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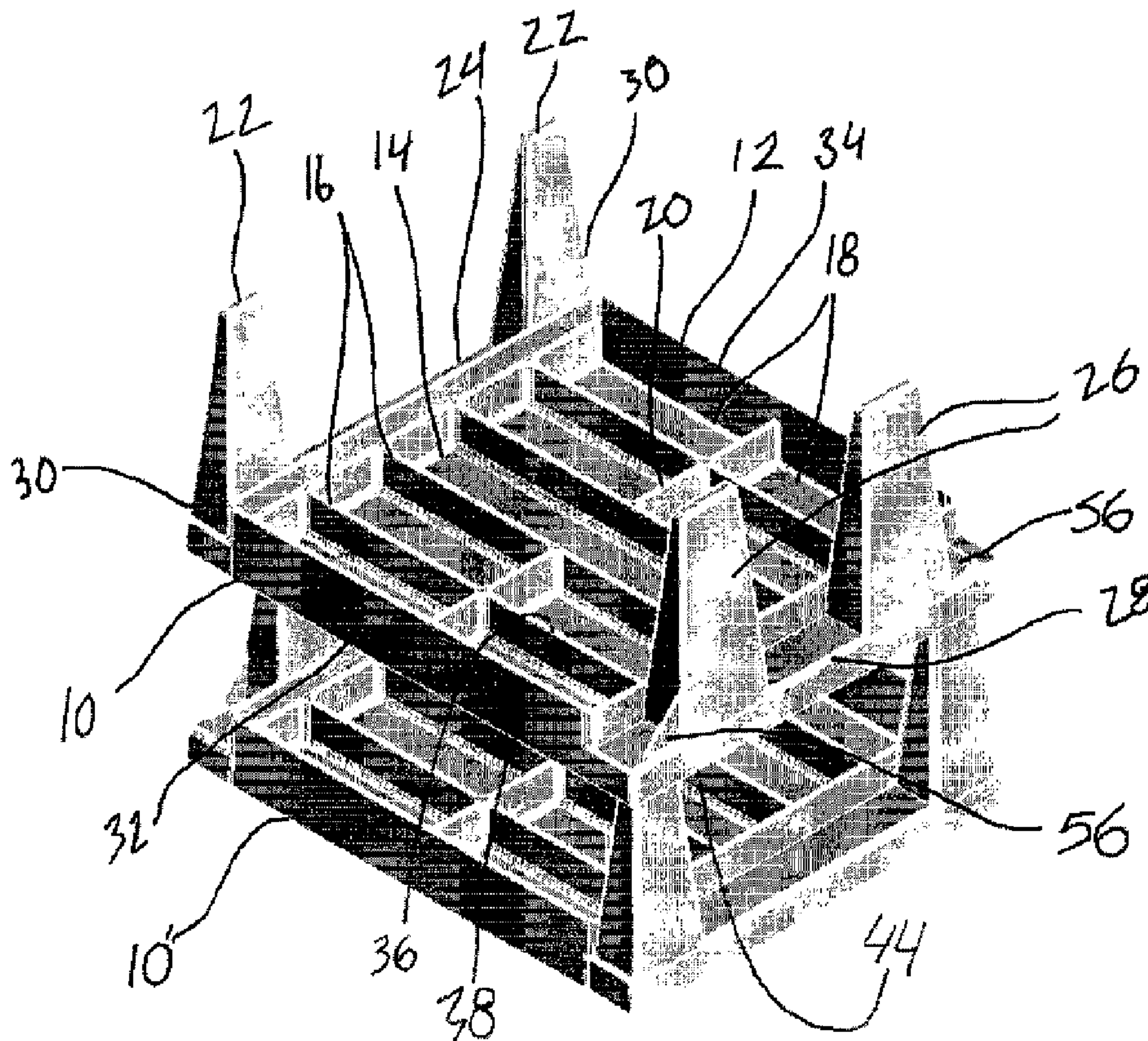
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(54) Title: COMPACT STACKABLE TRAY



(57) Abrégé/Abstract:

A compact stackable tray system is disclosed wherein in a first orientation the supports of a lower tray maintain an upper tray away from the lower tray such that one of a plurality of standard milk bags stored on the lower tray may be freely removed and in a second orientation wherein the supports of the lower tray nest within the support of the upper tray such that the lower surface of the upper tray rests against the upper surface of the lower tray.

Abstract

A compact stackable tray system is disclosed wherein in a first orientation the supports of a lower tray maintain an upper tray away from the lower tray such that one of a plurality of standard milk bags stored on the lower tray may be freely removed and in a second orientation wherein the supports of the lower tray nest within the support of the upper tray such that the lower surface of the upper tray rests against the upper surface of the lower tray.

## COMPACT STACKABLE TRAY

### FIELD OF THE INVENTION

[0001] The present invention relates to a compact stackable tray.

### BACKGROUND

[0002] Traditionally, milk in bags is delivered to the merchant in crates and placed on a stainless steel rolling rack (bossy cart) which can for example be pushed into a refrigerator. The racks are heavy and expensive and lead to injuries and the like. A picked pallet configuration where the pallet is delivered to the merchant preloaded and simply placed in racking and or on the ground from which customers can select the product they wish to purchase is typically preferred given its simplicity. However, current one way solutions which rely on the use cardboard boxes or the like require robust materials which are difficult to dispose of.

[0003] What is need therefore, and an object of the present application is an ecofriendly, inexpensive and convenient means to organize, transport and display for sale milk or other beverages held in bags as well as other items such as produce and the like.

[0004] An object of the present invention, therefore, is to provide a tray and system that in turn minimises the need for secondary packaging, is retail ready, reusable in a closed loop system and which is stackable and nestable thereby minimizing the space required for empty container storage and return.

### SUMMARY OF THE INVENTION

[0005] In order to address the above and other drawbacks, there is provided a compact stackable tray system. The system comprises a pair of

like compact stackable trays arranged as an upper tray and a lower tray. Each of the trays comprises a flat rectangular support, a plurality of dividers separating an upper surface of the support into a plurality of rectangular compartments, each of the compartments sized to receive a standard four liter milk bag therein wherein a long edge of each of the compartments is arranged in parallel to a long edge of the support, and further wherein a height of the dividers is sufficient to maintain a standard four liter milk bag in an upright position, a rim about a periphery of the rectangular support, the rim having a height above the rectangular support greater than that of the dividers, and a first pair of hollow supports arranged along a first short edge of the support and a second pair of hollow supports arranged on a second short edge of the support opposite the first edge, the supports extending above the support to a height above that of a standard four liter milk bag supported on the support. In a first orientation of the upper tray to the lower tray, the upper tray is supported by the supports of the lower tray such that a lower surface of the support of the upper tray is maintained at least a height of a standard four liter milk bag above an upper surface of the support of the lower tray and wherein in a second orientation of the upper tray to the lower tray rotated 180 degrees horizontally to the first orientation, the hollow supports of the lower tray nest within the hollow supports of the upper tray and such that the lower surface of the support of the upper tray is immediately adjacent the upper surface of the support of the lower tray.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Figure 1 provides an isometric view of a pair of compact stackable trays in accordance with an illustrative embodiment of the present invention,

[0007] Figure 2A provides a side plan view of a compact stackable tray in accordance with an illustrative embodiment of the present invention;

[0008] Figure 2B provides a front plan view of a compact stackable tray in

accordance with an illustrative embodiment of the present invention;

[0009] Figure 2C provides a top plan view of a compact stackable tray in accordance with an illustrative embodiment of the present invention;

[0010] Figure 3 provides a lowered right front view of a pair of compact stackable trays in accordance with an illustrative embodiment of the present invention;

[0011] Figure 4A provides a raised left front view of a plurality of compact stackable trays in a supported stack in accordance with an illustrative embodiment of the present invention;

[0012] Figure 4B provides a raised left front view of a plurality of compact stackable trays in a nested compact stack in accordance with an illustrative embodiment of the present invention; and

[0013] Figure 5 is a raised left front view of a compact stackable tray in accordance with an alternative embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENTS

[0014] Referring now to Figure 1, a pair of compact stackable trays in accordance with an illustrative embodiment of the present invention will now be described. Each tray, generally referred to using the reference numeral 10, is illustratively manufactured from injection molded plastic and comprises a substantially flat molded plastic tray support 12 divided into a plurality of bag receiving compartments as in 14 by a series of dividers as in 16 aligned with a long edge of the tray 10. Each of the compartments as in 14 may be divided into a pair of subcompartments 18 by provision of an additional divider 20 arranged across a respective compartment as in 14. A first pair of supports as in 22 is arranged along a first short edge 24 of the tray 10 and a second pair

of supports as in 26 is arranged along a second short edge 28 of the tray 10. As will be discussed in more detailed below an outer edge 30 of each of the first pair of supports as in 22 is positioned substantially flush with a respective long edge 32, 34 of the tray 10 while the second pair of supports as in 26 are positioned away from their respective long edges 32, 34. The dividers as in 16, 20 also provide structural strength to the tray support 12. This allows heavier goods to be supported by the support 12 and/or the support 12 to be manufactured from a thinner plastic.

[0015] Still referring to Figure 1, each sub compartment as in 18 is sized to accept a conventional milk bag (not shown). As known in the art, such bags each comprise four (4) liters of milk or liquid beverage organized in three (3) smaller bags of 1.33 liters each. Such bags have minimal structural strength and will typically fall over if not supported. The dividers as in 16 are of between 5 and 8 centimeters height to provide some support to the bags and help to maintain them in position and therefore keeping a side of the bag clearly visible, while at the same time being low enough to allow the milk bags to be individually extracted from the tray 10 without undue effort. A rounded upper edge 36 is also provided to the dividers as in 16 to prevent snagging or tearing of the bags during extraction. Each tray 10 also comprises a raised outer rim 38 of about 8 to 12 centimeters, also comprising a rounded upper edge, which provides additional support for bags when the tray 10 is full thereby preventing bags retained within the tray from inadvertently being ejected during transport, for example. In a particular embodiment small drainage holes (no shown) may be provided in each sub compartment as in 18 to allow for water or other liquids to escape, thereby facilitating washing, for example.

[0016] Still referring to Figure 1, each support as in 22, 26 extends approximately 28 centimeters (11 inches) above the bottom of the tray 10 in order, as will be discussed in more detail below, to provide adequate clearance between stacked trays such that a standard milk bag in between

may be freely removed. Referring to Figures 2A and 2B, each of the supports as in 22, 26 are hollow and illustratively of a rectangular frustum shape and are of the same height (i.e. they extend the same distance above the tray). The outer surfaces as in 40 and the inner surfaces as in 42 of the supports as in 22, 26 are tapered such that, as will be discussed in more detail below, trays as in 10 may be compactly stacked together by inserting respectively the first supports 22 and second supports 26 of a lower tray inside the hollow first supports 22 and hollow second supports 26 of an upper tray. In this regard, small holes (not shown) may be provided in the apex of each support as in 22, 26 to allow air to escape and enter the hollow support during compact nested stacking. Additionally, the taper of the inner and outer surfaces 40, 42 of the supports as in 22, 26 is selected such that during compact stacking, the outer surface 40 of the supports as in 22, 26 of a lower tray remain a small distance apart from the inner surfaces 42 of the supports as in 22, 26 of the upper tray, or in other words the supports as in 22, 26 do not bottom out in a compact stacked configuration. This limits sticking for example when the trays as in 10 are wet or the like allowing for easy unstacking of a compact stack of trays.

[0017] Referring to Figure 2C, each of the trays is rectangular in shape and illustratively 24 inches X 20 inches such that four (4) trays as in 10 may be placed in a 2 X 2 configuration to match the 40 inch by 48 inch foot print of a standard commercial pallet (not shown) and such that when positioned in a rack or the like a long edge of each tray, and therefore the individual milk bags, is displayed towards the front of the pallet, thereby allowing the product to be quickly recognized. Additionally, the support posts as in 22, 26 are dimensioned such that five (5) loaded and inverted trays may be stacked together. As each tray carries a maximum of 10 bags, or 40 liters, of milk, the supports as in 22, 26 must together be able to support a weight of at least about 160 kilograms.

[0018] Referring to Figure 3 in addition to Figure 1, as will now be appreciated by a person of ordinary skill in the art, trays may be stacked as shown by

reversing alternate trays and such that the supports 22, 26 of the lower tray 10' engage the underside 44 of the upper tray as in 10. In this regard, the underside 44 of each tray comprises pairs of locating points as in 46 which receive the apex 48 of a respective support as in 22, 26 therein. Each of the first pair of supports as in 22 butts against a respective outer tab as in 50 molded in the underside 44 and towards a lower outer edge 52 of the tray being supported, and thereby prevents the tray being supported from sliding on the first supports as in 22. Similarly, each of the second pair of supports as in 26 butts snugly against a respective inner tab as in 54 molded in the underside 44 of the tray which thereby prevents the tray being supported from sliding on the second pair of supports as in 26.

[0019] Referring back to Figure 2A in addition to Figure 3, the tabs 50, 54 may be tapered such that they better engage the tapered outer surface 40 of their respective supports as in 22, 26. In this manner the trays are stabilized versus one another thereby limiting shifting during transport or the like. Of note is that, as contact with the underside 44 of the tray 10 is lost below the hollow supports as in 22, provision of the tabs 54 on the *inside* of the respective supports as in 26 allows the supports as in 26 to be positioned somewhat farther apart while still maintaining contact between the apex as in 48 with the underside, thereby improving stability. In an alternative embodiment the second pair of supports as in 26 could be combined into one, with provision of a notch towards the center of the apex of the unified support and a corresponding notch engaging tab in the underside 44 of the tray 10 (all not shown). With brief reference to Figure 1, additional gussets as in 56 can be added to the supports as in 22, 26 to improve strength.

[0020] Still referring to Figure 3, a series of indentations as in 58 are typically formed on the underside 44 of the tray 10 during manufacture as the plastic cools and contracts.

[0021] Referring now to Figure 4A, in a first mode of operation trays as in 10

loaded with milk bags as in 60 are stacked in a 2 X 2 configuration and five high on a standard commercial pallet 62 to form a supported stack 64. As discussed above, in this manner a long edge of each of the trays as in 10, and therefore those of the milk bags as in 60 is visible from the outside and easily recognizable. As trays as in 10 are emptied, they are simply removed from the top of the stack and placed to the side, typically by the customer given their light weight. In this regard, the empty trays are light enough (for example a maximum of about 3.5 kilograms or 7-8 pounds) such that they can be easily manipulated without the use of gloves or special tools.

[0022] Referring now to Figure 4B, in a second mode of operation, empty trays as in 10 can be stacked as a nested stack 64 by reversing the orientation of the trays, by aligning respectively the first pairs of supports as in 22 and the second pairs of supports as in 26 and inserting the supports 22, 26 of a lower tray into those of an upper tray an such that the lower surface of the upper tray rests upon the upper surface of the lower tray. In this manner, a large number of empty trays can be compactly stacked to facilitate their return to the milk supplier or the like along with the standard commercial pallet 62.

[0023] Referring back to Figure 1, in an embodiment of the tray, for example for use in transporting and displaying other food stuffs such as fresh produce or the like, the dividers as in 16 and 20 may be modified, for example to accommodate cartons or the like, or removed. In this regard, the selection of the thickness of the plastic for use in manufacture of the support 12 will typically be determined by a combination of the presence or absence of the supporting dividers 16, 20 and the weight of the goods to be supported by the tray.

[0024] Referring now to Figure 5, in an alternative embodiment of the tray 10 an additional pair of tapered hollow central supports as in 64 is provided and the tray sized to accommodate 20 standard milk bags and for a 2 X 1 arrangement on a standard commercial pallet. A first of the pair of central

supports as in 64 is positioned flush against the edge of the tray 10 while a second of the of the pair of central supports as in 64 is offset from the tray such that when in a stacked configuration in a first orientation the pair of central supports 64 of the lower tray are engaged by the underside 44 of the upper tray (as are those of the first pair of supports 22 and the second pair of supports 26). In a second nested orientation, wherein the upper tray is rotated 180 degrees horizontally to the lower tray, the pair of central supports 64 of the lower tray are inserted into the pair of hollow central supports 64 of the upper tray (again, as are those of the first pair of supports 22 and the second pair of supports 26). In this orientation the upper surface of the lower tray is directly adjacent the the underside 44 of the upper tray.

## WE CLAIM:

1. A compact stackable tray system comprising:
    - a pair of like compact stackable trays arranged as an upper tray and a lower tray, each of said trays comprising:
      - a flat rectangular support;
      - a plurality of dividers separating an upper surface of said support into a plurality of rectangular compartments, each of said compartments sized to receive a standard four liter milk bag therein wherein a long edge of each of said compartments is arranged in parallel to a long edge of said support, and further wherein a height of said dividers is sufficient to maintain a standard four liter milk bag in an upright position;
      - a rim about a periphery of said rectangular support, said rim having a height above said rectangular support greater than that of said dividers; and
      - a first pair of hollow supports arranged along a first short edge of said support and a second pair of hollow supports arranged on a second short edge of said support opposite said first edge, said supports extending above said support to a height above that of a standard four liter milk bag supported on the support;
- wherein in a first orientation of said upper tray to said lower tray, said upper tray is supported by said supports of said lower tray such that a lower surface of said support of said upper tray is maintained at least a height of a standard four liter milk bag above an upper surface of said support of said lower tray and wherein in a second orientation of said upper tray to said lower tray rotated 180 degrees horizontally to said first orientation, said hollow supports of said lower tray nest within said hollow supports of said upper tray and such that said lower surface of

said support of said upper tray is immediately adjacent said upper surface of said support of said lower tray.

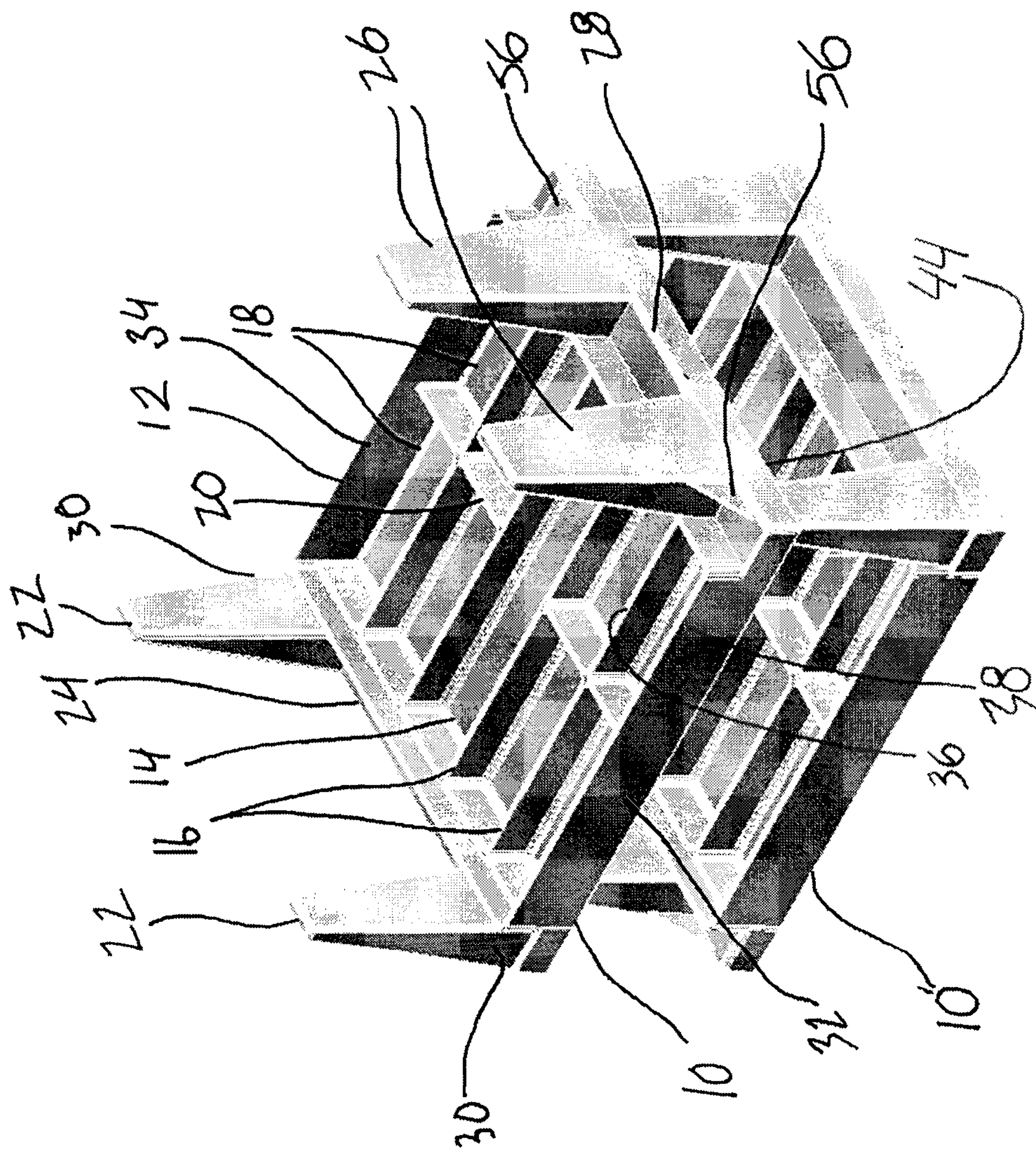


FIGURE 1

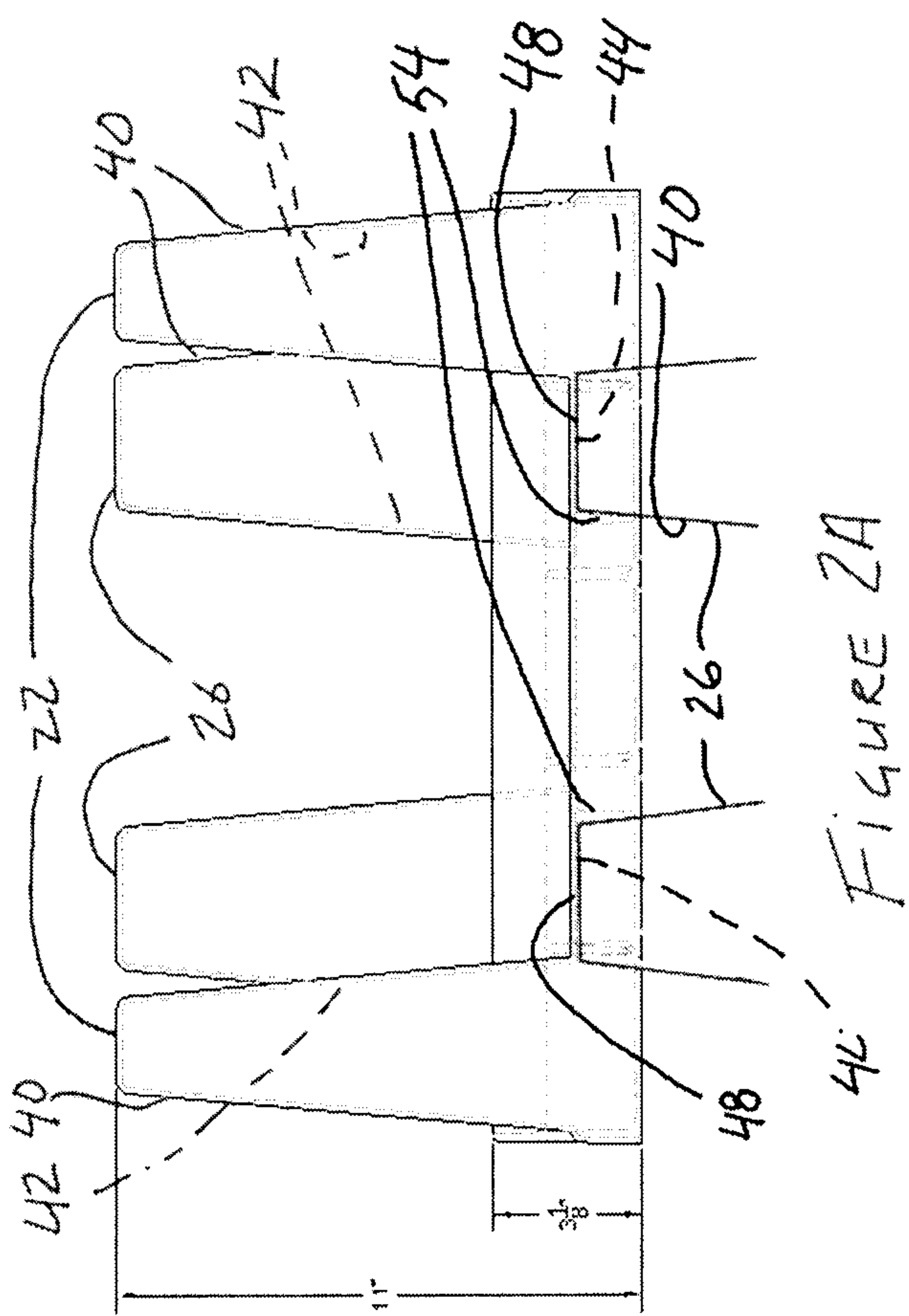


FIGURE 2A

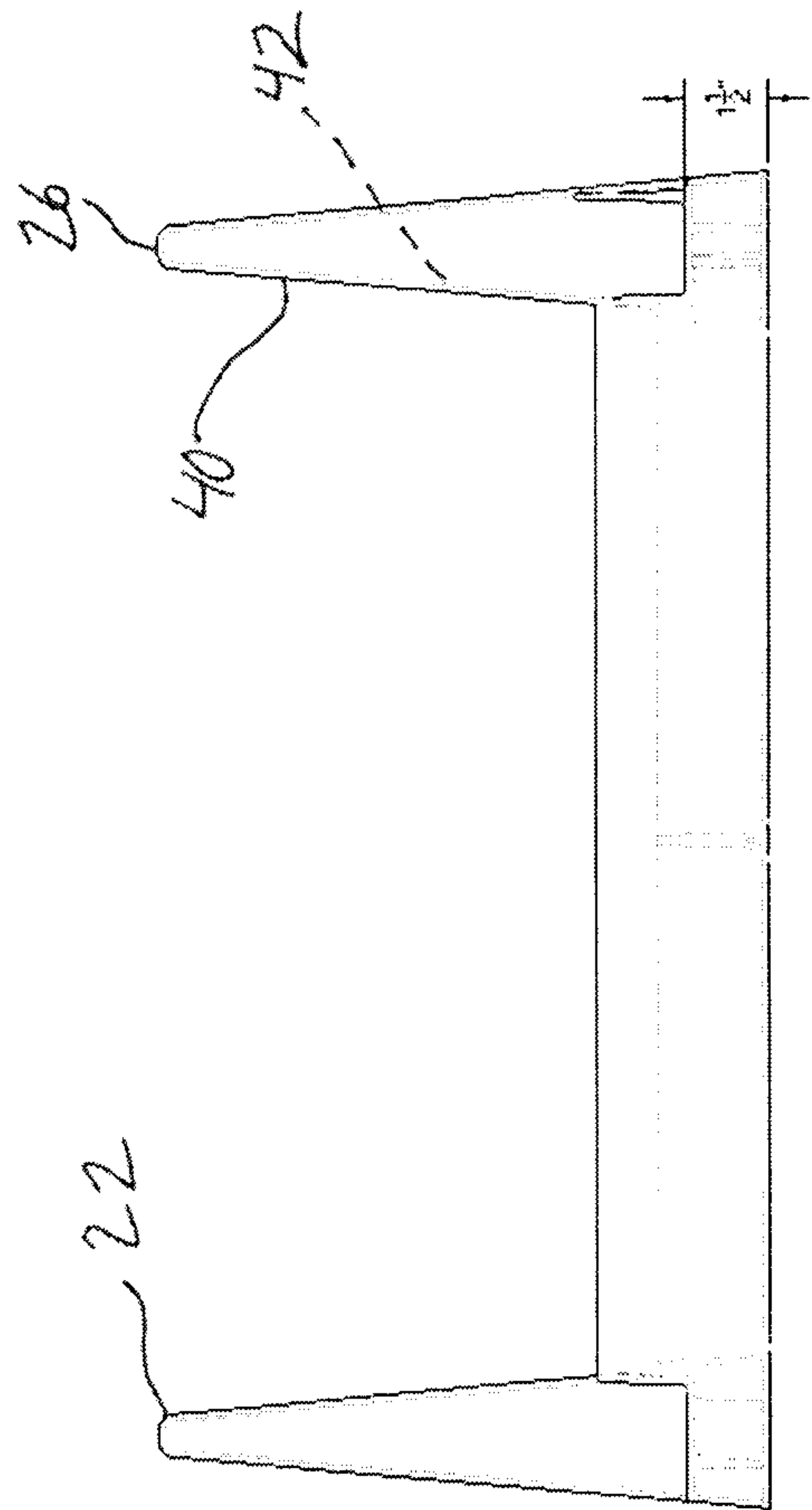


FIGURE 2B

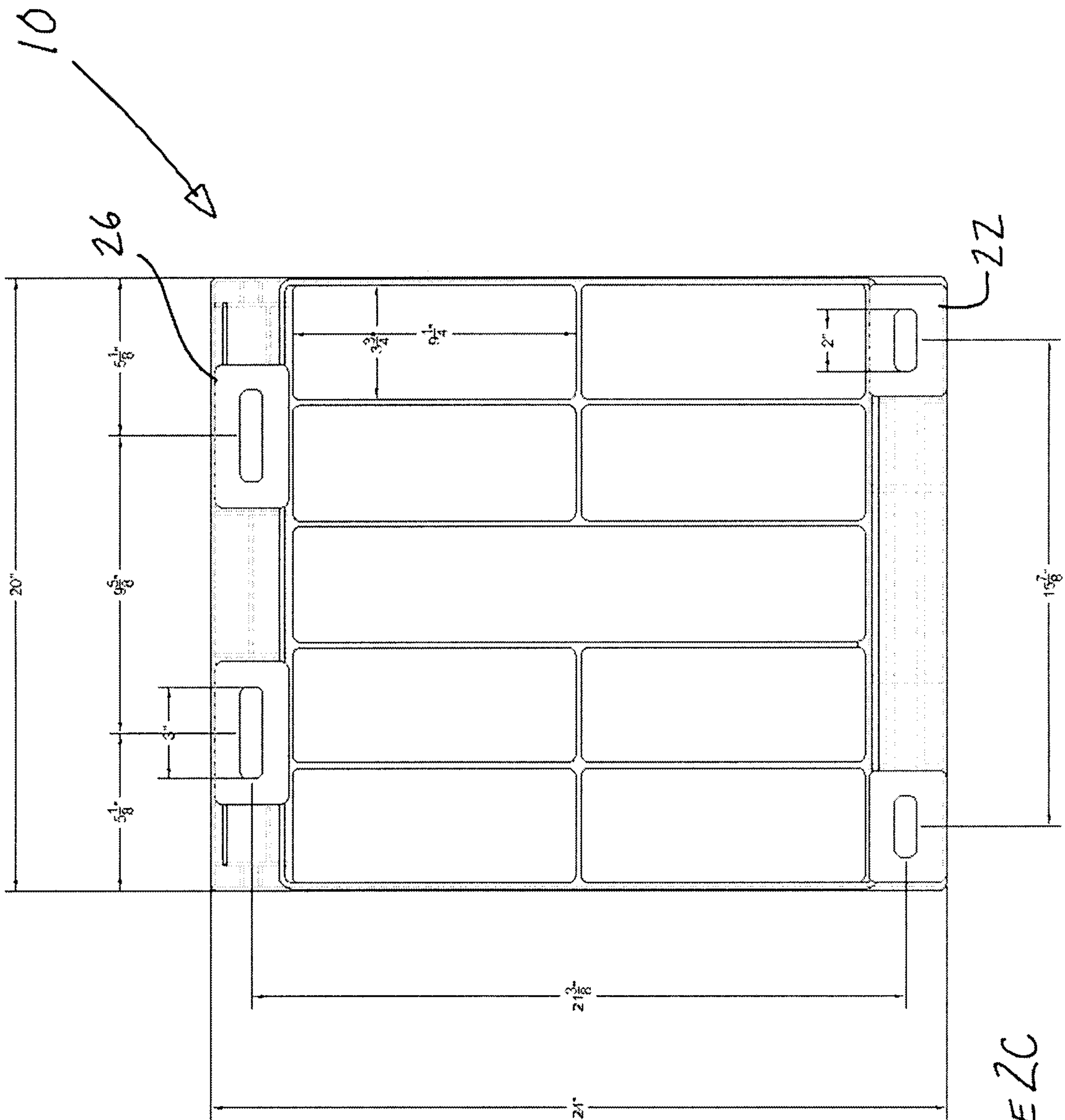
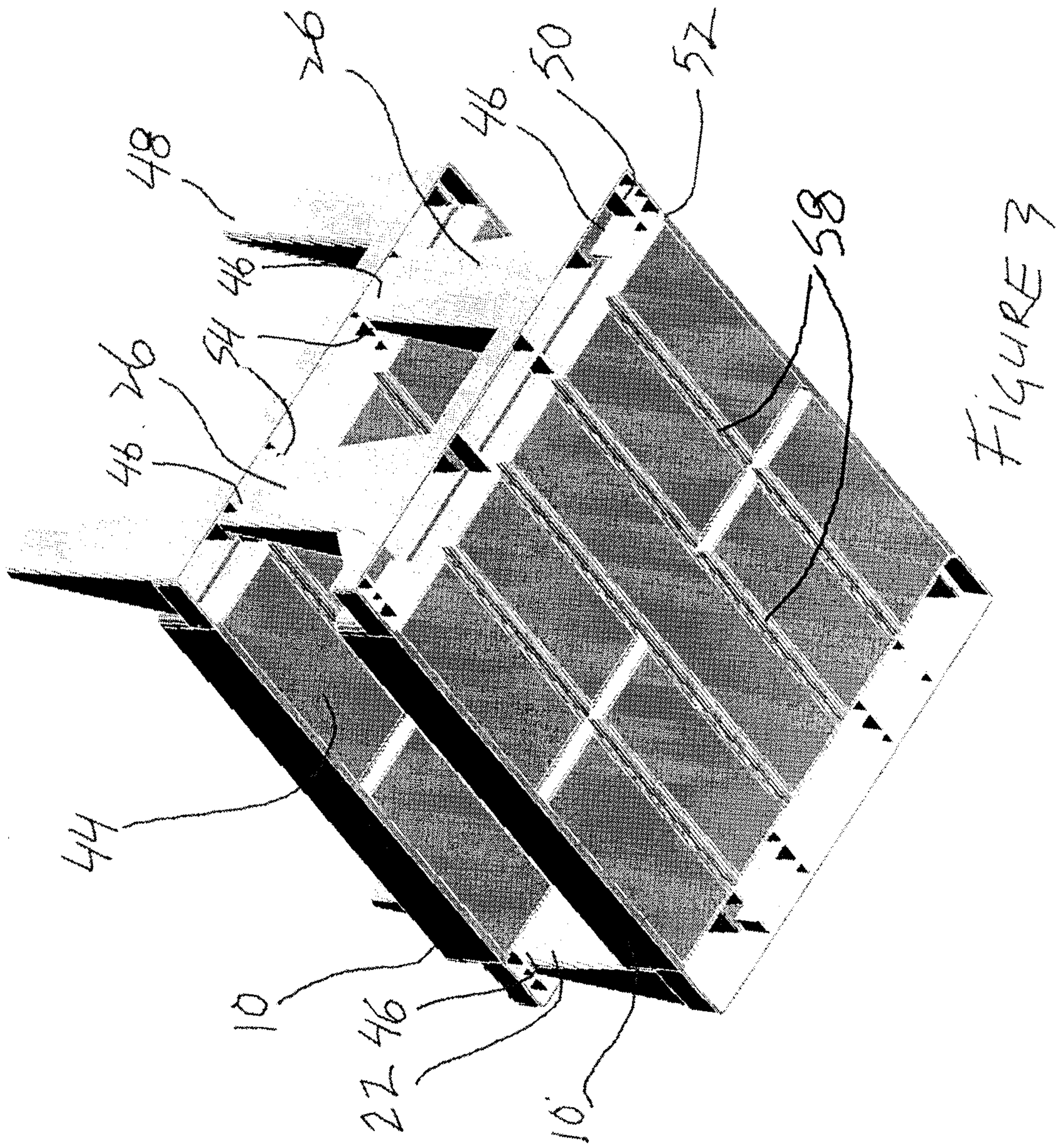


FIGURE 2C



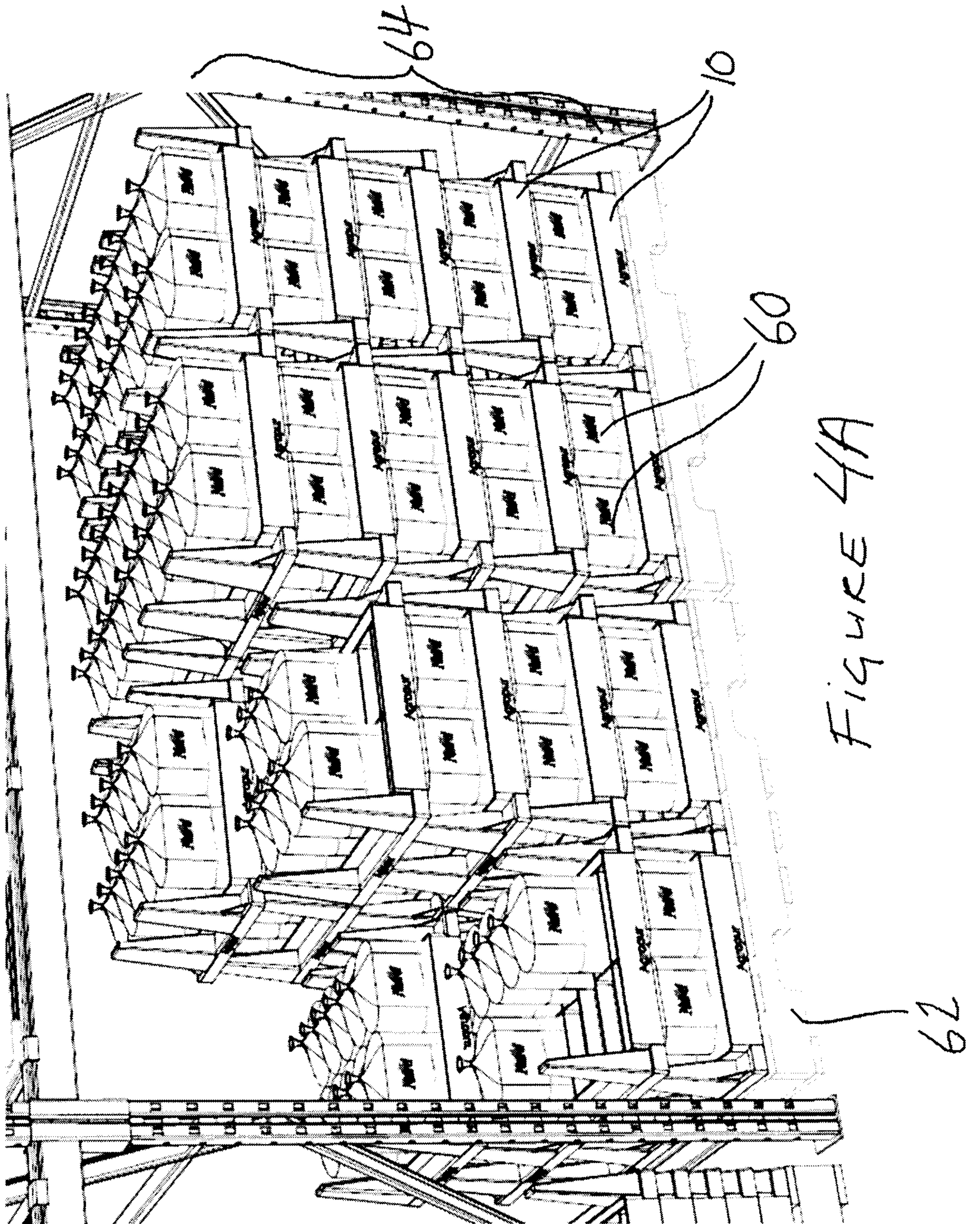


FIGURE 4A

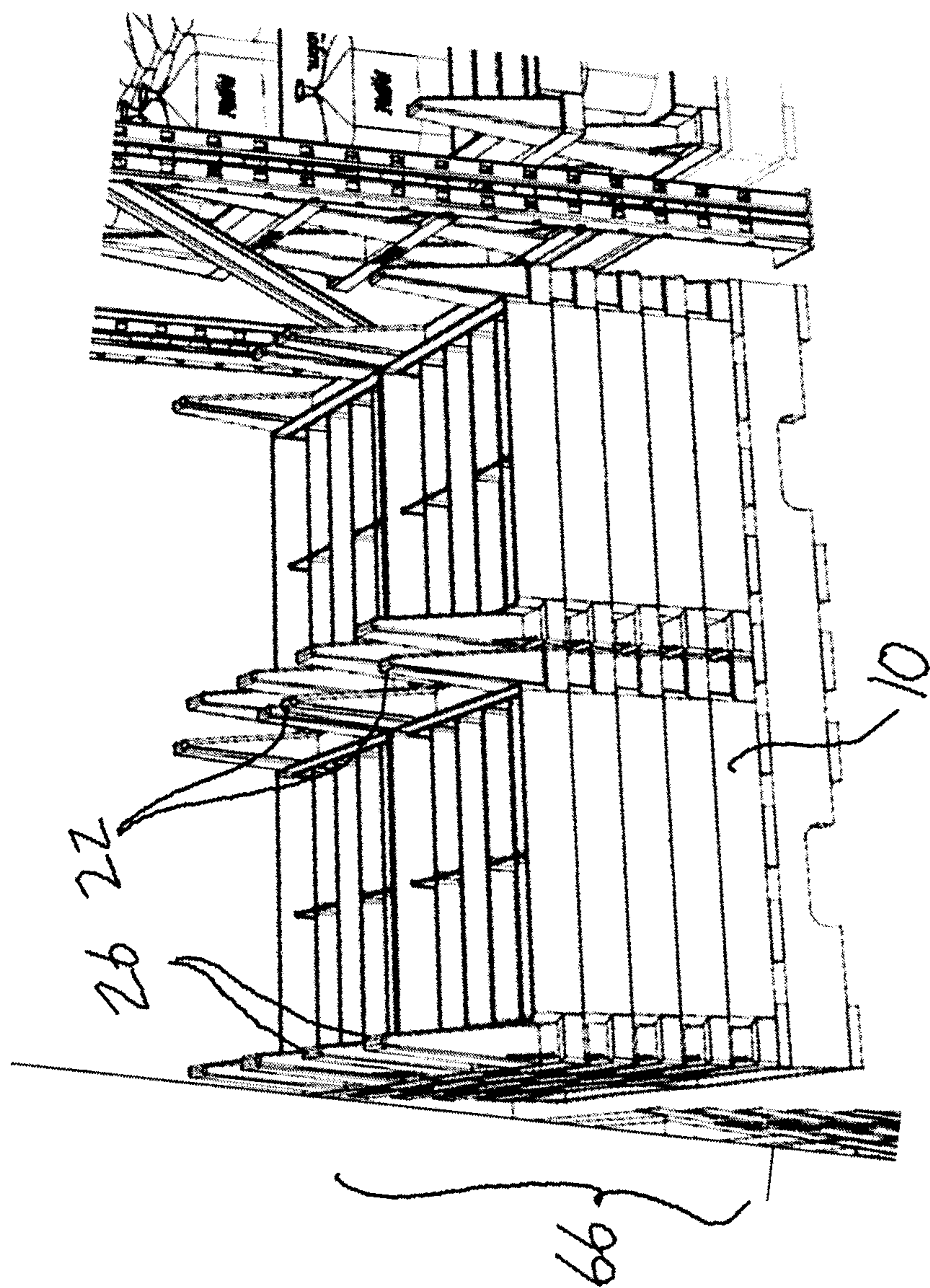


FIGURE 4B

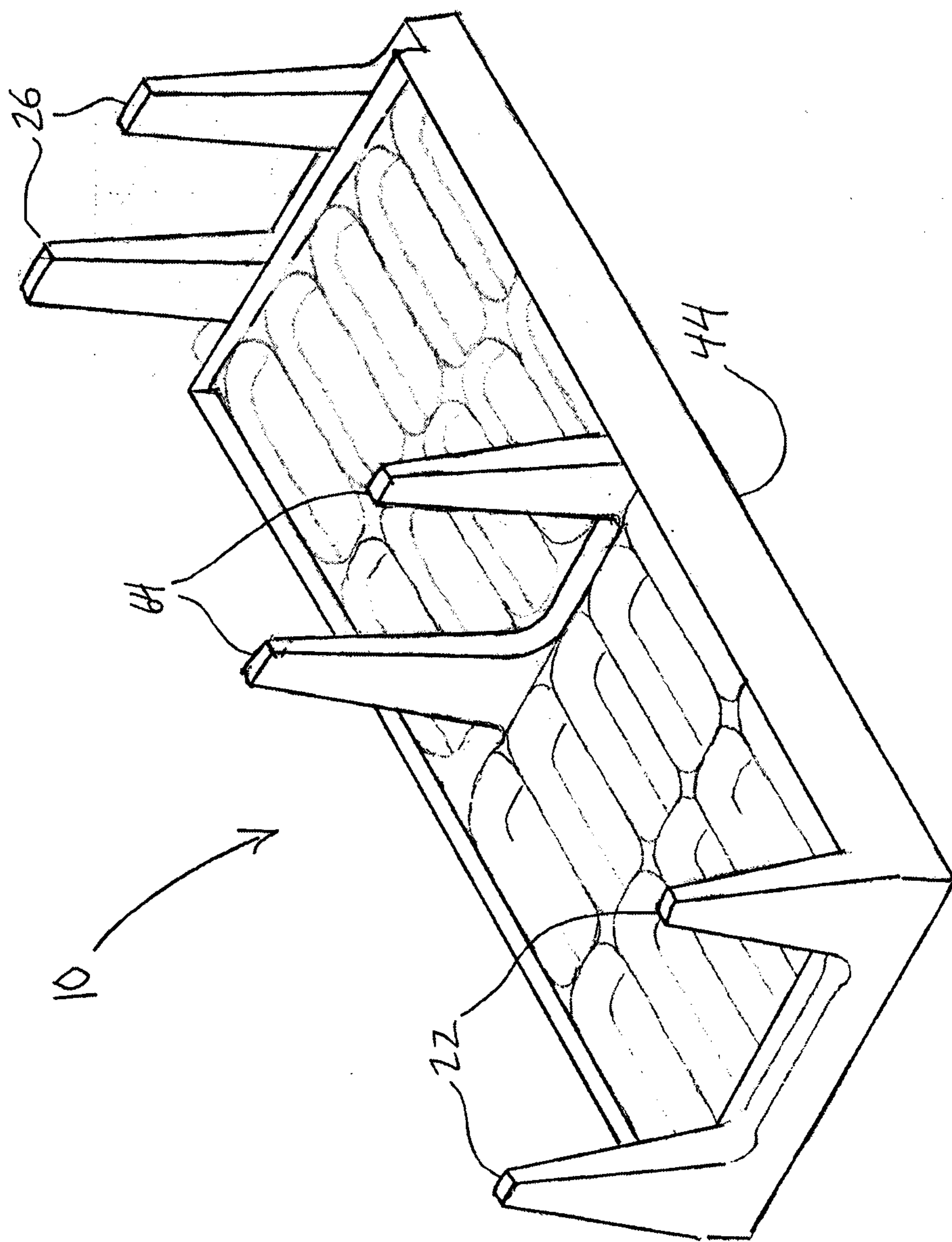


FIGURE 5

