

Description

[0001] The present invention relates to a mattress.

[0002] Inflatable mattresses and separately foam mattresses, are well known for reducing or alleviating pressure sores for persons who may be confined to a bed for example, for prolonged periods of time. However, as an underlying mattress support frame moves, such as when reconfiguring the mattress to enable an individual to move from a recumbent position to a seated position, the mattress will bend and twist and be subjected to regions of stress and compression, which affect the ability of the mattress to suitably support the individual and thus provide pressure relief.

[0003] We have now devised an improved mattress.

[0004] In accordance with the present invention, there is provided a mattress comprising a base having a lower surface and an upper surface, the mattress further comprising a frame which extends around at least a portion of a periphery of the base and which extends above the upper surface of the base to define a mattress cavity, the mattress further comprising an inflatable bladder disposed in the cavity.

[0005] In an embodiment, the mattress further comprises a cover which is arranged to extend over the cavity for retaining the bladder within the cavity. The cover may comprise a closable opening for receiving the base, frame and bladder therein. The cover further comprises a fastener, such as a zip fastener, disposed along the closable opening for opening and closing the cover. The cover may be formed of a polyurethane material.

[0006] In an embodiment, inflatable bladder comprises an inflation inlet, which may be provided with a one-way valve, for limiting the flow of a fluid, such as air, into the bladder during inflation thereof. The bladder may further comprise a pressure relief cap, which is removably insertable within the inflation inlet, to cause the valve to open to release air from within the bladder for deflating the bladder. In an embodiment, the inflation inlet is arranged to extend through the frame.

[0007] In an embodiment, the frame is disposed on the upper surface of the base. The frame is formed of a first foamed material and the base is formed of a second foamed material. Preferably, the first foamed material comprises a greater density than the second foamed material.

[0008] In an embodiment, the base comprises a rectangular shape and the frame comprises side members which extend along an upper surface of the base along at least a portion of the longitudinal sides thereof. The frame further comprises end members which extend along an upper surface on the base along at least a portion of the lateral sides thereof. In an embodiment, the side members and end members are rigidly coupled to the base, preferably upon the upper surface thereof, via an adhesive or bonding agent for example.

[0009] In an embodiment, the base comprises a plurality of upper channels formed in the upper surface. The

upper channels comprise a first set of channels which extend substantially parallel to each other and a second set of channels which extend substantially parallel to each other. Preferably, the channels of the first set are non-parallel with the channels of the second set. The channels of the second set preferably extend substantially transverse to the channels of the first set, thereby forming an intersecting lattice of channels on the upper surface.

[0010] In an embodiment, the channels of the first set are separated from each other by a first spacing and the channels of the second set are separated from each other by a second spacing. In an embodiment, the first and second spacing comprise the same spacing.

[0011] In an embodiment, the channels of the first set extend substantially parallel to a longitudinal axis of the base and the channels of the second set extend substantially parallel to a lateral axis of the base.

[0012] In an embodiment, the base further comprises a plurality of lower channels formed on the lower surface. The lower channels preferably extend substantially parallel to each other. The lower channels extend across the base, substantially parallel to a lateral axis of the base, and in an embodiment, the lower channels are localised to a first and second region of the lower surface. In an embodiment, the lower channels located within the first region are separated by a first spacing and the lower channels located within the second region are separated by a second spacing, which may be equal to the first spacing.

[0013] In an embodiment, the frame comprises a plurality of frame channels formed in an upper surface of each side member, which extend across the respective side member. The frame channels formed in each side member are preferably localised to a first and second region of the upper surface of the respective side member. In an embodiment, the frame channels formed in the first and second region of one side member are preferably aligned with the frame channels formed in the first and second region respectively, of the other side member.

[0014] In an embodiment, the number of lower channels disposed in the first region of the base is the same as the number of frame channels disposed in the first region of each side member. Similarly, the number of lower channels disposed in the second region of the base is the same as the number of frame channels disposed in the second region of each side member.

[0015] In an embodiment, the lower channels disposed in the first region are aligned substantially directly adjacent the frame channels disposed in the first region of each side member. Similarly, the lower channels disposed in the second region are aligned substantially directly adjacent the frame channels disposed in the second region of each side member. In normal use of the mattress, when positioned on a flat, horizontal support frame, the first and second regions of the frame channels are substantially vertically aligned with the first and second regions of the lower channels, respectively.

[0016] In an embodiment, the frame channels preferably extend to a depth within the respective side member, which is greater than a depth to which the lower channels extend into the base.

[0017] Whilst the invention has been described above, it extends to any inventive combination of features set out above or in the following description. Although illustrative embodiments of the invention are described in detail herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to these precise embodiments.

[0018] Furthermore, it is contemplated that a particular feature described either individually or as part of an embodiment can be combined with other individually described features, or parts of other embodiments, even if the other features and embodiments make no mention of the particular feature. Thus, the invention extends to such specific combinations not already described.

[0019] The invention may be performed in various ways, and, by way of example only, embodiments thereof will now be described, reference being made to the accompanying drawings in which:

Figure 1 is an exploded view of a mattress according to an embodiment of the present invention;

Figure 2 is a plan view of a mattress according to an embodiment of the present invention with the cover and bladder removed;

Figure 3 is a sectional view taken along line A-A in figure 2; and,

Figure 4 is a magnified view of the region of the end member shown circled in figure 4; and,

Figure 5 is a side view of a mattress illustrated in figure 2;

[0020] Referring to figure 1 of the drawings, there is illustrated an exploded view of a mattress 10 according to an embodiment of the present invention, for reducing pressure sores and the like associated with individuals which may be required to remain in a recumbent or seated position for prolonged periods. The mattress 10 comprises a base 20 having a frame 30 formed thereon which defines a cavity 40 for receiving an inflatable bladder 50. The bladder 50 is held central upon the base 20 by the frame 30, and the base 20, frame 30 and bladder 50 are enclosed within a cover 60, which may be formed of polyurethane, for example. The mattress 10 is arranged to conform with the contour of an underlying frame, such as a bed frame (not shown), to provide a suitable support for an individual. In this respect, the mattress 10 is arranged to flex as the underlying frame (not shown) moves, such as when it is desired to raise an individual from a recumbent position to a more upright position.

[0021] Referring to figure 2 of the drawings, the base

20 of the mattress 10 is formed of a foamed material and comprises a substantially rectangular shape, when viewed from above, although the skilled reader will recognise that other shapes for the base may be used without departing from the essence of the invention. The base 20 comprises an upper surface 21 and a lower surface 22 which are substantially parallel to each other. The upper surface 21 comprises a plurality of upper channels 23 formed therein which comprise a substantially square cross-sectional profile, as illustrated in figure 3 of the drawings. The upper channels 23 comprise a first set of channels 23a which extend along the length of the upper surface 21 of the base 20, substantially parallel to each other and to a longitudinal axis of the base 20, and a second set of channels 23b which extend across the width of the upper surface 21 of the base 20, substantially parallel to each other and to a lateral axis of the base 20. The channels 23a of the first set are separated from each other by a first spacing across the width of the base 20 and the channels 23b of the second set are separated from each other by a second spacing along the length of the base 20. In the illustrated embodiment, the first and second spacing's are substantially equal, such that the channels of the first and second set 23a, 23b form an intersecting lattice of channels 23 which form islands 24 on the upper surface 21 of the base 20, having a substantially square shape when viewed from above. However, the first and second spacing's may differ from each other in which case the islands 24 may take an alternative shape. Also, the spacing between adjacent channels 23a of the first set may not be consistent and as such may vary. Similarly, the spacing between adjacent channels 23b of the second set may not be consistent, and may vary.

[0022] The mattress frame 30 extends around a periphery of the base 20 and in an embodiment, the frame 30 comprises side members 31 which extend along longitudinal sides of the base 20 at each lateral end thereof, and end members 32 which extend along lateral sides of the base 20, at each longitudinal end thereof. The frame 30 is illustrated as extending around the complete periphery of the base 20, however, in an embodiment, the side members 31 and/or the end members 32 may instead extend along a portion of the respective side of the base 20.

[0023] The side and end members 31, 32 are formed of a foamed material which comprises a greater density than the foamed material of the base 20, and are rigidly bonded to the base 20 upon the upper surface 21 thereof. In an alternative embodiment however, it is envisaged that the frame 30 may instead be bonded to the base 20 along an outer periphery thereof.

[0024] The side and end members 31, 32 are bonded to the upper surface 21 of the base 20, but remain uncoupled from each other at the respective ends where the side and end members 31, 32 abut each other. The side and end members 31, 32, together with the base 20, collectively define the cavity 40 for receiving the in-

flatable bladder 50. The frame 30 ensures that the bladder 50 remains suitably positioned upon the base 20 and cannot slide off the base 20.

[0025] The inflatable bladder 50 is formed of a flexible plastics material, such as polyurethane, and comprises an outer wall 51 which defines a chamber having a shape which substantially conforms with the shape of the cavity 40 when inflated. Moreover, an upper or support surface 52 of the bladder 50 is arranged to extend substantially in a plane comprising an upper surface of the frame 30, when inflated. The bladder 50 further comprises an inflation inlet 53 comprising a conduit 54 which is arranged in fluid communication with the chamber and which extends outwardly away from the outer wall from at one longitudinal end thereof. The inflation inlet 53 is disposed proximate a corner region 54 of the bladder 50 and is arranged to extend out through an adjacent end member 32 via a slot or aperture 33 formed in the end member 32, as illustrated in figured 3 and 4 of the drawings. The inflation inlet 53 further comprises a one-way valve (not shown) for limiting the flow of a fluid, such as air, into the chamber during inflation thereof, and a pressure release cap (not shown) which is removably insertable within the inlet 53 to open the valve for deflation.

[0026] To enable the mattress 10 to contort and conform with the underlying contour of a support frame (not shown), the base 20 further comprises a plurality of lower channels 25 formed in the lower surface 22 of the base 20, as illustrated in figure 5 of the drawings. The lower channels 25 extend in a substantially parallel orientation, and substantially parallel to a lateral axis of the base 20, across the base 20. The lower channels 25 are localised to two separated regions 26a, 26b of the base 20, namely a first and second region 26a, 26b, which are separately centred at approximately one third of the length of the base 20, from each longitudinal end thereof. The lower channels 25 within the first region 26a are separated from each other by a first spacing and the lower channels 25 within the second region 26b are separated from each other by a second spacing, which is the same as the first spacing. However, the first and second spacing of the channels 25 in the first and second regions 26a, 26b may be different spacing's.

[0027] The mattress 10 further comprises a plurality of frame channels 34 formed within an upper surface 35 of each side member 31, which extend across a width of each side member 31. The frame channels 34 formed in each side member 31 extend substantially parallel to each other and to a lateral axis of the base 20. The frame channels 34 are localised to a first and second region 36a, 36b of the upper surface 35 of the respective side member 31, which are separately centred at approximately one third of the length of the base 20, from each longitudinal end thereof. The frame channels 34 disposed within the first and second region 36a, 36b of one side member 31 are aligned with the frame channels 34 disposed within the first and second region 36a, 36b respectively, of the other side member 31.

[0028] The spacing of the frame channels 34 within the first and second regions 36a, 36b forms ridges 37 in the side members 31 between each channel 34. In the illustrated embodiment, the ridges 37 comprise a curved upper region having a radius of curvature of approximately 5mm, whereas a lower region of each channel 34 comprises a curved base having a radius of curvature of approximately 5mm. The channels 34 and thus the outer sides of each ridge 37 are inclined at approximately 80° to the horizontal, such that the angular separation between adjacent sides of the channel 34 is substantially 20°. The frame channels 34 and ridges 37 formed therebetween thus form a substantially harmonically varying profile, and the pitch, namely the separation of adjacent channels 34 comprises approximately 40mm.

[0029] Similarly, the spacing of the lower channels 21 within the first and second regions 26a, 26b of the base 20 forms ridges 27 within the base 20, between each channel 25. In the illustrated embodiment, the ridges 27 comprise a flattened outer region (with respect to the base) which extends in the plane of the lower surface of the base 20, whereas an inner region (with respect to the base) of each channel 25 comprises a curved profile having a radius of curvature of approximately 10mm. The channels 25 and thus the outer sides of each ridge 27 are inclined at approximately 80° to the horizontal, such that the angular separation between the sides of adjacent channels 25 is substantially 20°, similar to the frame channels 34. The lower channels 25 thus comprise a similar profile to the frame channels 34, having a pitch of approximately 40mm. However, owing to the outer region of each ridge 27 in the lower surface 22 of the base 20 being truncated in the plane of the lower surface 22, the frame channels 34 extend to a depth into the side members 31 which is greater than the depth to which the lower channels 25 extend into the base 20.

[0030] The frame channels 34 associated with the first and second region 36a, 36b of each side member 31 are aligned substantially directly opposite the lower channels 25 associated with the first and second regions 26a, 26b of the base 20, and as such, the number of frame channels 34 equals the number of lower channels 25.

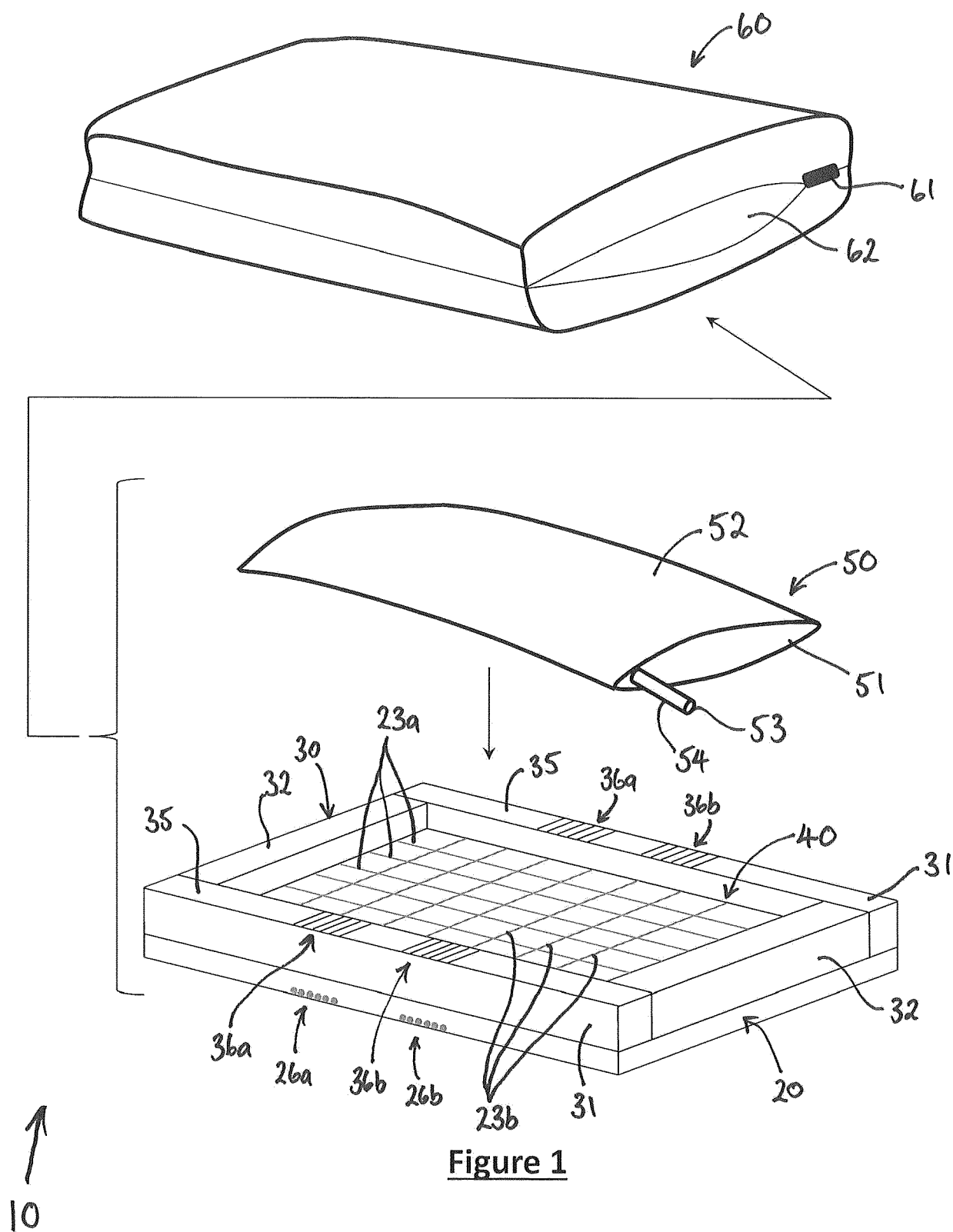
[0031] The frame channels 34, upper channels 23 and lower channels 25 permit the frame 30 and base 20 to bend and flex for example, and thus readily conform with an underlying support frame (not shown), without unduly stressing the base 20 and frame 30 material. This stress-relief maintains a suitable pressure relief across all regions of the base 20 while providing the necessary support to an individual.

[0032] In use, the bladder 50 is inflated via the inflation inlet 53 using a pump (not shown) for example, and then located within the cavity 40 formed between the frame 30 and the base 20. The conduit 54 is subsequently passed through the adjacent slot or aperture 33 formed within the end member 32 of the frame 30, and the base 20, frame 30 and bladder 50 are then positioned within the cover 60. This is achieved by opening the cover 60

using a fastener 61 which extends along a closable opening 62 of the cover 60. The fastener 61 is arranged selectively open and close the cover 60 and may comprise a zip, for example, which is arranged to extend around a periphery of the cover 60 adjacent a side of the base 20 when positioned therein. The cover 60, in combination with the frame 30, maintain a suitable positioning of the bladder 50 upon the base 20 as the mattress 10 moves with movement of the individual supported thereon, and with any movement of the underlying support frame (not shown), to maintain a suitable support and pressure relief for the individual.

Claims

1. A mattress comprising a base having a lower surface and an upper surface, the mattress further comprising a frame which extends around at least a portion of a periphery of the base and which extends above the upper surface of the base to define a mattress cavity, the mattress further comprising an inflatable bladder disposed in the cavity.
2. A mattress according to claim 1, wherein the inflatable bladder comprises an inflation inlet.
3. A mattress according to claim 2, wherein the inflation inlet comprises a one-way valve, for limiting the flow of air into the bladder.
4. A mattress according to claim 3, wherein the bladder further comprises a pressure relief cap, which is removably insertable within the inflation inlet, to cause the valve to open to release air from within the bladder for deflating the bladder.
5. A mattress according to any of claims 2 to 4, wherein the inflation inlet is arranged to extend through the frame.
6. A mattress according to any preceding claim, wherein the frame comprises side members which extend along an upper surface of the base along at least a portion of the longitudinal sides thereof, and end members which extend along an upper surface on the base along at least a portion of the lateral sides thereof.
7. A mattress according to any preceding claim, wherein the base comprises a plurality of upper channels formed in the upper surface the upper channels comprising a first set of channels which extend substantially parallel to each other and a second set of channels which extend substantially parallel to each other.
8. A mattress according to claim 7, wherein the channels of the first set are non-parallel with the channels of the second set and the channels of the second set extend substantially transverse to the channels of the first set.
9. A mattress according to claim 7 or 8, wherein the channels of the first set are separated from each other by a first spacing and the channels of the second set are separated from each other by a second spacing.
10. A mattress according to any of claims 7 to 9, wherein the channels of the first set extend substantially parallel to a longitudinal axis of the base and the channels of the second set extend substantially parallel to a lateral axis of the base.
11. A mattress according to any preceding claim, further comprising a plurality of lower channels formed on the lower surface.
12. A mattress according to claim 11, wherein the lower channels extend substantially parallel to each other.
13. A mattress according to claim 11 or 12, wherein the lower channels extend across the base, substantially parallel to a lateral axis of the base and wherein the lower channels are localised to a first and second region of the lower surface.
14. A mattress according to claim 13, wherein the lower channels located within the first region are separated by a first spacing and the lower channels located within the second region are separated by a second spacing.
15. A mattress according to any preceding claim, further comprising a plurality of frame channels formed in an upper surface of each side member, which extend across the respective side member.



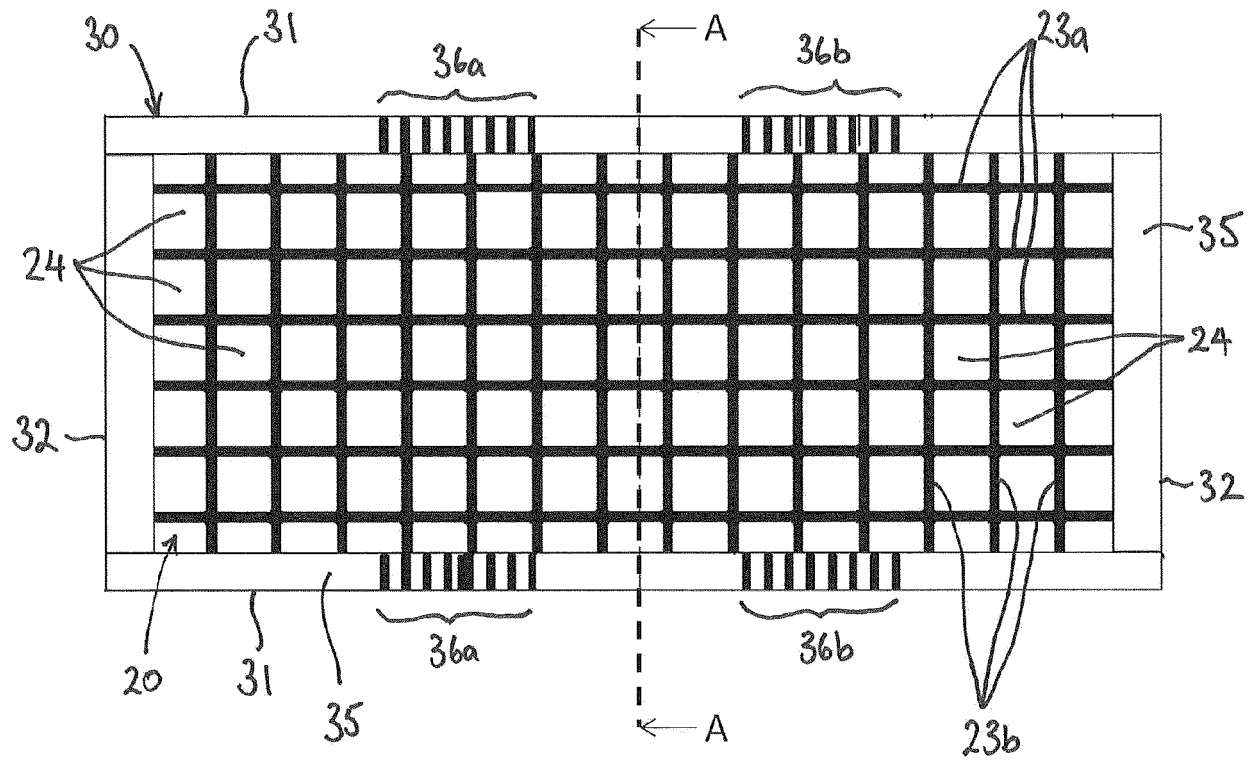


Figure 2

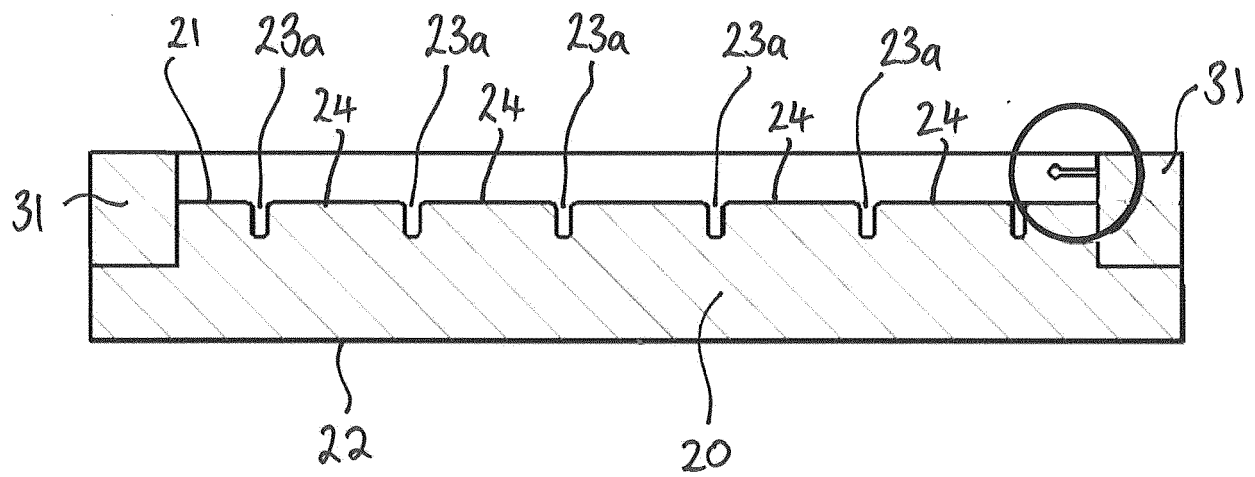


Figure 3

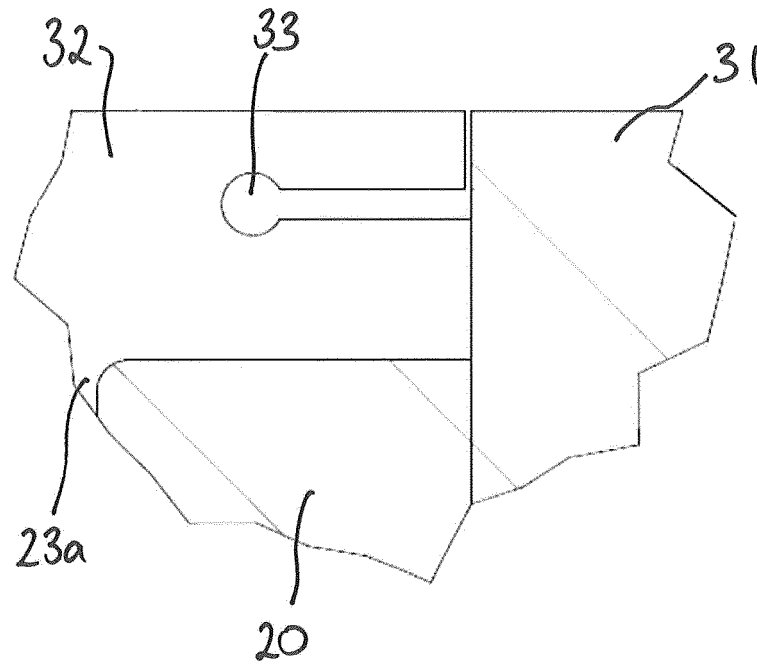


Figure 4

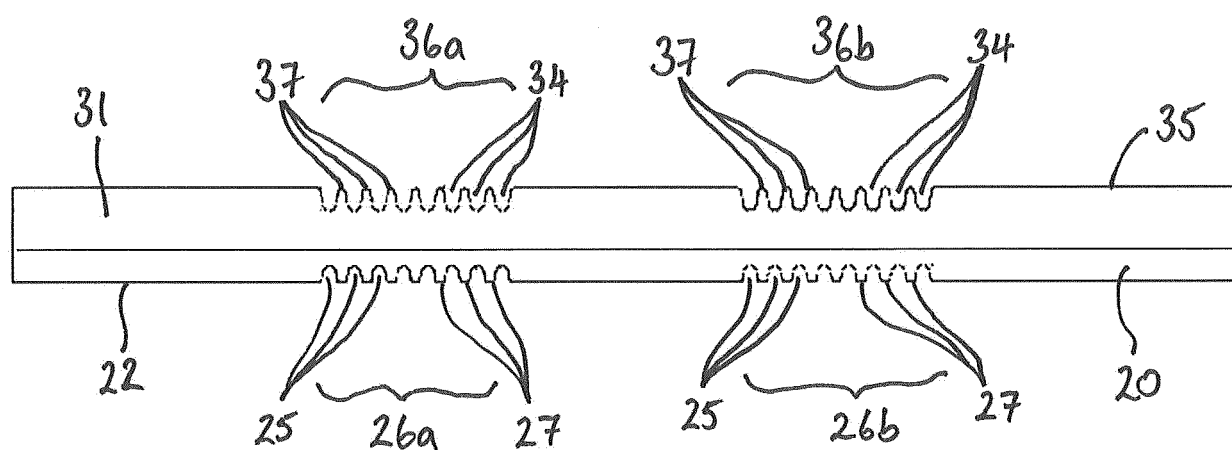


Figure 5



EUROPEAN SEARCH REPORT

 Application Number
 EP 17 18 5667

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 November 2017	Examiner Melo Sousa, Filipe
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 17 18 5667

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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