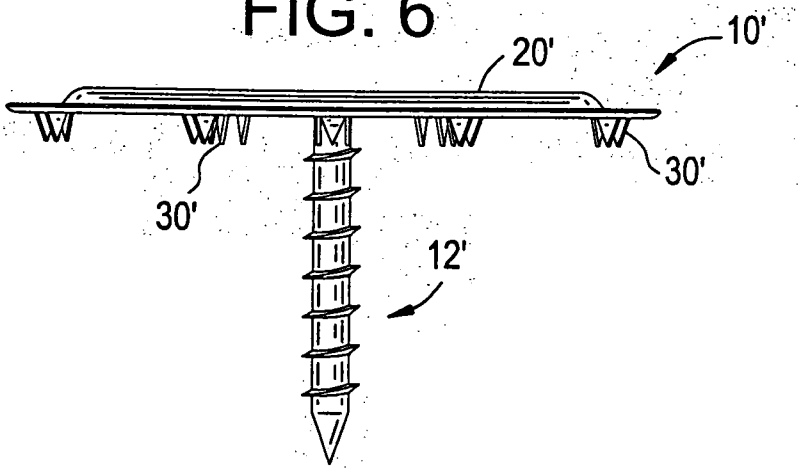



FIG. 7

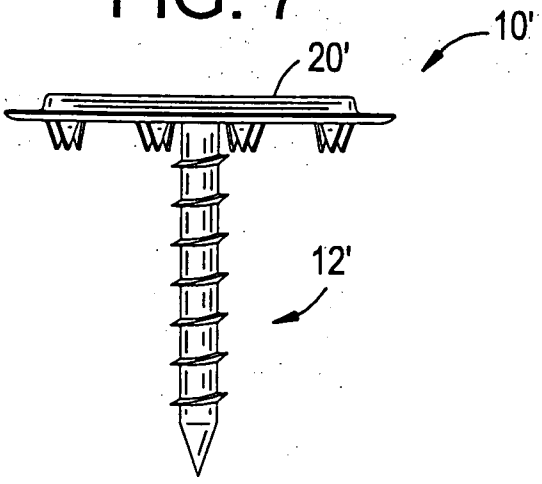


FIG. 8

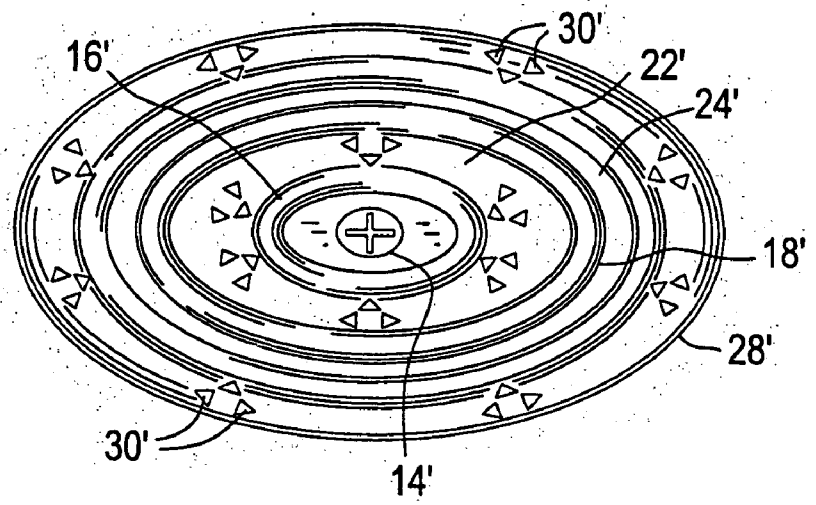



FIG. 9

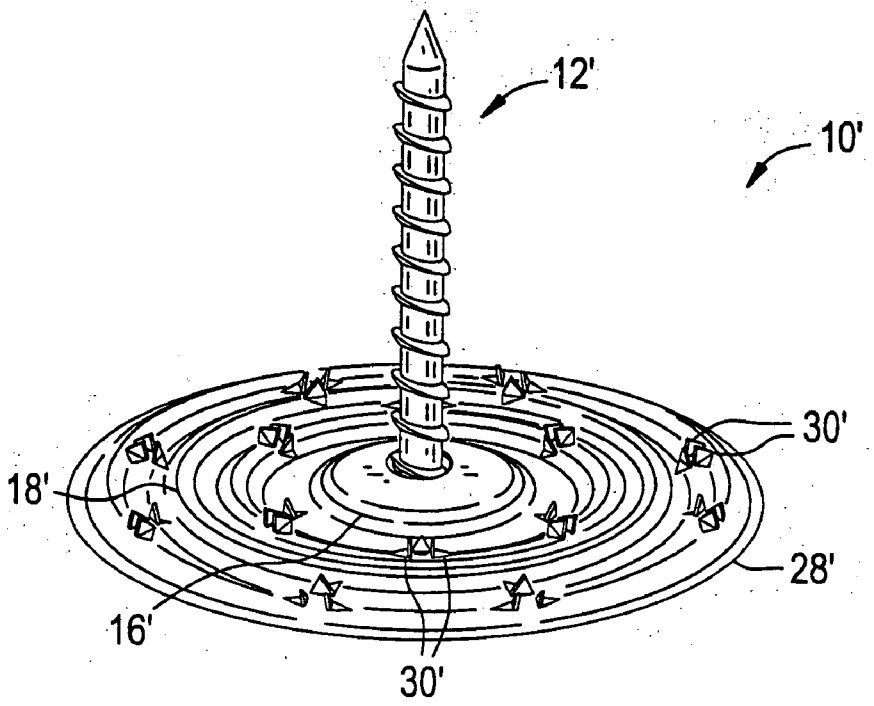


FIG. 10

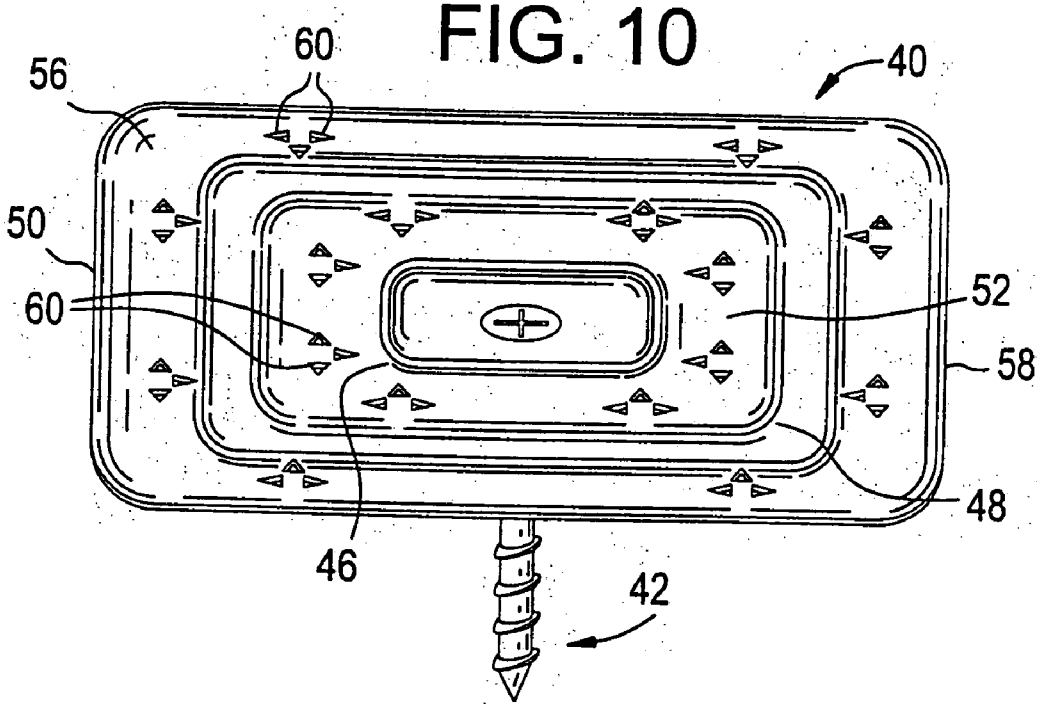



FIG. 11

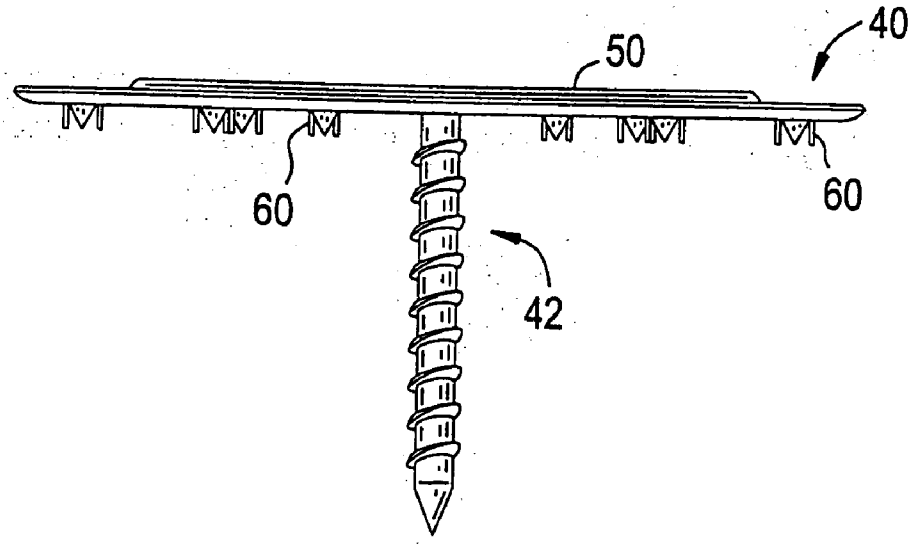


FIG. 12

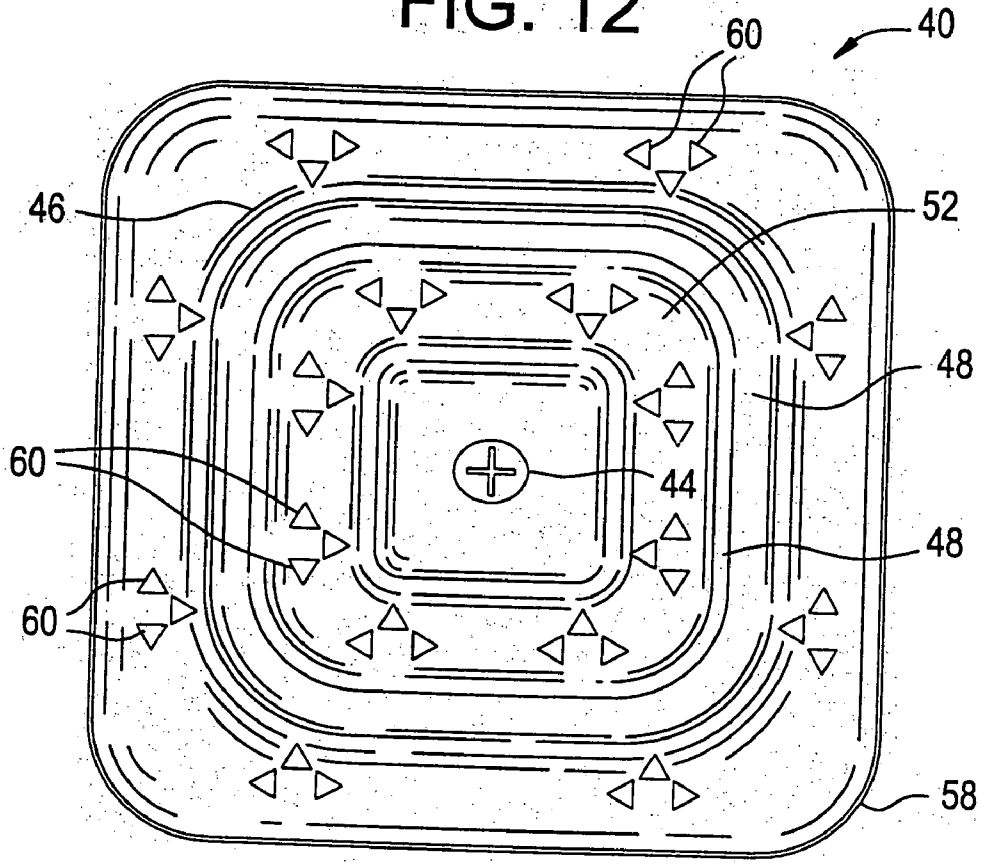



FIG. 13

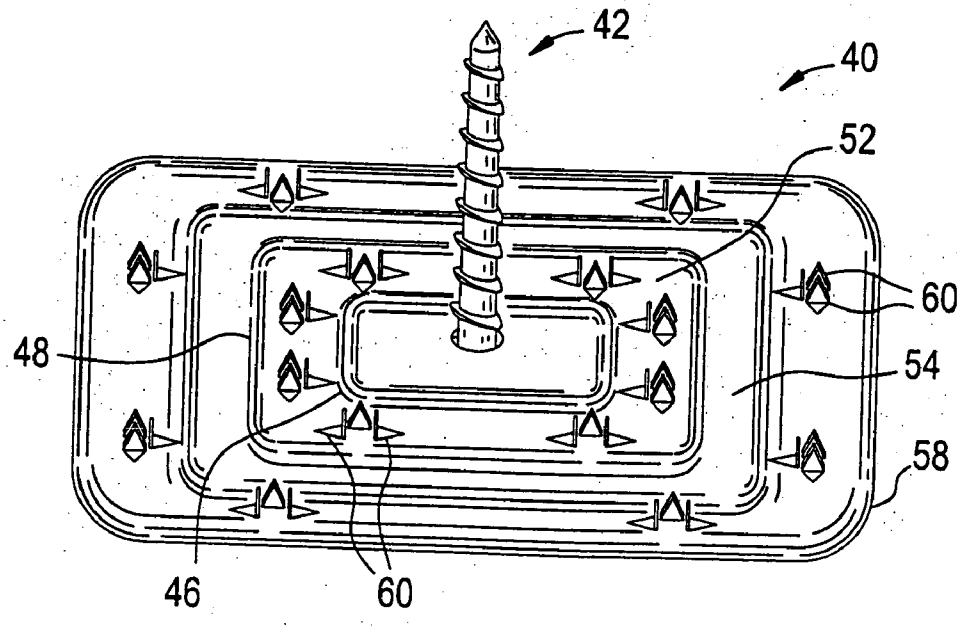


FIG. 14

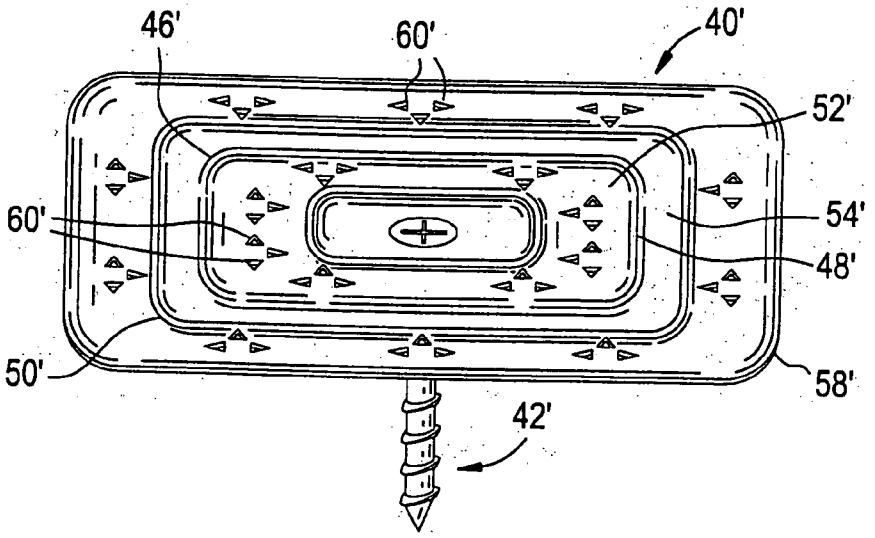
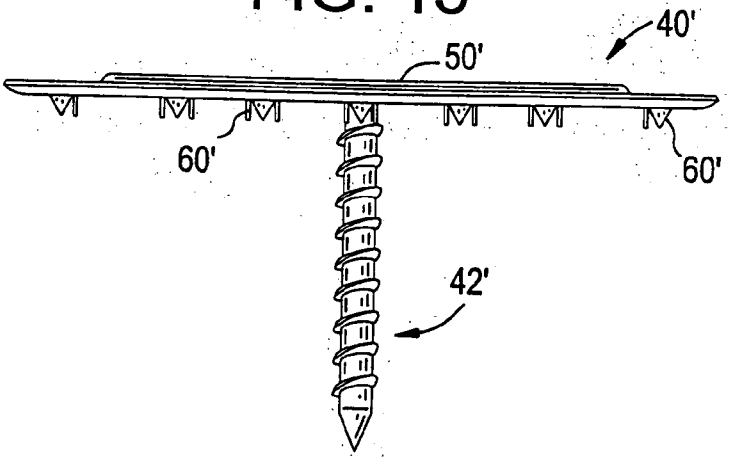



FIG. 15

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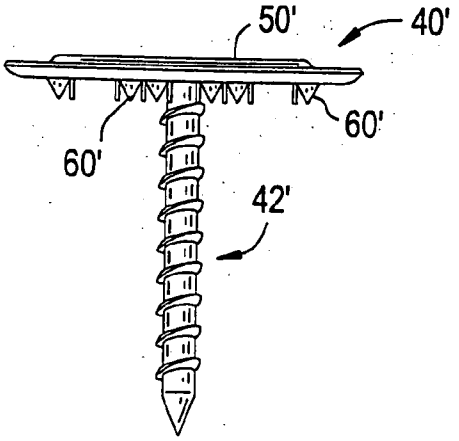
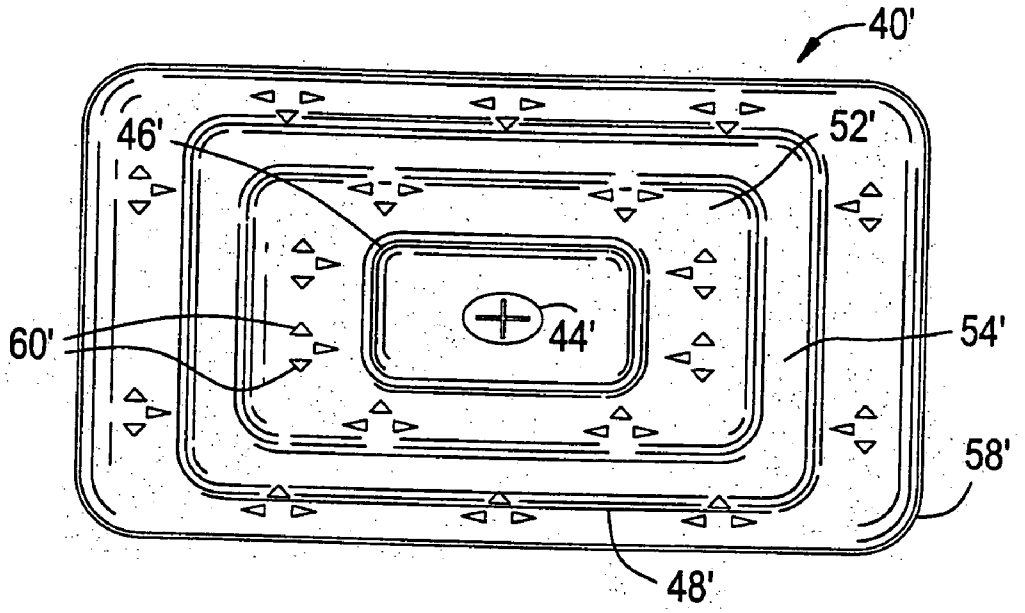


FIG. 17

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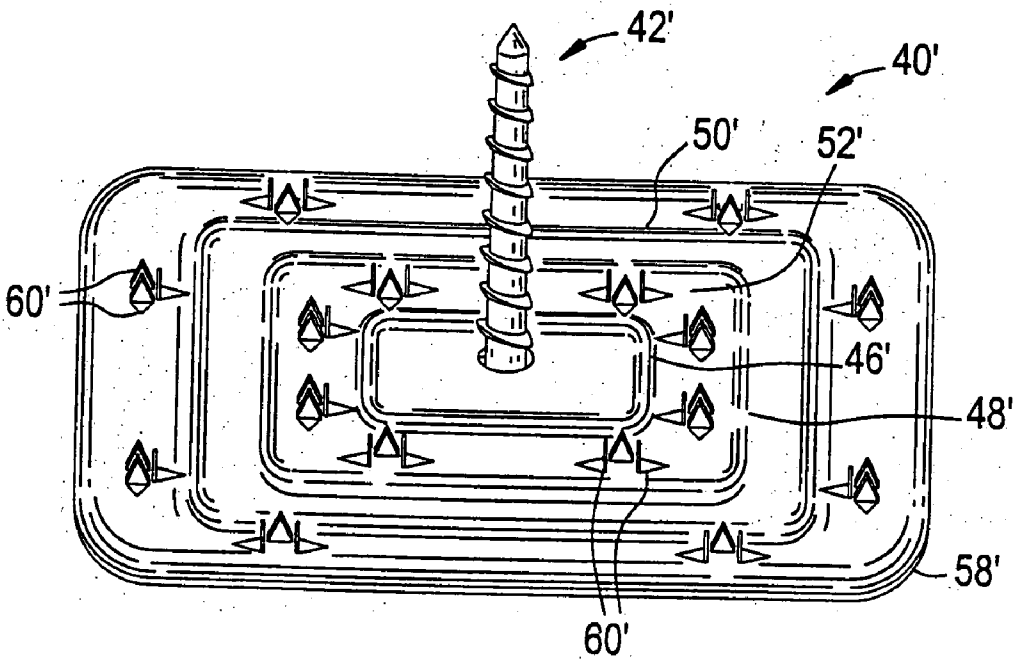


FIG. 19

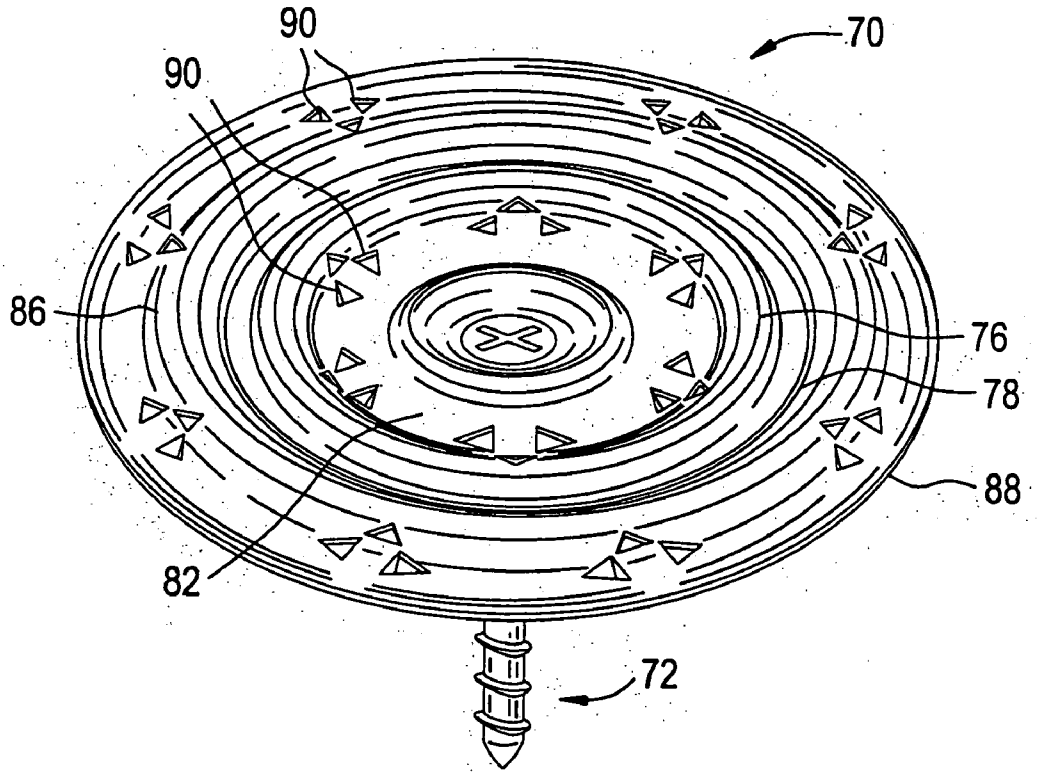



FIG. 20

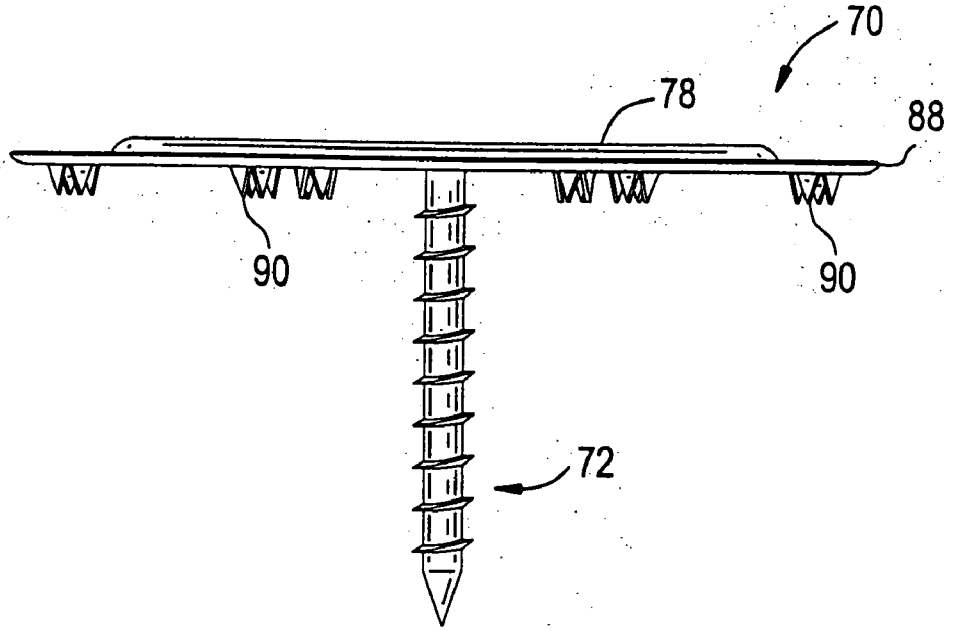
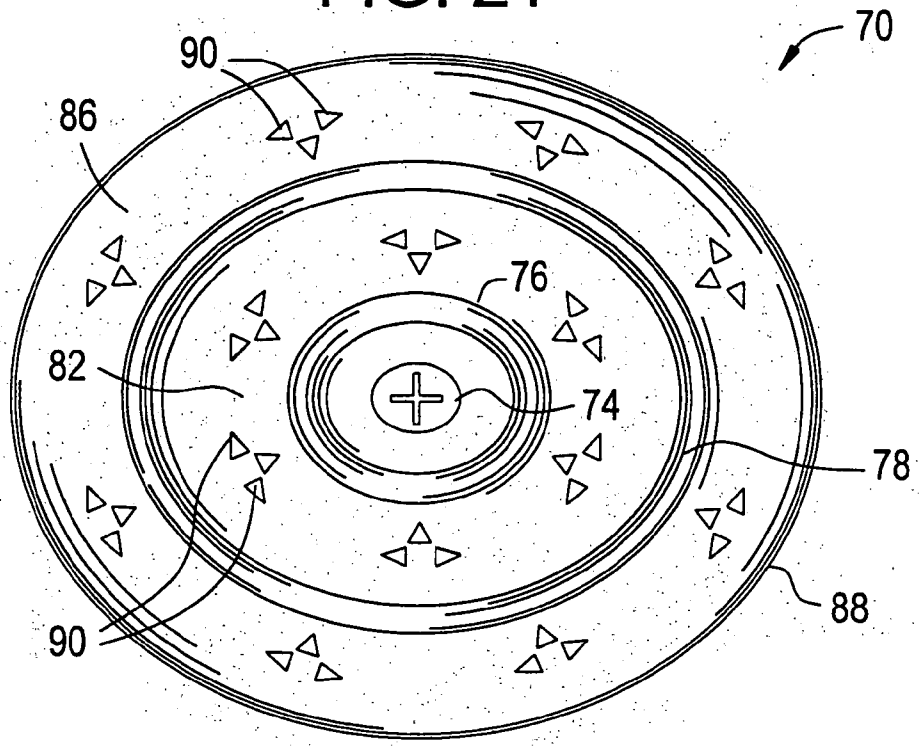


FIG. 21

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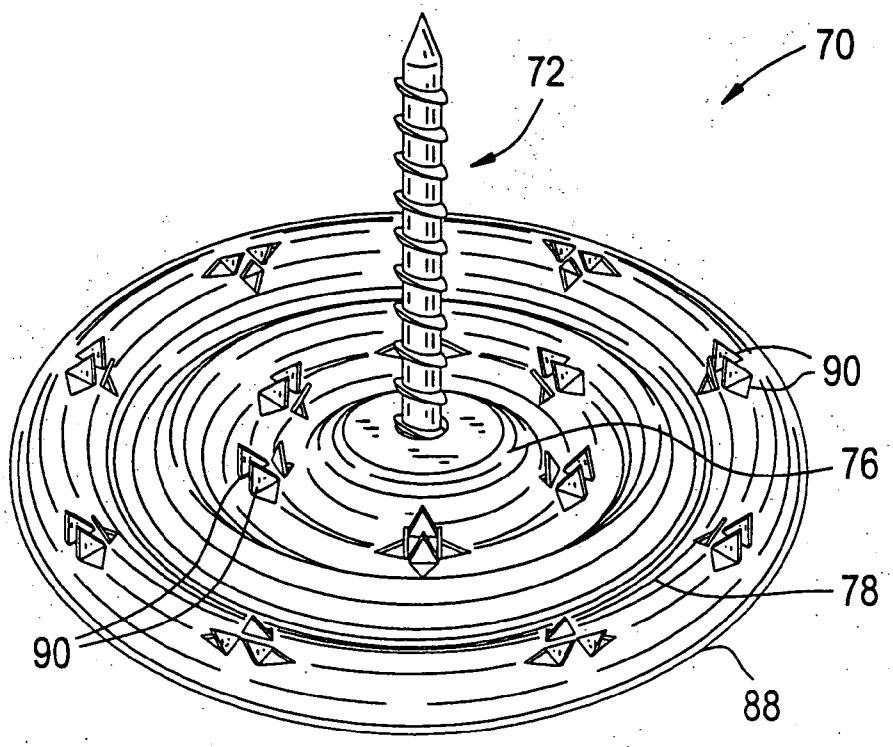

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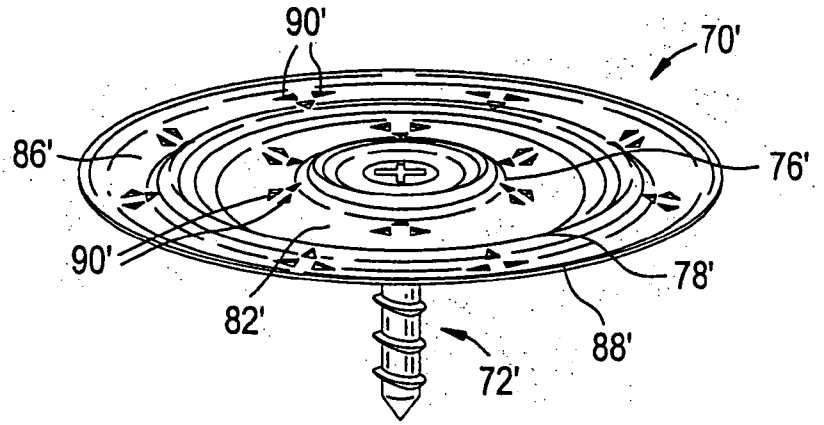


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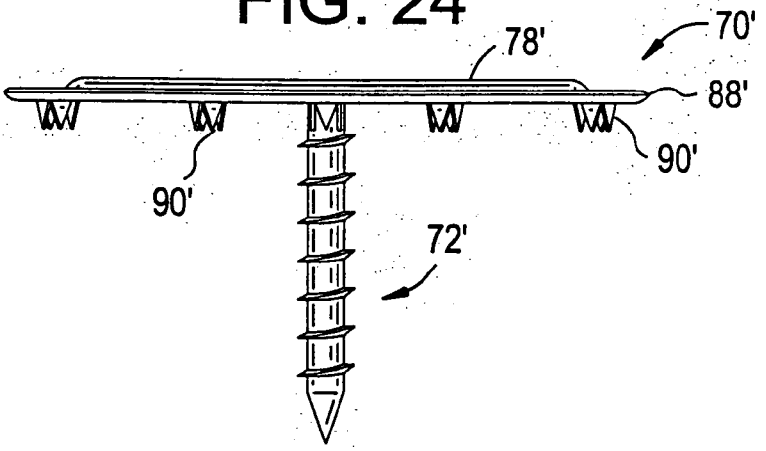


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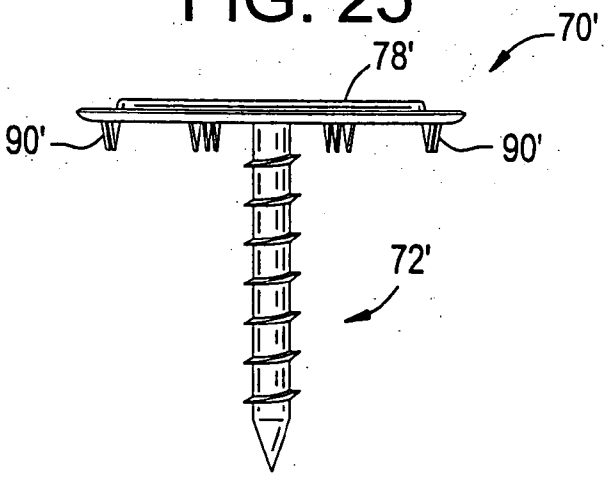

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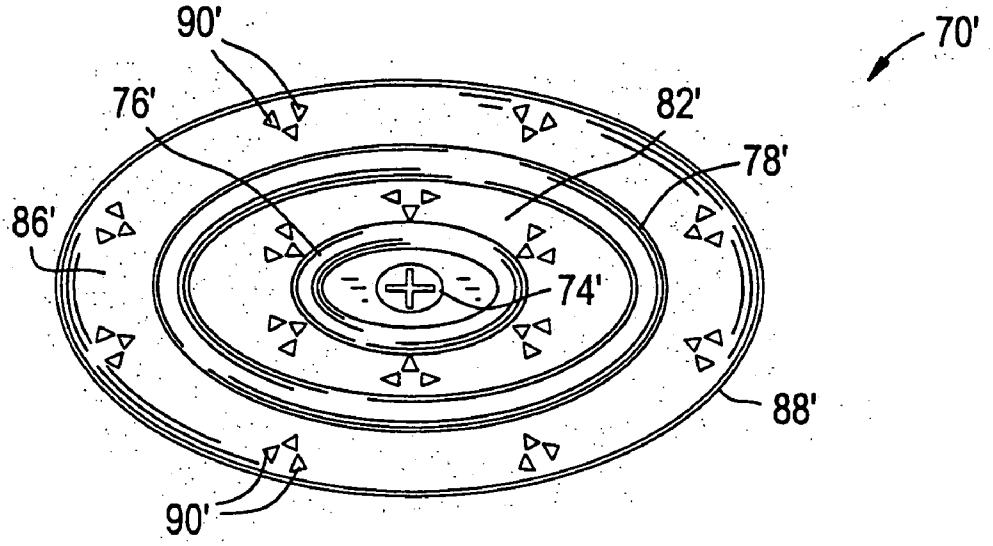


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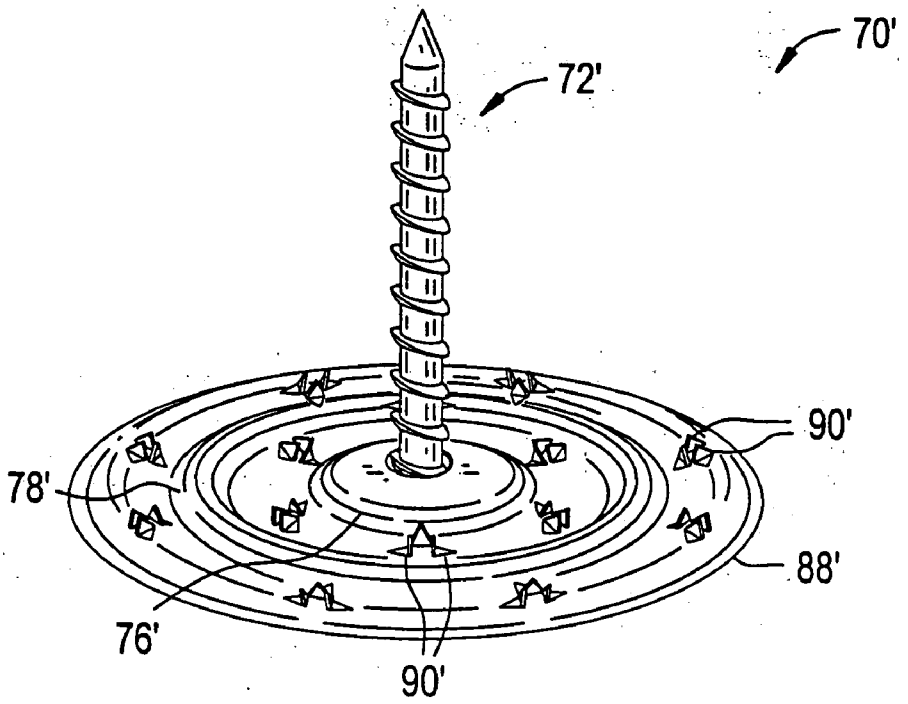

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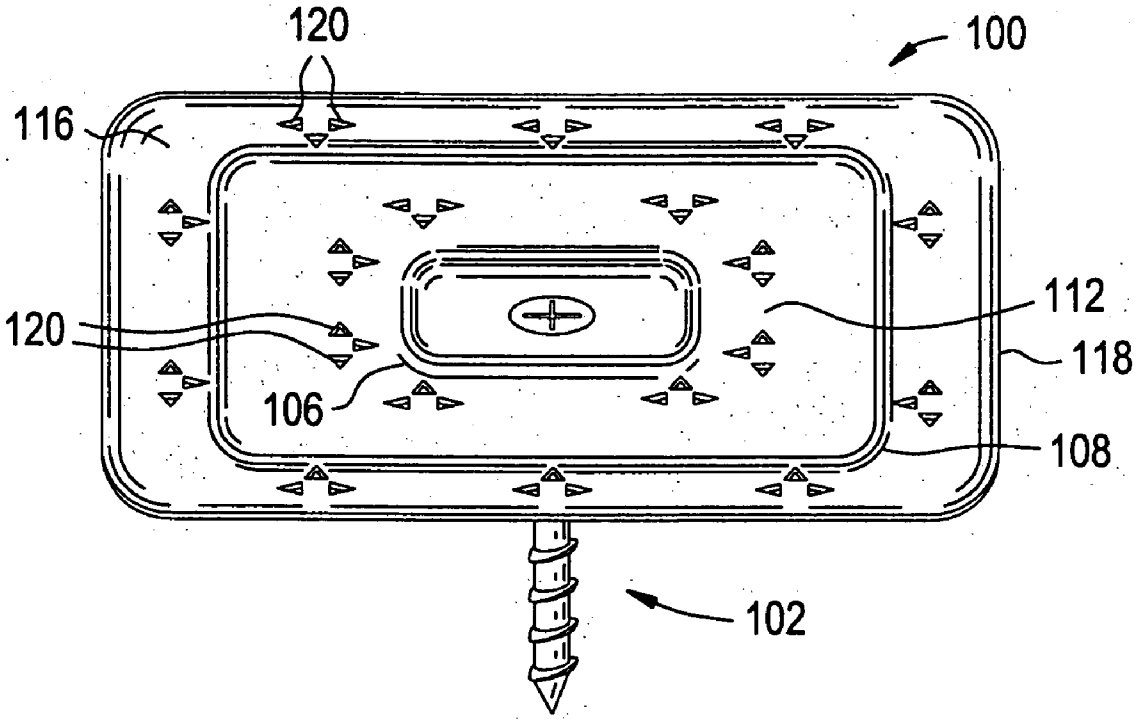


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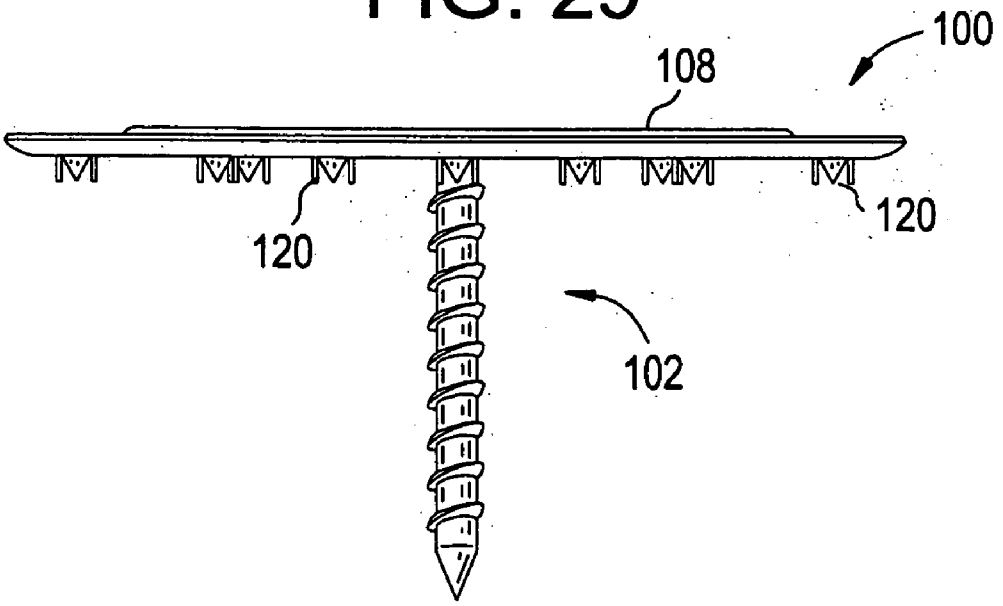

FIG. 30

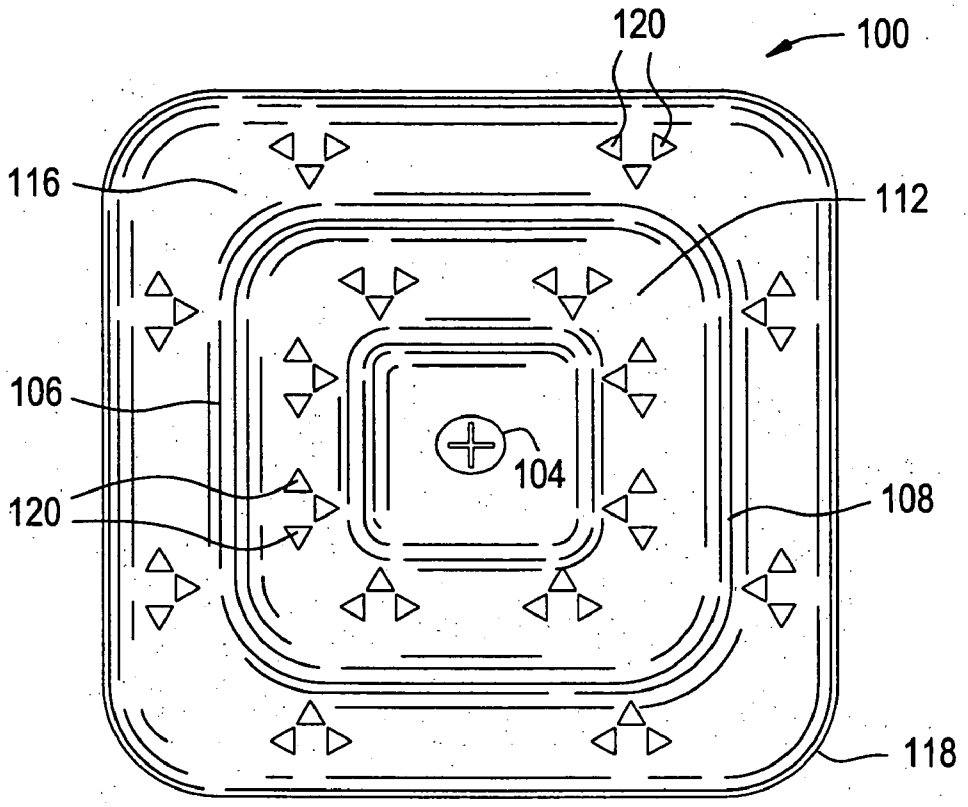
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FIG. 31

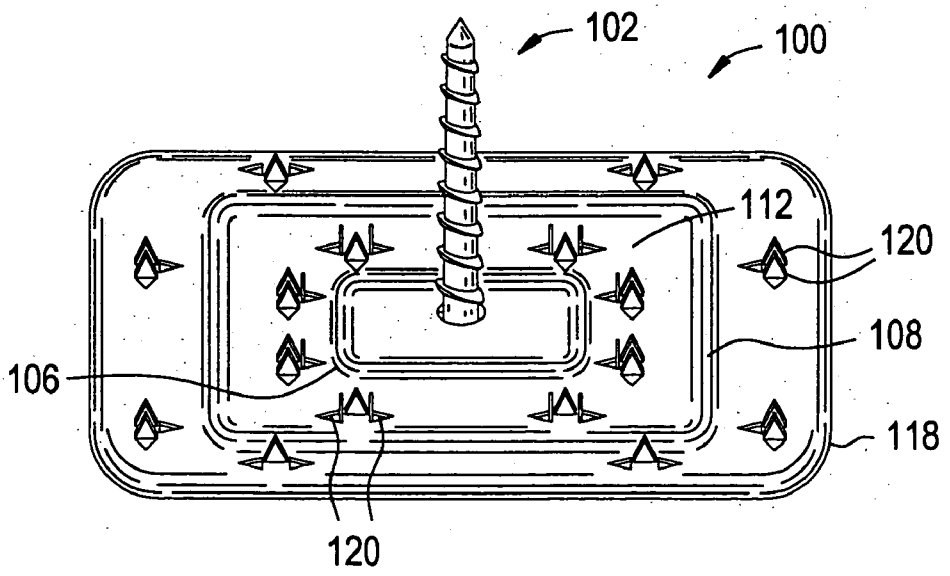
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FIG. 32

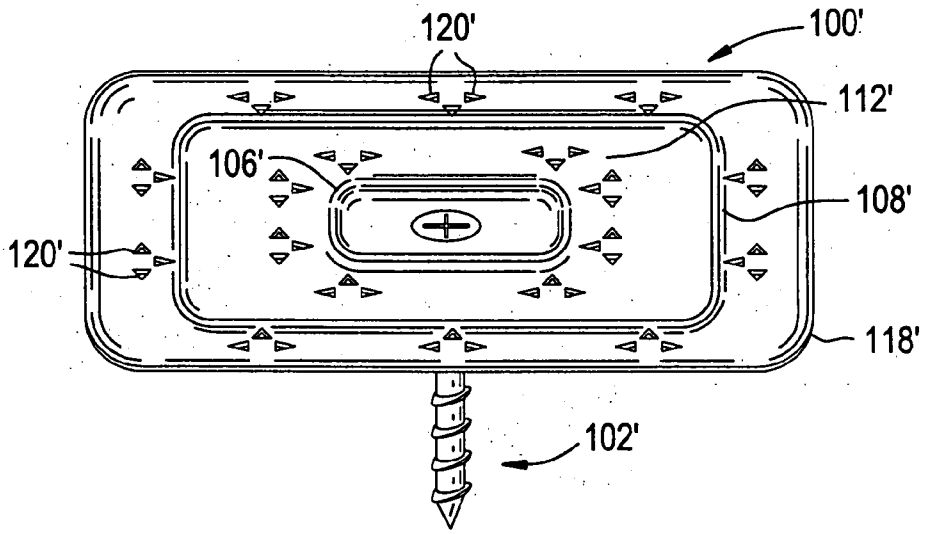



FIG. 33

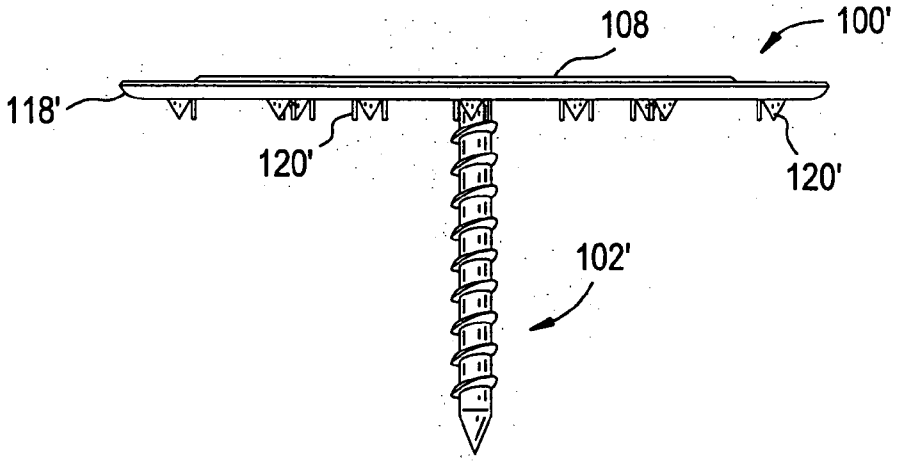



FIG. 34

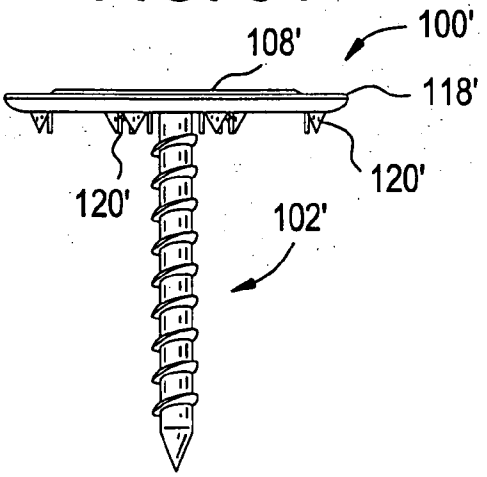


FIG. 35

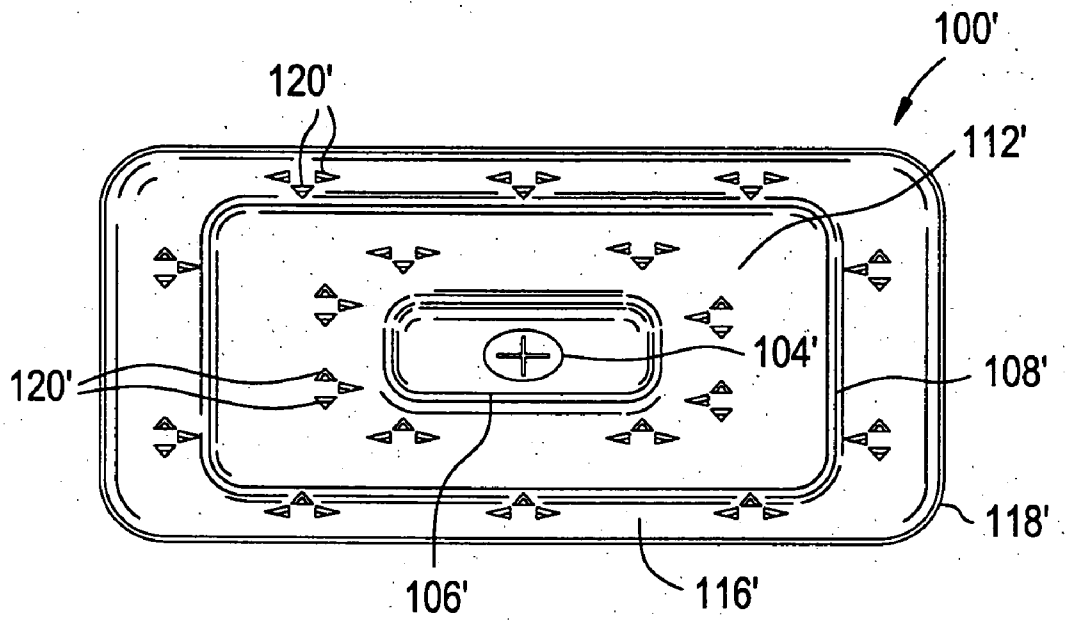



FIG. 36

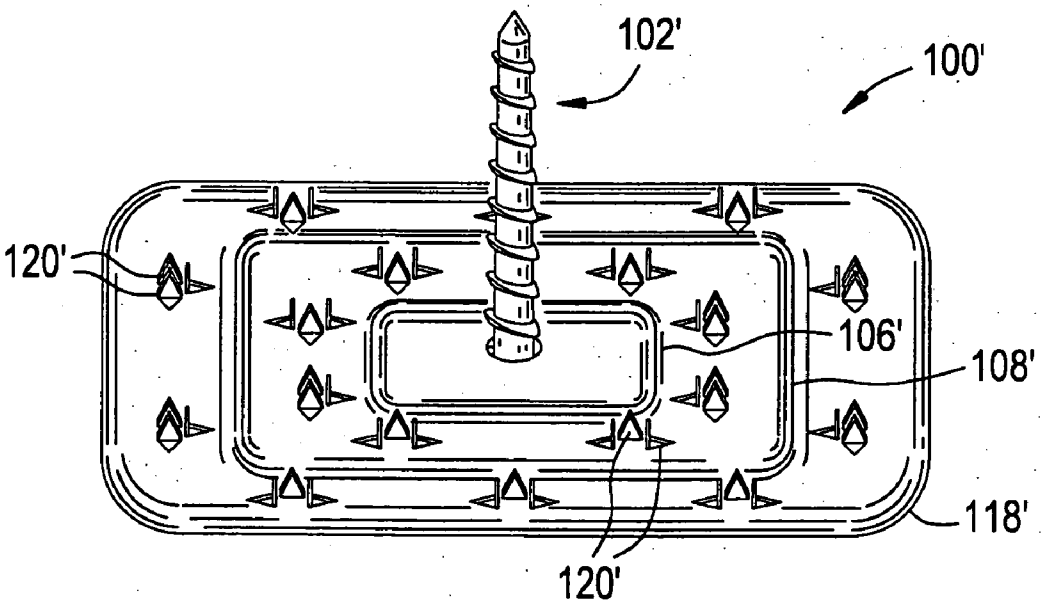
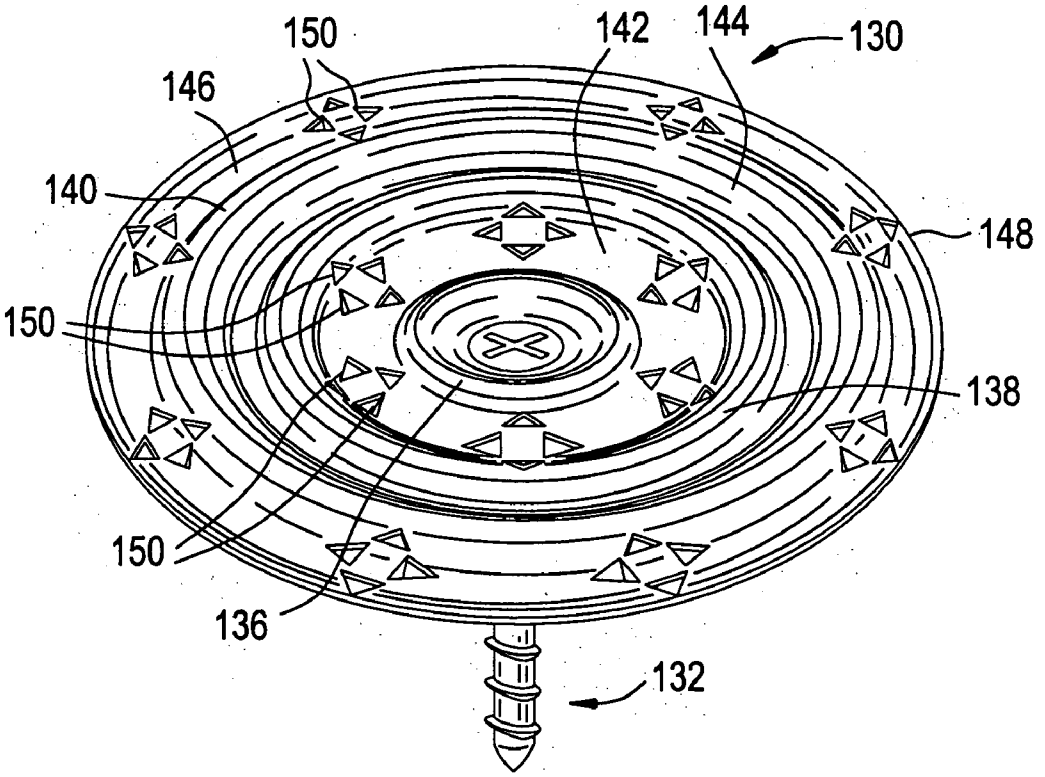


FIG. 37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136
132

FIG. 38

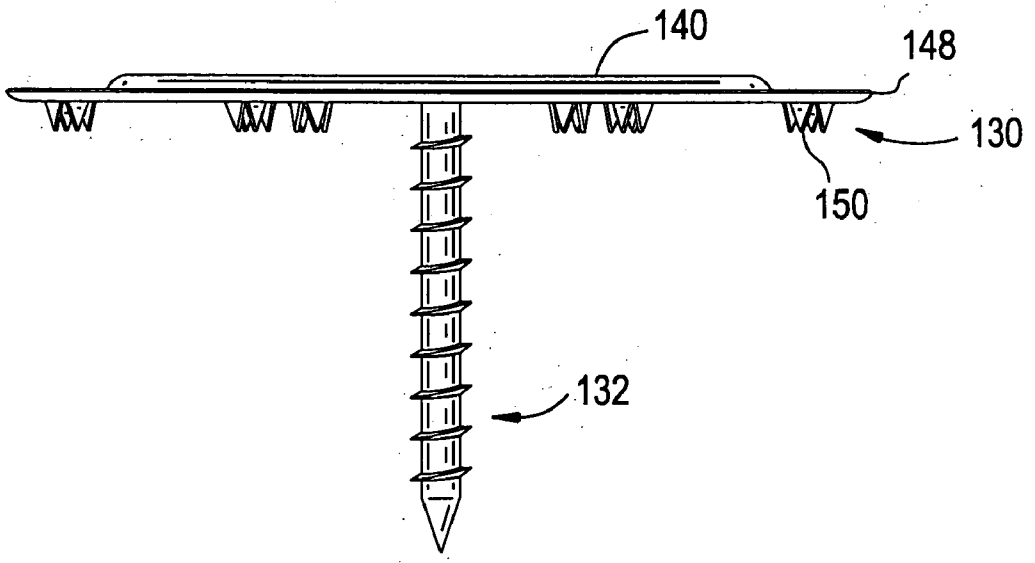
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FIG. 39

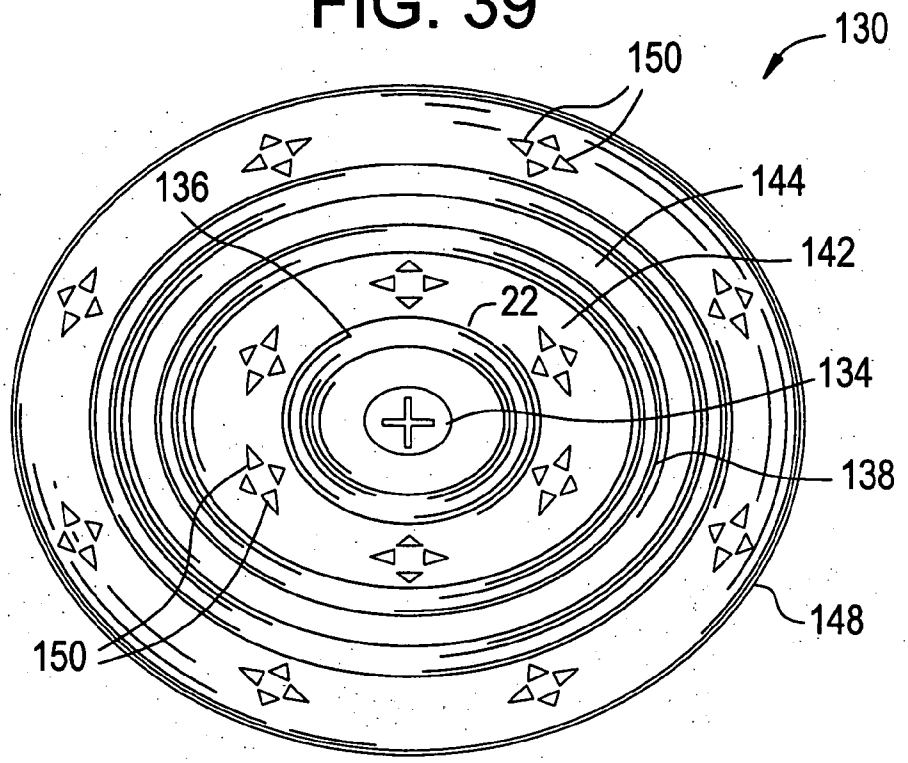
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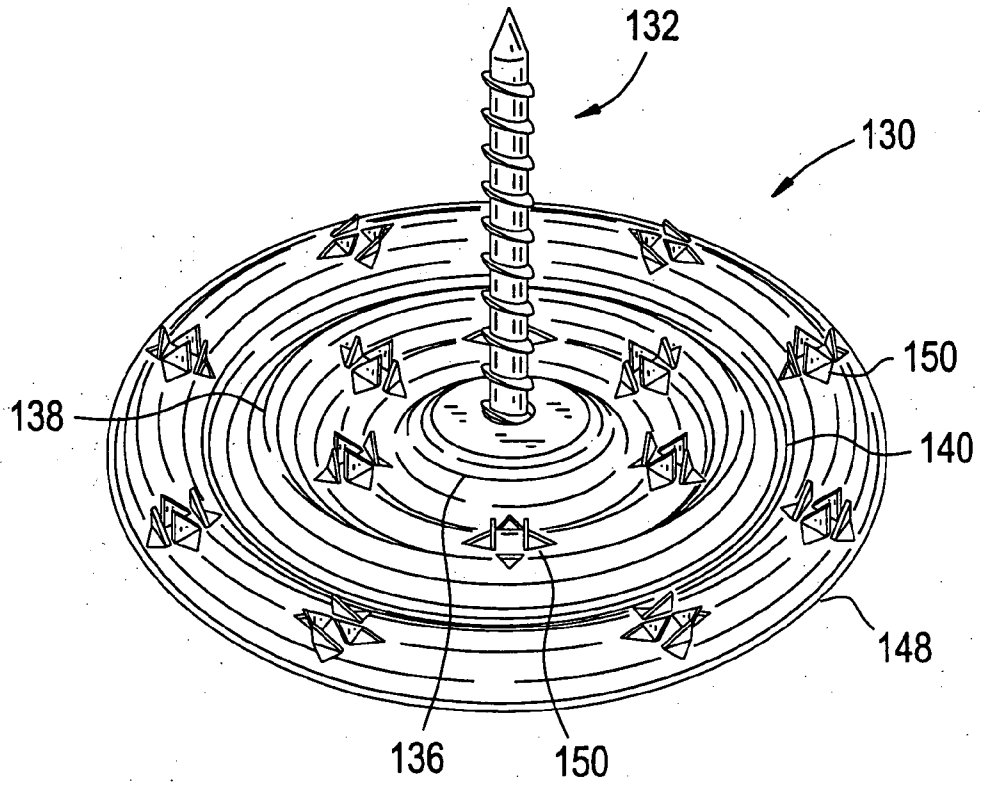
FIG. 40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148
136
150

FIG. 41

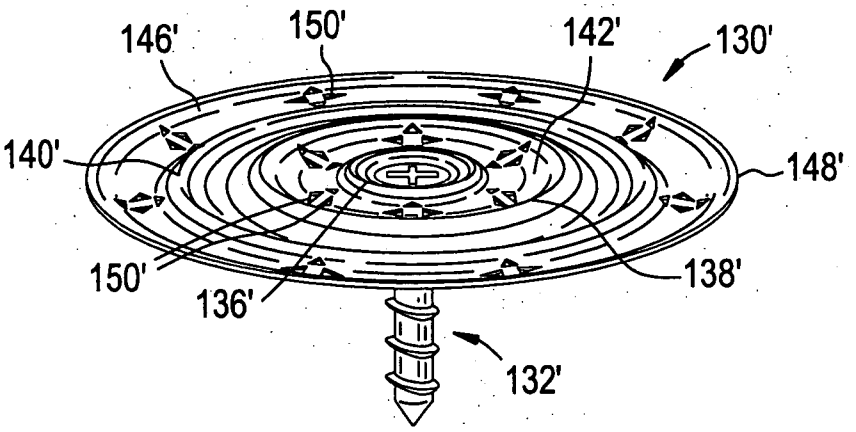


FIG. 42

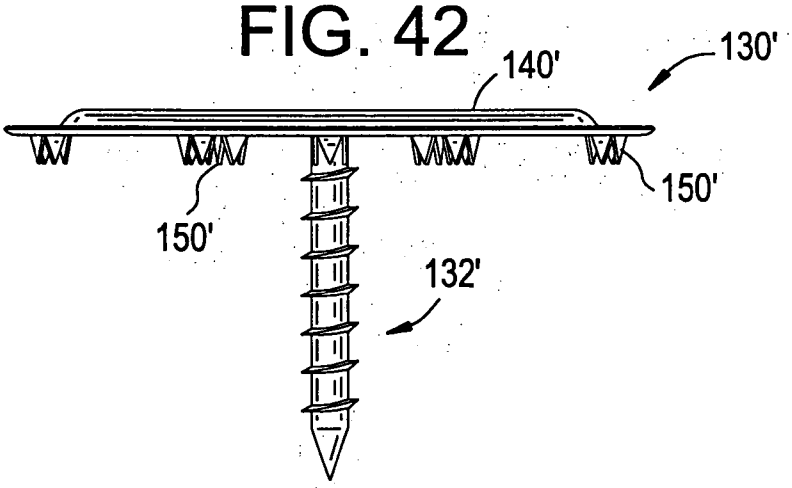


FIG. 43

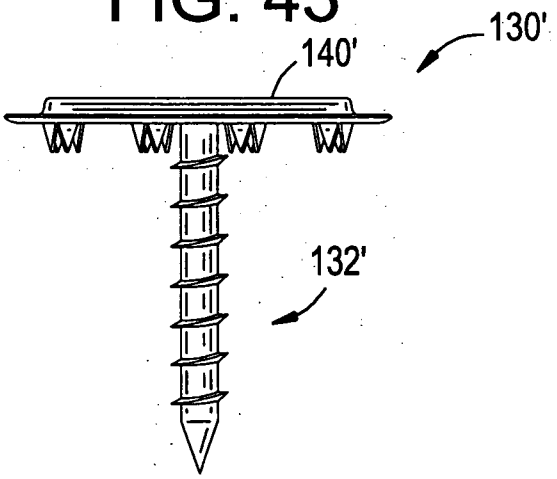

FIG. 44

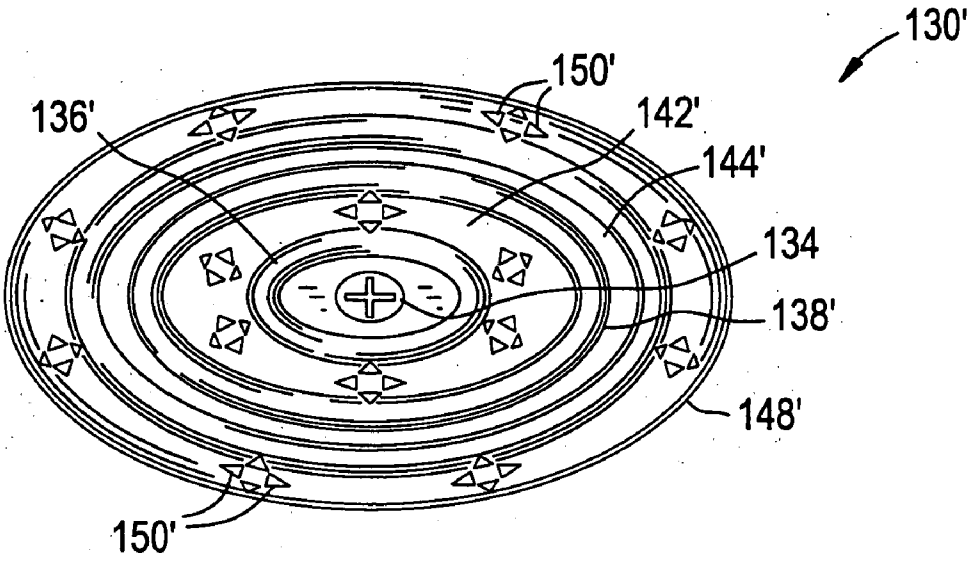


FIG. 45

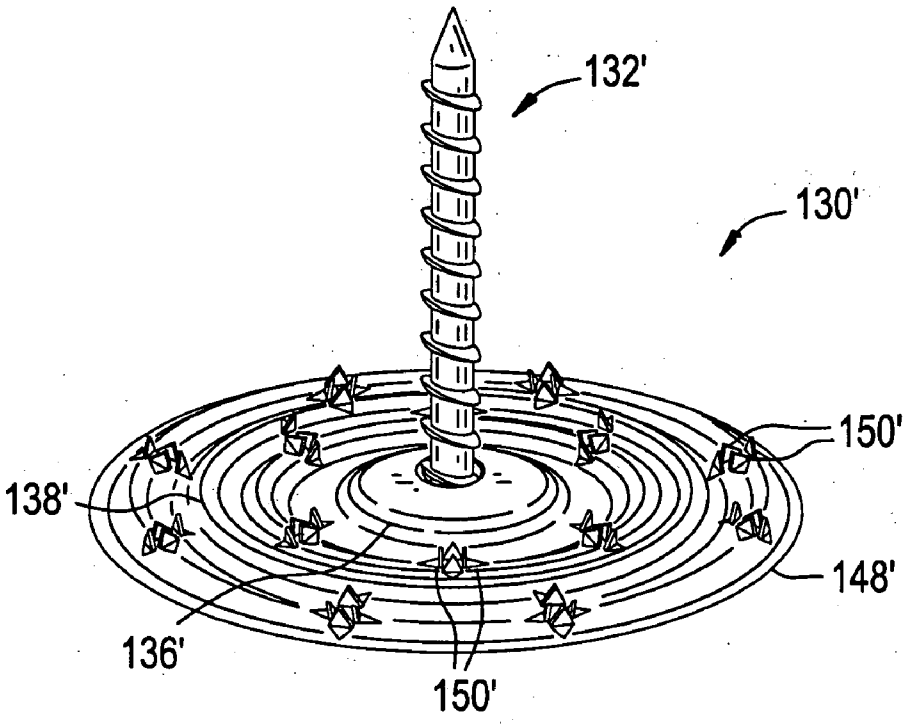

FIG. 46

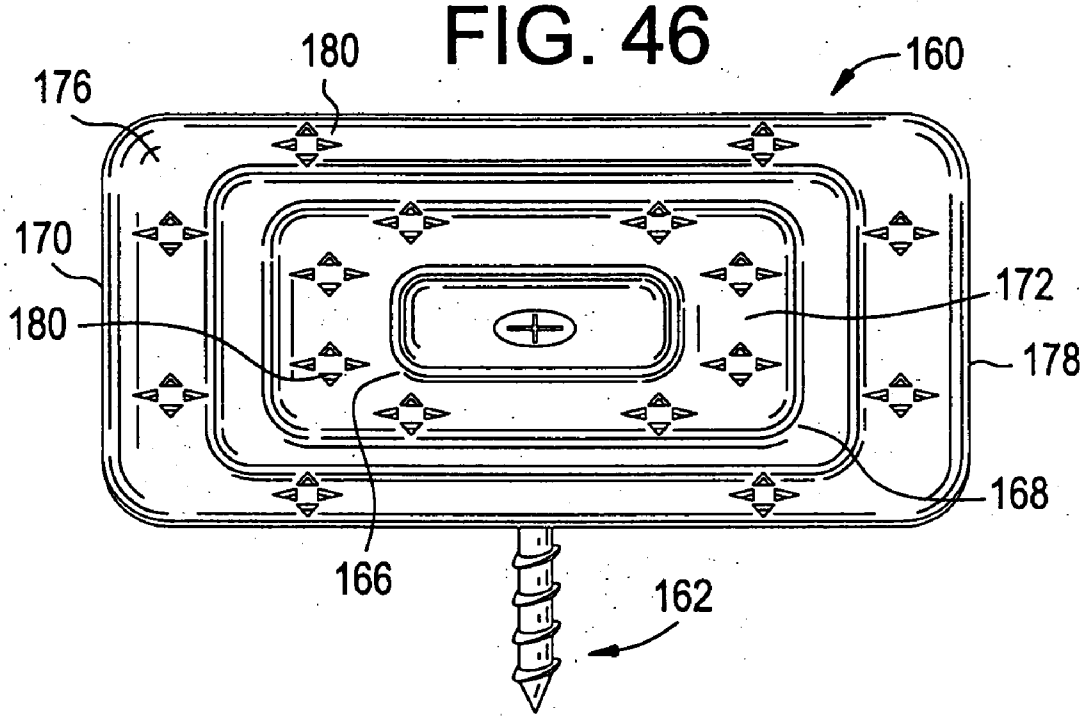


FIG. 47

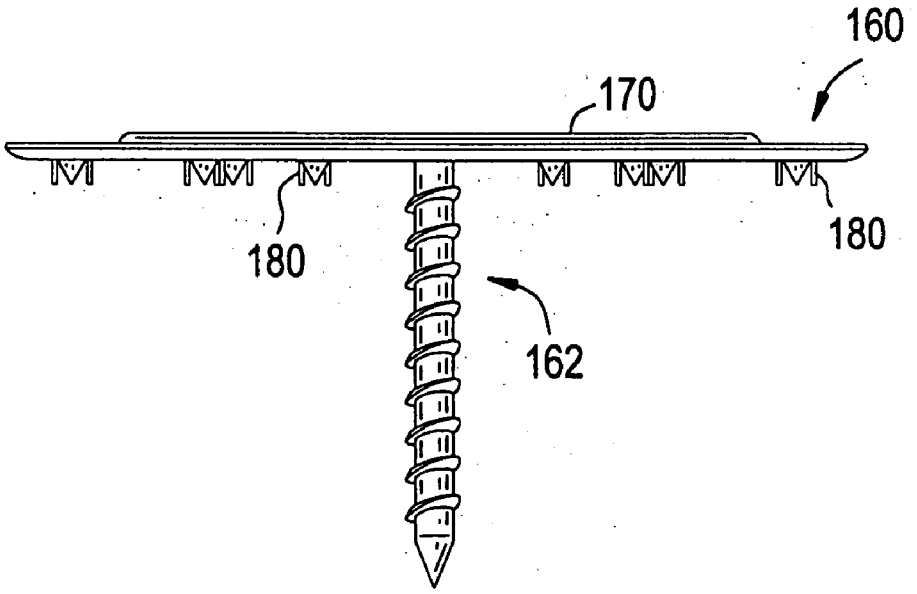

FIG. 48

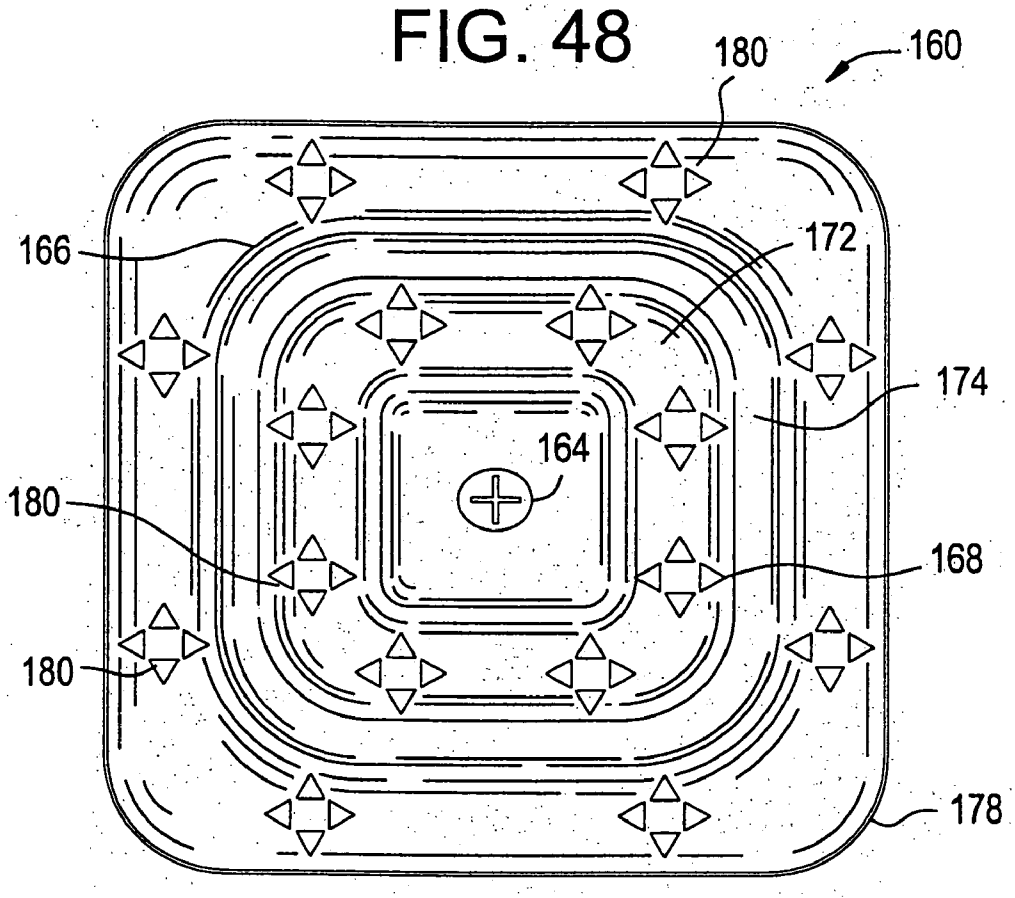
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FIG. 49

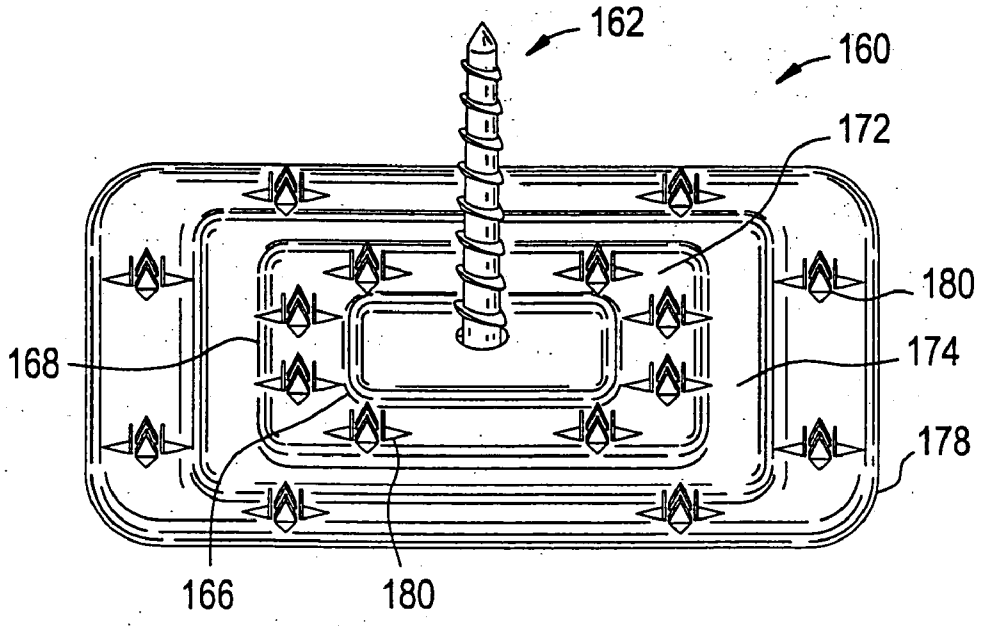
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FIG. 50

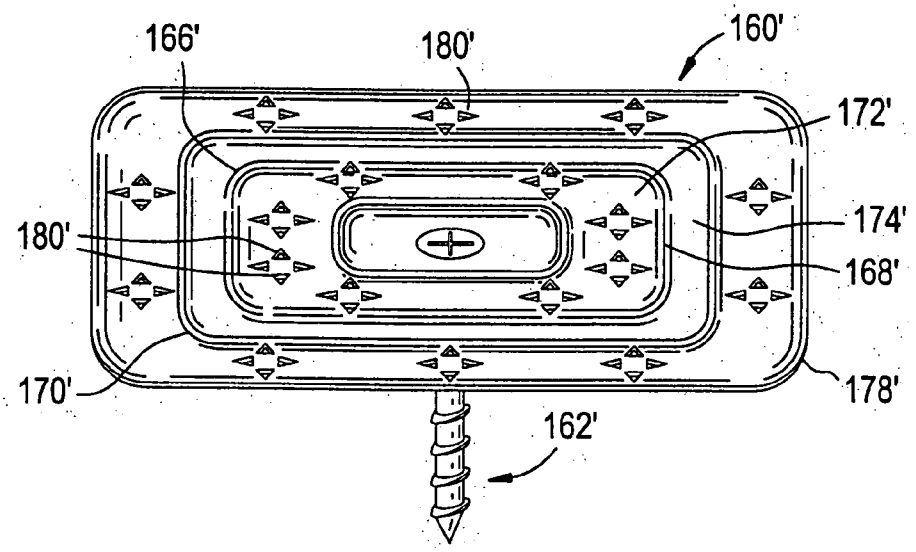



FIG. 51

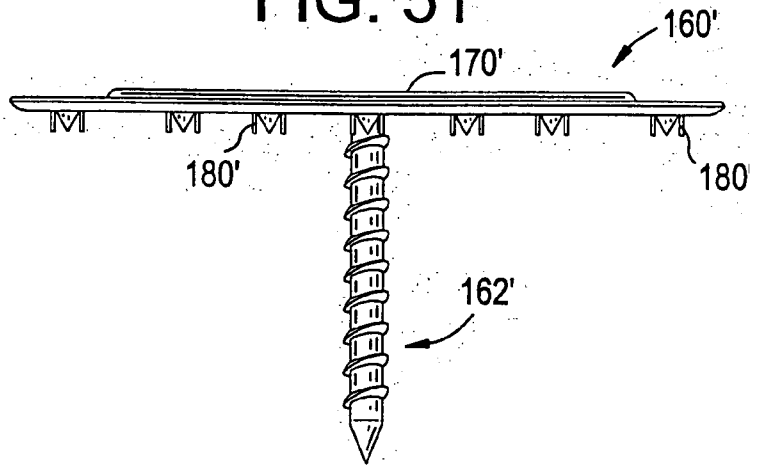



FIG. 52

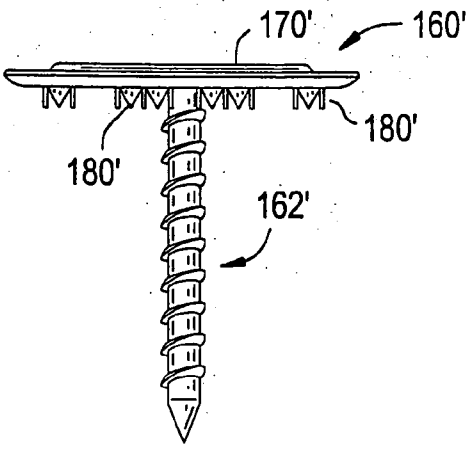


FIG. 53

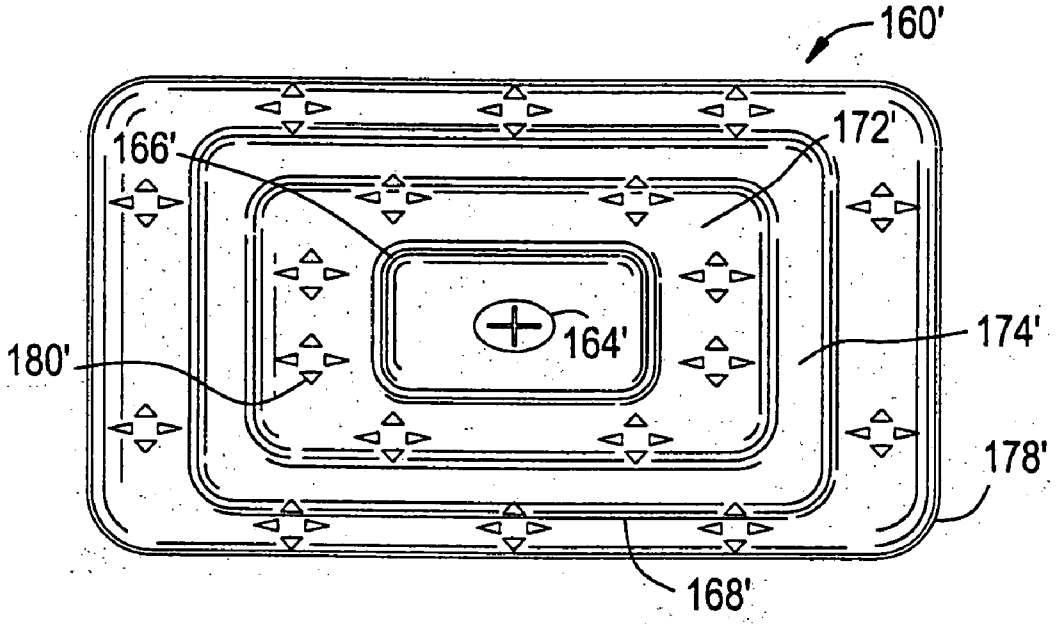

160'
166'
172'
164'
174'
180'
178'
168'

FIG. 54

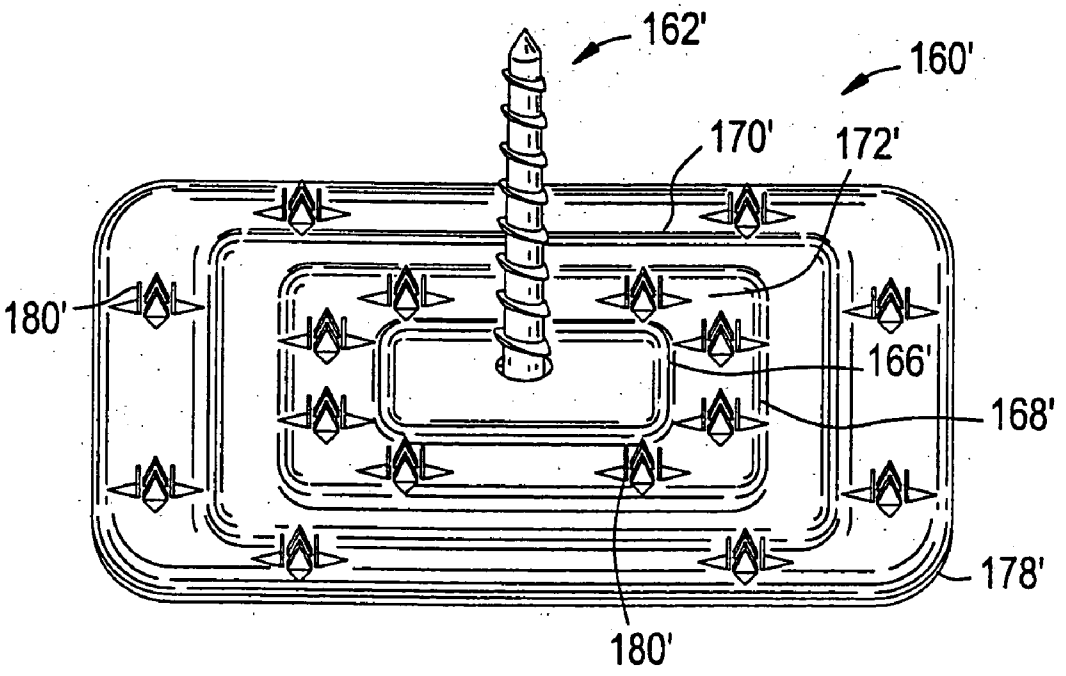

162'
160'
170'
172'
180'
166'
168'
178'
180'

FIG. 55

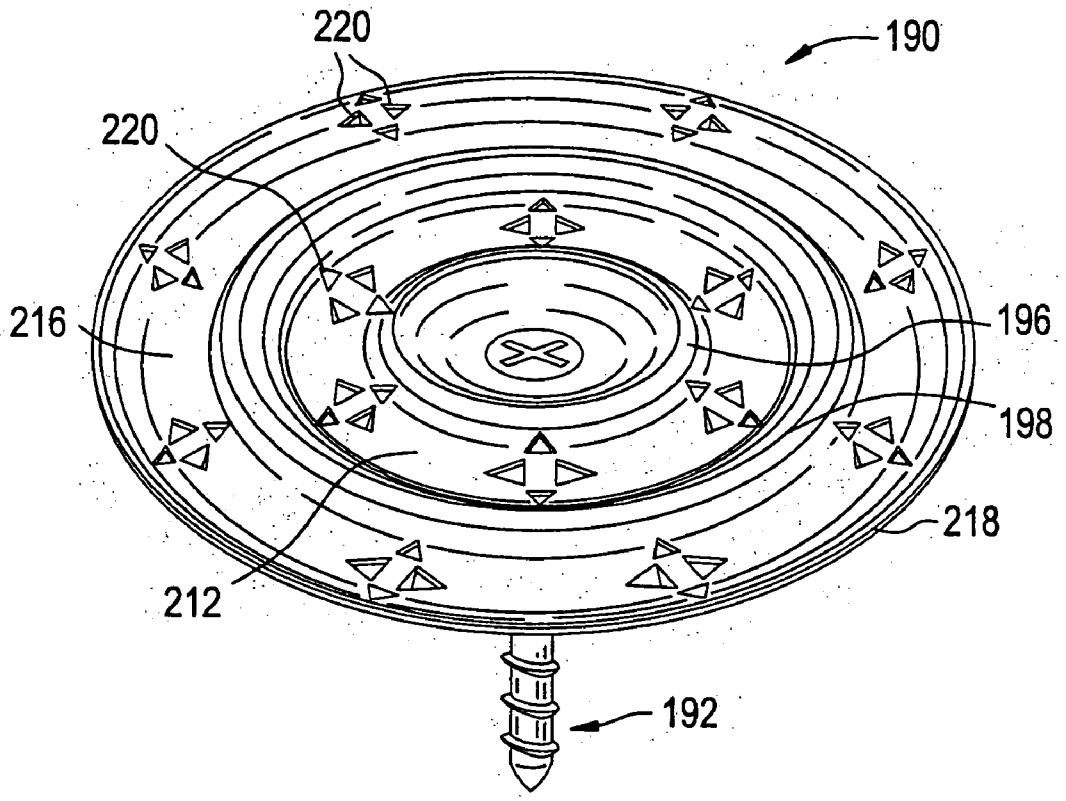



FIG. 56

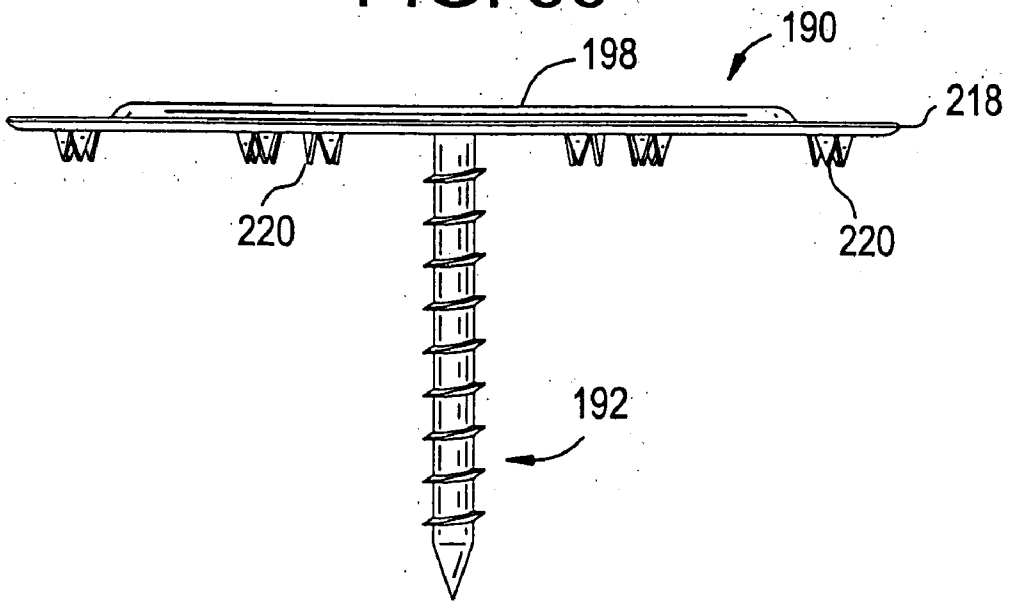


FIG. 57

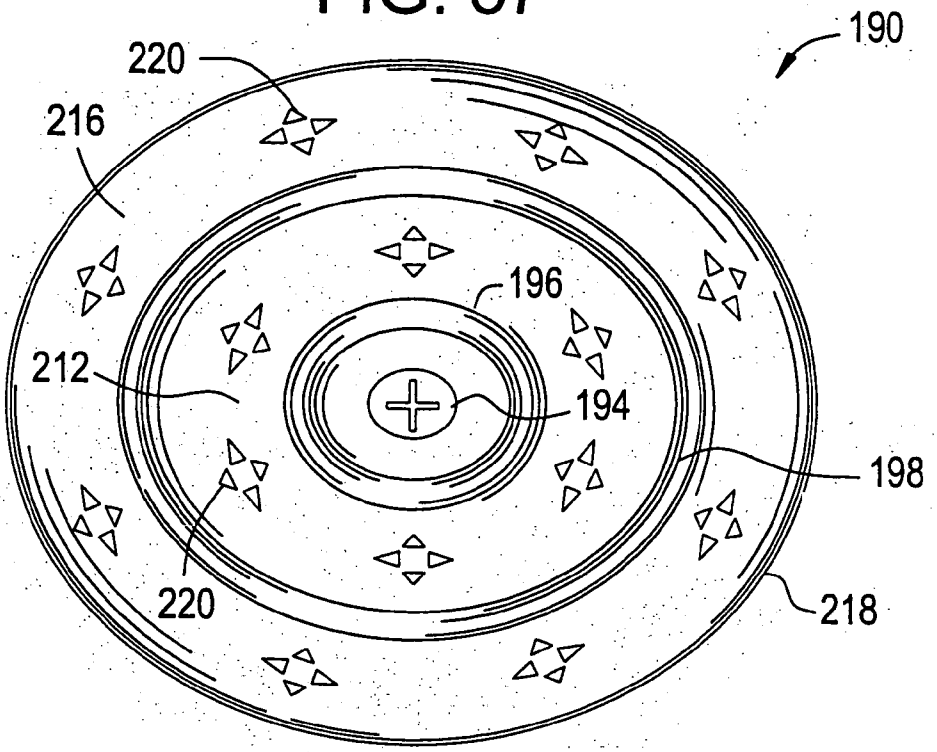



FIG. 58

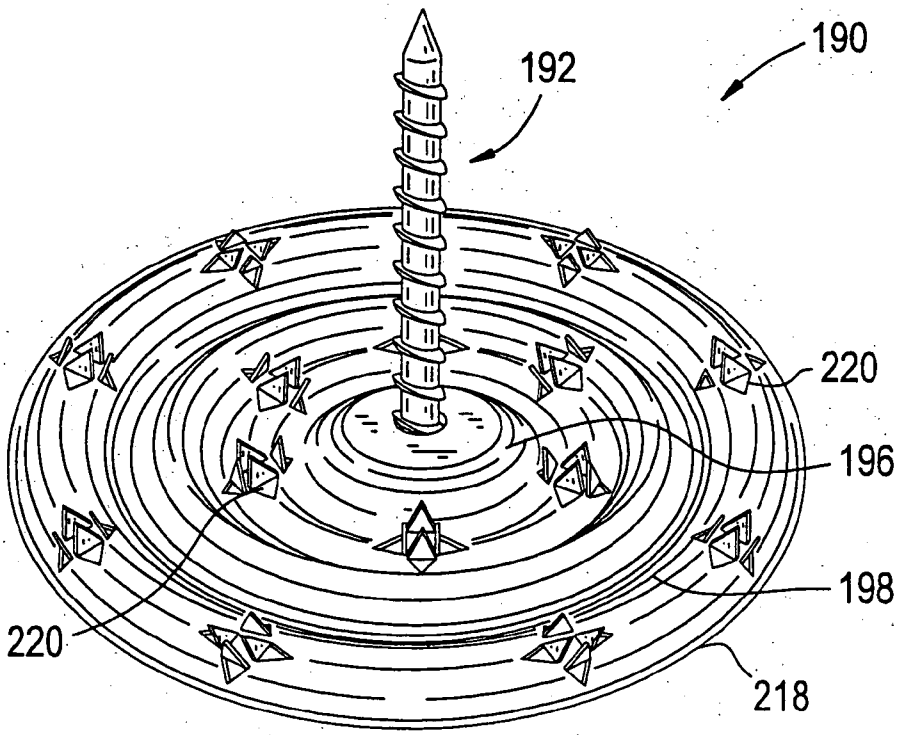


FIG. 59

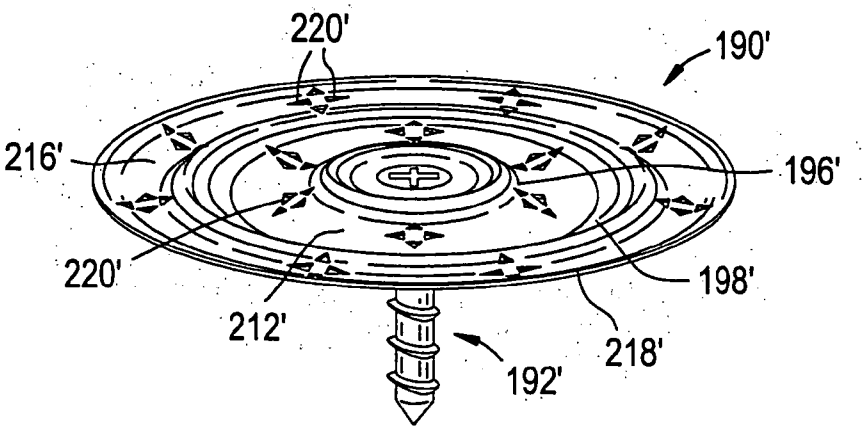



FIG. 60

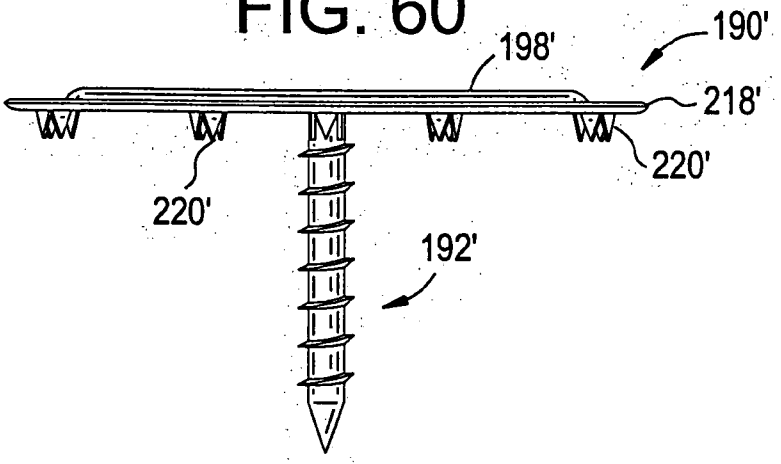



FIG. 61

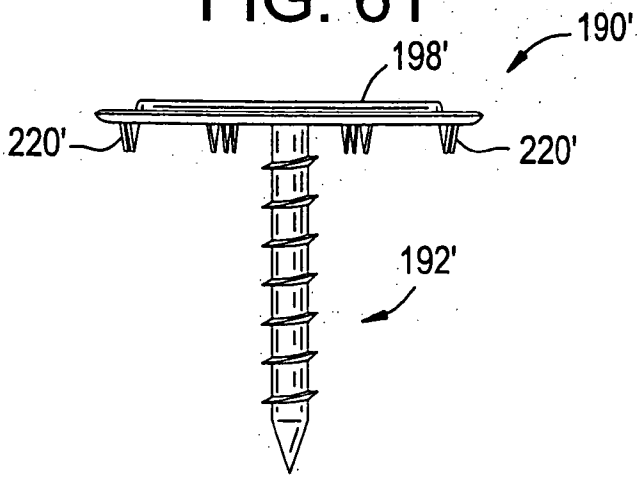


FIG. 62

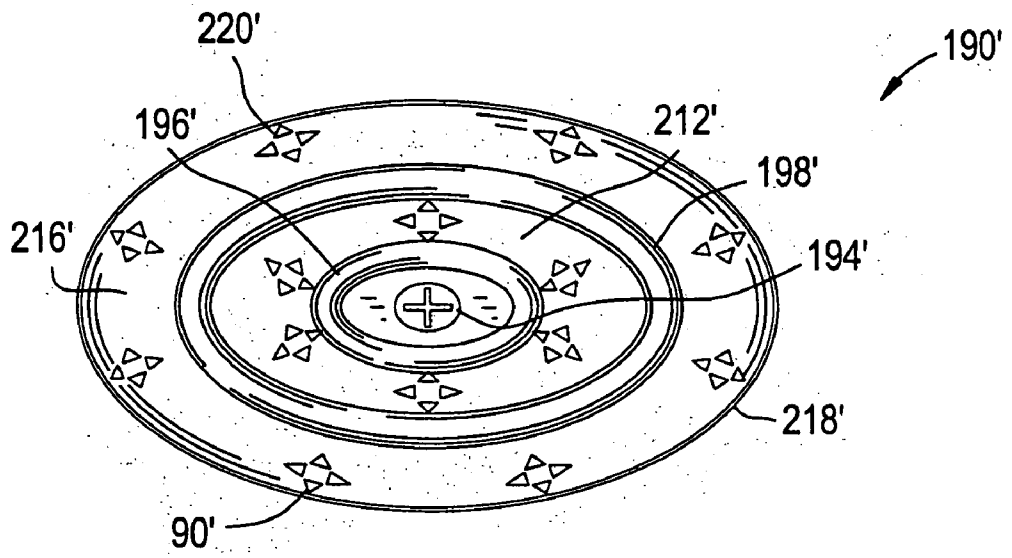



FIG. 63

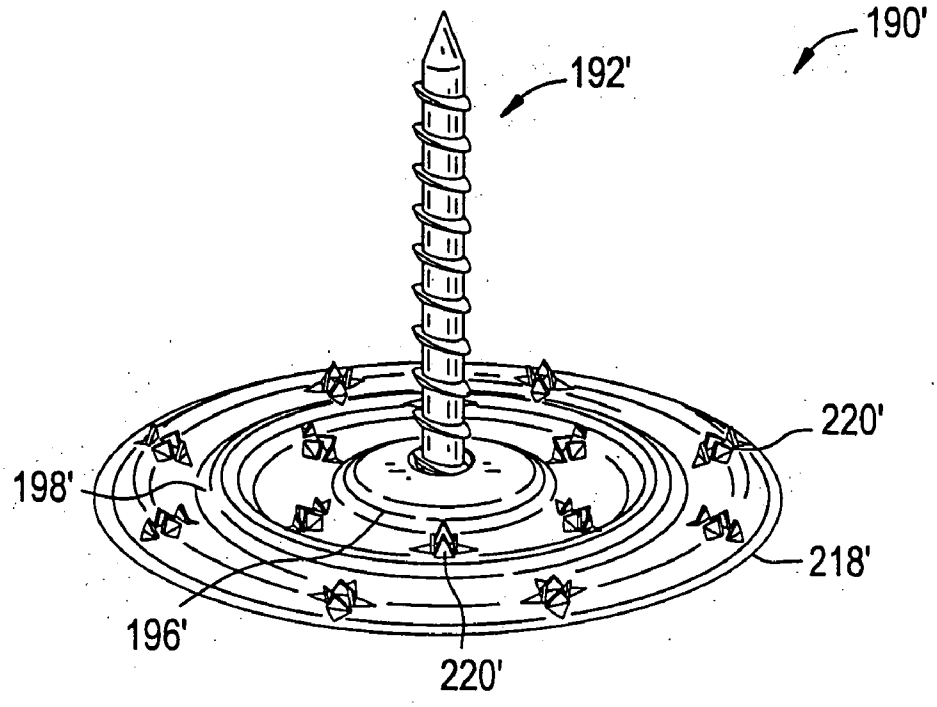


FIG. 64

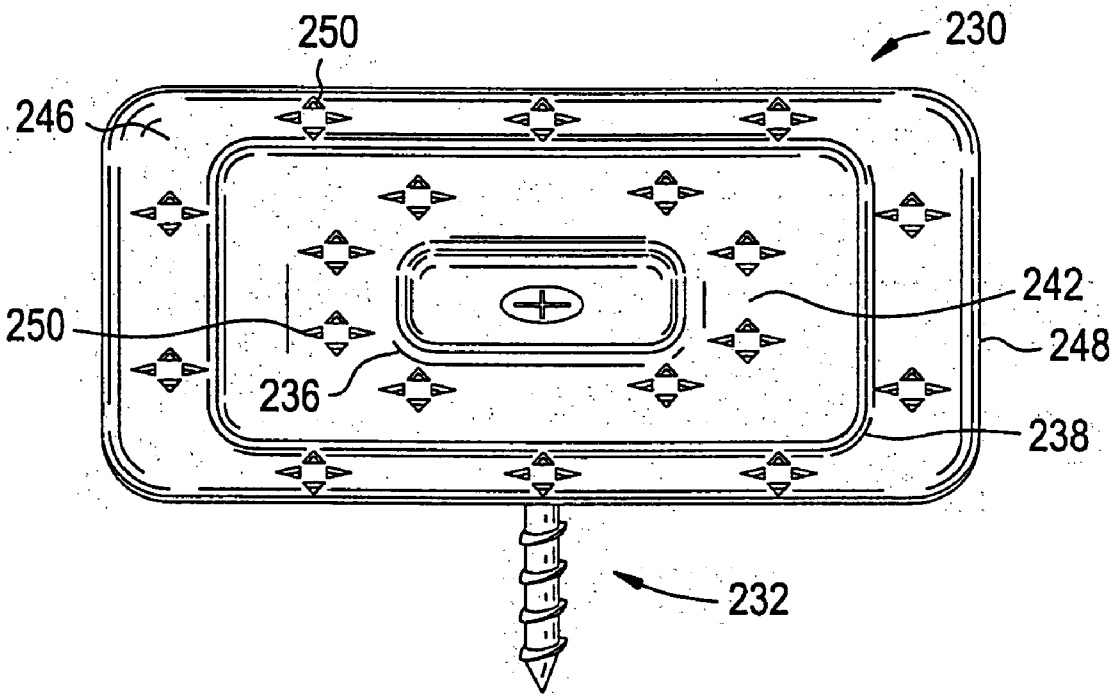



FIG. 65

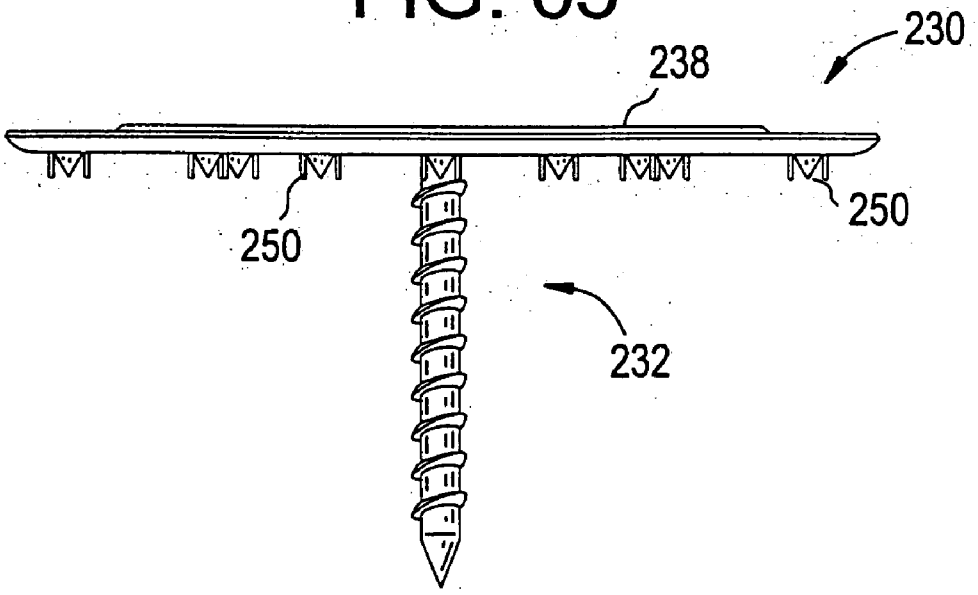


FIG. 66

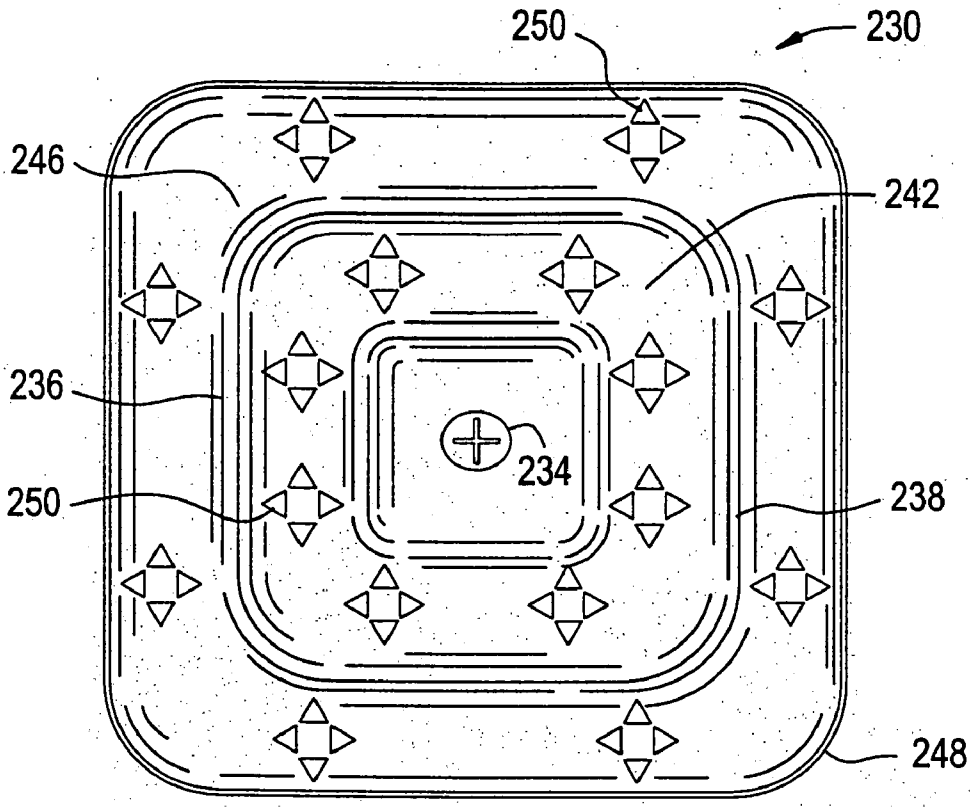

250
230
246
242
236
234
250
238
248

FIG. 67

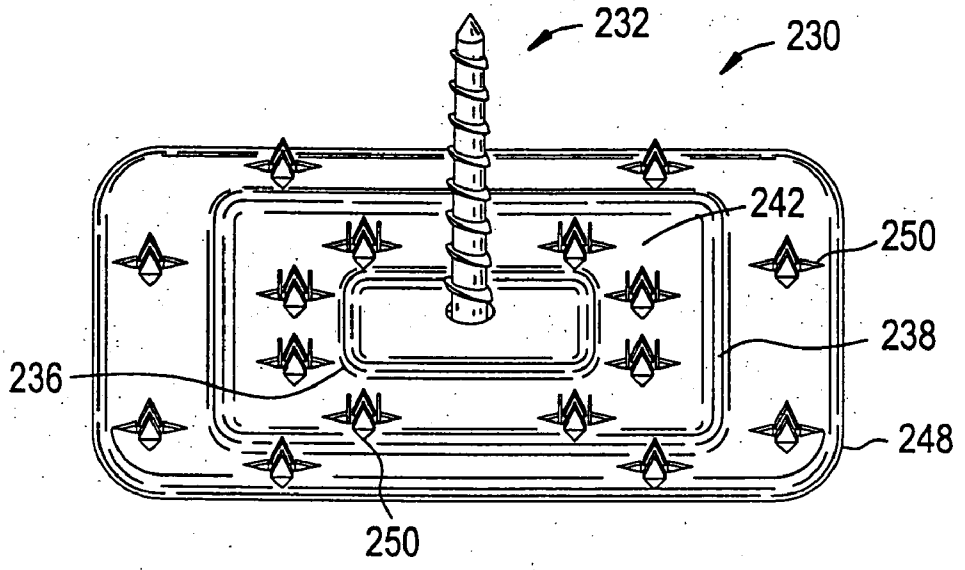

232
230
242
250
238
236
248
250

FIG. 68

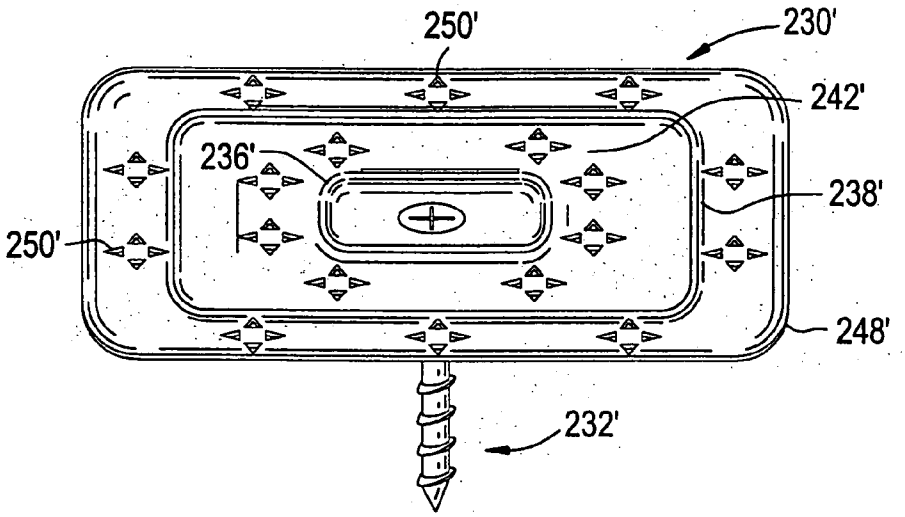



FIG. 69

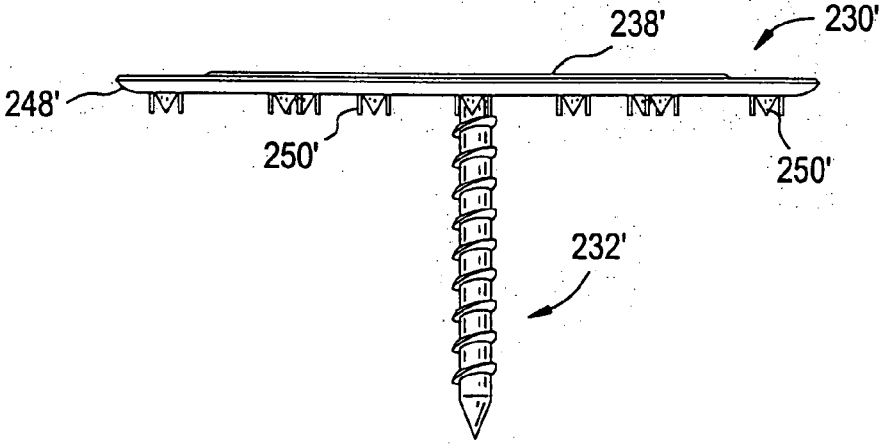



FIG. 70

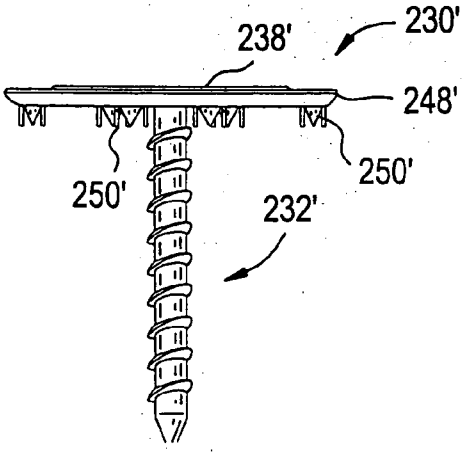


FIG. 71

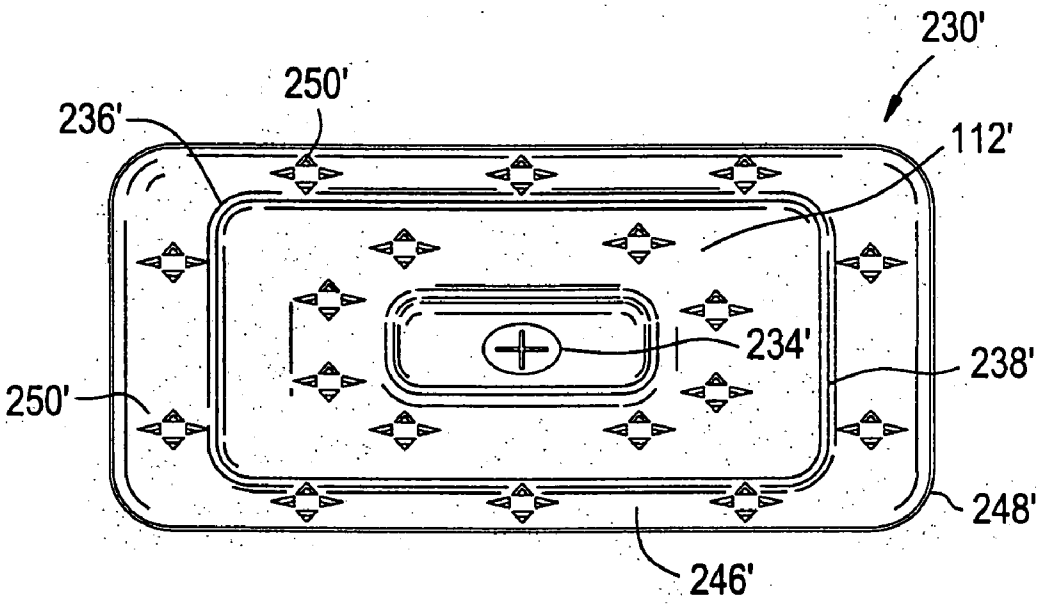



FIG. 72

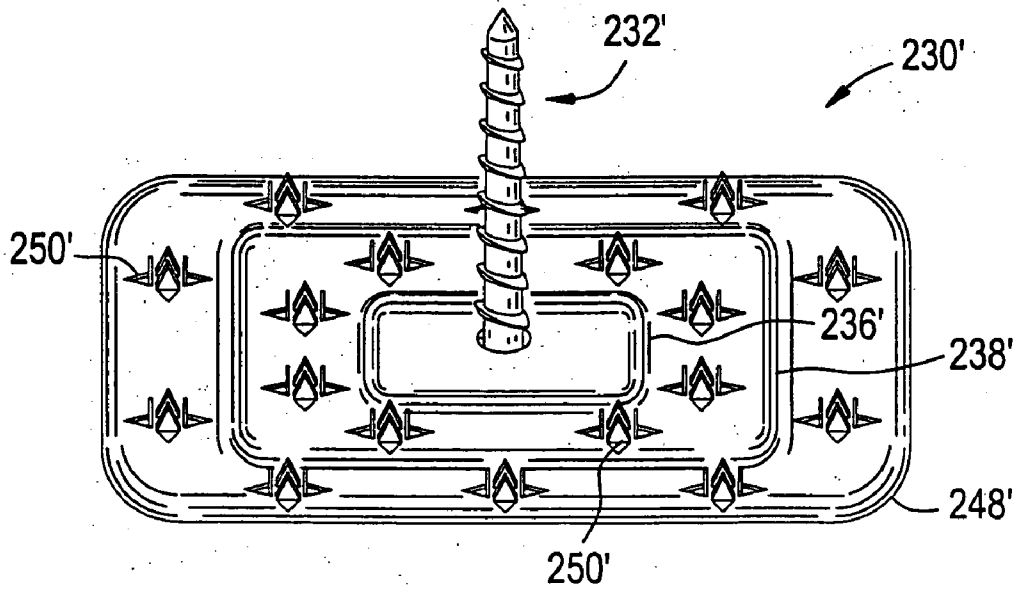


FIG. 73

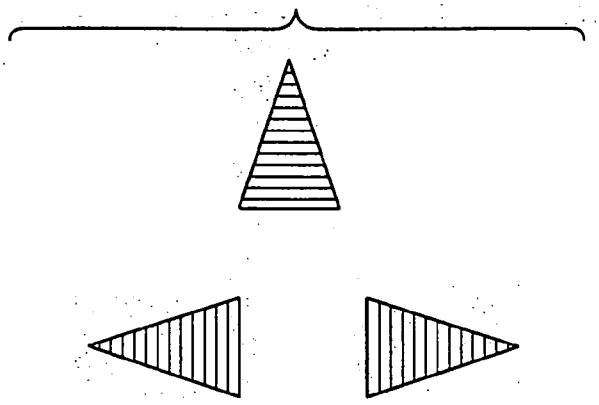


FIG. 74

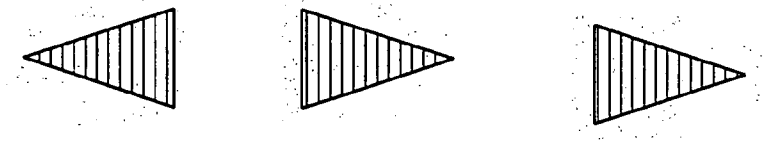


FIG. 75

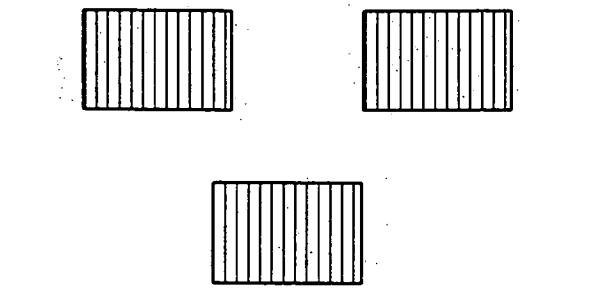


FIG. 76

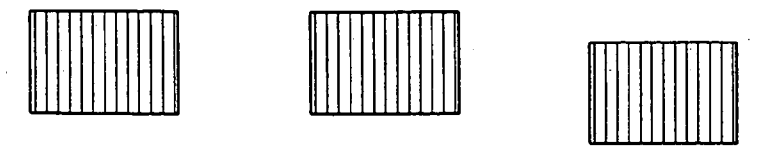


FIG. 77

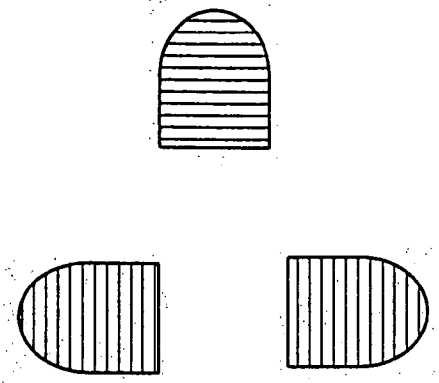


FIG. 78

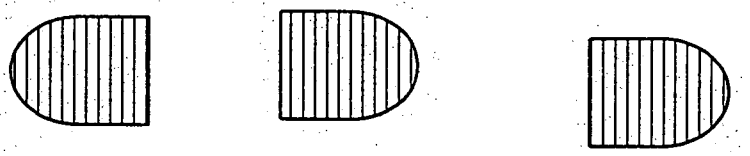
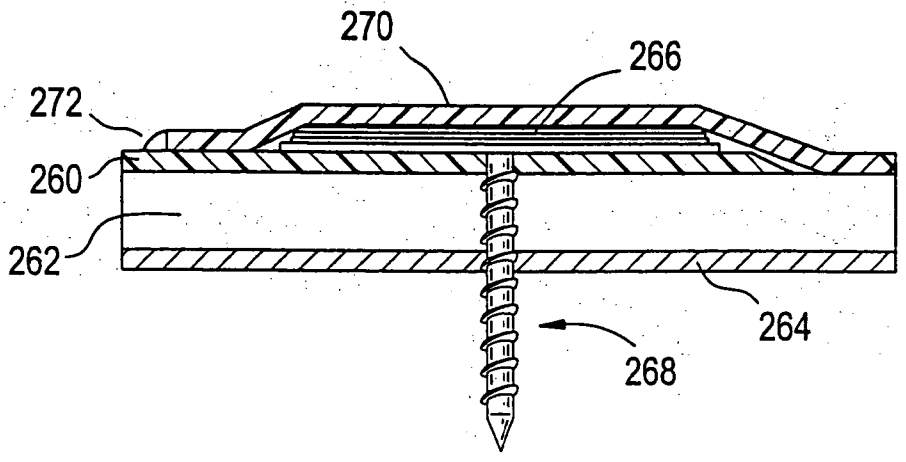


FIG. 79



# MULTIPLE BARBED PLATE WITH FASTENER

## REFERENCE TO PRIOR APPLICATION DATA

[0001] This application is a continuation-in-part of copending application Ser. No. 10/357,113 filed on Feb. 3, 2002.

## BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to fasteners employed to fasten a covering material to an underlying substrate. More particularly, the invention relates to a stress plate with a fastener for fastening a membrane, such as a roof membrane or roofing insulation, to a roof deck, a wall, concrete, stone, plaster, steel deck or wood.

[0004] 2. Reported Development

[0005] Fasteners are conventionally employed in the building industry for fastening or clamping a flexible membrane, such as an insulation membrane to a substrate, such as a roof deck. The fasteners typically comprise a large head portion and a shank portion. In use, the shank portion is driven through the membrane into the underlying substrate to anchor the fastener thereinto, while the head portion holds the membrane against the substrate and prevent removal thereof by wind lift. The undersurface of the head portion is typically provided with gripping means so that the membrane is prevented from moving or sliding under the fastener. The gripping means are typically designed not to penetrate completely through the membrane in order to prevent atmospheric moisture from entering into the substrate through the holes which tend to be made by the gripping means. It is also important that the gripping means are spread/distributed in the undersurface of the head portion of the stress plate in order prevent tearing of the membrane. Conventional fasteners are illustrated by the following references.

[0006] U.S. Pat. No. 4,787,188 discloses a stress plate for securing a roof membrane to a roof deck. The stress plate is circular having a top surface and a bottom surface with a central circular opening for receiving a screw for fastening the stress plate over a roof membrane and to the roof deck. The stress plate is equipped with four gripping prongs of triangular shape which are circumferentially spaced from each other by 90°.

[0007] In use a first membrane is applied to a roof deck surface, then the membrane is secured to the roof deck surface with the stress plate and the screw. A top sheet or membrane is lapped over the first membrane to cover the stress plate and welded to the first membrane. The four gripping prongs in the stress plate grip the first sheet and hold the same on top of the roof deck without tearing.

[0008] U.S. Pat. No. 5,049,018 discloses a fastener for gripping a substrate material. The fastener is of a unitary piece comprising a head portion, a shaft portion, and a hook portion at the end of the shaft portion, wherein the hook portion has an outwardly and upwardly extending resilient end portion. The end portion has an end surface which provides gripping contact with a wall of a hole in a substrate into which the fastener is inserted.

[0009] It is apparent that the reference invention is directed to a fastener the construction of which insures that the fastener will not be dislodged by wind uplift from the hole of the substrate.

[0010] U.S. Pat. No. 5,163,798 relates to a fastener assembly which is employed to secure plies or membranes of roofing, felt and paper to prevent the materials from being blown off the base roofing material before the base material is sufficiently hardened.

[0011] The assembly comprises a fastener and a retainer plate. The assembly includes a fastener plate which defines a substantially rectangular opening. The fastener includes a head and a pair of legs which are integrally hingably connected to the head. The legs have a contoured distal portion and an angular side configuration so that at least one of the legs is forced apart as the fastener is driven into the base material.

[0012] We have observed that under windy conditions the prior art fasteners need improvement in securely holding a flexible membrane on a substrate without the gripping means penetrating the flexible membrane, and without tearing the flexible membrane.

[0013] Accordingly, an object of the present invention is to provide a new and improved stress plate with a fastener to allow attachment of one or more flexible membranes to an underlying substrate without tearing the flexible membrane or allowing it to slip out from under the stress plate.

## SUMMARY OF THE INVENTION

[0014] The present invention comprises two non-integral components: a stress plate, and a fastener. In use the stress plate and the associated fastener attach and firmly hold a flexible membrane to an underlying substrate, such as a roof deck. The stress plate has a top surface and a bottom surface and is provided with multiple barbs extending vertically outwardly from the bottom surface and having sufficient length to grip the flexible membrane preferably without puncturing therethrough. The stress plate further includes an opening in its central portion to allow a fastener, such as a screw, therethrough for attachment of the stress plate to the underlying substrate. The opening may be circular, rectangular or square.

[0015] The present invention comprises sixteen preferred embodiments.

[0016] In the first embodiment of the invention the stress plate is circular having an opening in its center portion and three dome-shaped concentric ribs or protuberances rising above the top surface of the stress plate for providing sufficient strength thereto. The radius of the concentric ribs increases from the center opening to the outer circumference of the stress plate. Separating the first and second concentric ribs there is a first concentric depression or dimple, and separating the second and third concentric ribs there is a second concentric depression or dimple. A flat surface extends between the third rib and the edge or circumference of the stress plate. In preferred embodiments, the circular stress plate can range in diameter from about 1 to about 5 inches. At least one of the first or second dimples or the flat surface is provided with multiple pairs of barbs.

[0017] The first dimple optionally can be provided with a multiplicity of groups of triple barbs extending 90° down-

ward from the bottom surface of the stress plate, and preferably, four to eight groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configurations. The groups of barbs are approximately evenly spaced from each other. Optionally, the barbs can be located in the second dimple. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of triple barbs extending downward from the bottom surface of the stress plate, and preferably, four to ten groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0018] In the second embodiment of the invention the stress plate is elliptical having an opening in its center portion and three dome-shaped concentric ribs or protuberances rising above the top surface of the stress plate for providing sufficient strength thereto. Separating the first and second concentric ribs there is a first concentric depression or dimple, and separating the second and third concentric ribs there is a second concentric depression or dimple. A flat surface extends between the third rib and the edge or circumference of the stress plate. At least one of the first or second dimples or the flat surface is provided with multiple groups of triple barbs.

[0019] The first dimple optionally can be provided with a multiplicity of groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to twelve groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of triple barbs are approximately evenly spaced from each other. Optionally, the barbs can be located in the second dimple. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of triple barbs extending downward from the bottom surface of the stress plate, and preferably, four to ten groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0020] In the third embodiment of the invention the stress plate is of square configuration having an opening in its center portion and three dome-shaped concentric ribs or protuberances running parallel to each other and to the edge of the stress plate rising above the top surface of the stress plate for providing sufficient strength thereto. Separating the first and second ribs there is a first depression or dimple, and separating the second and third ribs there is a second depression or dimple. A flat surface extends between the third rib and the edge or circumference of the stress plate. At least one of the first or second concentric dimples or the flat concentric surface is provided with multiple groups of triple barbs.

[0021] The first dimple preferably optionally can be provided with a multiplicity of groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to twelve groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of triple barbs are approximately evenly spaced from each other. Optionally, the barbs can be located in the second dimple. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to ten groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0022] In the fourth embodiment of the invention the stress plate is of rectangular configuration having an opening in its center portion and three dome-shaped ribs or protuberances running parallel to each other and to the edge of the stress plate rising above the top surface of the stress plate for providing sufficient strength thereto. Separating the first and second ribs there is a first depression or dimple, and separating the second and third ribs there is a second depression or dimple. A flat surface extends between the third rib and the edge or circumference of the stress plate. At least one of the first or second concentric dimples or the flat concentric surface is provided with multiple groups of triple barbs.

[0023] The first dimple optionally can be provided with a multiplicity of groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to eight groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of triple barbs are approximately evenly spaced from each other. Optionally, the barbs can be located in the second dimple. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to ten groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0024] In the fifth embodiment of the invention the stress plate is circular having an opening in its center portion and two dome-shaped concentric ribs or protuberances rising above the top surface of the stress plate for providing sufficient strength thereto. The radius of the first concentric rib close to the opening is smaller than the radius of the second concentric rib close to the circumference of the stress plate. Separating the first and second concentric ribs there is a concentric depression or dimple. A flat surface extends between the second rib and the edge or circumference of the stress plate. At least one of the dimples or flat surface is provided with multiple groups of triple barbs.

[0025] The first dimple optionally can be provided with a multiplicity of groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to eight groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of triple barbs are approximately evenly spaced from each other. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of triple barbs extending downward from the bottom surface of the stress plate, and preferably, four to ten groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular pairs of barbs approximately evenly spaced from each other.

[0026] In the sixth embodiment of the invention the stress plate is elliptical having an opening in its center portion and two dome-shaped concentric ribs or protuberances rising above the top surface of the stress plate for providing

sufficient strength thereto. Separating the first and second concentric ribs there is a first concentric depression or dimple. The edge or circumference of the stress plate terminates in a substantially flat surface. At least one of the dimple or flat surface is provided with multiple groups of triple barbs.

[0027] The dimple optionally can be provided with groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to eight groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly space from each other. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to ten groups of triple barbs each of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0028] In the seventh embodiment of the invention the stress plate is of square configuration having an opening in its center portion and two dome-shaped ribs or protuberances running parallel to each other and to the edge of the stress plate rising above the top surface of the stress plate for providing sufficient strength thereto. Separating the first and second ribs there is a depression or dimple. A flat surface extends between the second rib and the edge or circumference of the stress plate. At least one of the dimple or flat surface is provided with multiple groups of triple barbs.

[0029] The dimple optionally can be provided with a multiplicity of groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to eight groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly space from each other. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to ten groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0030] In the eighth embodiment of the invention the stress plate is of rectangular configuration having an opening in its center portion and two dome-shaped ribs or protuberances running parallel to each other and to the edge of the stress plate rising above the top surface of the stress plate for providing sufficient strength thereto. Separating the first and second ribs there is a depression or dimple. A flat surface extends between the second rib and the edge or circumference of the stress plate. At least one of the dimple or flat surface is provided with multiple groups of triple barbs.

[0031] The dimple optionally can be provided with a multiplicity of groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to eight groups of triple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of triple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to ten groups of triple barbs each of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0032] In the ninth embodiment of the invention the stress plate is circular having an opening in its center portion and three dome-shaped concentric ribs or protuberances rising above the top surface of the stress plate for providing sufficient strength thereto. The radius of the concentric ribs increases from the center opening to the outer circumference of the stress plate. Separating the first and second concentric ribs there is a first concentric depression or dimple, and separating the second and third concentric ribs there is a second concentric depression or dimple. A flat surface extends between the third rib and the edge or circumference of the stress plate. In preferred embodiments, the circular stress plate can range in diameter from about 1 to about 5 inches. At least one of the first or second dimples or the flat surface is provided with multiple groups of quadruple barbs.

[0033] The first dimple optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to eight groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configurations. The groups of barbs are approximately evenly spaced from each other. Optionally, the barbs can be located in the second dimple. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of quadruple barbs extending downward from the bottom surface of the stress plate, and preferably, four to ten groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0034] In the tenth embodiment of the invention the stress plate is elliptical having an opening in its center portion and three dome-shaped concentric ribs or protuberances rising above the top surface of the stress plate for providing sufficient strength thereto. Separating the first and second concentric ribs there is a first concentric depression or dimple, and separating the second and third concentric ribs there is a second concentric depression or dimple. A flat surface extends between the third rib and the edge or circumference of the stress plate. At least one of the first or second dimples or the flat surface is provided with multiple groups of quadruple barbs.

[0035] The first dimple optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to twelve groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of quadruple barbs are approximately evenly spaced from each other. Optionally, the barbs can be located in the second dimple. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of quadruple barbs extending downward from the bottom surface of the stress plate, and preferably, four to ten groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0036] In the eleventh embodiment of the invention the stress plate is of square configuration having an opening in its center portion and three dome-shaped concentric ribs or protuberances running parallel to each other and to the edge of the stress plate rising above the top surface of the stress plate for providing sufficient strength thereto. Separating the first and second ribs there is a first depression or dimple, and separating the second and third ribs there is a second depression or dimple. A flat surface extends between the third rib and the edge or circumference of the stress plate. At least one of the first or second concentric dimples or the flat concentric surface is provided with multiple groups of quadruple barbs.

[0037] The first dimple preferably optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to twelve groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of quadruple barbs are approximately evenly spaced from each other. Optionally, the barbs can be located in the second dimple. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to ten groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0038] In the twelfth embodiment of the invention the stress plate is of rectangular configuration having an opening in its center portion and three dome-shaped ribs or protuberances running parallel to each other and to the edge of the stress plate rising above the top surface of the stress plate for providing sufficient strength thereto. Separating the first and second ribs there is a first depression or dimple, and separating the second and third ribs there is a second depression or dimple. A flat surface extends between the third rib and the edge or circumference of the stress plate. At least one of the first or second concentric dimples or the flat concentric surface is provided with multiple groups of quadruple barbs.

[0039] The first dimple optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to eight groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of quadruple barbs are approximately evenly spaced from each other. Optionally, the barbs can be located in the second dimple. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to ten groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs approximately evenly spaced from each other.

[0040] In the thirteenth embodiment of the invention the stress plate is circular having an opening in its center portion and two dome-shaped concentric ribs or protuberances rising above the top surface of the stress plate for providing sufficient strength thereto. The radius of the first concentric rib close to the opening is smaller than the radius of the second concentric rib close to the circumference of the stress plate. Separating the first and second concentric ribs there is a concentric depression or dimple. A flat surface extends between the second rib and the edge or circumference of the stress plate. At least one of the dimple or flat surface is provided with multiple groups of quadruple barbs.

[0041] The first dimple optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to eight groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of quadruple barbs are approximately evenly spaced from each other. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of quadruple barbs extending downward from the bottom surface of the stress plate, and preferably, four to ten groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular pairs of barbs approximately evenly spaced from each other.

[0042] In the fourteenth embodiment of the invention the stress plate is elliptical having an opening in its center portion and two dome-shaped concentric ribs or protuberances rising above the top surface of the stress plate for providing sufficient strength thereto. Separating the first and second concentric ribs there is a first concentric depression or dimple. The edge or circumference of the stress plate terminates in a substantially flat surface. At least one of the dimple or flat surface is provided with multiple groups of quadruple barbs.

[0043] The dimple optionally can be provided with groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to eight groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly space from each other. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to ten groups of quadruple barbs each of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0044] In the fifteenth embodiment of the invention the stress plate is of square configuration having an opening in its center portion and two dome-shaped ribs or protuberances running parallel to each other and to the edge of the stress plate rising above the top surface of the stress plate for providing sufficient strength thereto. Separating the first and second ribs there is a depression or dimple. A flat surface extends between the second rib and the edge or circumference of the stress plate. At least one of the dimples or flat surface is provided with multiple groups of quadruple barbs.

[0045] The dimple optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to eight groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly space from each other. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and

preferably, four to ten groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0046] In the sixteenth embodiment of the invention the stress plate is of rectangular configuration having an opening in its center portion and two dome-shaped ribs or protuberances running parallel to each other and to the edge of the stress plate rising above the top surface of the stress plate for providing sufficient strength thereto. Separating the first and second ribs there is a depression or dimple. A flat surface extends between the second rib and the edge or circumference of the stress plate. At least one of the dimple or flat surface is provided with multiple groups of quadruple barbs.

[0047] The dimple optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to eight groups of quadruple barbs each barb of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other. The flat surface of the stress plate adjacent to the edge optionally can be provided with a multiplicity of groups of quadruple barbs extending 90° downward from the bottom surface of the stress plate, and preferably, four to ten groups of quadruple barbs each of which may be of triangular, rectangular, or semi-circular configuration. The groups of barbs are approximately evenly spaced from each other.

[0048] Both the triple and the quadruple barbs may be arranged in a group or in a row configuration to form the multiplicity of barbs. Each embodiment may consist of a multiplicity of triple barbs in a group or row configuration, or a multiplicity of quadruple barbs in a group or row configuration. Furthermore, each embodiment may consists of a multiplicity of triple barbs and quadruple barbs arranged in an alternating configuration.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0049] The invention will be further described with respect to the accompanying drawings wherein:

[0050] **FIG. 1** is a top, perspective view of the circular stress plate having three ribs and multiple groups of triple barbs thereon and fastener;

[0051] **FIG. 2** is a side elevational view thereof;

[0052] **FIG. 3** is a top plan view thereof;

[0053] **FIG. 4** is a bottom perspective view thereof;

[0054] **FIG. 5** is a top perspective view of the elliptical stress plate having three ribs and multiple groups of triple barbs thereon and fastener;

[0055] **FIG. 6** is a side elevational view thereof;

[0056] **FIG. 7** is another side elevational view thereof;

[0057] **FIG. 8** is a top plan view thereof;

[0058] **FIG. 9** is a bottom perspective view thereof;

[0059] **FIG. 10** is a top perspective view of the square stress plate having three ribs and multiple groups of triple barbs thereon and fastener;

[0060] **FIG. 11** is a side elevational view thereof;

[0061] **FIG. 12** is a top plan view thereof;

[0062] **FIG. 13** is a bottom perspective view thereof;

[0063] **FIG. 14** is a top perspective view of the rectangular stress plate having three ribs and multiple groups of triple barbs thereon and fastener;

[0064] **FIG. 15** is a side elevational view thereof;

[0065] **FIG. 16** is another side elevational view thereof;

[0066] **FIG. 17** is a top plan view thereof;

[0067] **FIG. 18** is a bottom perspective view thereof;

[0068] **FIG. 19** is a is a top perspective view of the circular stress plate having two ribs and multiple groups of triple barbs thereon and fastener;

[0069] **FIG. 20** is a side elevational view thereof;

[0070] **FIG. 21** is a top plan view thereof;

[0071] **FIG. 22** is a bottom perspective view thereof;

[0072] **FIG. 23** is a top perspective view of the elliptical stress plate having two ribs and multiple groups of triple barbs thereon and fastener;

[0073] **FIG. 24** is a side elevational view thereof;

[0074] **FIG. 25** is another side elevational view thereof;

[0075] **FIG. 26** is a top plan view thereof;

[0076] **FIG. 27** is a bottom perspective view thereof;

[0077] **FIG. 28** is a is a top perspective view of the square stress plate having two ribs and multiple groups of triple barbs thereon and fastener;.

[0078] **FIG. 29** is a side elevational view thereof;

[0079] **FIG. 30** is a top plan view thereof;

[0080] **FIG. 31** is a bottom perspective view thereof;

[0081] **FIG. 32** is a top perspective view of the rectangular stress plate having two ribs and multiple groups of triple barbs thereon and fastener;

[0082] **FIG. 33** is a side elevational view thereof;

[0083] **FIG. 34** is another side elevational view thereof;

[0084] **FIG. 35** is a top plan view thereof;

[0085] **FIG. 36** is a bottom perspective view thereof;

[0086] **FIG. 37** is a top, perspective view of the circular stress plate having three ribs and multiple groups of quadruple barbs thereon and fastener;

[0087] **FIG. 38** is a side elevational view thereof;

[0088] **FIG. 39** is a top plan view thereof;

[0089] **FIG. 40** is a bottom perspective view thereof;

[0090] **FIG. 41** is a top perspective view of the elliptical stress plate having three ribs and multiple groups of quadruple barbs thereon and fastener;

[0091] **FIG. 42** is a side elevational view thereof;

[0092] **FIG. 43** is another side elevational view thereof;

[0093] **FIG. 44** is a top plan view thereof;

[0094] **FIG. 45** is a bottom perspective view thereof;

[0095] **FIG. 50** is a top perspective view of the square stress plate having three ribs and multiple groups of quadruple barbs thereon and fastener;

[0096] **FIG. 51** is a side elevational view thereof;

[0097] **FIG. 52** is a top plan view thereof;

[0098] **FIG. 53** is a bottom perspective view thereof;

[0099] **FIG. 54** is a top perspective view of the rectangular stress plate having three ribs and multiple groups of quadruple barbs thereon and fastener;

[0100] **FIG. 55** is a side elevational view thereof;

[0101] **FIG. 56** is another side elevational view thereof;

[0102] **FIG. 57** is a top plan view thereof;

[0103] **FIG. 58** is a bottom perspective view thereof;

[0104] **FIG. 59** is a is a top perspective view of the circular stress plate having two ribs and multiple groups of quadruple barbs thereon and fastener;

[0105] **FIG. 60** is a side elevational view thereof;

[0106] **FIG. 61** is a top plan view thereof;

[0107] **FIG. 62** is a bottom perspective view thereof;

[0108] **FIG. 63** is a top perspective view of the elliptical stress plate having two ribs and multiple groups of quadruple barbs thereon and fastener;

[0109] **FIG. 64** is a side elevational view thereof;

[0110] **FIG. 65** is another side elevational view thereof;

[0111] **FIG. 66** is a top plan view thereof;

[0112] **FIG. 67** is a bottom perspective view thereof;

[0113] **FIG. 68** is a is a top perspective view of the square stress plate having two ribs and multiple groups of quadruple barbs thereon and fastener;

[0114] **FIG. 69** is a side elevational view thereof;

[0115] **FIG. 70** is a top plan view thereof;

[0116] **FIG. 71** is a bottom perspective view thereof;

[0117] **FIG. 72** is a top perspective view of the rectangular stress plate having two ribs and multiple groups of quadruple barbs thereon and fastener;

[0118] **FIG. 73** is an enlarged top plan view of three triangular barbs in a group configuration;

[0119] **FIG. 74** is an enlarged top plan view of three triangular barbs in a row configuration;

[0120] **FIG. 75** is an enlarged top plan view of three rectangular barbs in a group configuration;

[0121] **FIG. 76** is an enlarged top plan view of three rectangular barbs in a row configuration;

[0122] **FIG. 77** is an enlarged top plan view of three semi-circular barbs in a group configuration;

[0123] **FIG. 78** is an enlarged top plan view of three semi-circular barbs in a row configuration;

[0124] **FIG. 79** is a cross-sectional view illustrating the use of the stress plate and the fastener for attaching a roof membrane to a roof deck.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0125] Reference is now being made to the drawings wherein like numerals represent like parts throughout the figures showing the various embodiments of the present invention.

### First Embodiment—Circular with Three Ribs

[0126] FIGS. **1-4** relate to a preferred first embodiment of the present invention in which the circular stress plate is generally designated at **10** and the fastener is generally designated at **12**. The two components are non-integral and when put together, constitute the invention. The circular stress plate **10** has a round or rectangular opening **14** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with three concentric dome-shaped ribs: rib **16** is the closest to the opening; rib **20** is farthest from the opening; and rib **18** is between ribs **16** and **20**. The ribs serve as reinforcements to the stress plate. Separating rib **16** from rib **18** there is a concentric depression or dimple **22**, and separating rib **18** from rib **20** there is another concentric depression or dimple **24**. An essentially flat surface **26** extends between rib **20** and the circumferential edge **28** of the stress plate. Dimple **22** is provided with multiple groups of triple barbs **30** (six pairs are shown), and flat surface **26** is also provided with multiple groups of triple barbs (eight pairs are shown). The individual barbs are either triangular (as shown), or rectangular (not shown), or semi-circular (not shown). The groups of barbs are approximately evenly spaced from each other. The individual barbs forming the triple barbs may be in a group configuration as shown, or may be in a row configuration (not shown).

### Second Embodiment—Elliptical with Three Ribs

[0127] FIGS. **5-9** relate to a preferred second embodiment of the present invention in which the elliptical stress plate is generally designated at **10'** and the fastener is generally designated at **12'**. The two components are non-integral and when put together, constitute the invention. The elliptical stress plate **10'** has a round or rectangular opening **14'** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with three concentric dome-shaped ribs: rib **16'** is the closest to the opening, rib **20'** is farthest from the opening; and rib **18'** is between ribs **16'** and **20'**. The ribs serve as reinforcements to the stress plate. Separating rib **16'** from rib **18'** there is a concentric depression or dimple **22'**, and separating rib **18'** from rib **20'** there is another concentric depression or dimple **24'**. An essentially flat surface **26'** extends between rib **20'** and the circumferential edge **28'** of the stress plate. Dimple **22'** is provided with multiple groups of triple barbs **30'** (six pairs are shown), and flat surface **26'** is also provided with multiple groups of triple barbs (eight pairs are shown). The individual barbs are either triangular (as shown), or rectangular (not shown), or semi-circular (not shown). The groups of barbs are approximately evenly spaced from each other. The individual barbs forming the triple barbs may be in a group configuration as shown, or may be in a row configuration (not shown).

Third Embodiment—Square with Three Ribs

[0128] FIGS. **10-13** relate to a preferred third embodiment of the present invention in which the square stress plate is generally designated at **40** and the fastener is generally designated at **42**. The two components are non-integral and when put together, constitute the invention. The square stress plate **40** has a round or rectangular opening **44** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with three concentric dome-shaped ribs: rib **46** is the closest to the opening; rib **50** is farthest from the opening; and rib **48** is between ribs **46** and **50**. The ribs serve as reinforcements to the stress plate. Separating rib **46** from rib **48** there is a concentric depression or dimple **52**, and separating rib **48** from rib **50** there is another concentric depression or dimple **54**. An essentially flat surface **56** extends between rib **50** and the circumferential edge **58** of the stress plate. Dimple **52** is provided with multiple groups of triple barbs **60** (eight pairs are shown), and flat surface **56** is also provided with multiple groups of triple barbs (eight pairs are shown). The individual barbs are either triangular (as shown), or rectangular (not shown), or semi-circular (not shown). The groups of barbs are approximately evenly spaced from each other. The individual barbs forming the triple barbs may be in a group configuration as shown, or may be in a row configuration (not shown).

Fourth Embodiment—Rectangular with Three Ribs

[0129] FIGS. **14-18** relate to a preferred fourth embodiment of the present invention in which the rectangular stress plate is generally designated at **40'** and the fastener is generally designated at **42'**. The two components are non-integral and when put together, constitute the invention. The rectangular stress plate **40'** has a round or rectangular opening **44'** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with three concentric dome-shaped ribs: rib **46'** is the closest to the opening; rib **50'** is farthest from the opening; and rib **48'** is between ribs **46'** and **50'**. The ribs serve as reinforcements to the stress plate. Separating rib **46'** from rib **48'** there is a concentric depression or dimple **52'**, and separating rib **48'** from rib **50'** there is another concentric depression or dimple **54'**. An essentially flat surface **56'** extends between rib **50'** and the circumferential edge **58'** of the stress plate. Dimple **52'** is provided with multiple groups of triple barbs **60'** (ten pairs are shown), and flat surface **56'** is also provided with multiple groups of triple barbs (eight pairs are shown). The individual barbs are either triangular (as shown), or rectangular (not shown), or semi-circular (not shown). The groups of barbs are approximately evenly spaced from each other. The individual barbs forming the triple barbs may be in a group configuration as shown, or may be in a row configuration (not shown).

Fifth Embodiment—Circular with Two Ribs

[0130] FIGS. **19-22** relate to a preferred fifth embodiment of the present invention in which the circular stress plate is generally designated at **70** and the fastener is generally designated at **72**. The two components are non-integral and when put together, constitute the invention. The circular stress plate **70** has a round or rectangular opening **74** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with two concentric dome-shaped ribs: rib **76** is an inner rib close to the opening, and rib **78** is an outer rib spaced from the inner rib toward the circumferential edge **88** of the stress plate. The ribs serve as reinforcements to the stress plate. Separating rib **76** from rib **78** there is a concentric depression or dimple **82**. An essentially flat surface **86** extends between rib **78** and the circumferential edge **88** of the stress plate. Dimple **82** is provided with multiple groups of triple barbs **90** (eight pairs are shown), and flat surface **86** is also provided with multiple groups of triple barbs (eight pairs are shown). The individual barbs are either triangular (as shown), or rectangular (not shown), or semi-circular (not shown). The groups of barbs are approximately evenly spaced from each other. The individual barbs forming the triple barbs may be in a group configuration as shown, or may be in a row configuration (not shown).

Sixth Embodiment—Elliptical with Two Ribs

[0131] FIGS. **23-27** relate to a preferred sixth embodiment of the present invention in which the elliptical stress plate is generally designated at **70'** and the fastener is generally designated at **72'**. The two components are non-integral and, when put together, constitute the invention. The elliptical stress plate **70'** has a round or rectangular opening **74'** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with two concentric dome-shaped ribs: rib **76'** is an inner rib close to the opening, and rib **78'** is an outer rib spaced from the inner rib toward the circumferential edge **88'** of the stress plate. The ribs serve as reinforcements to the stress plate. Separating rib **76'** from rib **78'** there is a concentric depression or dimple **82'**. An essentially flat surface **86'** extends between rib **78'** and the circumferential edge **88'** of the stress plate. Dimple **82'** is provided with multiple groups of triple barbs **90'** (six pairs are shown), and flat surface **86'** is also provided with multiple groups of triple barbs (eight pairs are shown). The individual barbs are either triangular (as shown), or rectangular (not shown), or semi-circular (not shown). The groups of barbs are approximately evenly spaced from each other. The individual barbs forming the triple barbs may be in a group configuration as shown, or may be in a row configuration (not shown).

Seventh Embodiment—Square with Two Ribs

[0132] FIGS. **28-31** relate to a preferred seventh embodiment of the present invention in which the square stress plate is generally designated at **100** and the fastener is generally designated at **102**. The two components are non-integral and, when put together, constitute the invention. The square stress plate **100** has a round or rectangular opening **104** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with two concentric dome-shaped ribs: rib **106** is an inner rib close to the opening, and rib **108** is an outer rib spaced from the inner rib toward the circumferential edge **118** of the stress plate. The ribs serve as reinforcements to the stress plate. Separating rib **106** from rib **108** there is a

concentric depression or dimple **112**. An essentially flat surface **106** extends between rib **108** and the circumferential edge **118** of the stress plate. Dimple **112** is provided with multiple groups of triple barbs **120** (eight pairs are shown), and flat surface **116** is also provided with multiple groups of triple barbs (eight pairs are shown). The individual barbs are either triangular (as shown), or rectangular (not shown), or semi-circular (not shown). The groups of barbs are approximately evenly spaced from each other. The individual barbs forming the triple barbs may be in a group configuration as shown, or may be in a row configuration (not shown).

Eighth Embodiment—Rectangular with Two Ribs

[**0133**] FIGS. **32-36** relate to a preferred eighth embodiment of the present invention in which the rectangular stress plate is generally designated at **100'** and the fastener is generally designated at **102'**. The two components are non-integral and, when put together, constitute the invention. The rectangular stress plate **100'** has a round or rectangular opening **104'** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with two concentric dome-shaped ribs: rib **106'** is an inner rib close to the opening, and rib **108'** is an outer rib spaced from the inner rib toward the circumferential edge **118'** of the stress plate. The ribs serve as reinforcements to the stress plate. Separating rib **106'** from rib **108'** there is a concentric depression or dimple **112'**. An essentially flat surface **106'** extends between rib **108'** and the circumferential edge **118'** of the stress plate. Dimple **112'** is provided with multiple groups of triple barbs **120'** (eight pairs are shown), and flat surface **116'** is also provided with multiple groups of triple barbs (eight pairs are shown). The individual barbs are either triangular (as shown), or rectangular (not shown), or semi-circular (not shown). The groups of barbs are approximately evenly spaced from each other. The individual barbs forming the triple barbs may be in a group configuration as shown, or may be in a row configuration (not shown).

Ninth Embodiment—Circular with Three Ribs

[**0134**] FIGS. **3740** relate to a preferred ninth embodiment of the present invention in which the circular stress plate is generally designated at **130** and the fastener is generally designated at **132**. The two components are non-integral and when put together, constitute the invention. The circular stress plate **130** has a round or rectangular opening **134** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with three concentric dome-shaped ribs: rib **136** is the closest to the opening; rib **140** is farthest from the opening; and rib **138** is between ribs **136** and **140**. The ribs serve as reinforcements to the stress plate. Separating rib **136** from rib **138** there is a concentric depression or dimple **142**, and separating rib **138** from rib **140** there is another concentric depression or dimple **144**. An essentially flat surface **146** extends between rib **140** and the circumferential edge **148** of the stress plate. Dimple **142** is provided with multiple quadruple barbs **150** (six are shown), and flat surface **146** is also provided with multiple quadruple barbs (eight are shown).

Tenth Embodiment—Elliptical with Three Ribs

[**0135**] FIGS. **41-45** relate to a preferred tenth embodiment of the present invention in which the elliptical stress plate is generally designated at **130'** and the fastener is generally designated at **132'**. The two components are non-integral and when put together, constitute the invention. The elliptical stress plate **130'** has a round or rectangular opening **134'** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with three concentric dome-shaped ribs: rib **136'** is the closest to the opening, rib **140'** is farthest from the opening; and rib **138'** is between ribs **136'** and **140'**. The ribs serve as reinforcements to the stress plate. Separating rib **136'** from rib **138'** there is a concentric depression or dimple **142'**, and separating rib **138'** from rib **140'** there is another concentric depression or dimple **144'**. An essentially flat surface **146'** extends between rib **140'** and the circumferential edge **148'** of the stress plate. Dimple **142'** is provided with multiple quadruple barbs **150'** (six are shown), and flat surface **146'** is also provided with multiple quadruple barbs (eight are shown).

Eleventh Embodiment—Square with Three Ribs

[**0136**] FIGS. **46-49** relate to a preferred eleventh embodiment of the present invention in which the square stress plate is generally designated at **160** and the fastener is generally designated at **162**. The two components are non-integral and when put together, constitute the invention. The square stress plate **160** has a round or rectangular opening **164** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with three concentric dome-shaped ribs: rib **166** is the closest to the opening; rib **170** is farthest from the opening; and rib **168** is between ribs **166** and **170**. The ribs serve as reinforcements to the stress plate. Separating rib **166** from rib **168** there is a concentric depression or dimple **172**, and separating rib **168** from rib **170** there is another concentric depression or dimple **174**. An essentially flat surface **176** extends between rib **170** and the circumferential edge **178** of the stress plate. Dimple **172** is provided with multiple quadruple barbs **180** (eight are shown), and flat surface **176** is also provided with multiple quadruple barbs (eight are shown).

Twelfth Embodiment—Rectangular with Three Ribs

[**0137**] FIGS. **50-54** relate to a preferred twelfth embodiment of the present invention in which the rectangular stress plate is generally designated at **160'** and the fastener is generally designated at **162'**. The two components are non-integral and when put together, constitute the invention. The rectangular stress plate **160'** has a round or rectangular opening **164'** in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with three concentric dome-shaped ribs: rib **166'** is the closest to the opening; rib **170'** is farthest from the opening; and rib **168'** is between ribs **166'** and **170'**. The ribs serve as reinforcements to the stress plate. Separating rib **166'** from rib **168'** there is a concentric depression or dimple **172'**, and separating rib **168'** from rib

170' there is another concentric depression or dimple 174'. An essentially flat surface 176' extends between rib 170' and the circumferential edge 178' of the stress plate. Dimple 172' is provided with multiple quadruple barbs 180' (ten are shown), and flat surface 176' is also provided with multiple quadruple barbs (eight are shown).

Thirteenth Embodiment—Circular with Two Ribs

[0138] FIGS. 55-58 relate to a preferred thirteenth embodiment of the present invention in which the circular stress plate is generally designated at 190 and the fastener is generally designated at 192. The two components are non-integral and when put together, constitute the invention. The circular stress plate 190 has a round or rectangular opening 194 in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with two concentric dome-shaped ribs: rib 196 is an inner rib close to the opening, and rib 198 is an outer rib spaced from the inner rib toward the circumferential edge 218 of the stress plate. The ribs serve as reinforcements to the stress plate. Separating rib 196 from rib 198 there is a concentric depression or dimple 212. An essentially flat surface 216 extends between rib 198 and the circumferential edge 218 of the stress plate. Dimple 212 is provided with quadruple barbs 220 (eight are shown), and flat surface 216 is also provided with multiple quadruple barbs (eight are shown).

Fourteenth Embodiment—Elliptical with Two Ribs

[0139] FIGS. 59-63 relate to a preferred fourteenth embodiment of the present invention in which the elliptical stress plate is generally designated at 190' and the fastener is generally designated at 192'. The two components are non-integral and, when put together, constitute the invention. The elliptical stress plate 190' has a round or rectangular opening 194' in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with two concentric dome-shaped ribs: rib 196' is an inner rib close to the opening, and rib 198' is an outer rib spaced from the inner rib toward the circumferential edge 218' of the stress plate. The ribs serve as reinforcements to the stress plate. Separating rib 196' from rib 198' there is a concentric depression or dimple 212'. An essentially flat surface 216' extends between rib 198' and the circumferential edge 218' of the stress plate. Dimple 212' is provided with multiple quadruple barbs 220' (six are shown), and flat surface 216' is also provided with multiple quadruple barbs (eight are shown).

Fifteenth Embodiment—Square with Two Ribs

[0140] FIGS. 64-67 relate to a preferred fifteenth embodiment of the present invention in which the square stress plate is generally designated at 230 and the fastener is generally designated at 232. The two components are non-integral and, when put together, constitute the invention. The square stress plate 230 has a round or rectangular opening 234 in its center portion through which the fastener is inserted when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with two concentric dome-shaped ribs: rib 236 is an inner rib close to the opening, and rib 238 is an outer rib spaced from the inner rib toward the circumferential edge 248 of the stress plate. The ribs serve as reinforcements to the stress plate. Separating rib 236 from rib 238 there is a concentric depression or dimple 242. An essentially flat surface 246 extends between rib 238 and the circumferential edge 248 of the stress plate. Dimple 242 is provided with multiple quadruple barbs 250 (eight are shown), and flat surface 246 is also provided with multiple quadruple barbs (eight are shown).

Sixteenth Embodiment—Rectangular with Two Ribs

[0141] FIGS. 68-72 relate to a preferred sixteenth embodiment of the present invention in which the rectangular stress plate is generally designated at 230' and the fastener is generally designated at 232'. The two components are non-integral and, when put together, constitute the invention. The rectangular stress plate 230' has a round or rectangular opening 234' in its center portion through which the fastener is inserted, when the stress plate is employed for attaching and firmly holding a roof membrane to an underlying roof deck. The stress plate is provided with two concentric dome-shaped ribs: rib 236' is an inner rib close to the opening, and rib 238' is an outer rib spaced from the inner rib toward the circumferential edge 248' of the stress plate. The ribs serve as reinforcements to the stress plate. Separating rib 236' from rib 238' there is a concentric depression or dimple 242'. An essentially flat surface 246' extends between rib 238' and the circumferential edge 248' of the stress plate. Dimple 242' is provided with multiple quadruple barbs 250' (eight are shown), and flat surface 246' is also provided with multiple quadruple barbs (eight are shown).

[0142] FIGS. 73, 74, 75, 77 and 78 show the triple barbs in enlarged top plan views used in the stress plate and are integral therewith.

[0143] FIG. 73 shows equilateral triangles in a group of three in the stress plate, the sharp points of the triangles extend outwardly from the bottom surface of the stress plate.

[0144] FIG. 74 shows equilateral triangles in a row of three in the stress plate, the sharp points of the triangles extend outwardly from the bottom surface of the stress plate.

[0145] FIG. 75 shows rectangular barbs in a group of three. In the stress plate the rectangular barbs extend outwardly from the bottom surface of the stress plate.

[0146] FIG. 76 shows rectangular barbs in a row of three. In the stress plate the rectangular barbs extend outwardly from the bottom surface of the stress plate.

[0147] FIG. 77 shows a pair of semi-circular barbs in a group of three. In the stress plate the semi-circular barbs extend outwardly from the bottom surface of the stress plate.

[0148] FIG. 78 shows a pair of semi-circular barbs in a row of three. In the stress plate the semi-circular barbs extend outwardly from the bottom surface of the stress plate.

[0149] The length of the barbs may vary depending on the thickness of the roof membrane which is to be attached to the underlying roof deck. Typically, the length of the barbs would be in the range of 0.1-1.0 centimeter or more, and preferably in the range of 0.2-0.5 centimeter.

[0150] The barbs are formed by cutting the same from the surface of the stress plate and bending them 90° from the surface of the stress plate. The barbs can be formed by a conventional dye punching process.

[0151] The stress plates are made of materials including galvanized or galvalume carbon steel and stainless steel. Softer metals such as copper or aluminum may also be used, however, the thickness of the stress plate should be larger to provide sufficient integrity to the stress plate. The thickness of the stress plate typically is about 0.05-0.1 cm. The fastener is typically a screw of 4 to 10 cm long having thread thereon.

[0152] **FIG. 79** is a cross-sectional view illustrating the use of the stress plate and the fastener for attaching a roof membrane to a roof deck. Lower membrane **260** is positioned over insulation **262** which is over the roof deck surface **264**. Inserting fastener **268** through stress plate **266**, insulation **262** and into roof deck **264**. Upper membrane **270** is then lapped-over portions of the lower membrane covering the stress plate **266**. The upper membrane is secured to the lower membrane by the welded seam **272**.

[0153] Wind Uplift Test

[0154] Comparative wind uplift tests were conducted on the triple and quadruple barb stress plates of the present invention, and the single barb stress plate. The wind uplift test measures the resistance of the roofing system to high wind currents. The triple and quadruple barb stress plates were found to have superior resistance to high wind currents as compared to single barb stress plates.

PARTS LIST

First and Second Embodiments - Circular and Elliptical with Three Ribs

| | |
|---|---|
| Stress plate, generally designated | 10, 10' |
| Fastener, generally designated | 12, 12' |
| Opening in center portion | 14, 14' |
| Ribs | 16, 16', 18, 18', 20, 20' |
| Depressions or dimples | 22, 22', 24, 24' |
| Flat surface of stress plate | 26, 26' |
| Circumferential edge of stress plate | 28, 28' |
| Triple barbs | 30, 30' |

Third and Fourth Embodiments - Square and Rectangular with Three Ribs

| | |
|---|---|
| Stress plate, generally designated | 40, 40' |
| Fastener, generally designated | 42, 42' |
| Opening in center portion of stress plate | 44, 44' |
| Ribs | 46, 46', 48, 48', 50, 50' |
| Depressions or dimples | 52, 52', 54, 54' |
| Flat surface of stress plate | 56, 56' |
| Circumferential edge of stress plate | 58, 58' |
| Triple barbs | 60, 60' |

Fifth and Sixth Embodiments - Circular and Elliptical with Two Ribs

| | |
|---|---|
| Stress plate, generally designated | 70, 70' |
| Fastener, generally designated | 72, 72' |
| Opening in center portion of stress plate | 74, 74' |
| Ribs | 76, 76', 78, 78' |
| Depressions or dimples | 82, 82' |
| Flat surface of stress plate | 86, 86' |
| Circumferential edge of stress plate | 88, 88' |
| Triple of barbs | 90, 90' |

-continued

PARTS LIST

Seventh and Eighth Embodiments - Square and Rectangular with Two Ribs

| | |
|---|---|
| Stress plate, generally designated | 100, 100' |
| Fastener, generally designated | 102, 102' |
| Opening in center portion of stress plate | 104, 104' |
| Ribs | 106, 106', 108, 108' |
| Depressions or dimples | 112, 112' |
| Flat surface of stress plate | 116, 116' |
| Circumferential edge of stress plate | 118, 118' |
| Triple barbs | 120, 120' |

Ninth and Tenth Embodiments - Circular and Elliptical with Three Ribs

| | |
|---|---|
| Stress plate, generally designated | 130, 130' |
| Fastener, generally designated | 132, 132' |
| Opening in center portion of stress plate | 134, 134' |
| Ribs | 136, 136', 138, 138', 140, 140' |
| Depressions or dimples | 142, 142', 144, 144' |
| Flat surface of stress plate | 146, 146' |
| Circumferential edge of stress plate | 148, 148' |
| Quadruple barbs | 150, 150' |

Eleventh and Twelfth Embodiments - Square and Rectangular with Three Ribs

| | |
|---|---|
| Stress plate, generally designated | 160, 160' |
| Fastener, generally designated | 162, 162' |
| Opening in center portion of stress plate | 164, 164' |
| Ribs | 166, 166', 168, 168', 170, 170' |
| Depressions or dimples | 172, 172', 174, 174' |
| Flat surface of stress plate | 176, 176' |
| Circumferential edge of stress plate | 178, 178' |
| Quadruple barbs | 180, 180' |

Thirteenth and Fourteenth Embodiments - Circular and Elliptical with Two Ribs

| | |
|---|---|
| Stress plate, generally designated | 190, 190' |
| Fastener, generally designated | 192, 192' |
| Opening in center portion of stress plate | 194, 194' |
| Ribs | 196, 196', 198, 198', |
| Depressions or dimples | 212, 212' |
| Flat surface of stress plate | 216, 216' |
| Circumferential edge of stress plate | 218, 218' |
| Quadruple barbs | 220, 220' |

Fifteenth and Sixteenth Embodiments - Square and Rectangular with Two Ribs

| | |
|---|---|
| Stress plate, generally designated | 230, 230' |
| Fastener, generally designated | 232, 232' |
| Opening in center portion of stress plate | 234, 234' |
| Ribs | 236, 236', 238, 238" |
| Depressions or dimples | 242, 242' |
| Flat surface of stress plate | 246, 246' |
| Circumferential edge of stress plate | 248, 248' |
| Quadruple barbs | 250, 250' |

Using the Stress Plate

| | |
|---|---|
| Lower membrane | 260 |
| Insulation | 262 |
| Roof deck | 264 |
| Stress plate | 266 |
| Fastener (screw) | 268 |
| Upper membrane | 270 |
| Welded seam | 272 |

[0155] Having described the invention with reference to its preferred embodiments, it is to be understood that modifications within the scope of the invention will be apparent to those skilled in the art.

What is claimed is:

1. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of circular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with triple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

2. The two-piece fastener assembly of claim 1 wherein said multiple triple barbs are extending 90° downward from the bottom surface of said fastener plate.

3. The two-piece fastener assembly of claim 1 wherein said multiple triple barbs are of triangular configuration.

4. The two-piece fastener assembly of claim 1 wherein said multiple triple barbs are of rectangular configuration.

5. The two-piece fastener assembly of claim 1 wherein said multiple triple barbs are of semi-circular configuration.

6. The two-piece fastener assembly of claim 1 wherein said fastener plate is formed of stainless steel or galvanized steel.

7. The two-piece fastener assembly of claim 1 wherein said multiple triple barbs are substantially evenly spaced from each other.

8. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of elliptical configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

9. The two-piece fastener assembly of claim 8 wherein said multiple triple barbs are extending 90° downward from the bottom surface of said fastener plate.

10. The two-piece fastener assembly of claim 8 wherein said multiple triple barbs are of triangular configuration.

11. The two-piece fastener assembly of claim 8 wherein said multiple triple barbs are of rectangular configuration.

12. The two-piece fastener assembly of claim 8 wherein said multiple triple barbs are of semi-circular configuration.

13. The two-piece fastener assembly of claim 8 wherein said fastener plate is formed of stainless steel or galvanized steel.

14. The two-piece fastener assembly of claim 8 wherein said multiple triple barbs are substantially evenly spaced from each other.

15. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of square configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**16**. The two-piece fastener assembly of claim 15 wherein said multiple triple barbs are extending 90° downward from the bottom surface of said fastener plate.

**17**. The two-piece fastener assembly of claim 15 wherein said multiple triple barbs are of triangular configuration.

**18**. The two-piece fastener assembly of claim 15 wherein said multiple triple barbs are of rectangular configuration.

**19**. The two-piece fastener assembly of claim 15 wherein said multiple triple barbs are of semi-circular configuration.

**20**. The two-piece fastener assembly of claim 15 wherein said fastener plate is formed of stainless steel or galvanized steel.

**21**. The two-piece fastener assembly of claim 15 wherein said multiple triple barbs are substantially evenly spaced from each other.

**22**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of rectangular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate,

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**23**. The two-piece fastener assembly of claim 22 wherein said multiple triple barbs are extending 90° downward from the bottom surface of said fastener plate.

**24**. The two-piece fastener assembly of claim 22 wherein said multiple triple barbs are of triangular configuration.

**25**. The two-piece fastener assembly of claim 22 wherein said multiple triple barbs are of rectangular configuration.

**26**. The two-piece fastener assembly of claim 22 wherein said multiple triple barbs are of semi-circular configuration.

**27**. The two-piece fastener assembly of claim 22 wherein said fastener plate is formed of stainless steel or galvanized steel.

**28**. The two-piece fastener assembly of claim 22 wherein said multiple triple barbs are substantially evenly spaced from each other.

**29**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of circular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate;

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**30**. The two-piece fastener assembly of claim 29 wherein said multiple triple barbs are extending 90° downward from the bottom surface of said fastener plate.

**31**. The two-piece fastener assembly of claim 29 wherein said multiple triple barbs are of triangular configuration.

**32**. The two-piece fastener assembly of claim 29 wherein said multiple triple barbs are of rectangular configuration.

**33**. The two-piece fastener assembly of claim 29 wherein said multiple triple barbs are of semi-circular configuration.

**34**. The two-piece fastener assembly of claim 29 wherein said fastener plate is formed of stainless steel or galvanized steel.

**35**. The two-piece fastener assembly of claim 29 wherein said multiple triple barbs are substantially evenly spaced from each other.

**36**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of elliptical configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate;

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**37**. The two-piece fastener assembly of claim 36 wherein said multiple triple barbs are extending 90° downward from the bottom surface of said fastener plate.

**38**. The two-piece fastener assembly of claim 36 wherein said multiple triple barbs are of triangular configuration.

**39**. The two-piece fastener assembly of claim 36 wherein said multiple triple barbs are of rectangular configuration.

**40**. The two-piece fastener assembly of claim 36 wherein said multiple triple barbs are of semi-circular configuration.

**41**. The two-piece fastener assembly of claim 36 wherein said fastener plate is formed of stainless steel or galvanized steel.

**42**. The two-piece fastener assembly of claim 36 wherein said multiple triple barbs are substantially evenly spaced from each other.

**43**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of square configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate;

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**44**. The two-piece fastener assembly of claim 43 wherein said multiple triple barbs are extending 90° downward from the bottom surface of said fastener plate.

**45**. The two-piece fastener assembly of claim 43 wherein said multiple triple barbs are of triangular configuration.

**46**. The two-piece fastener assembly of claim 43 wherein said multiple triple barbs are of rectangular configuration.

**47**. The two-piece fastener assembly of claim 43 wherein said multiple triple barbs are of semi-circular configuration.

**48**. The two-piece fastener assembly of claim 43 wherein said fastener plate is formed of stainless steel or galvanized steel.

**49**. The two-piece fastener assembly of claim 43 wherein said multiple triple barbs are substantially evenly spaced from each other.

**50**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of rectangular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate;

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**51**. The two-piece fastener assembly of claim 50 wherein said multiple triple barbs are extending 90° downward from the bottom surface of said fastener plate.

**52**. The two-piece fastener assembly of claim 50 wherein said multiple triple barbs are of triangular configuration.

**53**. The two-piece fastener assembly of claim 50 wherein said multiple triple barbs are of rectangular configuration.

**54**. The two-piece fastener assembly of claim 50 wherein said multiple triple barbs are of semi-circular configuration.

**55**. The two-piece fastener assembly of claim 50 wherein said fastener plate is formed of stainless steel or galvanized steel.

**56**. The two-piece fastener assembly of claim 50 wherein said multiple triple barbs are substantially evenly spaced from each other.

**57**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of circular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple triple barbs substantially piercing said roof membrane.

**58**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of ellipsoidal configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple triple barbs substantially piercing said roof membrane.

**59**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of square configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple triple barbs substantially piercing said roof membrane.

**60**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of rectangular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple triple barbs substantially piercing said roof membrane.

**61**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of circular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple triple barbs substantially piercing said roof membrane.

**62**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of elliptical configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple triple barbs substantially piercing said roof membrane.

**63**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of square configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple triple barbs piercing said roof membrane.

**64**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of rectangular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple triple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple triple barbs substantially piercing said roof membrane.

**65**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of circular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with quadruple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**66**. The two-piece fastener assembly of claim 65 wherein said multiple quadruple barbs are extending 90° downward from the bottom surface of said fastener plate.

**67**. The two-piece fastener assembly of claim 65 wherein said fastener plate is formed of stainless steel or galvanized steel.

**68**. The two-piece fastener assembly of claim 65 wherein said multiple quadruple barbs are substantially evenly spaced from each other.

**69**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of elliptical configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**70**. The two-piece fastener assembly of claim 69 wherein said multiple quadruple barbs are extending 90° downward from the bottom surface of said fastener plate.

**71**. The two-piece fastener assembly of claim 69 wherein said fastener plate is formed of stainless steel or galvanized steel.

**72**. The two-piece fastener assembly of claim 69 wherein said multiple quadruple barbs are substantially evenly spaced from each other.

**73**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of square configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**74**. The two-piece fastener assembly of claim 73 wherein said multiple quadruple barbs are extending 90° downward from the bottom surface of said fastener plate.

**75**. The two-piece fastener assembly of claim 73 wherein said fastener plate is formed of stainless steel or galvanized steel.

**76**. The two-piece fastener assembly of claim 73 wherein said multiple quadruple barbs are substantially evenly spaced from each other.

**77**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of rectangular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**78**. The two-piece fastener assembly of claim 77 wherein said multiple quadruple barbs are extending 90° downward from the bottom surface of said fastener plate.

**79**. The two-piece fastener assembly of claim 77 wherein said fastener plate is formed of stainless steel or galvanized steel.

**80**. The two-piece fastener assembly of claim 77 wherein said multiple quadruple barbs are substantially evenly spaced from each other.

**81**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of circular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate;

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**82**. The two-piece fastener assembly of claim 81 wherein said multiple quadruple barbs are extending 90° downward from the bottom surface of said fastener plate.

**83**. The two-piece fastener assembly of claim 81 wherein said fastener plate is formed of stainless steel or galvanized steel.

**84**. The two-piece fastener assembly of claim 81 wherein said multiple quadruple barbs are substantially evenly spaced from each other.

**85**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of elliptical configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate;

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**86**. The two-piece fastener assembly of claim 85 wherein said multiple quadruple barbs are extending 90° downward from the bottom surface of said fastener plate.

**87**. The two-piece fastener assembly of claim 86 wherein said fastener plate is formed of stainless steel or galvanized steel.

**88**. The two-piece fastener assembly of claim 86 wherein said multiple quadruple barbs are substantially evenly spaced from each other.

**89**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of square configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate;

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**90**. The two-piece fastener assembly of claim 89 wherein said multiple quadruple barbs are extending 90° downward from the bottom surface of said fastener plate.

**91**. The two-piece fastener assembly of claim 89 wherein said fastener plate is formed of stainless steel or galvanized steel.

**92**. The two-piece fastener assembly of claim 89 wherein said multiple quadruple barbs are substantially evenly spaced from each other.

**93**. A two-piece fastener assembly for securing a roof membrane to an underlying roof deck comprising:

a fastener plate of rectangular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate;

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

and wherein said fastener is a screw member having threads thereon.

**94**. The two-piece fastener assembly of claim 93 wherein said multiple quadruple barbs are extending 90° downward from the bottom surface of said fastener plate.

**95**. The two-piece fastener assembly of claim 93 wherein said fastener plate is formed of stainless steel or galvanized steel.

**96**. The two-piece fastener assembly of claim 93 wherein said multiple quadruple barbs are substantially evenly spaced from each other.

**97**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of circular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple quadruple barbs substantially piercing said roof membrane.

**98**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of ellipsoidal configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple quadruple barbs substantially piercing said roof membrane.

**99**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of square configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple quadruple barbs substantially piercing said roof membrane.

**100**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of rectangular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a third dome-shaped concentric rib spaced from said second dome-shaped concentric rib rising above the top surface of said fastener plate;

e) a first concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

f) a second concentric dimple between said second dome-shaped concentric rib and said third dome-shaped concentric rib;

g) a flat concentric surface extending between said third dome-shaped concentric rib and said circumferential edge; wherein at least one of said first or second concentric dimples or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple quadruple barbs substantially piercing said roof membrane.

**101**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of circular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple quadruple barbs substantially piercing said roof membrane.

**102**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of elliptical configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple quadruple barbs substantially piercing said roof membrane.

**103**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of square configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple quadruple barbs piercing said roof membrane.

**104**. A method of securing a roof membrane to a roof deck comprising the steps of:

1) providing a two-piece fastener assembly comprising:

a fastener plate of rectangular configuration defined by a top surface, a bottom surface, and a circumferential edge, said fastener plate comprising:

a) an opening in its center portion for receiving a fastener therethrough for securing the fastener plate to a roof deck;

b) a first dome-shaped concentric rib rising above the top surface of said fastener plate;

c) a second dome-shaped concentric rib spaced from said first dome-shaped concentric rib rising above the top surface of said fastener plate; and

d) a concentric dimple between said first dome-shaped concentric rib and said second dome-shaped concentric rib;

e) a flat concentric surface extending between said second dome-shaped concentric rib and said circumferential edge; wherein at least one of said concentric dimple or said flat concentric surface is provided with multiple quadruple barbs extending downward from the bottom surface of said fastener plate;

2) placing a roof membrane having a top surface on a roof deck;

3) placing said fastener plate on said roof membrane with its bottom surface projecting toward the top surface of said roof membrane;

4) inserting said fastener through said opening in said fastener plate; and

5) threading said fastener through the roof membrane into said roof deck to fasten the roof membrane to the roof deck without said multiple quadruple barbs substantially piercing said roof membrane.

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