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(54) **Inflatable liferaft with easy access configuration**

(57) The present invention relates to an inflatable liferaft (1) comprising an inflatable floatation tube (10) defining a lower circumferential rim of the inflatable liferaft

(1) and an inflatable barrier tube (11) defining an upper circumferential rim of the inflatable liferaft (1) wherein an opening (13) is provided in the upper circumferential rim.

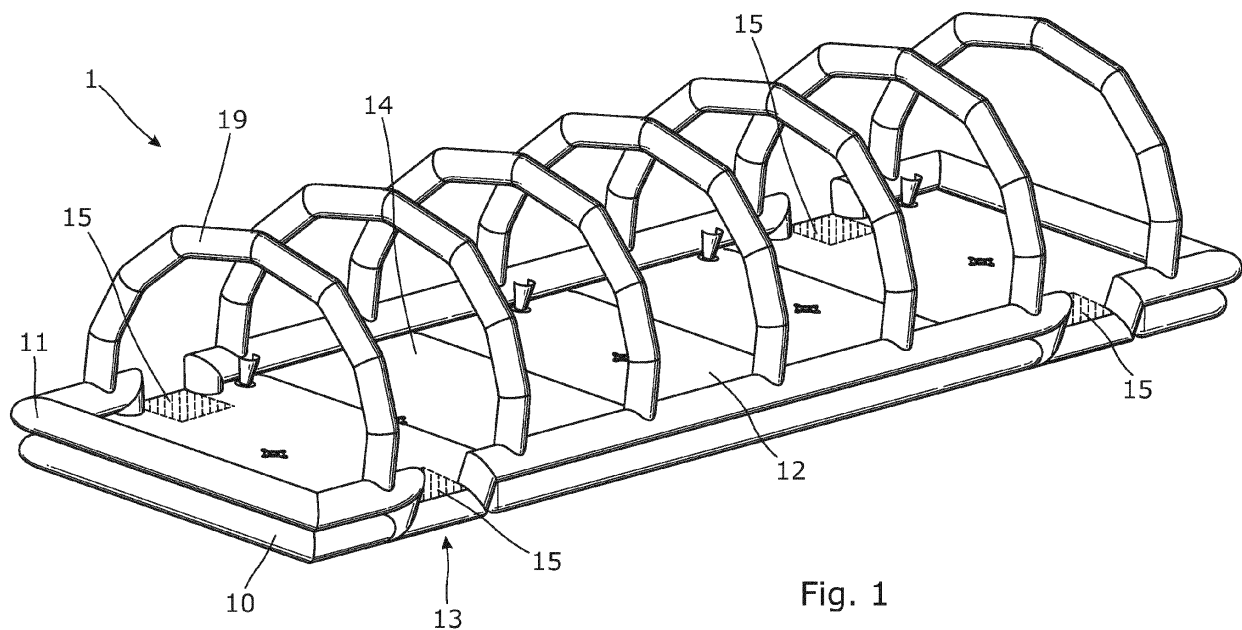


Fig. 1

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Description

Field of the invention

[0001] The present invention relates to an inflatable liferaft comprising an inflatable floatation tube defining a lower circumferential rim of the inflatable liferaft, an inflatable barrier tube defining an upper circumferential rim of the inflatable liferaft, the inflatable barrier tube being arranged substantially on top of the inflatable floatation tube and defining a protected area for containing passengers, and a flooring element provided between the inflatable floatation tube and the inflatable barrier tube, thereby defining a bottom of the inflatable floatable unit.

Background art

[0002] Vessels in general and cruise ships in particular tend to become larger and larger, thereby requiring life saving systems and inflatable liferafts with an increasing capacity. In case of an emergency situation requiring evacuation of the vessel, people on the vessel have to be evacuated to the inflatable liferafts position on the face on the sea along the side of the vessel. People may be evacuated to the inflatable liferaft using various disembarkment means such as slides or chutes extending from the deck of the vessel to the inflatable liferafts or to an adjacent evacuation platform.

[0003] To increase the total capacity of the disembarkment means of a vessel either the number of slides or chutes may be increased or the capacity of fewer slides or chutes may be improved. Many slides or chutes scattered all over the vessel may provide the disadvantage of ineffective use due to a lack of coordination and incorrect use. On the other hand, if fewer slides or chutes are centralised in strategic selected locations the evacuation procedure may be easier to coordinate and trained personnel may secure safe and fast evacuation.

[0004] In such evacuation systems an increasing number of inflatable liferafts are often deployed end to end extending from the side of the vessel. Hereby the multitude of rafts is grouped together and one common evacuation means or group of evacuation means may be used to evacuate people to the group of inflatable liferafts.

[0005] When arriving at the inflatable liferaft situated the closest to the vessel, the evacuated people have to be distributed into the other inflatable liferafts. However, when known inflatable liferafts are deployed end to end the design of the rafts prevents safe and fast evacuation. When people have to cross one inflatable liferaft to enter the next, they have to scale the rims of both inflatable liferafts, which constitutes a considerable obstacles both height- and width wise. To remedy this, a piece of cloth is sometimes stretched across the rims to provide a walking path. However, using such walking path still requires considerable physical strength. Further, scaling the rims of the inflatable liferafts slows down the speed of evacuation

providing room for optimisation.

Summary of the invention

[0006] It is an object of the present invention to wholly or partly overcome the above disadvantages and drawbacks of the prior art. More specifically, it is an object to provide an inflatable liferaft having improved accessibility whereby people may enter the liferaft in a fast and efficient manner.

[0007] The above objects, together with numerous other objects, advantages, and features, which will become evident from the below description, are accomplished by a solution in accordance with the present invention by an inflatable liferaft comprising:

- an inflatable floatation tube defining a lower circumferential rim of the inflatable liferaft,
- an inflatable barrier tube defining an upper circumferential rim of the inflatable liferaft, the inflatable barrier tube being arranged substantially on top of the inflatable floatation tube and defining a protected area for containing passengers, and
- a flexible flooring element provided between the inflatable floatation tube and the inflatable barrier tube, thereby defining a bottom of the inflatable floatable unit,

wherein at least one opening is provided in the upper circumferential rim at a section along a perimeter of the inflatable liferaft, thereby defining a planar entry zone to the protected area which is substantially levelled with the flooring element.

[0008] By the entry zone being levelled with the flooring element and thus comprising no difference in level, as would have been the case had the circumferential rim been continued along the entire perimeter of the inflatable liferaft, people may enter the inflatable liferaft more easily. In case of a difference in level, such as an outer rim of the liferaft, access to the liferaft is hindered, making evacuation slower and constituting a serious obstacle to some people.

[0009] In one embodiment, the entry zone may be planar. Furthermore, the entry zone may comprise no difference in level.

[0010] Furthermore, the inflatable liferaft in a deflated condition may be packable whereby the inflatable life raft may be compacted to a volumetric size of 0.75-2 m³.

[0011] The inflatable liferaft may comprise two openings in the upper circumferential rim at two sections along the perimeter of the inflatable liferaft, thereby providing two planar entry zones to the protected area which are substantially levelled with the flooring element, wherein the two openings are provided on opposite sides of the inflatable liferaft.

[0012] In an embodiment, the flooring element may be made from a waterproof flexible material, such as a rubber material or an impregnated piece of cloth.

[0013] Furthermore, the inflatable liferaft may comprise multiple openings, such as four openings provided in the upper circumferential rim on opposite sides of the inflatable liferaft.

[0014] By providing openings on opposite sides of the inflatable liferaft, people may enter through one opening, move across the protected area, and exit the inflatable liferaft on the opposite side to enter another abutting inflatable liferaft. Hereby, one inflatable liferaft may be arranged on the side of another inflatable liferaft facing away from a vessel, and people may be transferred from the vessel via the inflatable liferaft closest to the vessel and to the outermost inflatable liferaft.

[0015] In an embodiment, the two openings are provided directly opposite each other, thereby providing the shortest possible distance between the openings on the opposite side of the inflatable liferaft.

[0016] Hereby, people moving to an abutting liferaft may cross the inflatable liferaft along the shortest possible route and in the fastest possible manner.

[0017] Moreover, the one or more openings may be provided by the inflatable barrier tube comprising a bend, whereby a section of the bend of the inflatable barrier tube is arranged in level with the inflatable floatation tube and extends along the perimeter of the inflatable liferaft.

[0018] In another embodiment, the section of the bend of the inflatable barrier tube may be arranged in level with the inflatable floatation tube below the flooring element.

[0019] Also, the bend of the inflatable barrier tube may extend in a downwards direction towards the subjacent inflatable floatation tube.

[0020] Furthermore, the one or more openings may be provided by a section of the inflatable barrier tube being cut out, whereby the inflatable barrier tube comprises end sections arranged on opposite sides of the opening.

[0021] In addition, the one or more openings may be provided by oppositely arranged end sections of the inflatable barrier tube comprising substantially angular bends, whereby the end sections extend downwards and engage with the inflatable floatation tube.

[0022] In an embodiment, the inflatable barrier tube may be in fluid communication with the inflatable floatation tube.

[0023] By arranging a section of the inflatable barrier tube in level with the inflatable floatation tube, the overall buoyancy of the inflatable liferaft is maintained without the inflatable liferaft having to comprise additional means for providing buoyancy.

[0024] Moreover, the inflatable floatation tube may be adapted to accommodate the bend of the inflatable barrier tube by comprising a bend partly enclosing the bend of the inflatable barrier tube.

[0025] Hereby, the structural stability of the entry zone is improved compared to a construction wherein the inflatable barrier tube would just have been discontinued to provide an entry zone.

[0026] Additionally, the bend of the inflatable floatation tube may extend in a direction substantially parallel to

the extension of the flooring element.

[0027] Also, the bends of each of the inflatable barrier tubes and the inflatable floatation tube may be constituted by a series of substantially angular bends changing the direction of the inflatable barrier tube and the inflatable floatation tube, respectively.

[0028] The inflatable liferaft may further comprise a closing element for selectively opening and closing the opening of the inflatable barrier tube to prevent water from entering the protected area.

[0029] In an embodiment, zippers may be provided for securing the closing element at the opening of the inflatable barrier tube.

[0030] Furthermore, hoop-and-loop fasteners or Velcro may be provided for securing the closing element at the opening of the inflatable barrier tube.

[0031] Moreover, the closing element may be made from a waterproof flexible material, such as a rubber material or an impregnated piece of cloth.

[0032] In addition, the closing element may be detachable.

[0033] Also, the closing element may be adapted to be simultaneously secured to two abutting inflatable liferafts to provide a substantially planar walking path between the inflatable liferafts.

[0034] Additionally, the closing element of one inflatable liferaft may be adapted to be secured to a closing element of an abutting inflatable liferaft to provide a substantially planar walking path between the inflatable liferafts.

[0035] The present invention further relates to an evacuation system comprising two or more inflatable liferafts according to any of the preceding claims and one or more disembarkment means for transferring persons from a vessel to at least one of the inflatable liferafts, wherein at least two of the liferafts are arranged side by side with one of their respective openings and entry zones abutting the opening and entry zones of the other inflatable liferaft.

[0036] Hereby, people may move in an unhindered way from one inflatable liferaft to the other without having to scale the outer rims of two abutting inflatable liferafts.

[0037] Finally, the present invention relates to a vessel comprising the inflatable liferaft described above.

Brief description of the drawings

[0038] The invention and its many advantages will be described in more detail below with reference to the accompanying schematic drawings, which for the purpose of illustration show some non-limiting embodiments and in which

Fig. 1 shows an inflatable liferaft comprising four entry zones,

Fig. 2 shows a to view of a section of the inflatable liferaft shown in Fig. 1,

Figs. 3A-3C show a close-up of the construction of an entry zone, and

Fig. 4 shows a vessel comprising an evacuation system in a deployed state.

[0039] All the figures are highly schematic and not necessarily to scale, and they show only those parts which are necessary in order to elucidate the invention, other parts being omitted or merely suggested.

Detailed description of the invention

[0040] Fig. 1 shows an inflatable liferaft 1 according to an embodiment of the invention. For illustrative purposes, the inflatable liferaft 1 is shown in an inflated condition and the following description of the structural components of the inflatable life raft will in general adhere to the inflatable liferaft in an inflated condition. Nevertheless, the inflatable life raft also exists in a deflated condition wherein the inflatable liferaft is packable and thus may be packed to significantly reduce the size occupied by the inflatable liferaft. It is to be understood by those skilled in the art that the essential structural components of an inflatable and packable liferaft are of a flexible character allowing for the inflatable life raft to be bent and folded into a packable condition.

[0041] The inflatable liferaft 1 comprises an inflatable flotation tube 10 defining a lower circumferential rim and an inflatable barrier tube 11 defining an upper circumferential rim. The inflatable barrier tube is arranged on top of the inflatable flotation tube and defines a protected area 14 for containing passengers. Also, a flexible flooring element 12 is provided between the inflatable flotation tube and the inflatable barrier tube, thereby defining a bottom of the inflatable floatable unit. To make the inflatable liferaft more accessible, four openings 13 are provided in the upper circumferential rim at a section along a perimeter 111 of the inflatable liferaft, thereby defining four entry zones 15 to the protected area which are substantially levelled with the flooring element. It is to be understood by those skilled in the art that other numbers of openings and entry zones both higher and lower than that specified are possible and are considered to be within the scope of the present invention.

[0042] Further, the inflatable liferaft comprises inflatable cross members 18 secured to the inflatable flotation tube, as shown in Fig. 2, and inflatable roof support members 19 in the form of inflatable arcs extending across the inflatable liferaft. The roof support members 19 are adapted to support a suspended roof element 20, as shown in Fig. 4.

[0043] In the following, the construction of an embodiment of each of the openings disclosed above will be described. As shown in Fig. 2 and Fig. 3A, the opening is constituted by a bend 16 provided in the inflatable barrier tube 11. The bend 16 extends in a substantially vertical direction downwards towards the inflatable flotation

tube. The bend 16 is constituted by a series of bends 162 of the inflatable barrier tube, preferably four substantially angular bends. Hereby, a section 161 of the bend of the inflatable barrier tube is arranged in level with the inflatable flotation tube and extends along the perimeter 111 of the inflatable liferaft. The section 161 of the bend is thus arranged below the flooring element, and the opening provided in the upper circumferential rim hereby becomes levelled with the flooring element. Because the opening is levelled with the flooring element, a planar entry zone 15 is defined, as shown in Fig. 3B. The entry zone thus comprises no differences in level, which greatly improves accessibility to the inflatable liferaft. Further, by arranging the section 161 of the bend of the inflatable barrier tube in level with the inflatable flotation tube, both the inflatable flotation tube and the inflatable barrier tube may contribute to the buoyancy of the inflatable liferaft. To accommodate the bend 16 provided in the inflatable barrier tube, a corresponding bend 17 is provided in the inflatable flotation tube. The bend 17 extends in a direction parallel to the extension of the flooring element inwards towards a centre of the inflatable liferaft. The bend 17 thereby partly encloses the bend of the inflatable barrier tube, which may enhance the structural stability of the entry opening and entry zone. The bend 17 of the inflatable flotation tube is also constituted by a series of bends 172, preferably four substantially angular bends, in the inflatable flotation tube.

[0044] In another embodiment (not shown), the opening may be constituted by a section of the inflatable barrier tube being cut out, whereby the inflatable barrier tube comprises end sections arranged on opposite sides of the opening. The opposite end sections of the inflatable barrier tube may further comprise angular bends, whereby each of the end sections extends downwards into engagement with the inflatable flotation tube. Hereby, the inflatable barrier tube may be brought into fluid communication with the inflatable flotation tube.

[0045] As shown in Fig. 4, the inflatable liferaft may comprise four openings 13 and associated entry zones 15. The openings are provided on opposite sides of the inflatable liferaft, directly opposite each other. In another embodiment, the inflatable liferaft may alternatively comprise openings arranged differently, such as openings arranged along the sides and/or in the bow and/or stern of the inflatable liferaft.

[0046] The inflatable liferaft further comprises a closing element 21, shown in a closed position in Fig. 3C. The closing element is used for selectively opening and closing the opening 13 in the inflatable barrier tube to prevent water from entering the protected area.

[0047] In one embodiment, the closing element is constructed as a flap fixedly secured to the inflatable barrier tube or the inflatable flotation tube along a bottom edge 212 thereof. The closing element comprises zippers, hoop-and-loop fasteners or other fastening means 211 for securing sides 213 of the closing element in the closed position. The closing element is made from a waterproof

flexible material, such as a rubber material or an impregnated piece of cloth. In the open position (not shown), the closing element may be adapted to secure two abutting inflatable liferafts to each other and to provide a substantially planar walking path between the entry zones of each of the inflatable liferafts.

[0048] One or more of the inflatable liferafts disclosed above may be comprised in an evacuation system 100. Fig. 4 shows a vessel 102 comprising an evacuation system in a deployed position. The evacuation system comprises four inflatable liferafts 1 deployed end to end and disembarkment means 101, such as a chute or slide, for transferring persons from the vessel 102 to the inflatable liferaft next to the vessel. The disembarkment means may be arranged at selected positions on the vessel and be manned by trained crew to secure fast and safe evacuation of the people on board. The inflatable liferafts are arranged side by side with each of their respective openings and entry zones abutting the openings and entry zones of the adjacent inflatable liferafts. People arriving at the inflatable liferaft the closest to the vessel may thus move in an unhindered way across the first inflatable liferaft to the next without having to scale the outer rims of two abutting inflatable liferaft. Hereby, people may be evacuated safely and fast, and the inflatable liferafts may be filled in an efficient manner. When people start arriving at the inflatable liferafts, they move outwards towards the outermost inflatable liferaft. When the outermost inflatable liferaft is full, it is detached and is towed or sails away into a safe distance from the vessel. The procedure is continued until all inflatable liferafts have been filled or all people have been evacuated.

[0049] Although the invention has been described in the above in connection with preferred embodiments of the invention, it will be evident for a person skilled in the art that several modifications are conceivable without departing from the invention as defined by the following claims.

Claims

1. An inflatable liferaft (1) comprising:

- an inflatable flotation tube (10) defining a lower circumferential rim of the inflatable liferaft,
 - an inflatable barrier tube (11) defining an upper circumferential rim of the inflatable liferaft, the inflatable barrier tube being arranged substantially on top of the inflatable flotation tube and defining a protected area (14) for containing passengers, and
 - a flooring element (12) provided between the inflatable flotation tube and the inflatable barrier tube, thereby defining a bottom of the inflatable floatable unit,
- wherein at least one opening (13) is provided in the upper circumferential rim at a section along

a perimeter (111) of the inflatable liferaft, thereby defining a planar entry zone (15) to the protected area which is substantially levelled with the flooring element.

2. An inflatable liferaft according to claim 1, comprising two openings in the upper circumferential rim at two sections along the perimeter of the inflatable liferaft, thereby providing two planar entry zones (15) to the protected area which are substantially levelled with the flooring element, wherein the two openings are provided on opposite sides of the inflatable liferaft.
3. An inflatable liferaft according to claim 2, wherein the two openings are provided directly opposite each other, thereby providing the shortest possible distance between the openings on the opposite side of the inflatable liferaft.
4. An inflatable liferaft according to any of the preceding claims, wherein the inflatable barrier tube extends continuously around the perimeter of the inflatable liferaft and the one or more openings are provided by the inflatable barrier tube comprising a bend (16), whereby a section (161) of the bend of the inflatable barrier tube is arranged in level with the inflatable flotation tube and extends along the perimeter (111) of the inflatable liferaft.
5. An inflatable liferaft according to any of the preceding claims, wherein the inflatable flotation tube is adapted to accommodate the bend of the inflatable barrier tube by comprising a bend (17) partly enclosing the bend of the inflatable barrier tube.
6. An inflatable liferaft according to any of the preceding claims, wherein the bends of each of the inflatable barrier tubes and the inflatable flotation tube are constituted by a series of substantially angular bends (162, 172) changing the direction of the inflatable barrier tube and the inflatable flotation tube, respectively.
7. An inflatable liferaft according to any of the preceding claims, further comprising a closing element (21) for selectively opening and closing the opening of the inflatable barrier tube to prevent water from entering the protected area.
8. An inflatable liferaft according to any of the preceding claims, wherein the closing element (21) is adapted to be simultaneously secured to two abutting inflatable liferafts to provide a substantially planar walking path between the inflatable liferafts.
9. An evacuation system (100) comprising two or more inflatable liferafts (1) according to any of the preceding claims and one or more disembarkment means

(101) for transferring persons from a vessel (102) to at least one of the inflatable liferafts, wherein at least two of the liferafts are arranged side by side with one of their respective openings and entry zones abutting the opening and entry zones of the other inflatable liferaft. 5

10. A vessel (102) comprising the inflatable liferaft (1) according to any of the claims 1-8.

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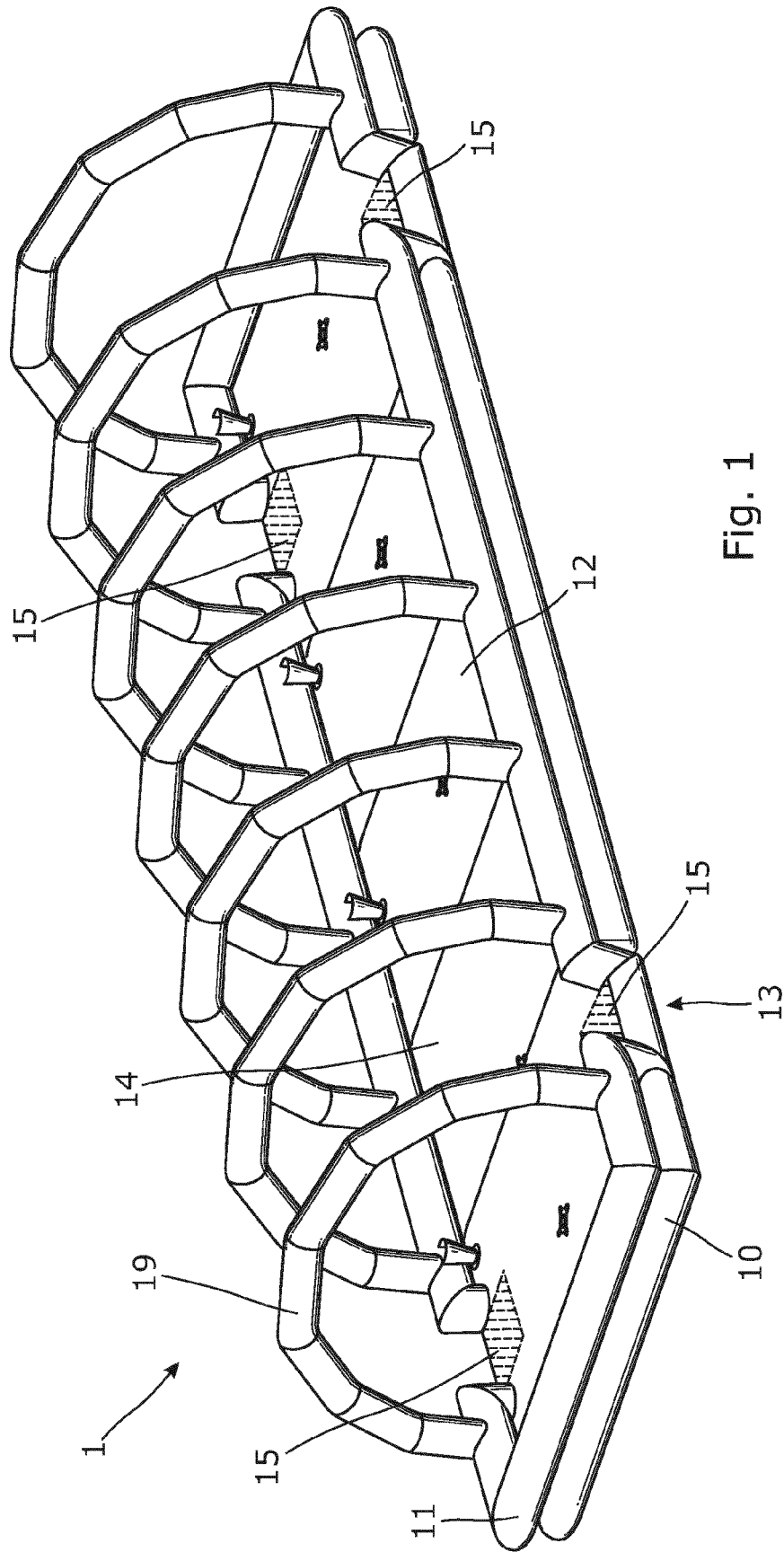
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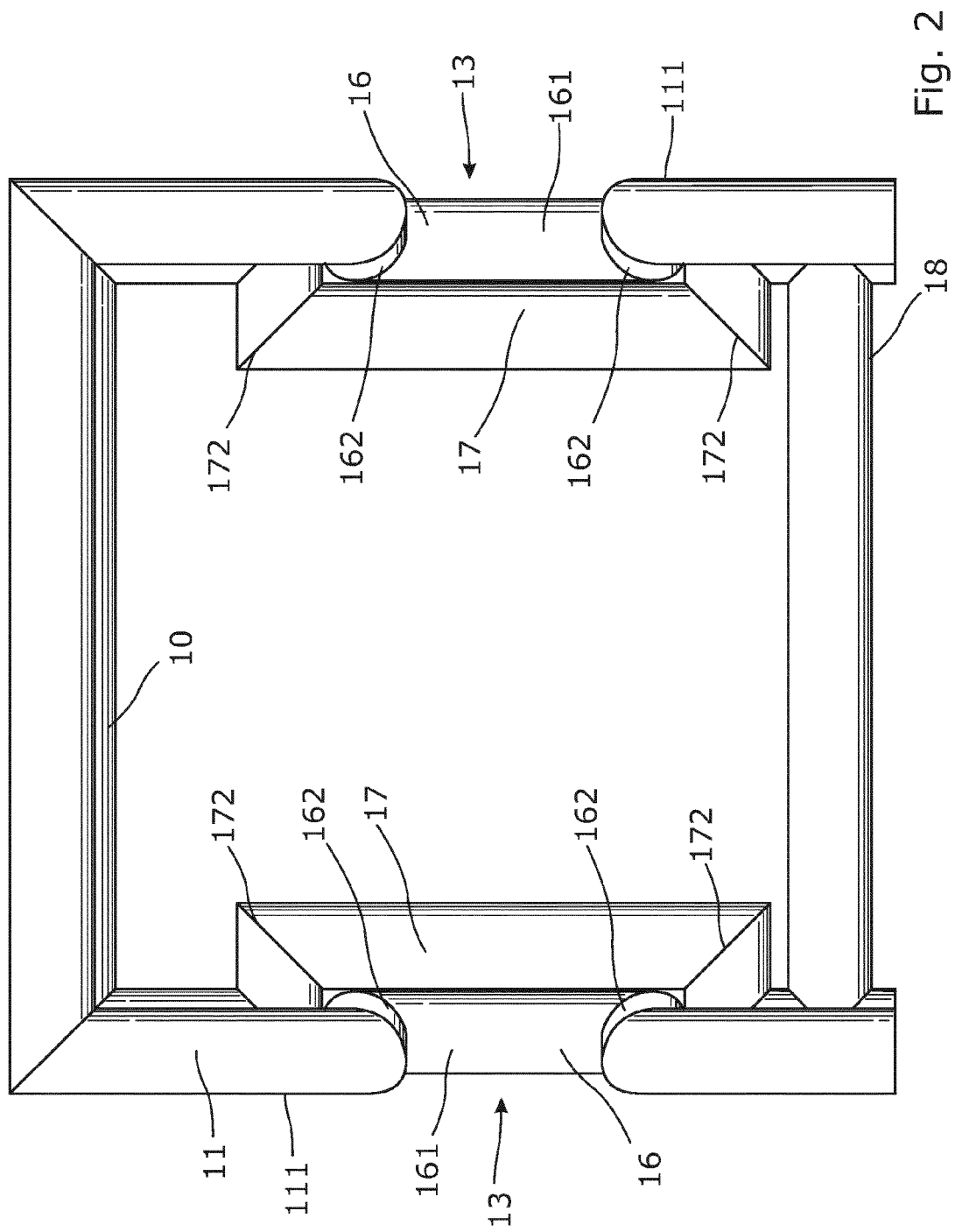
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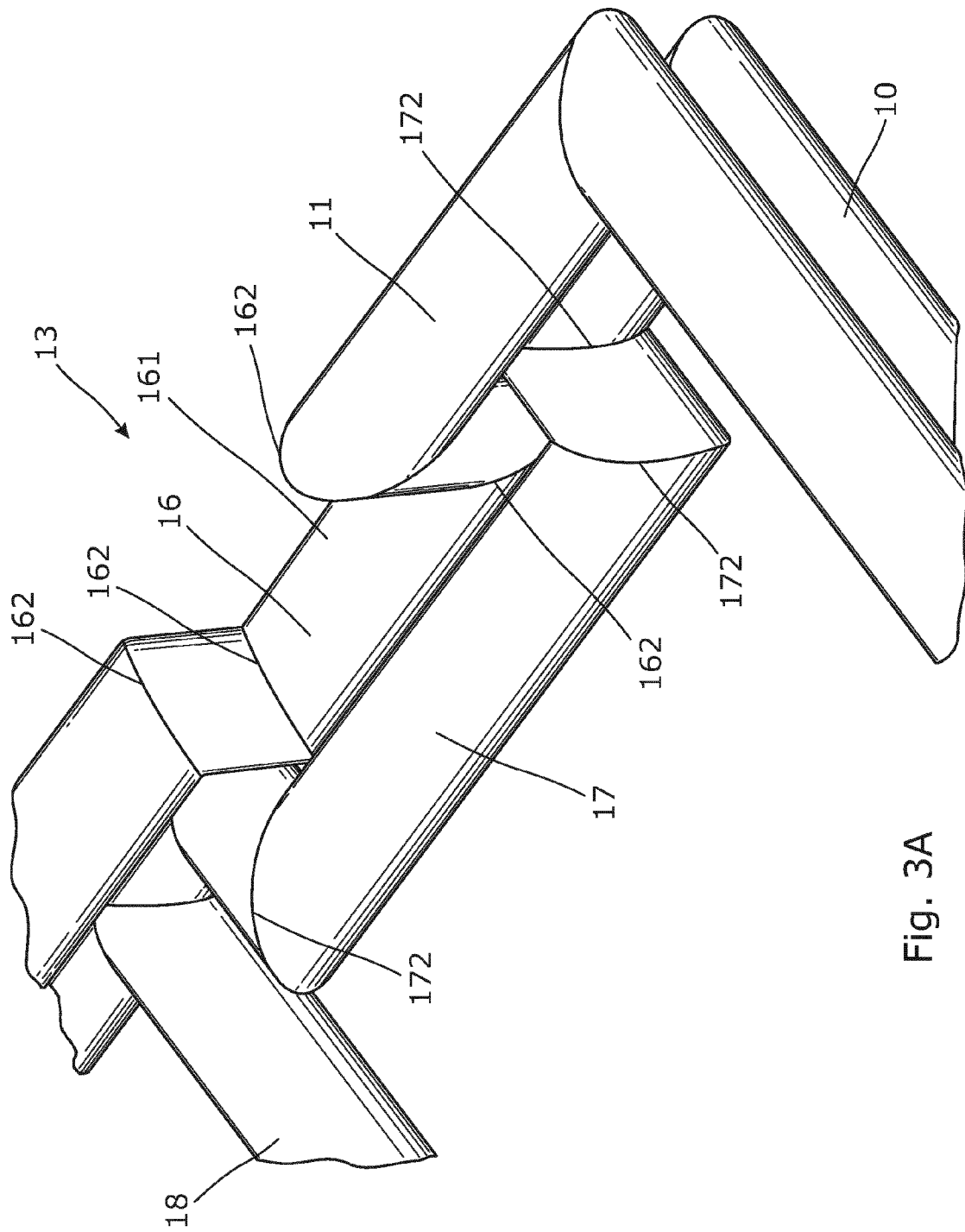


Fig. 3A

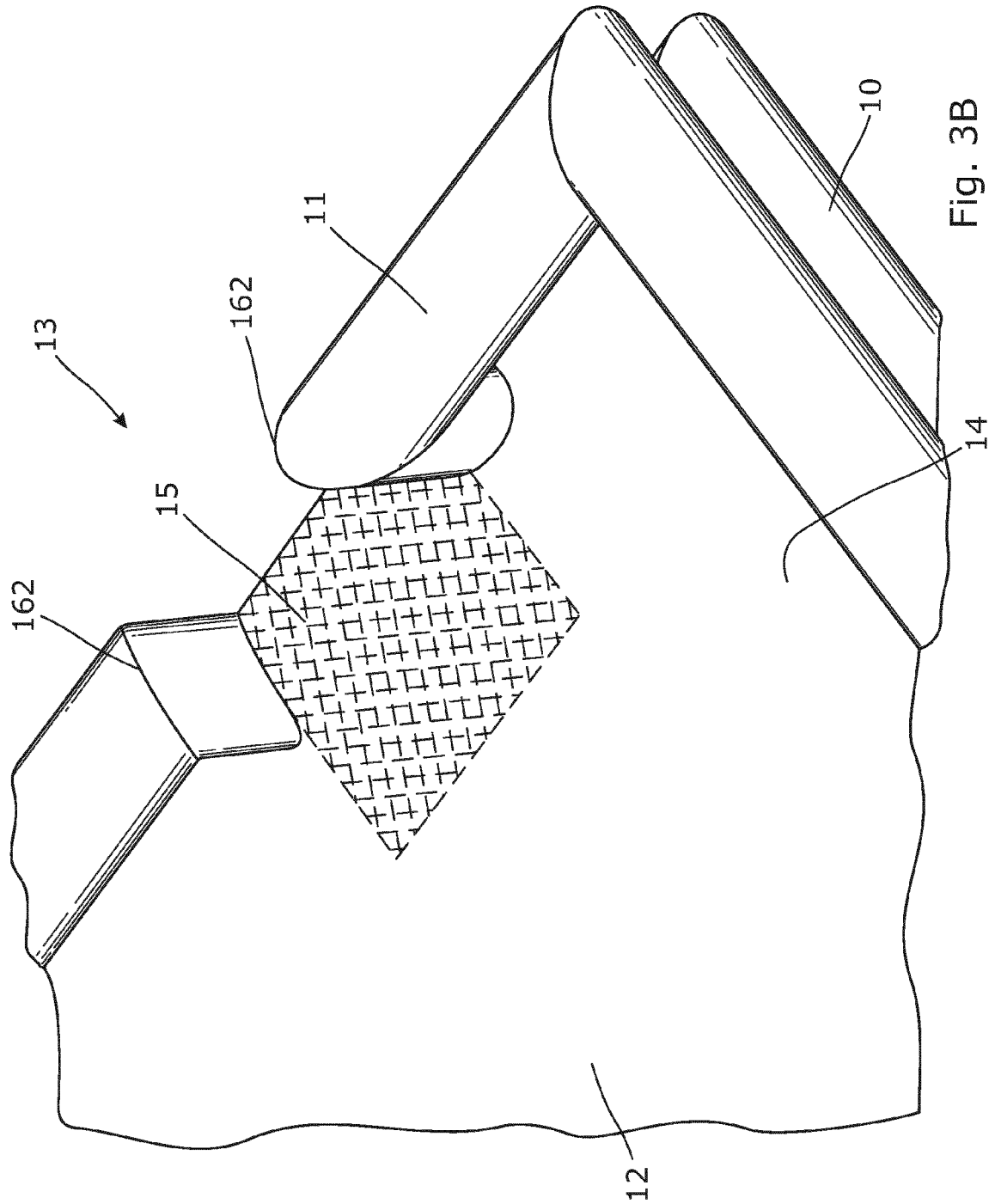
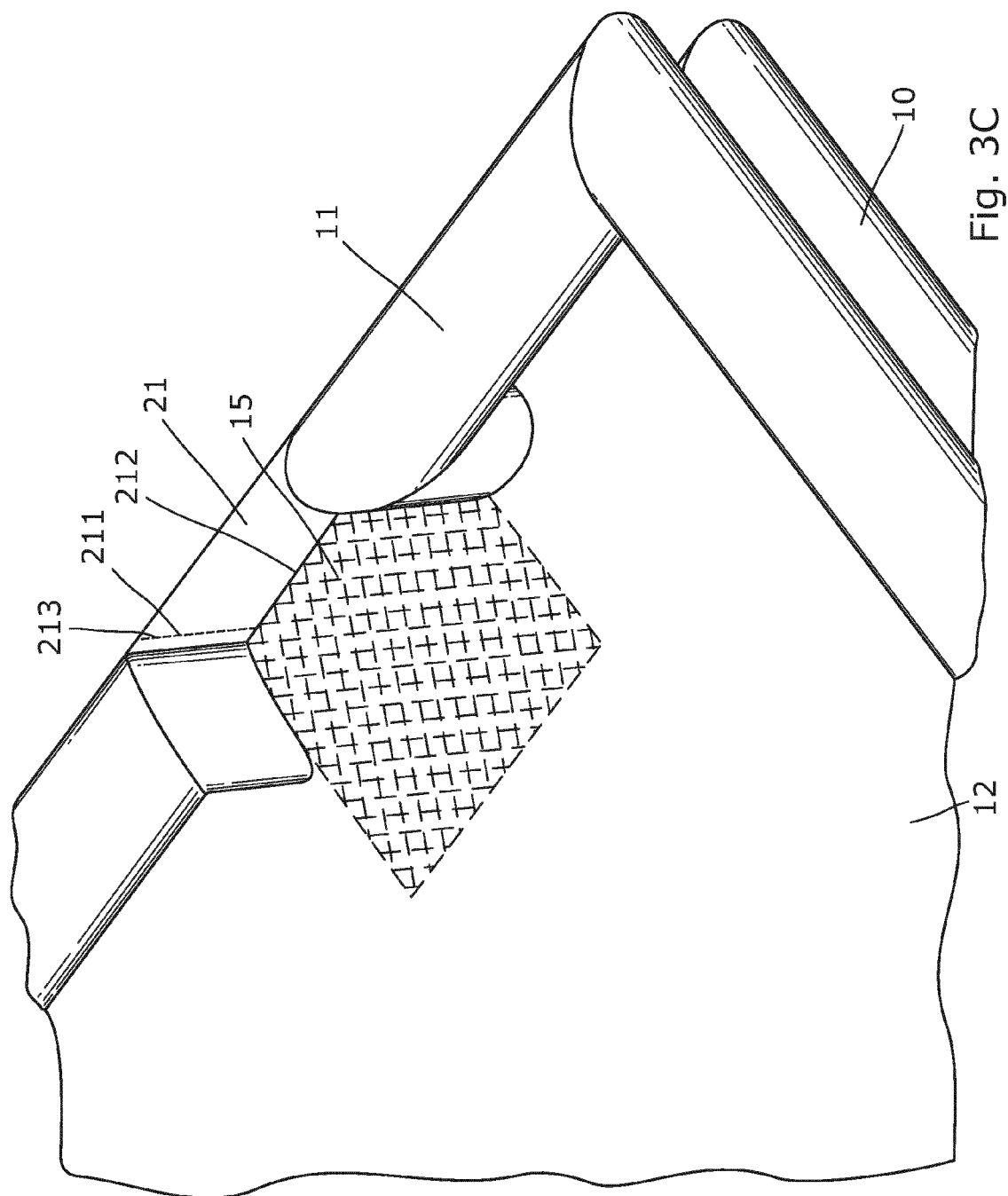


Fig. 3B



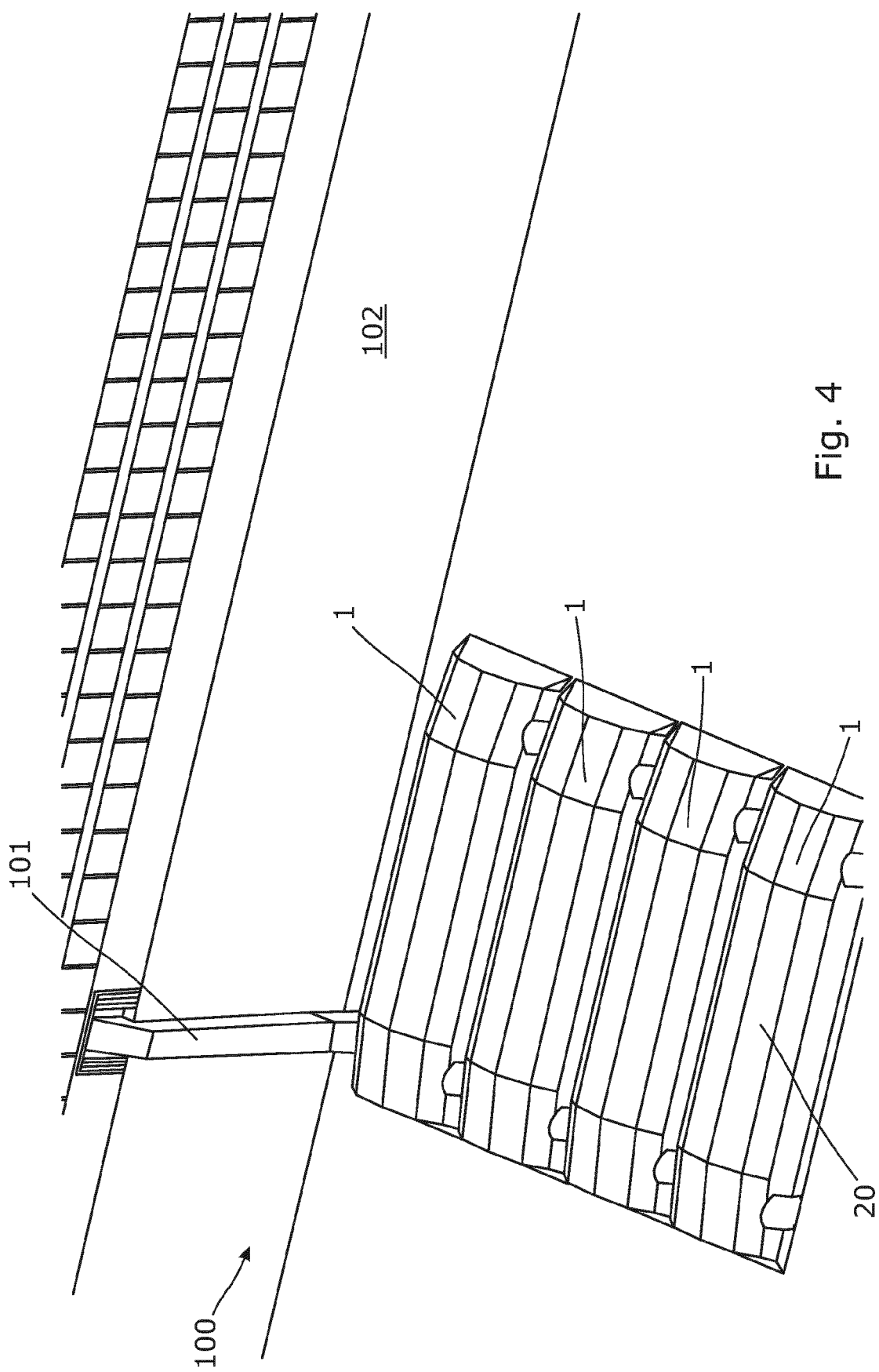


Fig. 4



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