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(54) **INTERLOCKING CONTINUOUS ROOF ASSEMBLY METHOD FOR WIND RESISTANT ROOFING**

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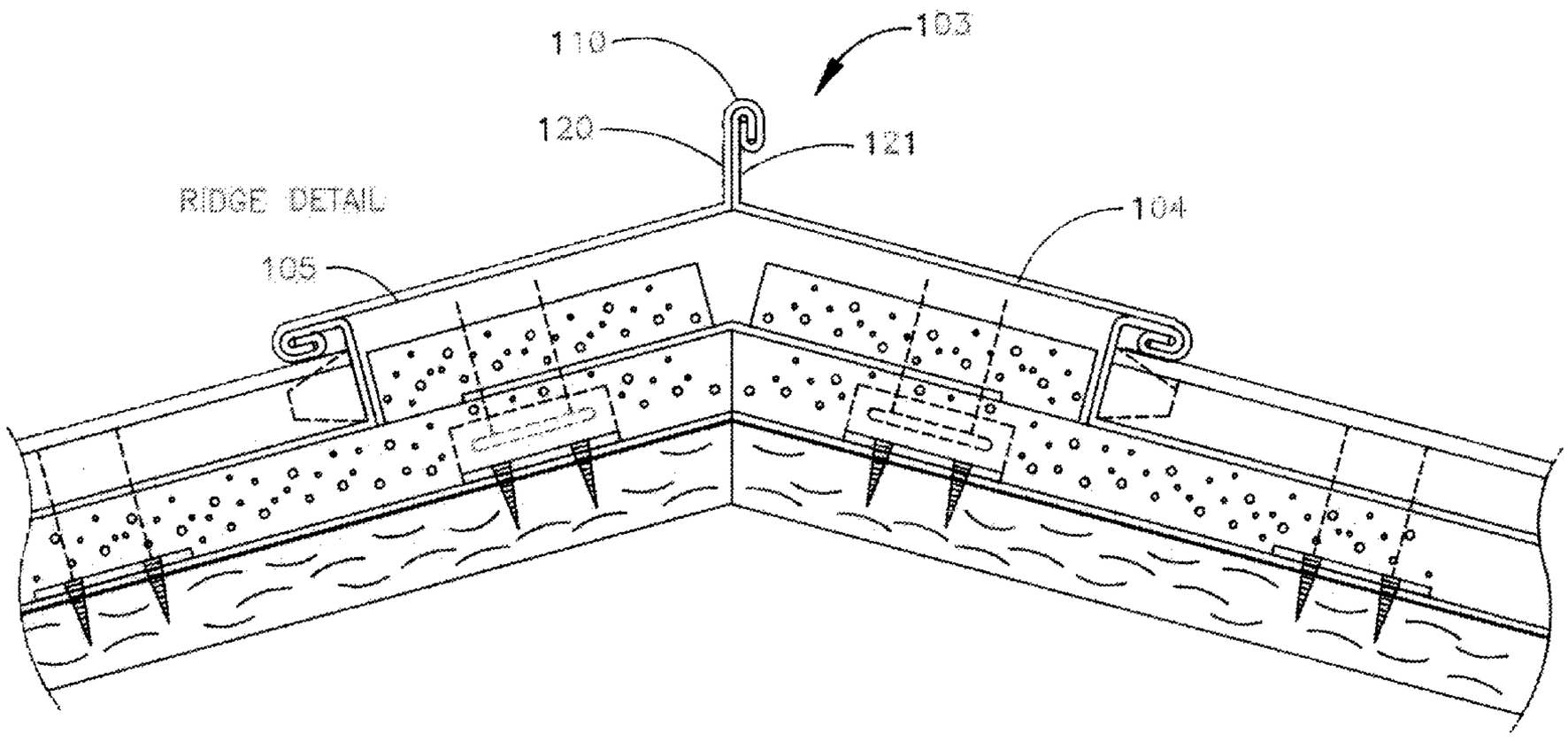
(57) **ABSTRACT**

A method of assembling metal roofs from roof panels is presented, whereby continuous double lock seams are used exclusively to join panels together. This roof manufacturing methodology results in a roof that possesses improved resistance to wind and water during storm conditions and thereby decreases the chances of the roof being damaged or destroyed by severe weather.



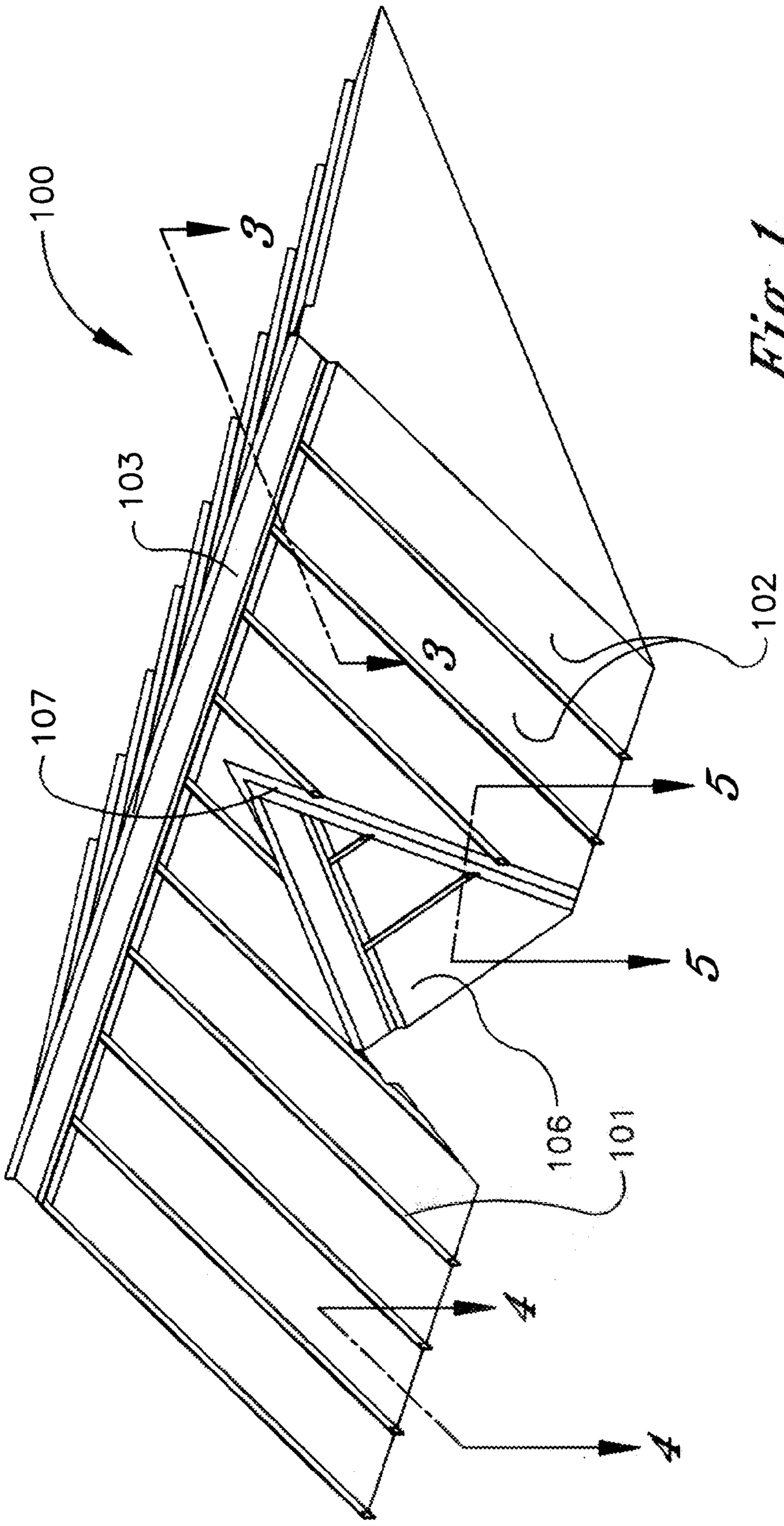
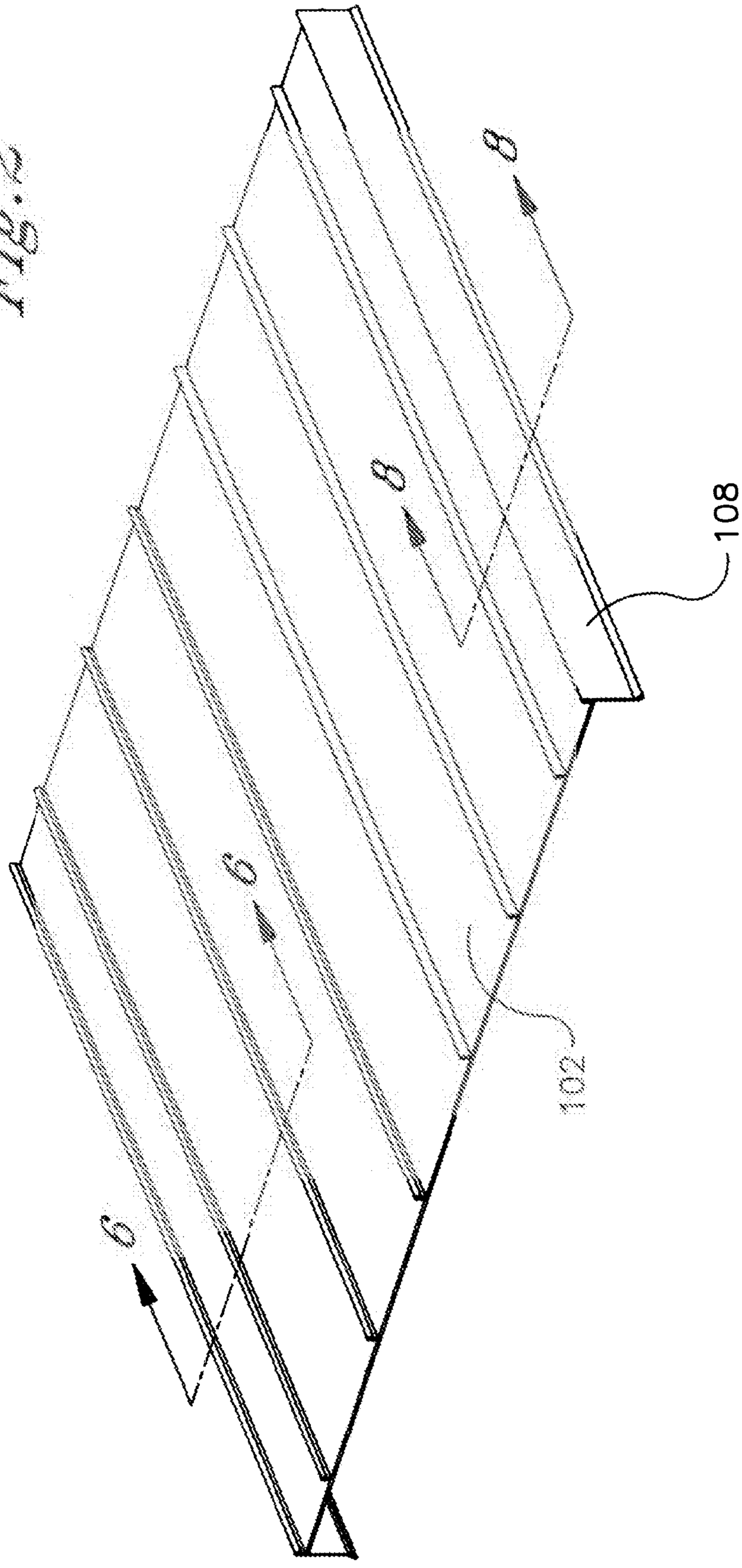


Fig. 1

Fig. 2



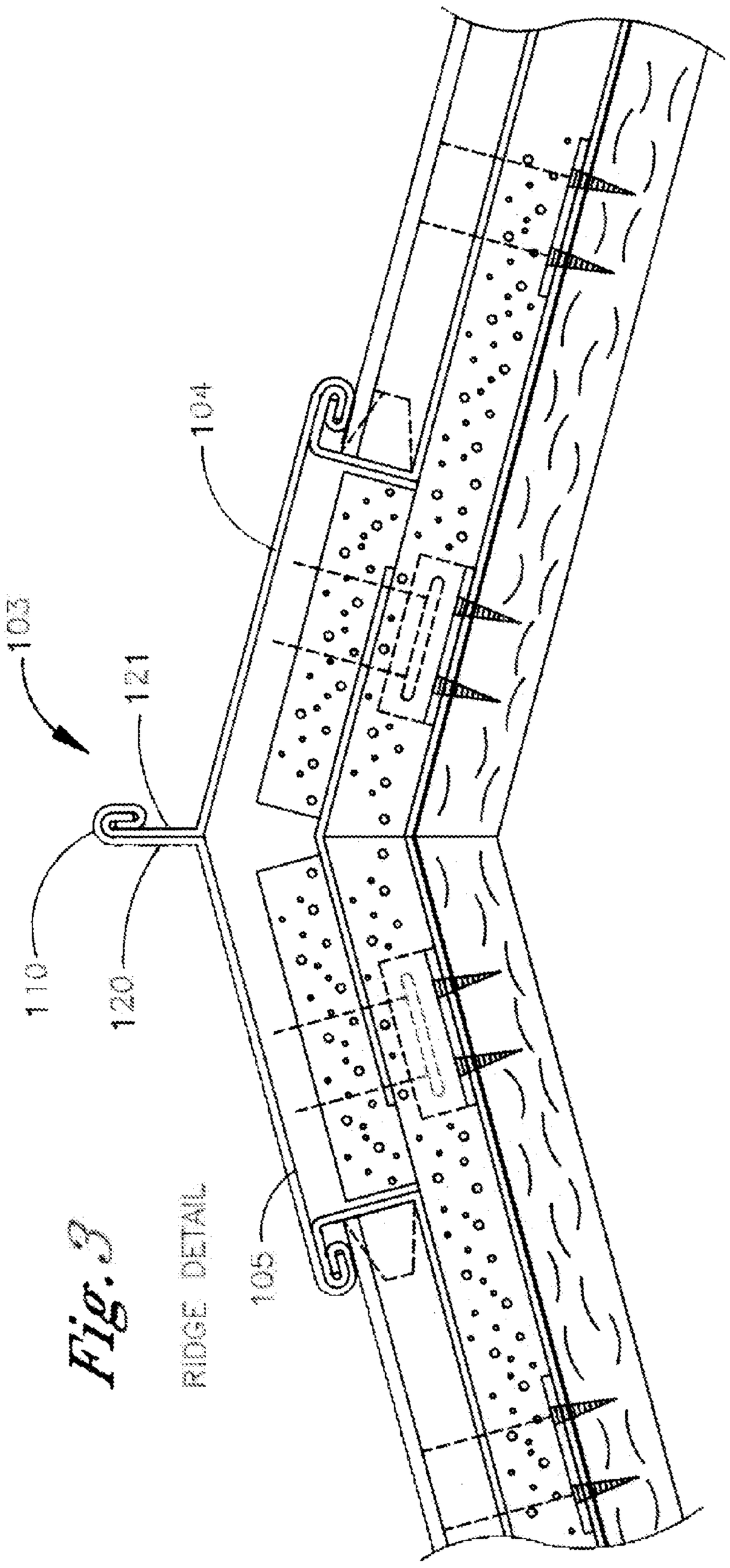


Fig. 3

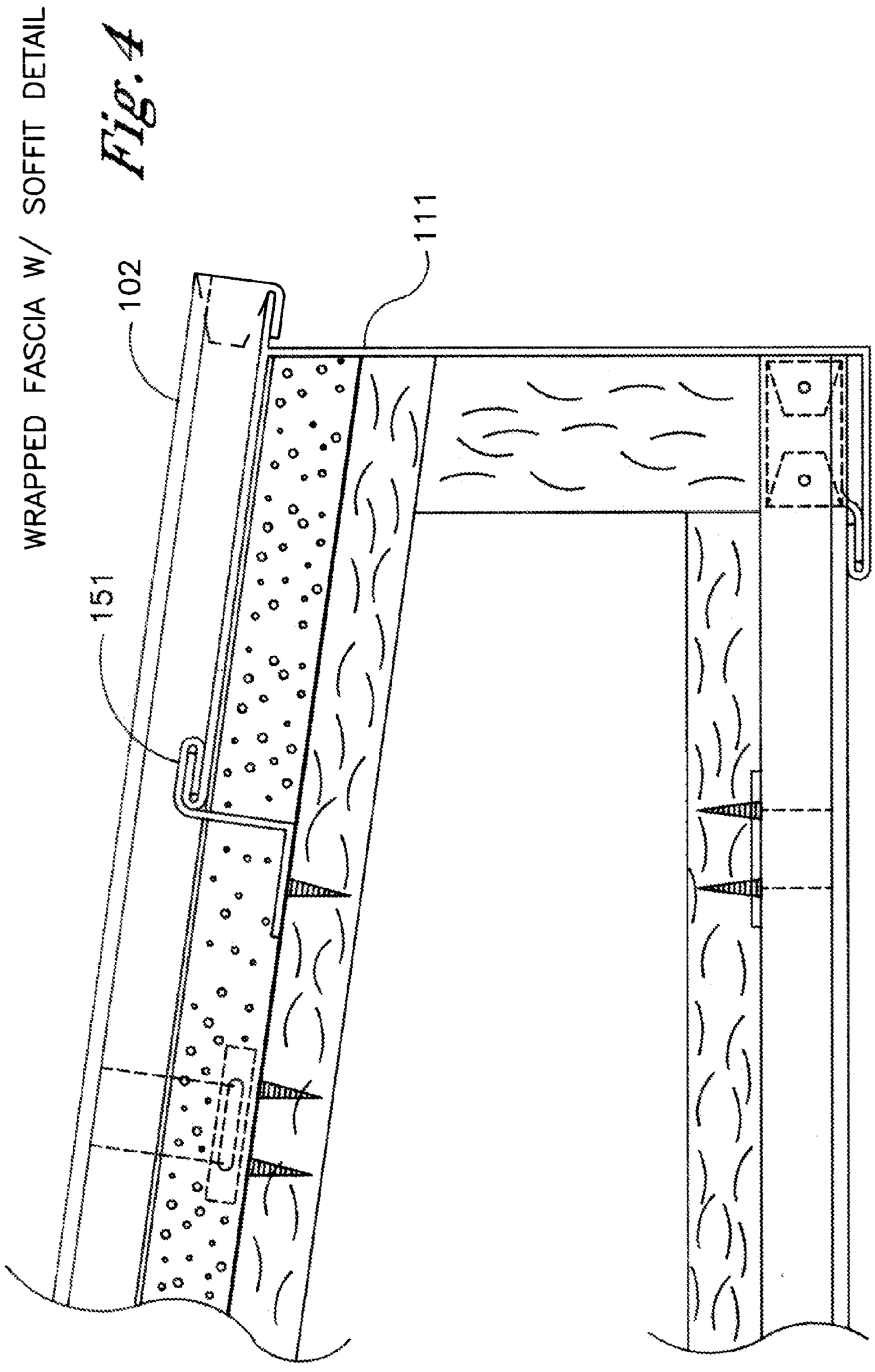


Fig. 4

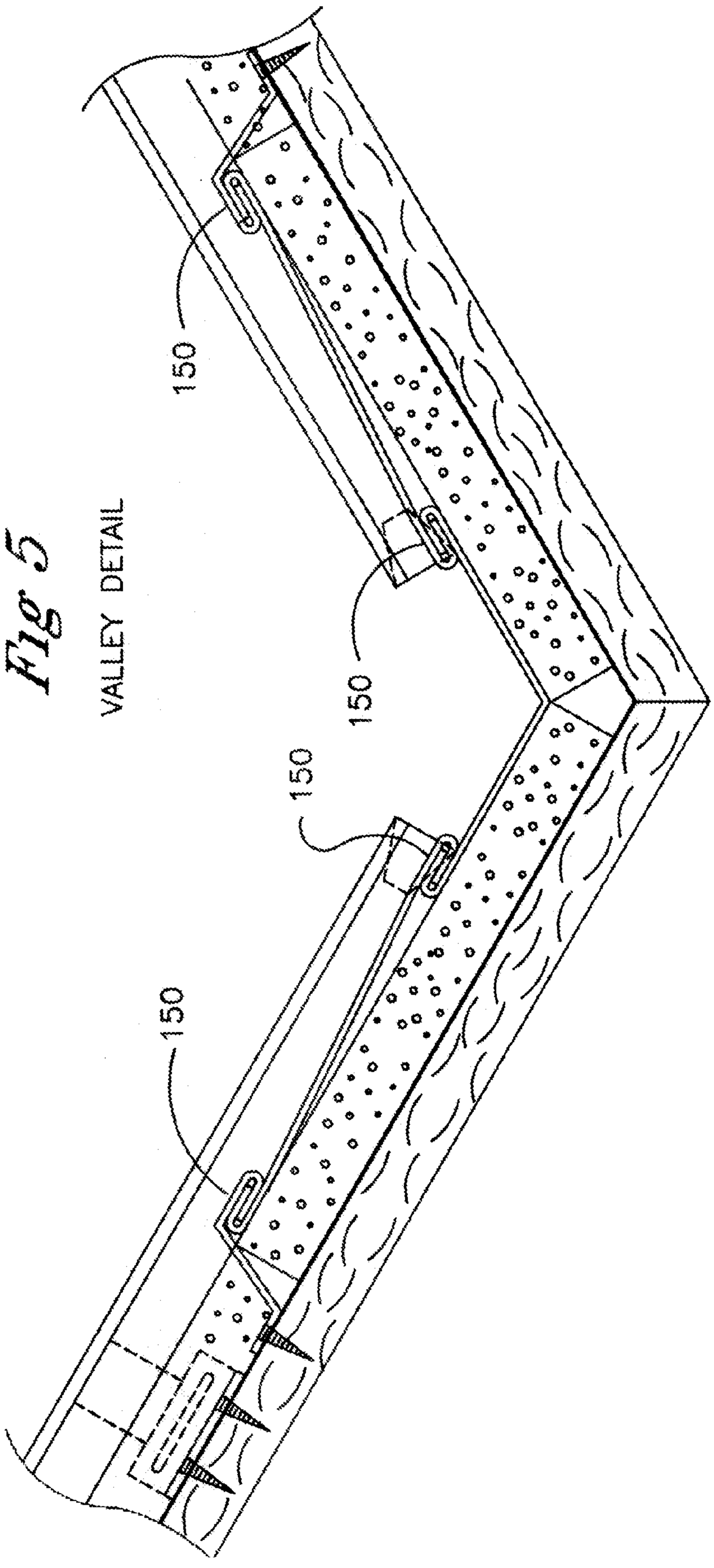


Fig 5

VALLEY DETAIL

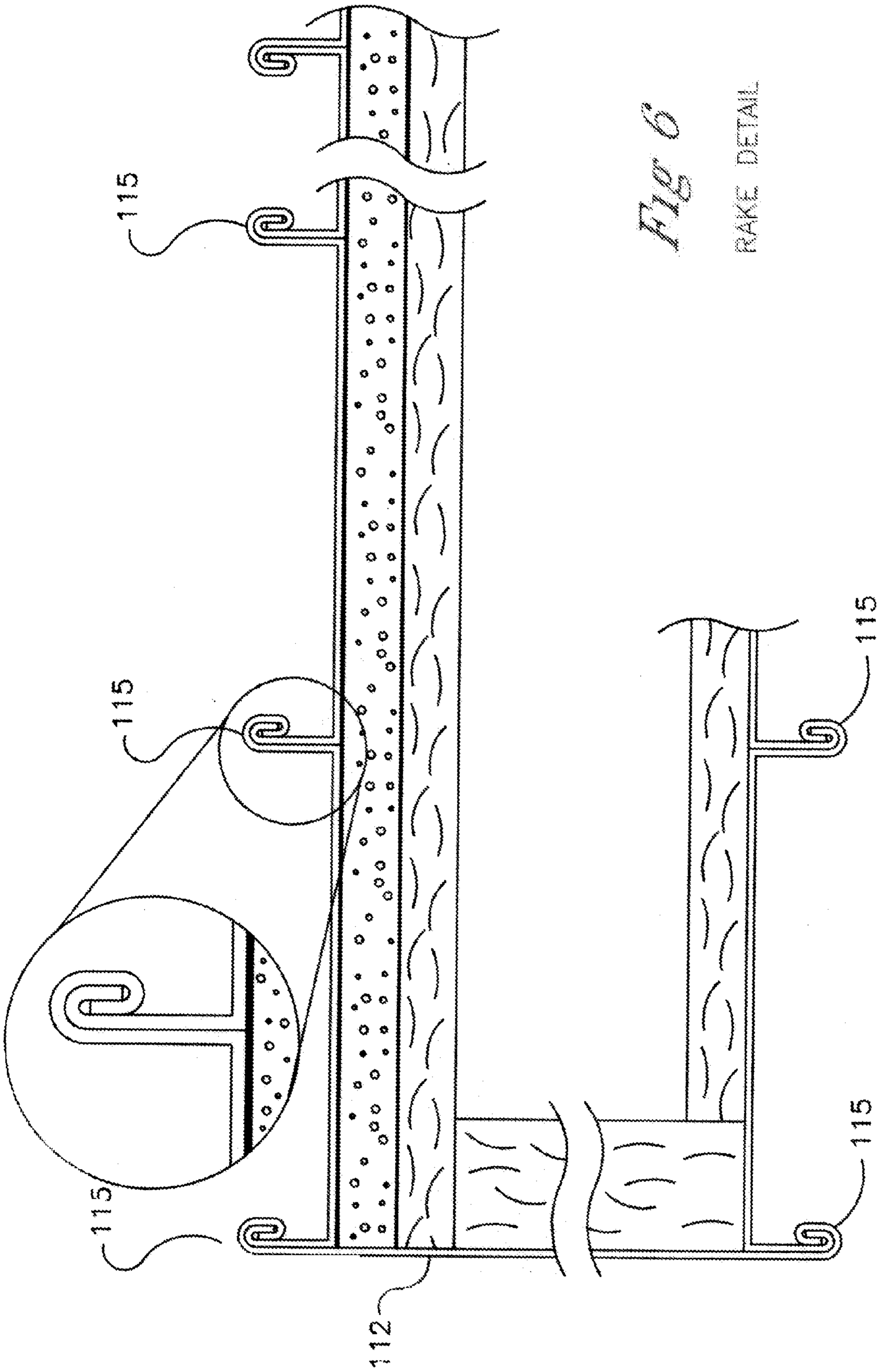


FIG 6
RAKE DETAIL

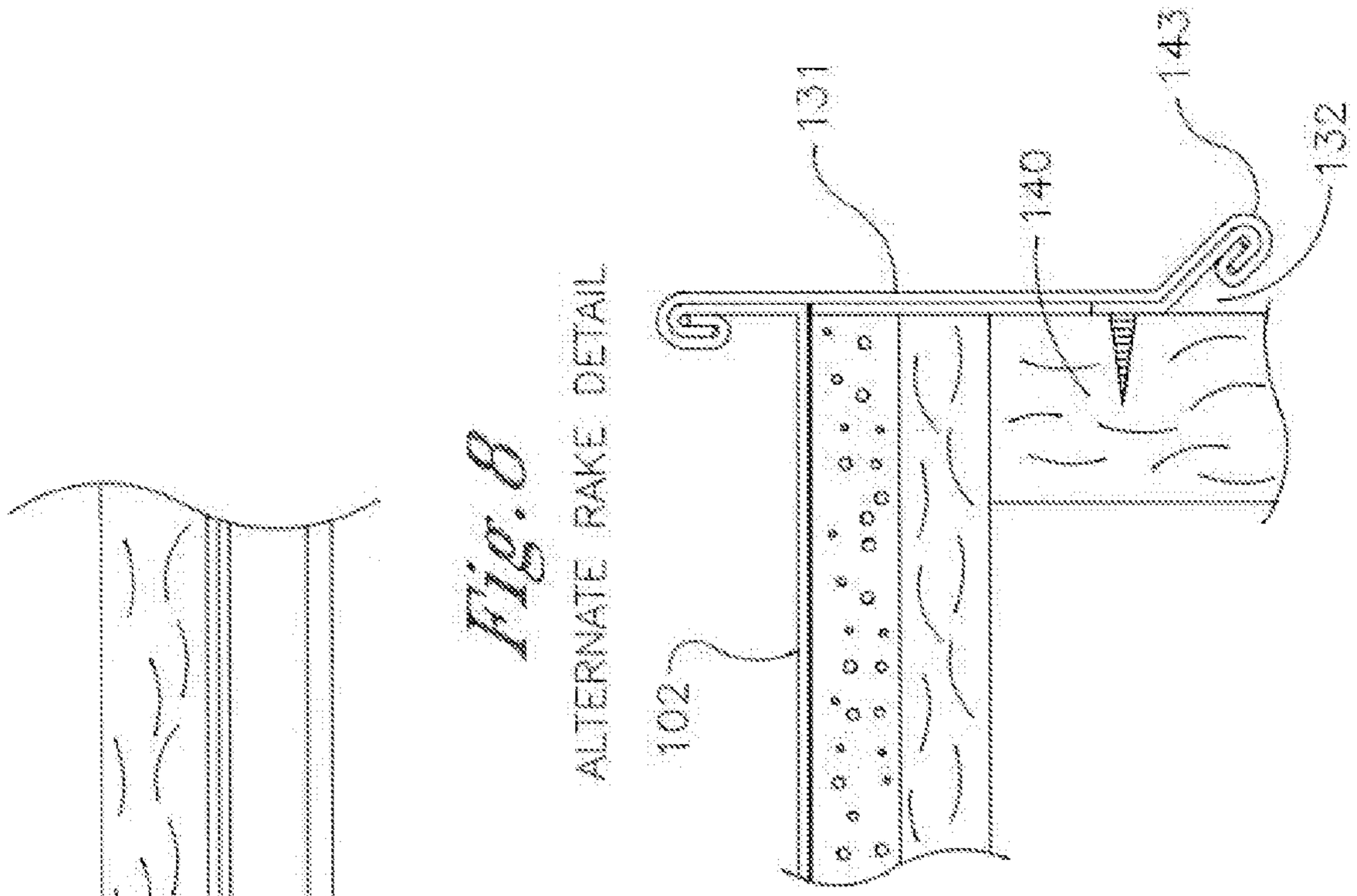
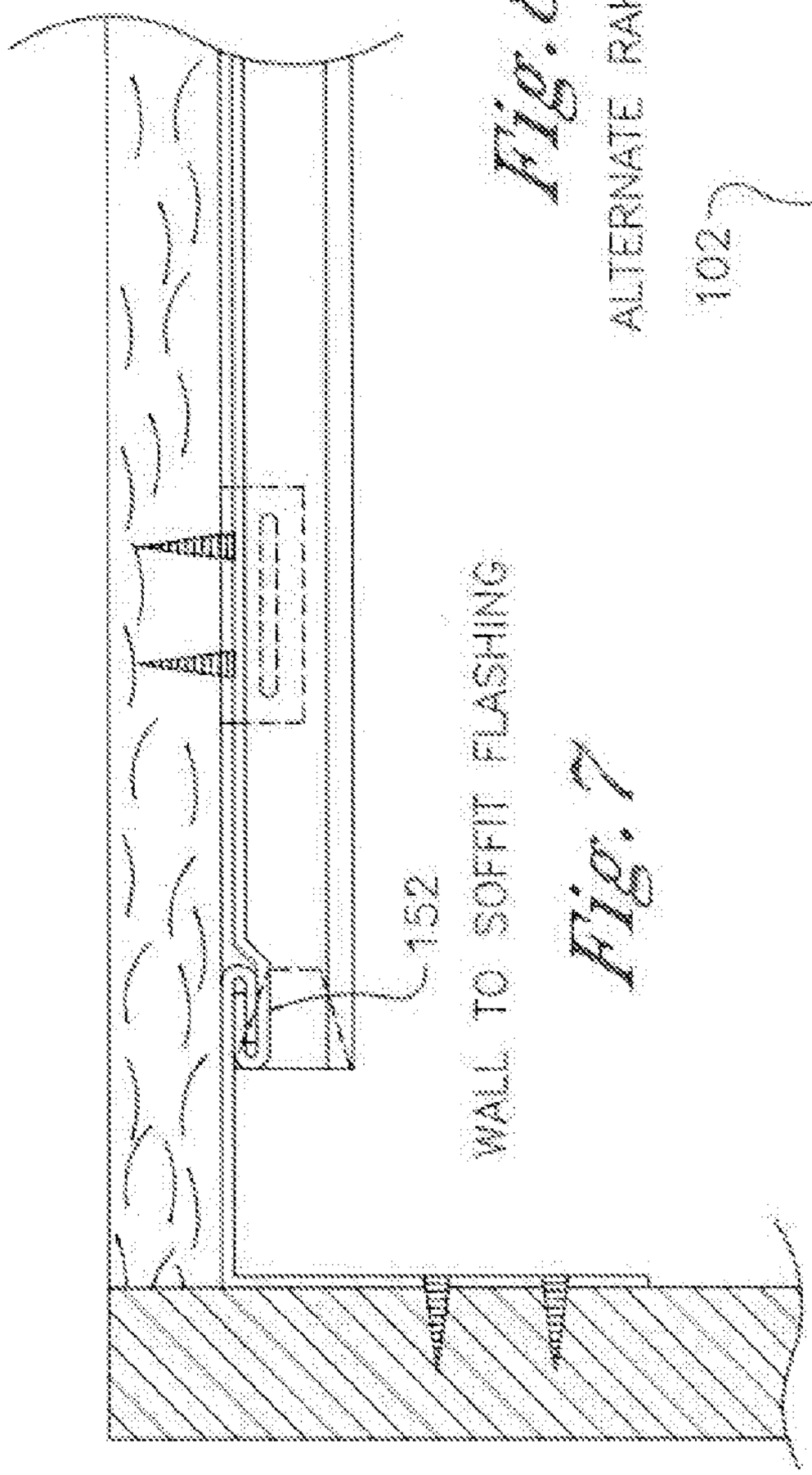


Fig. 8

ALTERNATE RAKE DETAIL



WALL TO SOFFIT FLASHING

Fig. 9

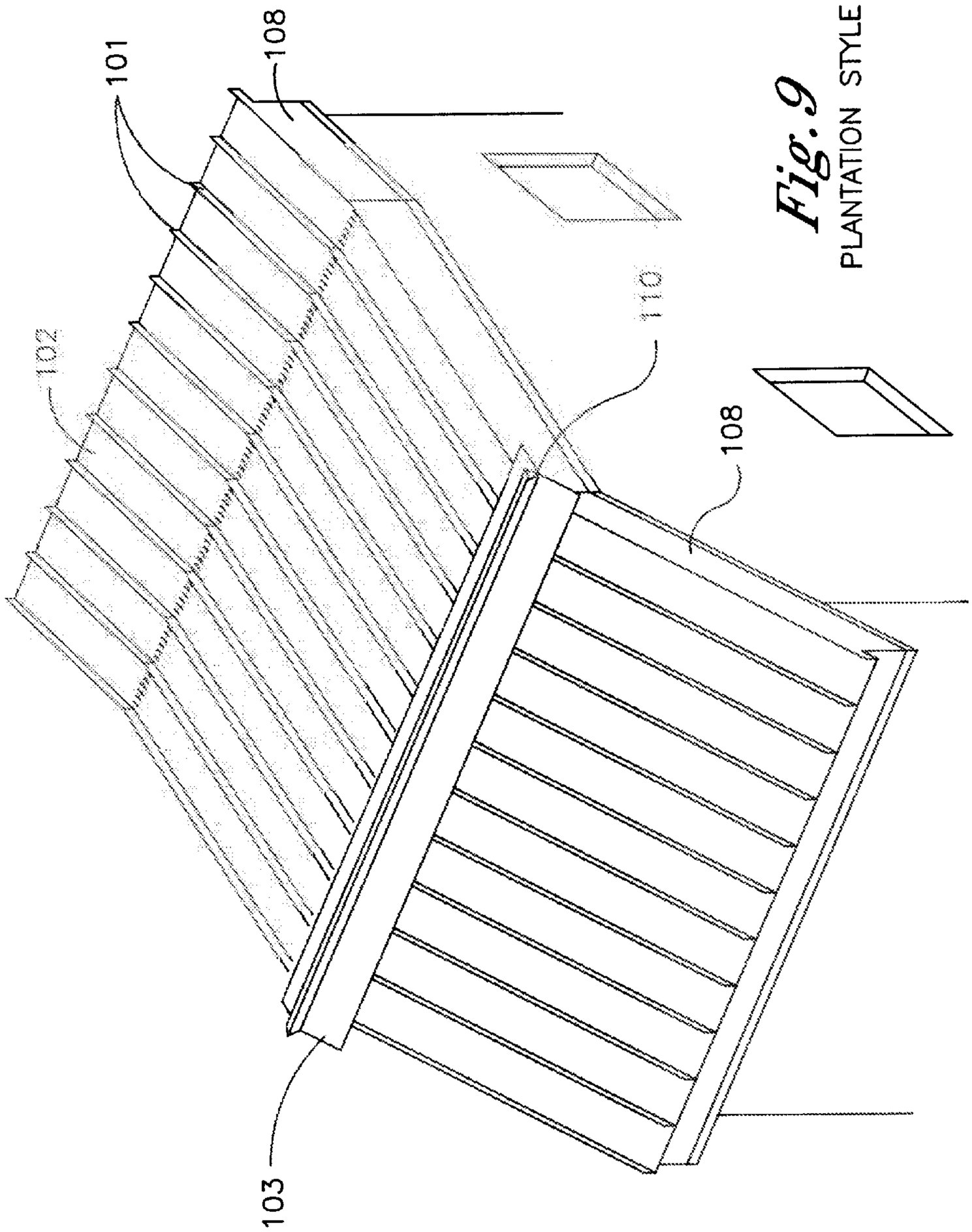


Fig. 9
PLANTATION STYLE

INTERLOCKING CONTINUOUS ROOF ASSEMBLY METHOD FOR WIND RESISTANT ROOFING

FIELD OF THE INVENTION

[0001] This invention relates to the methods of construction for residential and business building roofs with any pitch, single or split, flat or steep, with a continuous interlocking wind resistant metal membrane.

BACKGROUND OF THE INVENTION

[0002] Roofing projects where the building design includes a change in the pitch of the roof, a "slope break", present special difficulties for many roofing materials. This is especially true for long-panel metal roofing systems, where such a change in slope will usually require cutting the pan at the slope break, or require the use of two separate roof panels with a flashing at the slope break.

[0003] Many different flashing techniques and sealants have been employed by metal roofing installers over time to deal with such a change in roofing angles, with varying degrees of success.

[0004] The state-of-the-art flashing techniques often fail in extreme weather conditions when water blown by high winds penetrates flashing details at the ridge cap, valley, fascia, and slope break, because the flashing is not continuous and interlocking In particular, flashing techniques at slope breaks that rely on sealants to prevent water penetration will fail over time as sealants are weathered and age.

[0005] The present invention involves a field-proven technique that will allow the installation of roofing panels and ridge caps onto a roof with a split pitch in a single, continuous length without the need to cut the roofing panel. Roofing panels and ridge caps are installed from ridge to eaves with continuous double-lock standing seams without cuts or seams, thereby creating leak-proof conditions. The continuous nature of the double lock seams is crucial, because joints along the seam would permit water or wind to work on the seam and eventually split it open.

[0006] The typical roof in a high wind weather condition is degraded and eventually destroyed because one or more roofing panels and or the ridge cap are lifted off of the structure. When this happens, the entire roof is quickly peeled off of the building and the rest of the building is exposed to the weather. By eliminating the entry of water and wind under the edges of the roof panels and ridge cap, the roof will survive heavy hurricane force winds.

[0007] The purpose of this invention is to provide a standard American-style roof with eaves, pitched or flat, straight pitch or split pitch, or plantation style, resistance to winds of extreme force by forming a metal membrane of continuous interlocking flashing. With roofing panels, the present invention will confer resistance to all winds, not depending on thru fasteners or flashing with caulk.

[0008] All details of roof split pitch, valley, ridge cap, fascia are unique and new to the roofing industry because roofers have not been equipped to produce continuous panels and all other flashings in one piece, including ridge caps, valleys, soffit flashings, fascia cap, on site.

OBJECTIVES OF THE PRESENT INVENTION

[0009] The objective of the present is to provide a methodology for assembling sheet metal roofs in such a manner as to minimize or eliminate leakage and susceptibility of the roof to wind damage.

[0010] A further objective of this invention is to make the methodology easy and cost-efficient to use.

[0011] A further objective of the present invention is to allow the methodology to be implemented with hand tools or power tools with hand tool finishing.

[0012] A further objective of the present invention is to permit all steps of roof manufacture using this methodology to be performed on the roofing job site.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. **1**. Perspective view of typical pitched roof

[0014] FIG. **2**. Roof panel detail

[0015] FIG. **3**. Ridge detail cross section

[0016] FIG. **4**. Wrapped Fascia with Soffit detail cross-section

[0017] FIG. **5**. Roof valley detail cross section

[0018] FIG. **6**. Roof rake detail cross-section

[0019] FIG. **7**. Wall to Soffit Flashing detail cross section

[0020] FIG. **8**. An alternate rake detail cross section

[0021] FIG. **9**. A roof in plantation style using the present invention

DETAILED SPECIFICATION

[0022] The method implemented by the present invention is intended to make waterproof and windproof seams between roof panels **102** and the roof ridge cap **103**, where the roof ridge cap **103** is comprised of a male **104** and a female lock **105** panel. The present method is also used to assemble roofs from collections of roof panels **102** by means of producing double lock seams **115**. FIG. **1** shows a typical metal roof **100** with a plurality of roof panels **102** connected with double-lock roof panel seams **101** and a roof ridge cap **103**. Also shown is a typical dormer **106** roof with valleys **107**.

[0023] FIG. **2** shows a composite roof panel **102** with rake **108**. FIG. **3** is a cross-section of the roof ridge assembly. The male lock panel **104** and female lock panel **105** are joined at the top of the roof ridge cap **103** by means of a folded-over double-lock seam **10** formed by folding the mating edge **120** of the female lock panel **105** over the mating edge **121** of the male lock panel **104** to form a single lock seam, and then folding the single lock seam one more time to make a double-lock seam **110**.

[0024] The length of the male lock panel **104** and female lock panel **105** is indeterminate, and can be of any reasonable length along the ridge of the building. The present invention method includes the step of manufacturing the roof ridge cap **103** on the building site to be as long as necessary to reach from one end of the building roof ridge to the other, comprised of two continuous pieces of metal, the male and female lock panels **104**,**105**. The next step is to form a double lock seam **110** connecting the male and female lock panels **104**,**105** by double folding the mating edges **120**,**121** of the lock panels **104**,**105**.

[0025] The width of the male and female lock panels **104**, **105**, running from the mating edges **120**,**121** of the lock

panels **104**,**105** to where they encounter the mating edges **130** of the roof panels **102**, is set by design.

[0026] As shown in FIGS. **4**, **5**, and **6**, the method of the present invention can be applied to all areas of the roof **100** where metal roof panels **102** encounter each other or building fascia **111**. In FIG. **6**, the detail of roof panel **102** and roof rake **112** is shown. Note that the seams joining the roof panels **102** to each other and to the roof rake **112** are double lock seams **115**.

[0027] In FIG. **8**, an alternate embodiment of the seaming between a roof panel **102** and the fascia **131** is shown, where the fascia **131** terminates before wrapping under the roof **140**. This fascia **131** arrangement is held down to the roof by means of a bracket **132** made of the same metal as the roof panels **102**, joined to the roof rake **133** by means of a double lock seam **143**.

[0028] As shown in FIGS. **4**,**5**, and **7**, where double lock seams are not possible, S-lock seams **150**,**151**,**152** are used to bind metal to metal. As with the double lock seams **110**,**115**, **143** shown above, the S-lock seams are made in single, continuous lengths where possible.

[0029] FIG. **9** shows a typical plantation-style roof made with the present invention. The break in roof slope is accommodated by means of folding the continuous metal roof parts.

[0030] While the foregoing describes a preferred method, variation on this design and equivalent methods may be resorted to in the scope and spirit of the claimed invention.

What is claimed is:

1. A method of assembling metal roofs for buildings with a split pitch roof ridge to minimize wind and water damage to the building,

the method comprised of the steps of

mating a plurality of roof panels to each other with double lock seams, then

mating the roof panels at the edges of the roof to a plurality of roof rake panels using double lock seams, then

mating roof rake panels to fascia panels with double lock seams, then

mating a roof ridge cap to the ridge cap end of the plurality of roof panels by means of double lock seams,

the roof ridge cap formed with the method comprised of the steps of

manufacturing a male lock panel and a female lock panel each in a continuous sheet of metal such that the male lock panel and the female lock panel are each as long as the roof ridge, the male lock panel and the female lock panel each possessing a seam edge and a roof panel edge, then

joining the male lock panel to the female lock panel along the length of the two lock panels by means of a double lock seam at the seam edge of each of the male lock panel and the female lock panel,

the double lock seam in each case formed by folding the seam edge of the female lock panel over the seam edge of the male lock panel once to form a single lock seam, then folding the single lock seam again to form a double lock seam.

2. The method of assembling metal roofs for buildings with a split pitch roof ridge of claim **1** where the step of folding the seam edge of the female lock panel over the seam edge of the male lock panel is performed by means of hand tools, selected from the group of pliers, needle-nose pliers, hand seamers, and wooden mallets.

3. The method of assembling metal roofs for buildings with a split pitch roof ridge of claim **1** where the metal roofs are comprised of a metal selected from the group of copper, galvanized steel, or aluminum.

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