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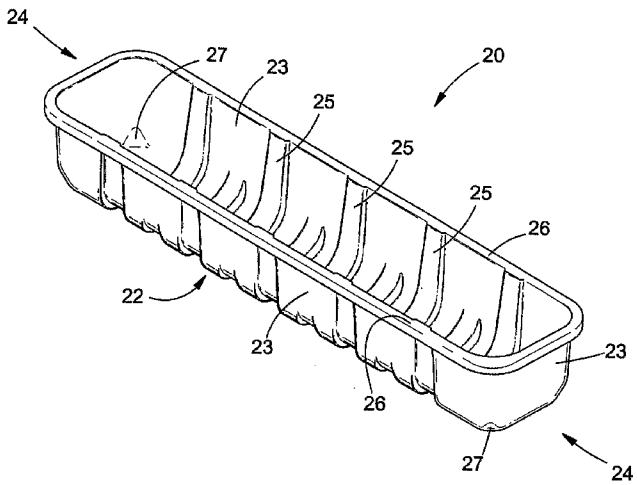
(54) Title: FLOATING PLATFORM ARRANGEMENT



(57) Abstract: The invention provides a floating platform arrangement including at least one floatation member, the floatation member comprising a base and four sides extending from the base; opposing sides of the floatation member being angularly offset relative to one another in a configuration where opposing sides diverge when viewed in cross-section, the configuration being such that a further floatation member is at least partially receivable inside the floatation member; and the floatation member including flange formations being connectable to a planar member to form an upper surface of the floating platform arrangement.

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FLOATING PLATFORM ARRANGEMENT

FIELD OF THE INVENTION

The invention relates to a floating platform arrangement, and more particularly, but not exclusively, to a floating walkway arrangement suitable for use as a jetty, a floating walkway, a working or pump platform or a pipe carrier.

BACKGOUND TO THE INVENTION

Many applications exist where it is required that a platform, such as a walkway, be provided across on an expanse of water. Typical applications include, but are not limited to, jetties commonly found at marinas, lakes and waterfront developments, walkways and pump platforms used in tailing dams, reservoirs and tanks in the mining and industrial market, and walkways serving as temporary or permanent access methods, bridges and river crossings.

The platforms and walkways known in the art usually comprise complicated civil constructions and a platform or walkway mounted atop steel, aluminium, concrete or foam structures including support members. Various other cross braces and supports are often required to provide sufficient stability to render the platform or walkway safe for human use. It will be appreciated that this type of constructed platform or walkway is often expensive to install and to maintain, difficult to erect, especially in desolate areas. It is also often not viable to reuse the crudely constructed timber or conventional platforms or walkways in a new application as cost of movement inhibits such reuse. The materials used, such as for instance gum poles, are also often not ideal for use in water, thus necessitating frequent maintenance.

OBJECT OF THE INVENTION

It is accordingly an object of the invention to provide a floating platform arrangement which would, at least partially, alleviate the abovementioned disadvantages, and/or will provide a useful alternative to existing platform assemblies. The floating structures or walkway arrangements are in particular designed to allow for cost-efficient (in freight to volume) transportation thereof to any desired location.

It is a further object of the invention to provide a floatation member for use in a floating platform arrangement, the floatation member being a useful alternative to existing hybrid floatation devices. In particular, this floatation member can be used in floating platform arrangements that are fast to assemble, strong and capable of reconfiguration.

SUMMARY OF THE INVENTION

According to the invention there is provided a floating platform arrangement including:

at least one floatation member, the floatation member comprising:

a base and four sides extending from the base;

opposing sides of the floatation member being angularly offset relative to one another in a configuration where opposing sides diverge when viewed in cross-section, the configuration being such that a further floatation member is at least partially receivable inside the floatation member; and

the floatation member including flange formations being connectable to a planar member to form an upper surface of the floating platform arrangement.

Preferably the floating platform arrangement will include at least two floatation members, and the floating platform arrangement will be divided in a plurality of platform sections, each section including two floatation members.

There is provided for upper edges of the sides of the floatation member to terminate in flange formations, the flange formations having upper faces being substantially parallel relative to the base of the floatation member. The flange formations preferably extend about the entire periphery of the floatation member so as to be substantially continuous.

Preferably, elongate protrusions protrude from the upper faces of the flange formations for use in providing a seal between the floatation member and the planar member when connected. The elongate protrusions preferably extend about the entire periphery of the flange formations so as to form a continuous ridge along the upper face of the flange formations. In a preferred embodiment there may be at least two substantially parallel continuous ridges.

There is further provided for the floatation member to include corner sections, each corner section being formed by a corner zone of the base and lower corner zones of adjacent sides, the corner sections being at least partially rounded so as to prevent the occurrence of point loads on sharp corners. Preferably, the corner zones will include at least partially planar zones.

The floatation member may include reinforcement formations in the form of ribs, the reinforcement formations extending along the surface of the floatation member. There is provided for the reinforcement formations to be integrally formed with the

floatation member, and more particularly for the reinforcement formations to be in the forms of channels that are formed in the sides of the floatation member.

There is also provided for the floating platform arrangement to include a planar member defining a platform of the floating platform arrangement, the planar member being releasably securable to the floatation member.

The planar member and the floatation member may be configured to abut when secured to one another. The planar member abuts the upper face of the flange formation of the floatation member, in order for the abutting sections to form a seal between the floatation member and the external environment in which the floating platform arrangement is to be used. The planar member abuts the elongate protrusions or ridges provided on the flange formation.

Alternatively, an elastomeric sealing member may be provided between the flange formation of the floatation member and the planar member. The sealing member may be positioned on the elongate protrusions or ridges provided on the flange formation, in order for the sealing member to be deformed about the protrusions when the planar member is forced towards the floatation member.

There is also provided for at least two floatation members to be located adjacent one another in side-by-side relationship.

The floatation members may be connectable to one another in side-by-side relationship by way of first connecting means, the first connecting means being in the form of an extrusion having end sections adapted to locate underneath the flange formation of the adjacent floatation members, and a central section adapted to be

securable to the planar member, in so doing trapping the flange formation between the end sections of the first connecting means and the planar member.

The first connecting means may comprise two discrete end sections being connectable to a discrete central section. Alternatively, the end sections and the central section may be one integral extruded unit.

In the embodiment where the end sections and the central sections are separate from one another, complimentary tongue and groove formations may be provided on an upper surface of the section and a flange formation of the end sections respectively, so as to enable the end sections to locate on the central sections.

The central section may be connected to the planar member by way of threaded connecting members. Threaded apertures for receiving the threaded connecting member may be provided in the central section of the first connecting means.

A reinforcing member may extend from the central section of the first connecting means so as to provide rigidity to the first connecting means.

There is further provided for at least two floatation members to be located adjacent one another in end-to-end relationship.

The floatation members may be connectable to one another in end-to-end relationship by way of second connection means, the second connection means having a first end being connectable to one floatation member, and a second end being connectable to an adjacent flotation member, the first end and the second end being pivotable relative to one another in order to allow the adjacent floatation members to be at least partially displaceable relative to one another.

The first end and the second end of the second connection means may be pivotable about a ball and socket joint. Alternatively, and preferably, the second connection means may be in the form of a resilient planar member such as a rubber connection strip wherein opposing sides of the connecting strip is connected to adjacent floatation members, so as to form a flexible plastic joint.

A further feature of the invention provides for a third connection means to be connectable to sides of the floatation members. The third connection means may be in the form of an extrusion having an end section adapted to locate underneath the flange formation on the floatation members, and a shoulder section, the shoulder section defining an edge of the platform or walkway. The third connection also includes a central section as described hereinbefore.

The end section, central section and shoulder section may be integrally formed, and alternatively may be three discrete sections as described hereinbefore.

A side rail may extend from the shoulder section of the connection means. Cleats may also be provided on the shoulder section.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention are described by way of non-limiting example, and with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a floatation member in accordance with the invention;

Figure 2 is a side view of the floatation member of figure 1;

Figure 3 is a cross-sectional end view of the floatation member of figure 1;

Figure 4 is an enlarged cross-sectional view of an edge zone of the floatation member of figure 3;

Figure 5 is a perspective view of a first connecting means in accordance with the invention;

Figure 6 is a perspective view of a second connecting means in accordance with the invention;

Figure 7 is a cross-sectional end view of the second connecting means of figure 6;

Figure 8 is a cross-sectional end view of the partially assembled floating platform arrangement in accordance with the invention;

Figure 9 is an enlarged cross-sectional view of a seal formed between the floatation member and the planar member;

Figure 10 shows the assembled floating member and third connecting means of figure 8 in more detail;

Figure 11 shows the assembled floating member and first connecting means of figure 8 in more detail;

Figure 12 is a side view of the second connection means connecting to adjacent floatation members;

Figure 13 is a perspective view of the floating platform arrangement in accordance with the invention, without showing the planar member forming the platform or walkway;

Figure 14 is a perspective view of the floating platform arrangement in accordance with the invention;

Figure 15 is a perspective view of the a further embodiment of the floating platform arrangement in accordance with the invention, without showing the planar member forming the platform;

Figure 16 is a perspective view of the floating platform arrangement of figure 15 with the planar member in position;

Figure 17 is a cross-sectional end view of the partially assembled floating platform arrangement in accordance with a further embodiment of the invention;

Figure 18 shows the assembled floating member and third connecting means of figure 17 in more detail; and

Figure 19 shows the assembled floating member and first connecting means of figure 17 in more detail.

DETAIL DESCRIPTION OF THE INVENTION

Referring to the drawings, in which like numerals indicate like features, a floating platform arrangement is generally indicated by reference numeral 10, and includes a plurality of floatation members 20, first connecting means 30 for connecting adjacent floatation members 20 in side-by-side relationship, second connecting means 50 for connecting adjacent floatation members 20 in end-to-end relationship, and at least one planar member 15 defining a platform or walkway.

A floatation member is shown in figures 1 and 2 and comprises a receptacle or a vessel that includes a base 22 and four sides 23 extending from the base 22. In this description the term ends will refer to the shortest sides of the floatation member 20, as indicated by reference numeral 24. Opposing sides 23 are angularly offset relative to one another, and more particularly diverge from one another when viewed in cross-section. This diverging configuration can best be seen in figure 3, and allows for a plurality of floatation members 20 to be stackable inside one another when the floatation members 20 are not in use or transported, thus reducing the volumetric storage and/or transportation requirements.

The floatation members 20 are made of a plastic, and reinforcing ribs 25 are provided in the sides 23 and base 22 of the vessel so as to provide structural rigidity. The ribs 25 are integrally formed with the vessel, and are more particularly in the form of channels formed in the sides 23 of the vessel. Corner zones 27 of the vessel is substantially planar, and acute angles and corners have as far as possible been omitted. The flat, or at least rounded, corner zones 27 prevent the presence of point loads on corners of the vessel.

The floatation member 20 also includes a continuous flange formation 26 that extends from upper edges of the sides 23 of the vessel. The flange formations 26 are substantially parallel to the base 22, and a cross-sectional view of a part of the flange formation is shown in figures 3 and 4. Elongate protrusions 28 extend from the flange formation 26. The protrusions are of elongate configuration, and extend about the periphery of the flange formation 26 so as to form two parallel, continuous ridges. These ridges aid in providing a sealing interface between the floatation members 20 and the planar members 15, as will be described in more detail below.

Typically, the floatation members 20 will have a length of either about two meters or about three meters depending on the application, and will have a width of about 0.650 meters.

In use, a plurality of floatation members 20 are located adjacent one another so as to form an elongate floating column, as is shown in figures 13 and 14. The floatation members 20 are typically positioned to form a column having a width of two floatation members 20 located side-by-side, and a length as per the particular requirement. It will be appreciated that the floatation members 20 need to be securely connected to one another in order for the floating platform or walkway to be structurally sound. First connecting means 30 is used to connect the floatation members 20 in side-by-side relationship, and second connection means 50 is used to connect adjacent floatation members 20 in end-to-end relationship.

A first connecting means 30 is shown in figure 5, and comprises an extruded structure having opposite end sections 32 and a central section 33. The end sections 32 are mirrored about an axis through the centre of the central section 33. The end sections 32 are configured and dimensioned to fit underneath the flange

formation 26 located on the floatation members 20. A reinforcing member 34 extends downwardly from the central section 33 of the first connecting means 30, and provides structural rigidity in a longitudinal direction. Additional channels 35 are provided between the end zones 32 and the central zone 33, and fulfils the twofold purpose of accommodating a skirt 29 depending from the flange formations 26, whilst also counteracting downward forces imparted on the first connection means 30 when connected to the planar member 15 and the floatation members 20, so as to minimise the moment induced about the central zone 33 of the first connecting means 30.

An alternative, and preferred, embodiment of the first connecting means is shown in figure 18. In this embodiment the end sections 32 are independent and separate from the central section 33. The end sections 32 include groove formations 91, and the central section includes tongue formations 92 to enable the end sections to engage the central section 33 and to assist in facilitating proper alignment between the end sections 32 and the central section 33.

Second connecting means 50 is shown in figure 12, and is of similar configuration and functional design as the first connecting means 30. However, the second connecting means 50 comprises two separate sections, each section having an end zone 51. The two sections, and thus the end zones 51, are pivotable relative to one another about a pivotable connection 53 in the form of a ball and socket joint. The pivotable connection forms the central zone 52 of the second connection member 50. The pivotable configuration ensures sufficient longitudinal flexibility of an elongate platform or walkway, and reduces the reactive forces exerted on the second connecting means 50.

In an alternative, and preferred, embodiment of the second connecting means 50, the second connecting means 50 comprises an elongate strip made of resilient material, such as for instance rubber. Opposing sides of the strip are then secured to adjacent ends of floatation members 20 on order to secure the floatation members 20 and to prevent displacement thereof away from one another, whilst still allowing pivoting movement between the floatation members.

In addition to the first 30 and second 50 connecting means, third connecting means 40 is provided for sealing the outer peripheries of the floatation members 20, and also to provide a side structure in the form of a kerb and possibly side rails. The third connecting means 40 is shown in figures 6 and 7, and is in the form of an extruded structure having an end section 41 and shoulder section 42. The second end section 42 is elevated relative to the first end section 41, and in use defines a kerb for the platform or walkway. Side rails (not shown) may extend from or be connected to the second end zone 42.

An alternative, and preferred, embodiment of the third connecting means 40 is shown in figure 19. In this embodiment the third connecting means comprises an end section 41, a shoulder section 42 as well as a central section 43, all being discrete parts. The central section 43 is similar to the central section 33 used in the first connecting means, and again grooves 91 and tongues 92 are provided to ensure proper alignment and securement of the end section 42 and the shoulder section 42 to the central section 43. Cleats 93 may also be secured to the shoulder sections 42, depending in the particular application of the floating platform arrangement.

The manner in which the planar member 15, the connecting means 30, 40 or 50, and the floatation member 20 are connected, is preferably the same for all the connecting means 30, 40 and 50. The respective end zones, 32, 42 and 51, are positioned

underneath the flange formations 26 extending from adjacent floatation members 30, and the planar member 15 is positioned atop the flange formations 26. The planar member 15 is subsequently secured to the connecting means, 30, 40 or 50, and the flange formations 26 are trapped between, and forced against, the end zones, 32, 42 or 51, of the connecting means, 30, 40 or 50, and the planar member 15. In this way the flanges of the floatation members are securely sandwiched between the end section of the connecting means, 30, 40 or 50, and the planar member.

Referring to figures 9, 10 and 11, a sealing member 18 may be used to provide a proper seal between the planar member 15 and the flange formation 26, as it is important that the vessel of the floatation member 20 is properly sealed of to avoid the ingress of water, which would adversely affect the buoyancy of the floatation member 20. The sealing member 18, typically made of an elastomeric material such as butile, is positioned between the flange formation 26 and the planar member 15. The sealing member 18 is in the form of an elongate strip, and overlies the protrusions 28 or ridges standing proud of the flange formations 26. When a securing force is applied, the planar member 15 and the flange formation 26 are forced towards one another, thus trapping the sealing member therebetween, and applying a compressive force thereto. Due to the nature of the materials used, a bond is formed between the sealing member 18 and the planar member 15 which is typically made of metal. However, the sealing member 18 does not form a strong bond with the flange formation 26 of the floatation member 20, due to the floatation member 20 being made of an elastomeric material. The sealing member 18 therefore deforms about the protrusions 28 so as to form an improved sealing interface.

It is foreseen that the sealing member 18 may be omitted if the planar member 15 is made from a suitable material, such as for example polyethylene. If the planar member 15 is made from such material, the planar member 15 will in itself fulfil the function of the sealing member 18 as described above. In other words, the planar member 15 and sealing member 18 may functionally be the same component. However, in the preferred embodiment a sealing member will be used, and the sealing member will be made from butyl rubber.

The planar member 15 and the connecting means 30, 40 and 50 can be secured to one another in many different ways. In one embodiment a threaded member in the form of a bolt or screw may be inserted through an aperture 60 located in the planar member, which threaded member then engages a threaded aperture (not shown) in the connecting means. In one configuration, as shown in figure 10, the threaded aperture may be in the form of an elongate channel 43 having elongate grooves (not shown) defining a thread for engaging a threaded member. The threaded member is typically in the form of a threaded bolt. The configuration of having the threaded member engaging the elongate threaded channel is advantageous in that it will be easy to orientate the aperture in the planar member relative to the channel 43, as the aperture only needs to be aligned in one degree of freedom. It will however be appreciated that the components as discussed above can be secured in many different ways, and that the above example is by no means exhaustive or limiting.

A partially assembled floating platform arrangement is shown in figure 13, and a fully assembled arrangement in figure 14. In use, a plurality of floatation members 20 are positioned in a required configuration, which will depend on the particular area and length of the required platform or walkway. Adjacent floatation members 20 are subsequently connected to one another by using the first 30, second 50 and third 40 connecting means, whilst simultaneously securing the planar member 15 to the

floatation members 20. Side rails may be added should the same be required. The side rails may be of many different configurations, and may include rigid posts with cables extending therebetween.

In this manner a platform or walkway is constructed that is easy to assemble and to disassemble, and which is structurally sound whilst still allowing sufficient flexibility to accommodate relative movement along the length of the walkway. Protection members 65, in this case in the form of rubber fenders or bumpers, are secured to the sides of the third connecting means 40. The protection members 65 are typically in the form of elongate rubber strips being substantially D-shaped when viewed in cross-section.

A further embodiment of the invention is shown in figures 15 and 16. In this embodiment floatation members 20 are located at right angles relative to one another so as to form a substantially square platform 15 having a central well provided therethrough. This configuration is typically used when a pump platform or similar arrangement is required. The platform shown in figures 15 and 16 may be used as a discrete unit, but can also be connected to the walkway arrangement shown in figures 13 and 14.

It will be appreciated that the above is only some embodiments of the invention, and that there may be many variations in detail without departing from the spirit and the scope of the invention. For instance, the floatation members may be positioned in many different configurations, and the configuration is not limited to that shown in the drawings. The configuration will typically be dependent on the required buoyancy and stability, and adjacent rows of the walkway may for instance alternate between one and two floatation members per row.

CLAIMS:

1. A floating platform arrangement including:

at least one floatation member, the floatation member including:

a base and four sides extending from the base;

opposing sides of the floatation member being angularly offset relative to one another in a configuration where opposing sides diverge when viewed in cross-section, the configuration being such that a further floatation member is at least partially receivable inside the floatation member; and

the floatation member including flange formations extending therefrom, the flange formations being connectable to a planar member that forms an upper surface of the floating platform arrangement.

2. The floating platform arrangement of claim 1 wherein upper edges of the sides of the floatation member terminate in flange formations, the flange formations having upper faces being substantially parallel relative to the base of the floatation member.

3. The floating platform arrangement of claim 1 or claim 2 wherein the flange formations extend about the entire periphery of the floatation member so as to be substantially continuous.

4. The floating platform arrangement of claim 2 wherein elongate protrusions protrude from the upper faces of the flange formations for use in providing a seal between the floatation member and the planar member when connected.

5. The floating platform arrangement of claim 4 wherein the elongate protrusions extend about the entire periphery of the flange formations so as to form a continuous ridge along the upper face of the flange formations.

6. The floating platform arrangement of claim 5 wherein at least two substantially parallel continuous ridges extends from the flange formations.

7. The floating platform arrangement of any one of the preceding claims wherein the floatation member includes a plurality of corner sections, each corner section being formed by a corner zone of the base and lower corner zones of adjacent sides, the corner sections being at least partially rounded so as to prevent the occurrence of point loads on sharp corners.

8. The floating platform arrangement of claim 7 wherein the corner sections include at least partially planar zones.

9. The floating platform arrangement of any one of the preceding claims wherein the floatation member includes reinforcement formations in the form of ribs, the reinforcement formations extending along the surface of the floatation member.

10. The floating platform arrangement of claim 9 wherein the reinforcement formations are in the form of channels being integrally formed with the floatation member.

11. The floating platform arrangement of any one of the preceding claims including a planar member defining a platform of the floating platform arrangement, the planar member being releasably securable to the floatation member.

12. The floating platform arrangement of claim 11 wherein the planar member and the floatation member are adapted to abut when secured to one another.

13. The floating platform arrangement of claim 12 wherein the planar member abuts the upper face of the flange formation of the floatation member, in order for the abutting sections to form a seal between the floatation member and the external environment in which the floating platform arrangement is to be used.

14. The floating platform arrangement of claim 13 wherein the planar member abuts the elongate protrusions or ridges provided on the flange formation.

15. The floating platform arrangement of claim 12 wherein an elastomeric sealing member is located between the flange formation of the floatation member and the planar member.

16. The floating platform arrangement of claim 15 wherein the sealing member is positioned on the elongate protrusions or ridges provided on the flange formation, in order for the sealing member to be deformed about the protrusions when the planar member is forced towards the floatation member.

17. The floating platform arrangement according to any one of the preceding claims wherein at least two floatation members are located adjacent one another in side-by-side relationship.

18. The floating platform arrangement of claim 17 wherein the floatation members are connectable to one another in side-by-side relationship by way of first connecting means, the first connecting means being in the form of an extrusion having end sections adapted to locate underneath the flange formation of the adjacent

floatation members, and a central section adapted to be securable to the planar member, in so doing trapping the flange formation between the end sections of the first connecting means and the planar member.

19. The floating platform arrangement of claim 18 wherein the first connecting means comprises two discrete end sections being connectable to a discrete central section.

20. The floating platform arrangement of claim 18 wherein the end sections and the central section of the first connecting means comprises one integral extruded unit.

21. The floating platform arrangement of claim 19 wherein complementary tongue and groove formations are provided on an upper surface of the central section and flange formations of the end sections respectively, so as to enable the end sections to locate on the central sections.

22. The floating platform arrangement of any one of claims 18 to 21 wherein the central section is connectable to the planar member by way of threaded connecting members.

23. The floating platform arrangement of claim 22 wherein threaded apertures for receiving the threaded connecting members are provided in the central section of the first connecting means.

24. The floating platform arrangement of any one of claims 18 to 23 wherein a reinforcing member extends from the central section of the first connecting means so as to provide rigidity to the first connecting means.

25. The floating platform arrangement pf any one of the preceding claims wherein at least two floatation members are located adjacent one another in end-to-end relationship.

26. The floating platform arrangement of claim 25 wherein the floatation members are connectable to one another in end-to-end relationship by way of second connection means, the second connection means having a first end being connectable to one floatation member, and a second end being connectable to an adjacent flotation member, the first end and the second end being pivotable relative to one another in order to allow the adjacent floatation members to be at least partially displaceable relative to one another.

27. The floating platform arrangement of claim 26 wherein the first end and the second end of the second connection means are pivotable about a ball and socket joint.

28. The floating platform arrangement of claim 26 wherein the second connection means are in the form of a resilient planar member wherein opposing sides of the connecting strip is connected to adjacent floatation members.

29. The floating platform arrangement of claim 28 wherein the second connection means is in the form of a rubber strip.

30. The floating platform arrangement of any one of the preceding claims wherein third connection means are connectable to sides of the floatation members.

31. The floating platform arrangement of claim 30 wherein the third connection means are in the form of an extrusion having an end section adapted to locate underneath the flange formation on the floatation members, and a shoulder section, the shoulder section defining an edge of the platform or walkway.

32. The floating platform arrangement of claim 31 wherein the third connection includes a central section.

33. The floating platform arrangement of claim 32 wherein the end section and the shoulder section is securable to the central section.

34. The floating platform arrangement of claim 32 wherein the end section, central section and shoulder section are integrally formed.

35. The floating platform arrangement of any one of claims 31 to 34 wherein side rails extend from the shoulder section.

36. The floating platform arrangement of any one of claims 31 to 35 wherein cleats extend from the shoulder section.

37. A floatation member, suitable for use in a floating platform arrangement, the floatation member including:

a base and four sides extending from the base;

opposing sides of the floatation member being angularly offset relative to one another in a configuration where opposing sides diverge when viewed in cross-section, the configuration being such that a further floatation member is at least partially receivable inside the floatation member; and

the floatation member including flange formations extending therefrom, the flange formations being connectable to a planar member that forms an upper surface of the floating platform arrangement.

38. The floatation member of claim 37 wherein upper edges of the sides of the floatation member terminate in flange formations, the flange formations having upper faces being substantially parallel relative to the base of the floatation member.

39. The floatation member of claim 37 or claim 38 wherein the flange formations extend about the entire periphery of the floatation member so as to be substantially continuous.

40. The floatation member of claim 38 wherein elongate protrusions protrude from the upper faces of the flange formations for use in providing a seal between the floatation member and the planar member when connected.

41. The floatation member of claim 40 wherein the elongate protrusions extend about the entire periphery of the flange formations so as to form a continuous ridge along the upper face of the flange formations.

42. The floatation member of claim 41 wherein at least two substantially parallel continuous ridges extends from the flange formations.

43. The floatation member of any one of claims 37 to 43 including a plurality of corner sections, each corner section being formed by a corner zone of the base and lower corner zones of adjacent sides, the corner sections being at least partially rounded so as to prevent the occurrence of point loads on sharp corners.

44. The floatation member of claim 43 wherein the corner sections include at least partially planar zones.

45. The floatation member of any one of claims 37 to 44 including reinforcement formations in the form of ribs, the reinforcement formations extending along the surface of the floatation member.

46. The floatation member of claim 45 wherein the reinforcement formations are in the form of channels being integrally formed with the floatation member.

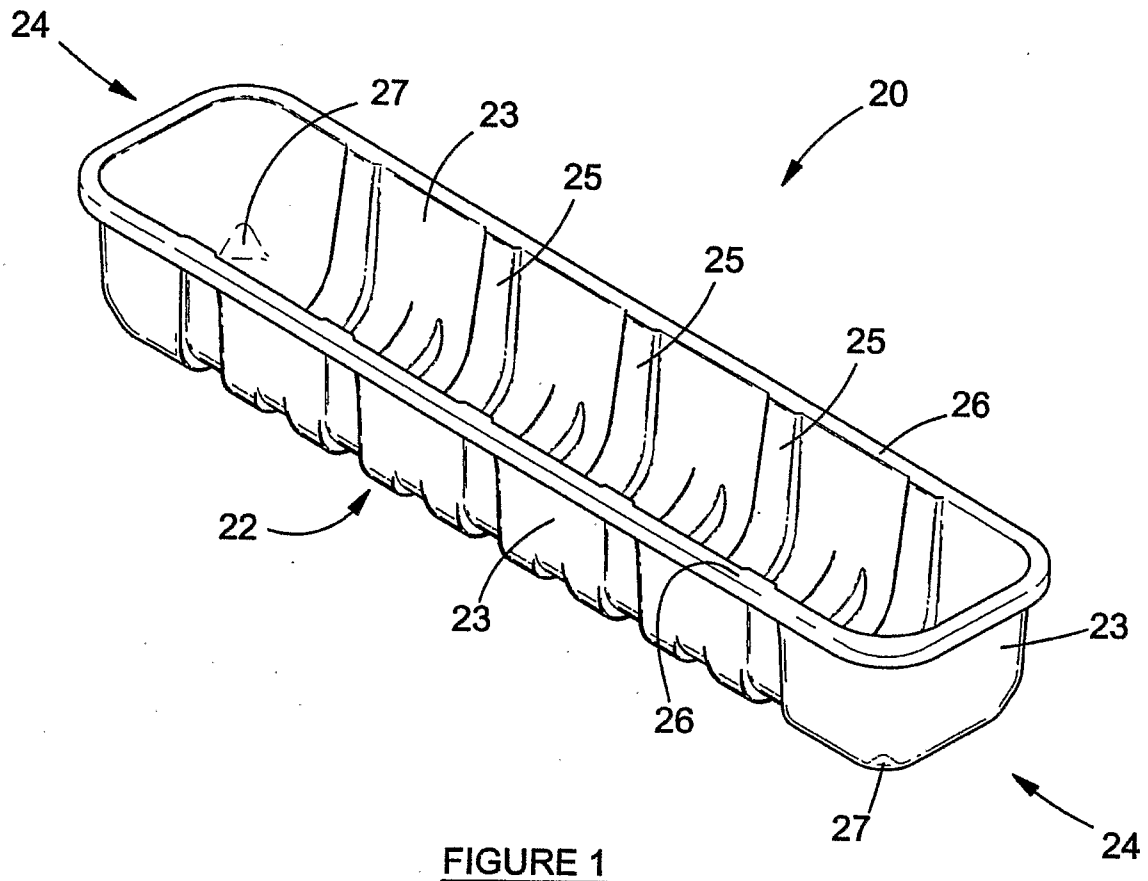

FIGURE 1

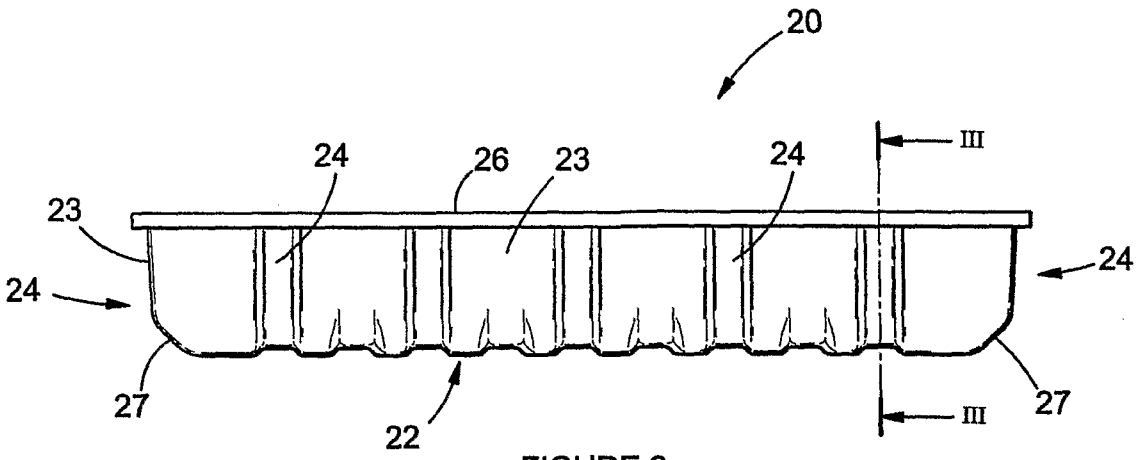

FIGURE 2

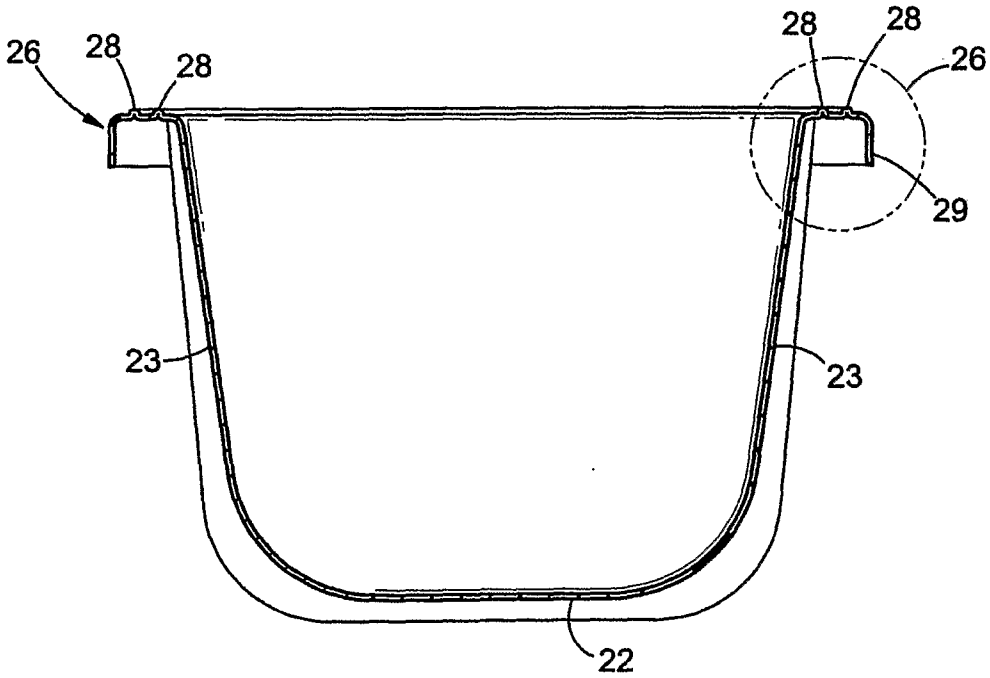

FIGURE 3

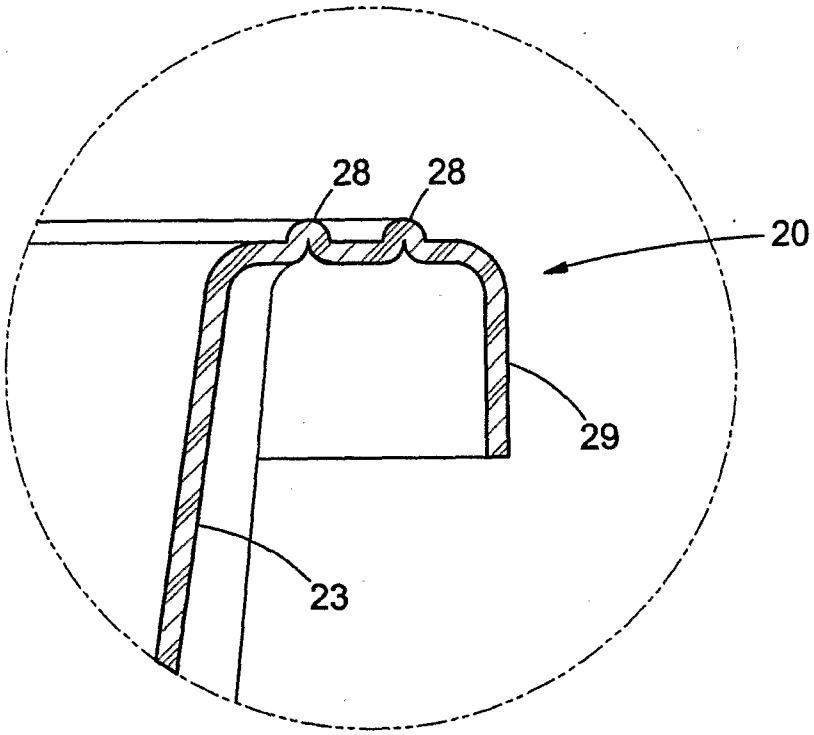

FIGURE 4

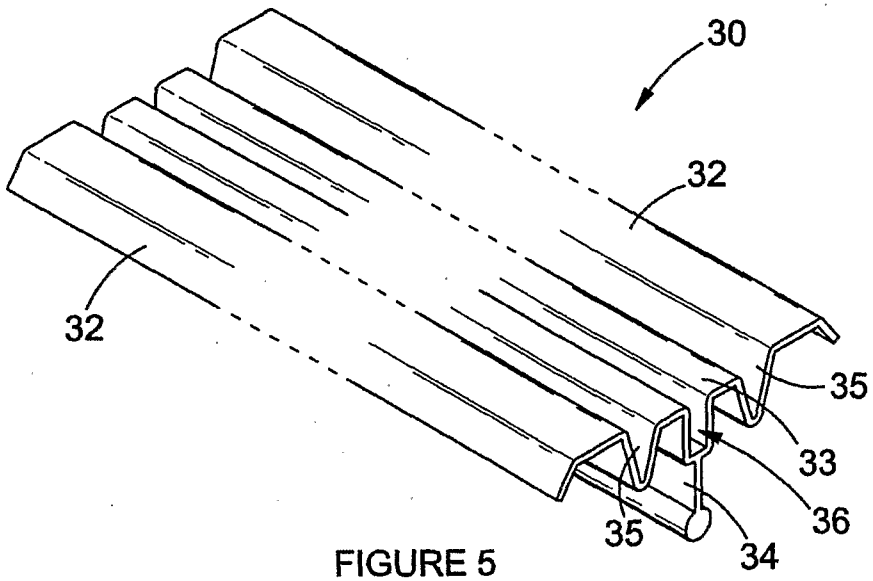

FIGURE 5

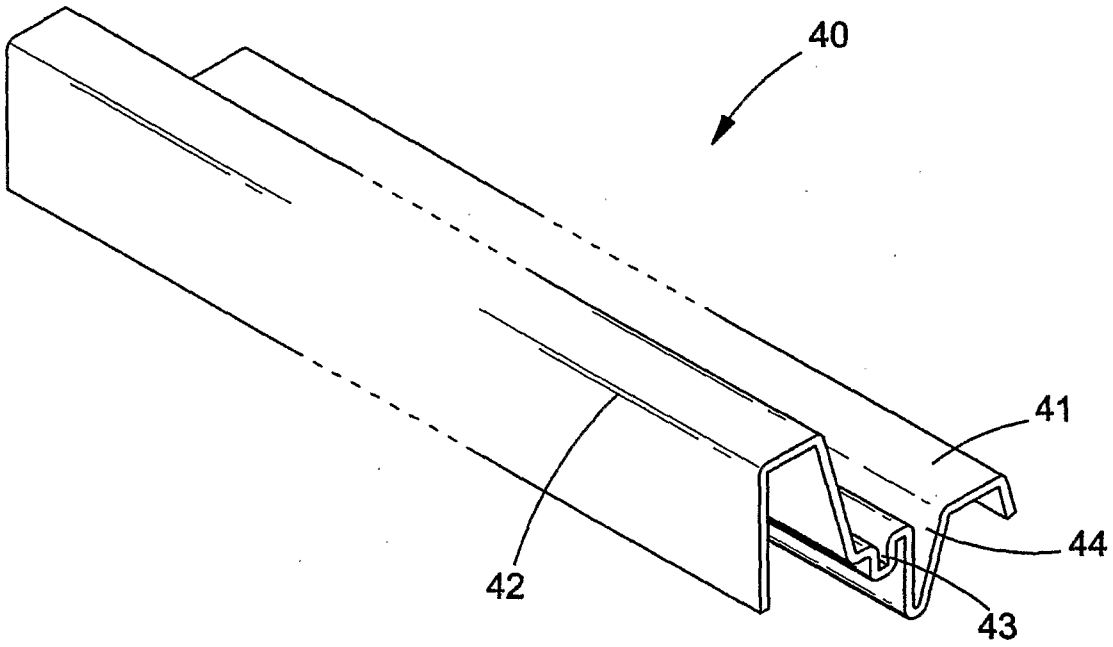

FIGURE 6

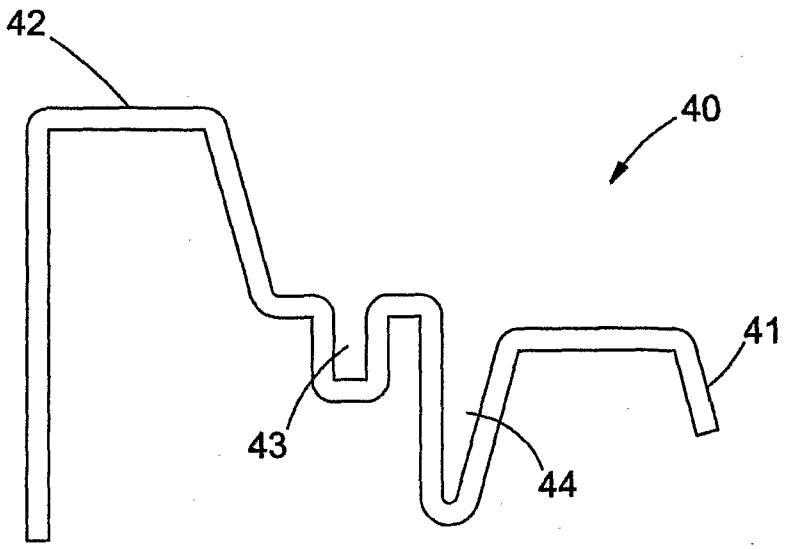

FIGURE 7

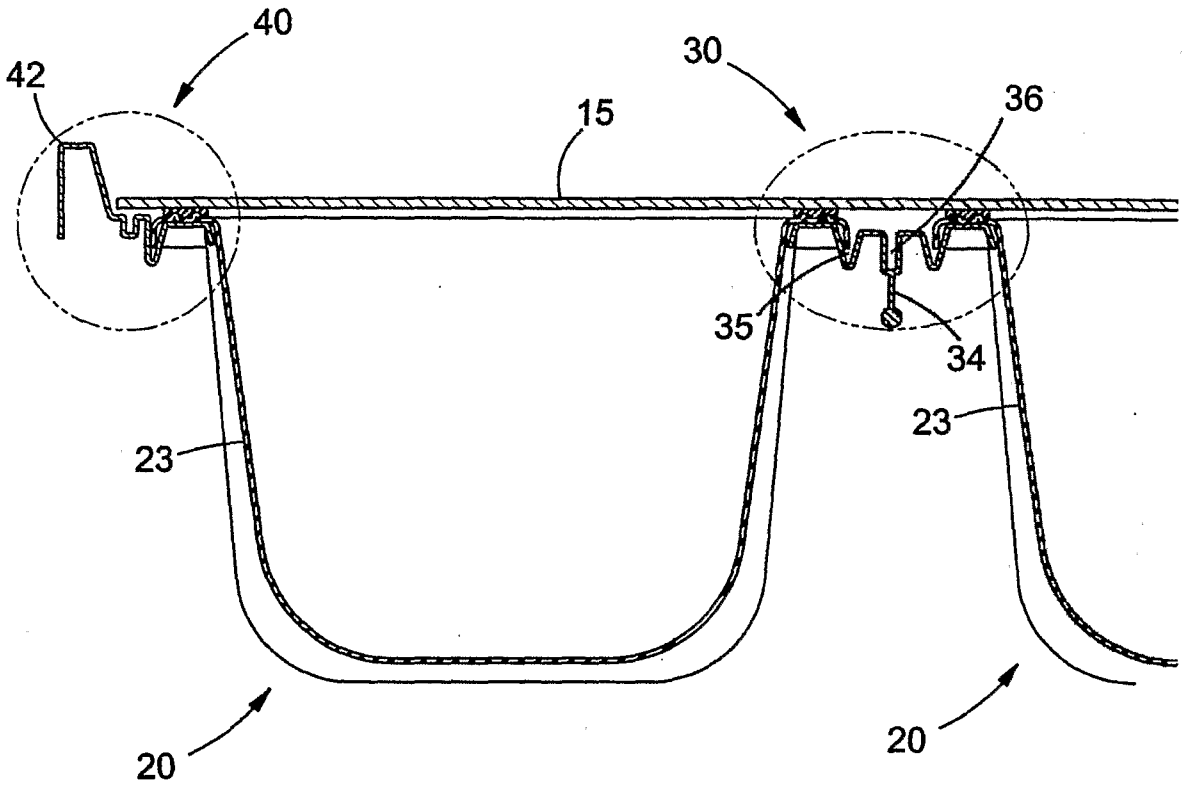

FIGURE 8

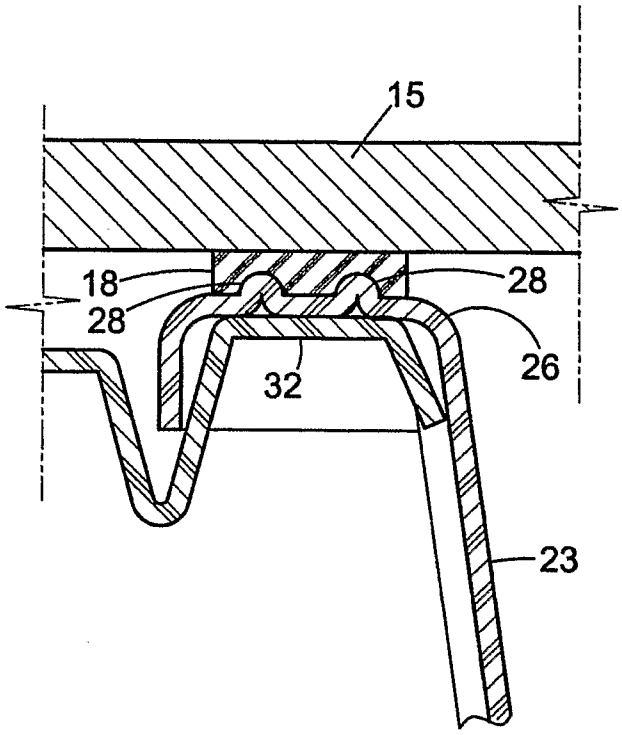

FIGURE 9

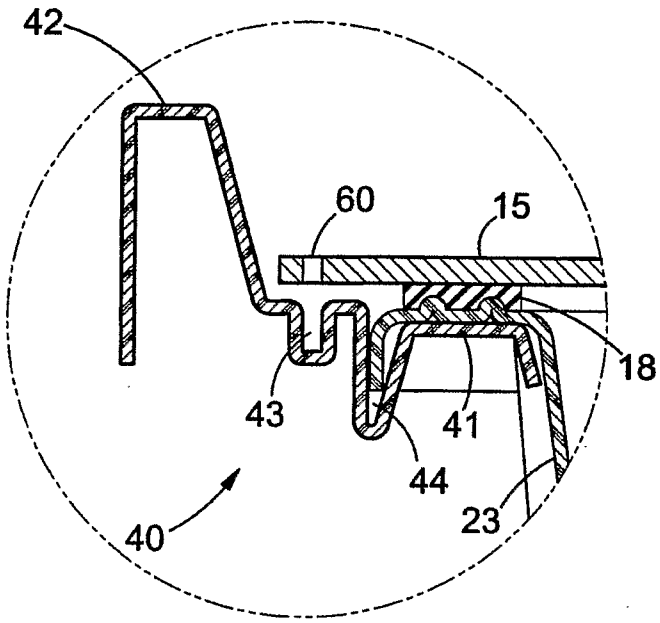

FIGURE 10

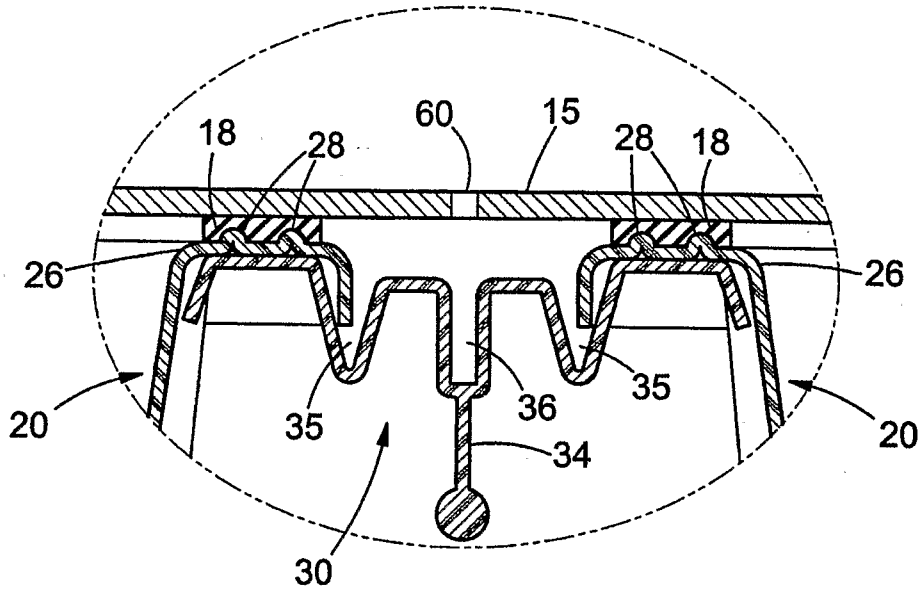

FIGURE 11

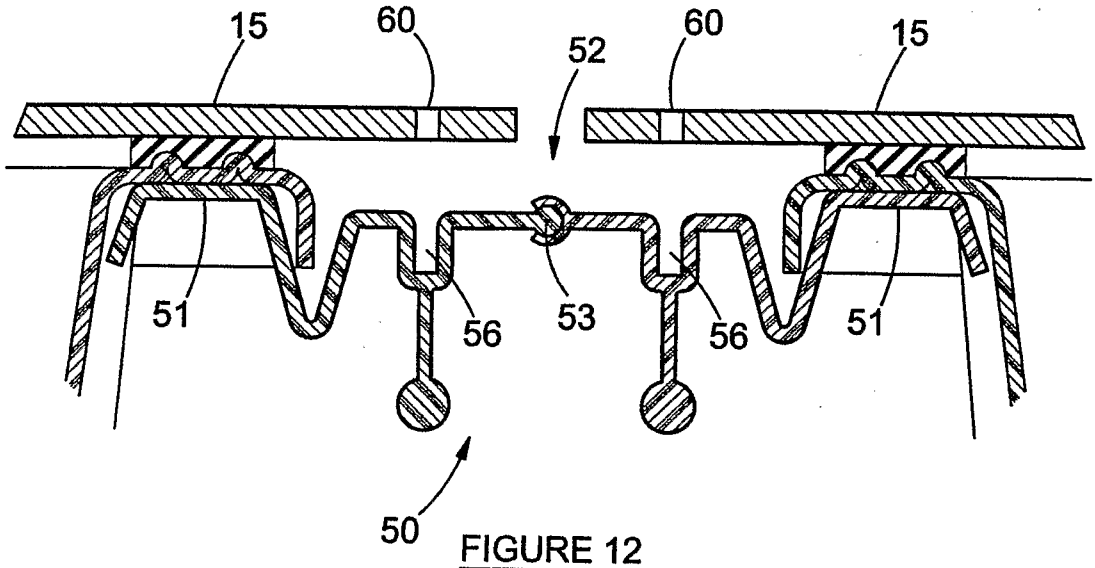

FIGURE 12

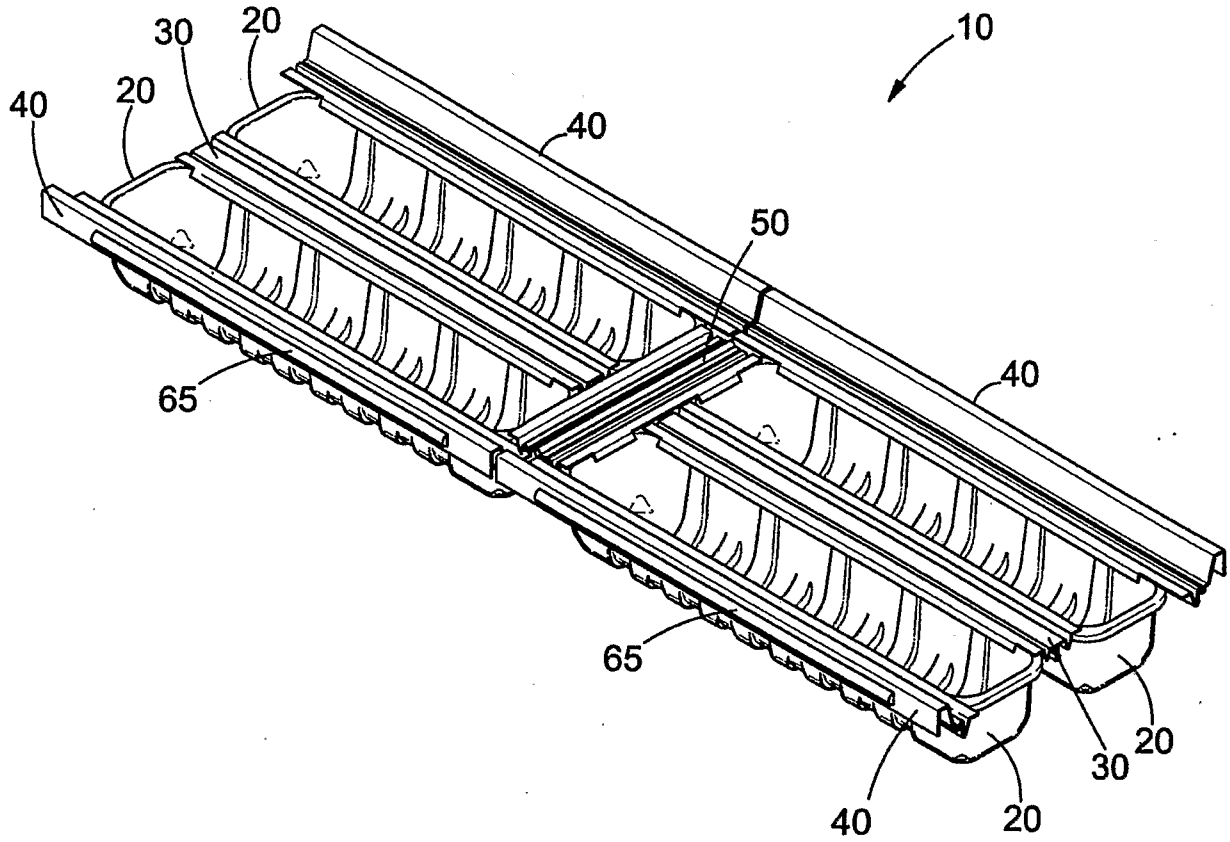

FIGURE 13

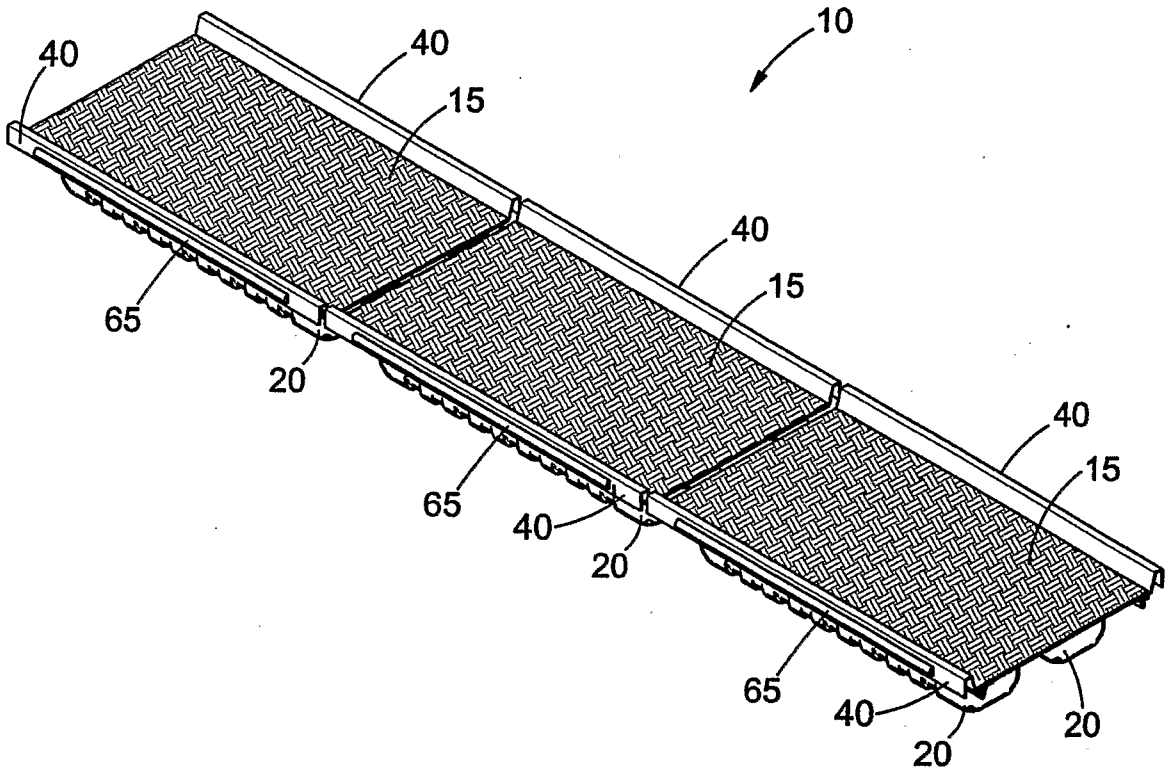

FIGURE 14

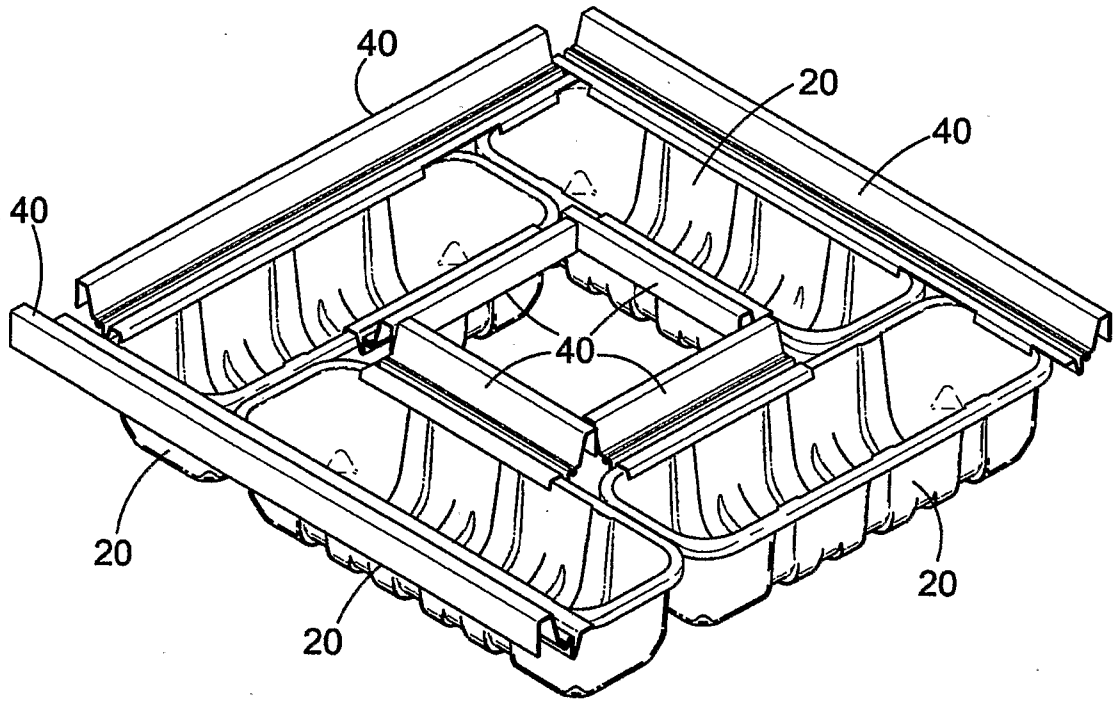

FIGURE 15

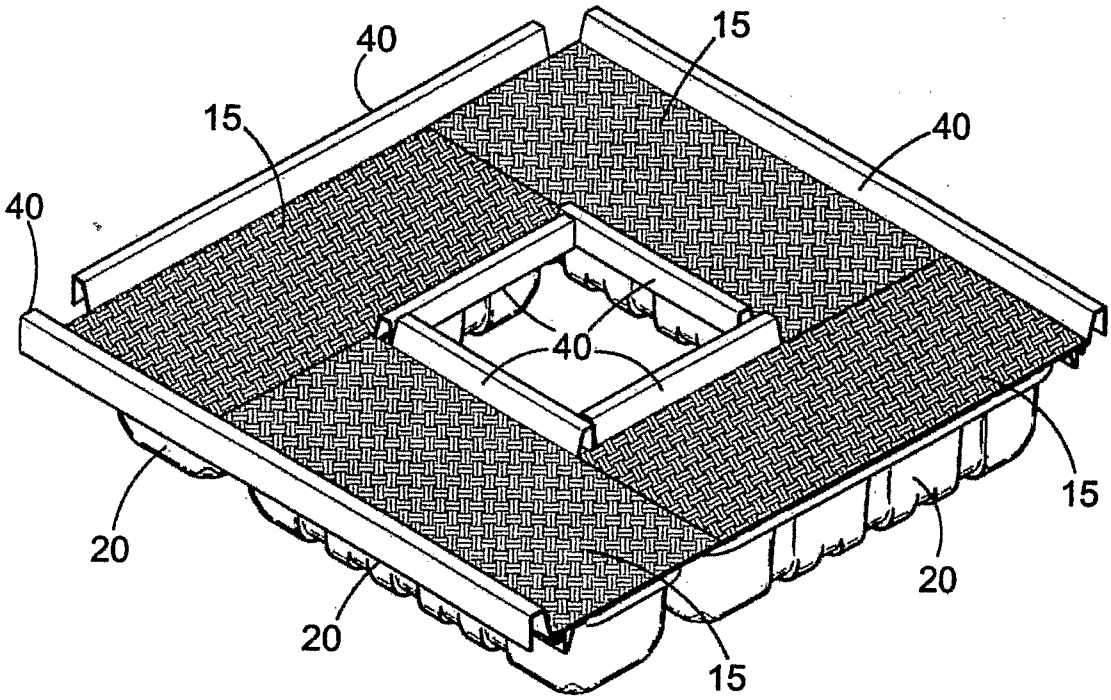

FIGURE 16

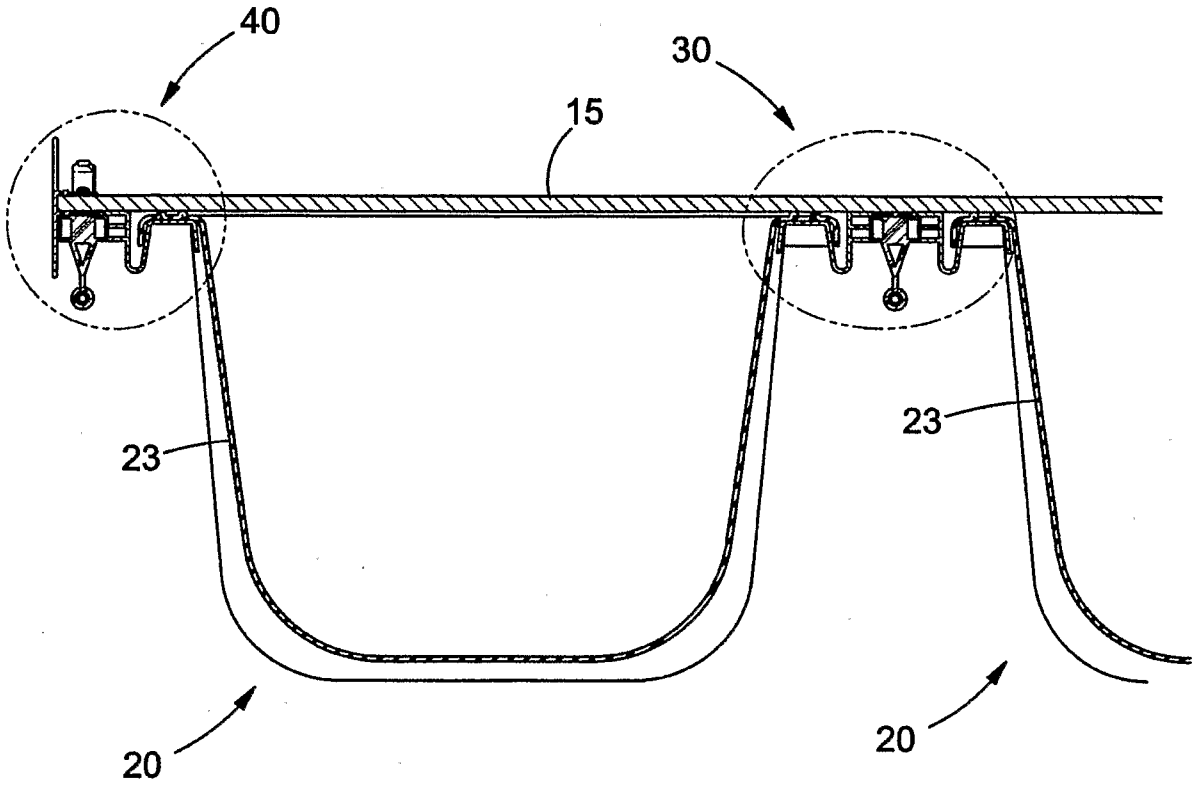

FIGURE 17

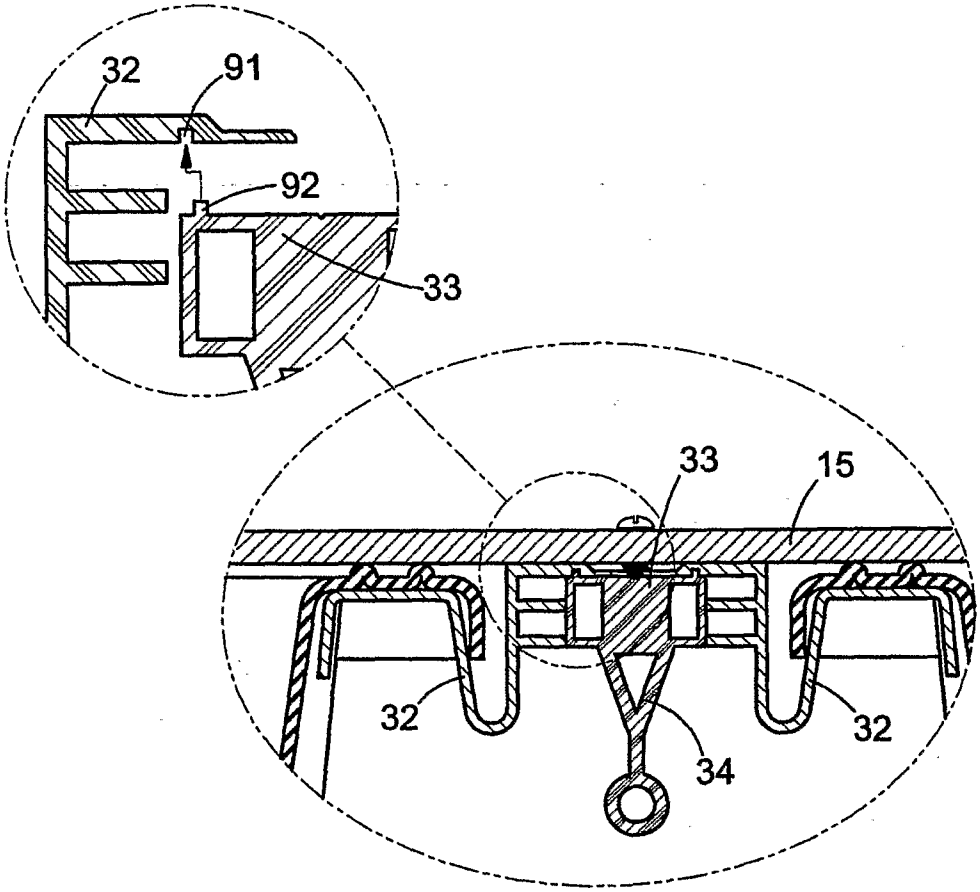

FIGURE 18

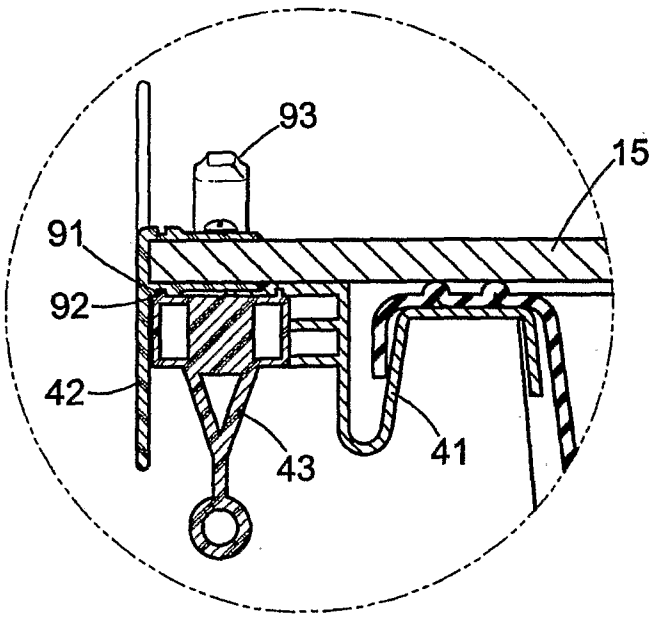

FIGURE 19