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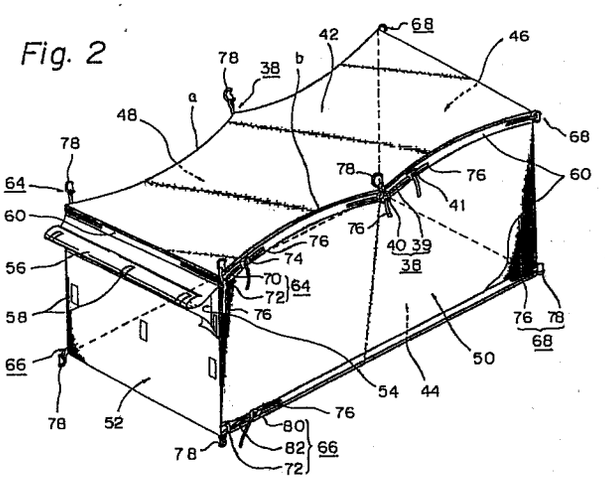
(54) Container liner.

(57) A container liner includes an upper wall (42), a bottom wall (44), a rear wall (46), side walls (48 and 50), and a front wall (52) to form a substantial hexahedron and mounting arrangements (38, 64, 66, 68) provided at least on edges of the upper wall (42) for connecting the liner to inner walls of a container. At least one mounting arrangements (38) is provided along at least one edge (a, b) of the upper wall (42) between the mounting arrangements provided at the ends of said edge (a, b). Parts of the edge (a, b) between the adjacent mounting arrangements (64, 38; 38, 68) along the edge are concave inwardly of the upper wall (42) viewed in a plan view. Slack of the upper wall (42) can be considerably reduced or can be mostly eliminated to prevent water from accumulating on the upper wall (42) of a long liner. As a result, the liner can substantially completely avoid water from entering the liner through the upper wall (42) and prevent goods from being splashed by the water when the goods are being discharged from the liner in a dump-up position.

Fig. 2



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Description

CONTAINER LINER

The invention relates to a container liner for use in transportation.

Containers have been widely used in transporting facilities such as ships, railway trains and lorries for transporting bulk goods such as corn, food, raw materials for industries and industrial goods. In such transportation with containers, goods are often accommodated in liners within containers so as to avoid contamination of goods subsequently carried in the containers by the smell of goods previously accommodated in the containers.

Various kinds of liners for containers have been proposed. For example, Japanese Laid-open Utility Model Application No. 62-8988 disclosed a container liner capable of preventing slack of an upper wall of the liner. One example of such a liner will be briefly explained hereinafter.

Figure 1 of the accompanying drawings is a schematic plan view of a liner of previously proposed kind comprising an upper wall 10, a bottom wall (not shown), a rear wall 12, side walls 14 and 16 and a front wall 18 to form a substantial hexahedron. The liner further comprises, although not shown, mounting arrangements provided along edges of the hexahedron, for example, hook-like hangers, and charging and discharging openings provided at determined locations of the hexahedron.

Reference numerals 20 and 22 denote an edge of the upper wall 10 connecting with the side wall 14 and an edge of the upper wall 10 connecting with the side wall 16, respectively. In this example, the edges 20 and 22 are in the form of arcs of a circle having apexes at the mid-position of the edges 20 and 22 of the upper wall 10. Moreover, the edges 20 and 22 curve toward one another. In this manner, slack occurring at the middle of the upper wall 10 is prevented.

In transporting goods in containers, dew is often deposited to form water droplets on inner walls of the container and outer surfaces of liners thereof, and rainwater and seawater may enter the containers. As a result, if there is slack of the upper wall 10, the water tends to accumulate in the slack. However, the illustrated liner does not have slack in the upper wall so that water does not accumulate on the upper wall 10. Accordingly, when the container is tilted into a dump-up position for discharging the goods therein, the goods, for example, corn or chemical medicines are not contaminated by the water. Such a contamination of the goods would be caused by water flowing along the outer surfaces of the liner to splash over the discharging goods or by the water directly entering the liner through the upper wall.

With this hitherto used liner, the slack of the upper wall is prevented by bending at least one edge of the upper wall connecting with one side wall into a convex or circular arc shape toward the other edge of the upper wall connecting with the other side wall as above described.

In the case of a short liner of previously proposed kind, for example, for a 6 metre (20 feet) container, the slack in the upper wall is effectively prevented because the edges of the upper wall of the liner are sufficiently short. In case of a long liner, for example for a 12 metre (40 feet) container, however, the slack of the upper wall could not be prevented sufficiently because the long edges of the upper wall of the liner tends to increase the likelihood that slack will occur.

In case of such a long liner, moreover, there are often provided a plurality of mounting arrangements on bendable edges of the upper wall in order to distribute as uniformly as possible the load from the accommodated goods, which load increases for long or large liners. However, as these mounting arrangements are provided along the bendable edges, it is difficult to extend the upper wall uniformly and therefore it is more difficult to ensure that there is no slack in the upper wall of the liner. A plurality of the mounting arrangements provided along bendable edges are indicated by dotted circles in Figure 1.

According to the invention there is provided a container liner including an upper wall, a bottom wall, a rear wall, side walls and a front wall to form a substantial hexahedron and having mounting arrangements provided at least on a side of the upper wall for connecting the liner to inner walls of a container, characterised in that at least one mounting arrangement is provided intermediate the ends of at least one edge of the upper wall between the mounting arrangements provided at the ends of said one edge, and parts of said one edge between the adjacent mounting arrangements along said one edge are concave inwardly of the upper wall viewed in a plan view of the upper wall.

In such a liner slack in the upper wall can be avoided even if it is a long liner.

The parts of the edge are preferably arcuate but the concave parts may consist of segments of straight lines.

Edges of the upper wall extending substantially perpendicular to the edge provided with the mounting arrangements may be also concave inwardly of the upper wall viewed in the plan view of the upper wall.

With such a construction of liner for a container, at least one edge of the upper wall of the liner is provided with a plurality of mounting arrangements and parts of the edge between the adjacent mounting arrangements are concave inwardly of the upper wall. Accordingly, at least one edge of the upper wall has a plurality of concave parts so that the slack of the upper wall can be considerably reduced in comparison with the prior art or the slack can be effectively prevented, even if a long liner is hung and extended in a long container.

With the concave parts of the edge between the adjacent mounting arrangements, the upper surface can be tensioned more uniformly than in the prior art, so that the slack of the long liner is reduced or prevented more effectively than in the prior art.

The invention is diagrammatically illustrated by

way of example with reference to the accompanying drawings, in which:-

Figure 1 is a schematic plan view illustrating a container liner of previously proposed kind;

Figure 2 is a schematic perspective view illustrating a first embodiment of a container liner according to the invention;

Figure 3 is a schematic plan view of the liner of the first embodiment of the invention; and

Figure 4 is a schematic plan view illustrating a second embodiment of a container liner according to the invention.

Referring to Figure 2, a container liner comprises mainly an upper wall 42, a bottom wall 44, a rear wall 46, side walls 48 and 50 and a front wall 52 to form a substantial hexahedron.

The liner is provided with an opening 54 at an upper portion of the front wall 52 for charging or discharging goods and with a cover member 56 extending from a location above the opening 54 for opening and closing the opening 54.

Reference numeral 58 denotes fastening members, for example, surface fasteners. An extending end of the cover member 56 can be anchored to a middle portion of the front surface 52 by means of the fastening members 58 to close the opening 54. When the goods, for example, corn such as barleycorn for beer, are discharged from the liner in a dump-up position, the lower portion of the front wall 52 may be formed with an opening by slashing part of the lower portion with a knife to discharge the corn through the opening.

Reference numerals 60 indicate reinforcing cloth strips provided along edges of the liner to reinforce them.

Reference numberals 38, 64, 66 and 68 denote mounting arrangements whereby the liner can be mounted on inner walls of a container. In this embodiment, the mounting arrangements 64 are provided at the two upper corners of the front wall 52 of the liner, the mounting arrangements 66 are provided at the two lower corners of the front wall 52 of the liner and the mounting arrangements 68 are provided at the four corners of the rear wall 46 of the liner. The mounting arrangements 38 are provided substantially at mid positions along edges a and b of the upper wall 42 which join to edges of the side wall 48 and 50 respectively. In this manner, the liner has the mounting arrangements 64, 38 and 68 along the edges a and b in order from the front wall 52 to the rear wall 46.

As can be seen in Figures 2 and 3, parts of the edges a and b between the adjacent mounting arrangements 64 and 38 and between the adjacent mounting arrangements 38 and 68 are curved concave inwardly of the upper wall 42 as viewed in the plan view. The concave edges are preferably substantially circular arcuate. However, the concave edges may be of the other shapes, for example, comprising segments of straight lines. In order to prevent slack in the upper wall 42 effectively, it is preferable to concave both the edges a and b inwardly. However, if desired, only one of the edges a and b may be concave. The mounting arrangements 38, 64 and 68 are indicated by solid line circles in Figure 3.

Any suitable constructions of the mounting arrangements 64, 66, 68 and 38 are acceptable. In the embodiment, for example, the mounting arrangements 64 are case hanging devices of a kind previously proposed by the applicant.

As shown in Figure 2, each mounting arrangement 64 comprises a strap 70 with one end fixed to one face of one corner of the liner and the other end anchored to a buckle 74 provided on another face of said one corner of the liner, and a ring 72 provided at the corner. In the illustrated embodiment, the ring 72 is fixed to the corner with the aid of a further strap 76, and the buckle 74 is fixed to the corner by means of a further strap 76.

Part of the strap 70 between the fixed and free ends passes through the ring 72 to form a loop. The loop is connected to an attaching portion (not shown) of an inner wall of a container by means of a C-shaped mounting ring 78.

The mounting arrangement 64 allows the loop to be adjusted to smaller sizes by pulling on the free end of the strap 70. Therefore, when the loop of the strap 70 is made smaller, the corners of the liner are attracted to the inner walls of the container to tension the liner.

The buckle 74 in this embodiment is provided with a stopper which is inoperative, that is to say it does not anchor the free end of the strap 70, when the free end is pulled in a direction making the loop smaller, but is operative to anchor the free end when the strap is subjected to a force in a direction opposite to the direction making the loop smaller. As a result, the loop in the smaller size is held to its size by the buckle 74 with the stopper, so that the liner is maintained tensioned.

Each mounting arrangement 66 comprises a ring 72 provided at the respective corner of the liner, and a strap 82 with one end fixed to a face of the corner and the other end anchored by a buckle 80 also provided on said face. The ring 72 is fixed to the corner through the strap 60, and the buckle 80 is fixed to said face through a further strap 76.

In each mounting arrangement 66, part of the strap 82 passes through the ring 72 to form a loop in the same manner as in the mounting arrangement 64. In hanging and extending the liner in a container, therefore, the loop is connected to an attaching portion of an inner wall of a container with the aid of a mounting ring 78. When the loop of the strap 82 is made smaller it pulls the liner toward the inner walls of the container to tension the liner in the container. The buckle 80 is also provided with a stopper similar to that of the buckle 74, thereby maintaining the liner in a tensioned condition.

The mounting arrangement 68 comprises a strap 84 fixed to one face of a respective corner of the liner, and a mounting ring 78 fixed to the strap 84. In hanging and extending the liner in a container, the mounting ring 78 of the mounting arrangement 68 is connected to an attaching portion on an inner wall of the container.

Each mounting arrangement 38 comprises a strap 39 with one end fixed to the respective edge of the liner and the other end anchored by a buckle 41 also

provided on said edge, and a ring 40 provided on said edge between the buckle 41 and the fixed end of the strap 39. The buckle 41 is fixed to the edge through a further strap 76 and the ring 40 is fixed to said edge through a further strap 76 between the buckle 41 and the fixed end of the strap 39.

In each mounting arrangement 38, a loop of the strap 39 is formed with the aid of the ring 40 in the same manner as in the mounting arrangement 64. In hanging and extending the liner in a container, therefore, the loop is connected through a mounting ring 78 to an attaching portion of an inner wall of the container. By making the loop of the strap 39 smaller the ring 40 is pulled toward the inner wall of the container so as to tension the liner in the container. The buckle 41 is also provided with a stopper similar to that of the buckle 74, so that the liner can be maintained in the tensioned condition.

If desired, in the mounting arrangements 38, 64 and 66, the loops of the straps 39, 70 and 82 may be directly connected to the attaching portions of the inner walls of a container without using the mounting rings 78.

The operations of hanging and extending the liners in a container will be explained by way of example.

First, the mounting arrangements 68 provided at the four corners of the rear wall 46 and the mounting arrangements 38 provided at the edges a and b are connected to the inner walls of the container. Then, the upper wall 42 of the container is partially tensioned by means of the mounting arrangements 38 so that the concave parts of the edges a and b between the mounting arrangements 38 and 68 become substantially straight in their longitudinal directions, thereby eliminating slack of the part of the upper wall 42 between such substantially straight edges.

Thereafter, the mounting arrangements 64 provided at the two upper corners of the front wall 52 of the liner are connected to the inner walls of the container. Then the upper wall 42 is partially tensioned by means of the mounting arrangements 64 so that the concave parts of the edges a and b between the mounting arrangements 38 and 64 become substantially straight in their longitudinal directions, thereby eliminating slack of the part of the upper wall 42 between such substantially straight edges.

Then, the mounting arrangements 66 provided at the two lower corners of the front wall 52 are connected to the inner walls of the container and then the bottom wall 44 is tensioned by means of the mounting arrangements 66. The hanging and extending of the inner bag in the container is then complete.

The upper wall 42 of the liner comprises a plurality of concave portions along the edges a and b, so that even if the liner so hung and extended is long, slack of the upper wall is effectively prevented. Moreover, the parts of the edges a and b are concave inwardly between the mounting arrangements 64 and 38 and between the mounting arrangements 38 and 68, so that the upper wall 42 is more uniformly tensioned in comparison with prior proposals.

Figure 4 is a plan view, illustrating a second embodiment of the invention. In Figure 4, like components are designated by the same reference numerals as those in Figure 3 and will not be described in further detail.

The second embodiment differs from the first embodiment in the configuration of the upper wall, and the number and positional relation of mounting arrangements.

In the second embodiment, two mounting arrangements 38 are provided on each of the edges a and b between the mounting arrangements 64 and 68. The mounting arrangements 64, 38, 38 and 68 are arranged spaced apart from each other. As viewed in the plan view of the upper wall 42, parts of the edges a and b between the mounting arrangements 64 and 38, between the mounting arrangements 38 and 38 between the mounting arrangements 38 and 68 are concave inwardly of the upper wall 42. Moreover, edges c and d of the upper wall at the edges joining with the front and rear walls 52, 46, are also concave inwardly of the upper wall 42 as viewed in the plan view of the upper wall.

The liner of the second embodiment can bring about the same significant effects as those of the first embodiment.

It is most preferable to make the upper wall from a single cloth-like member. However, it may be formed by a plurality of panels by, for example, sewing or welding together these panels. In forming the upper wall from the plurality of panels, the jointed panels are preferably sealed watertightly and subjected to waterproofing treatment.

Claims

1. A container liner including an upper wall (42), a bottom wall (44), a rear wall (46), side walls (48 and 50) and a front wall (52) to form a substantial hexahedron and having mounting arrangements (64, 66, 68) provided at least on a side of the upper wall (42) for connecting the liner to inner walls of a container, characterised in that at least one mounting arrangement (38) is provided intermediate the ends of at least one edge (a, b) of the upper wall (42) between the mounting arrangements (64, 68) provided at the ends of said one edge (a, b), and parts of said one edge (a,b) between the adjacent mounting arrangements (64, 38, 68) along said one edge (a, b) are concave inwardly of the upper wall (42) viewed in a plan view of the upper wall (42).

2. A container liner according to claim 1, wherein the concave parts of the edge (a, b) are arcuate.

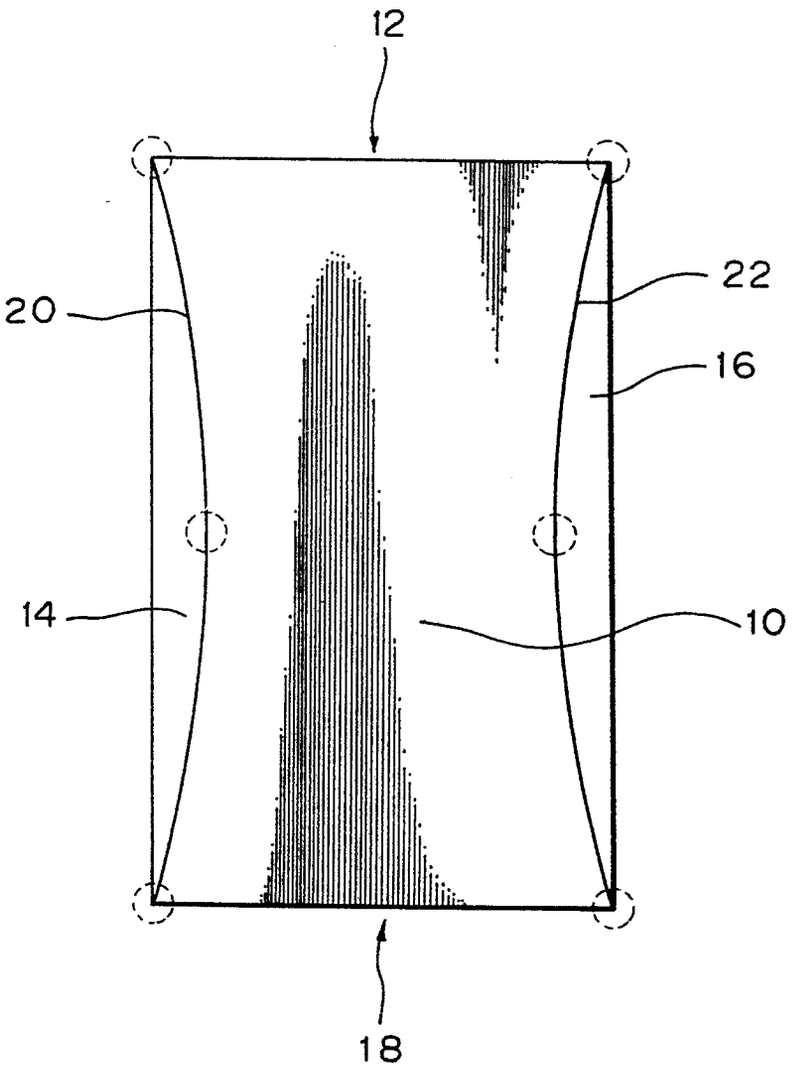
3. A container liner according to claim 1, wherein the concave parts of the edge (a, b) comprise segments of straight line to form concave parts.

4. A container liner according to claim 1, wherein two mounting arrangements (38) are provided along said at least one edge (a, b) of the upper wall (42) between the mounting

arrangements (64, 68) provided at the ends of said one edge (a, b).

5. A container liner according to claim 1, wherein edges (c, d) of the upper wall (42) extending substantially perpendicular to said one edge (a, b) provided with said mounting arrangements (38) are also concave inwardly of the upper wall (42) viewed in the plan view of the upper wall (42).

Fig. 1



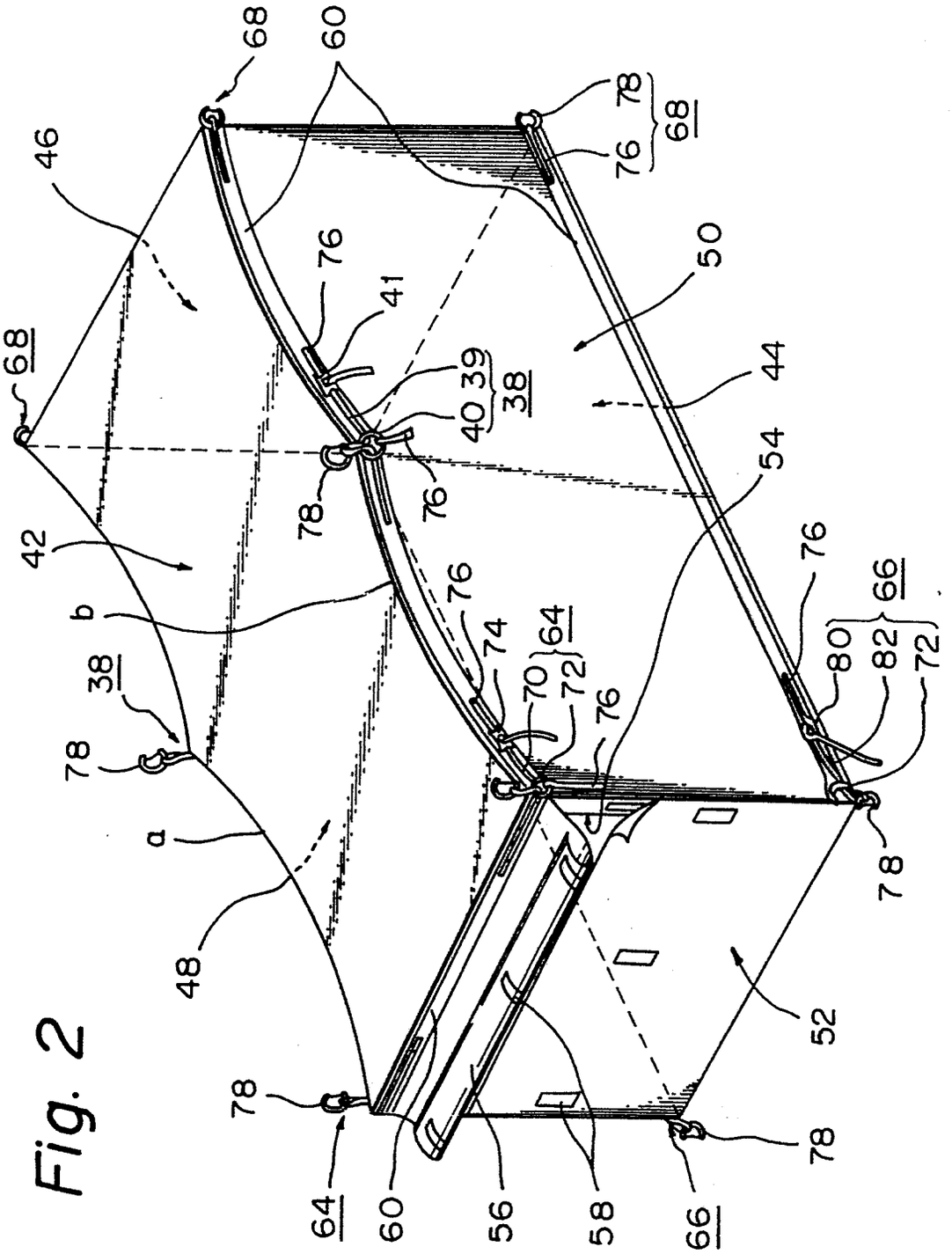

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Fig. 2

Fig. 3

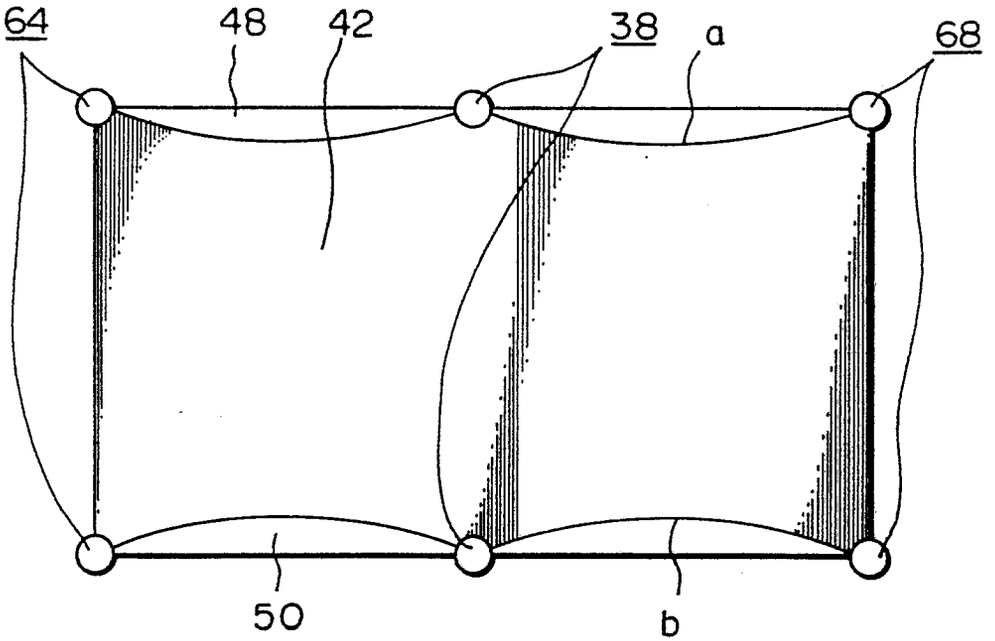

Fig. 4