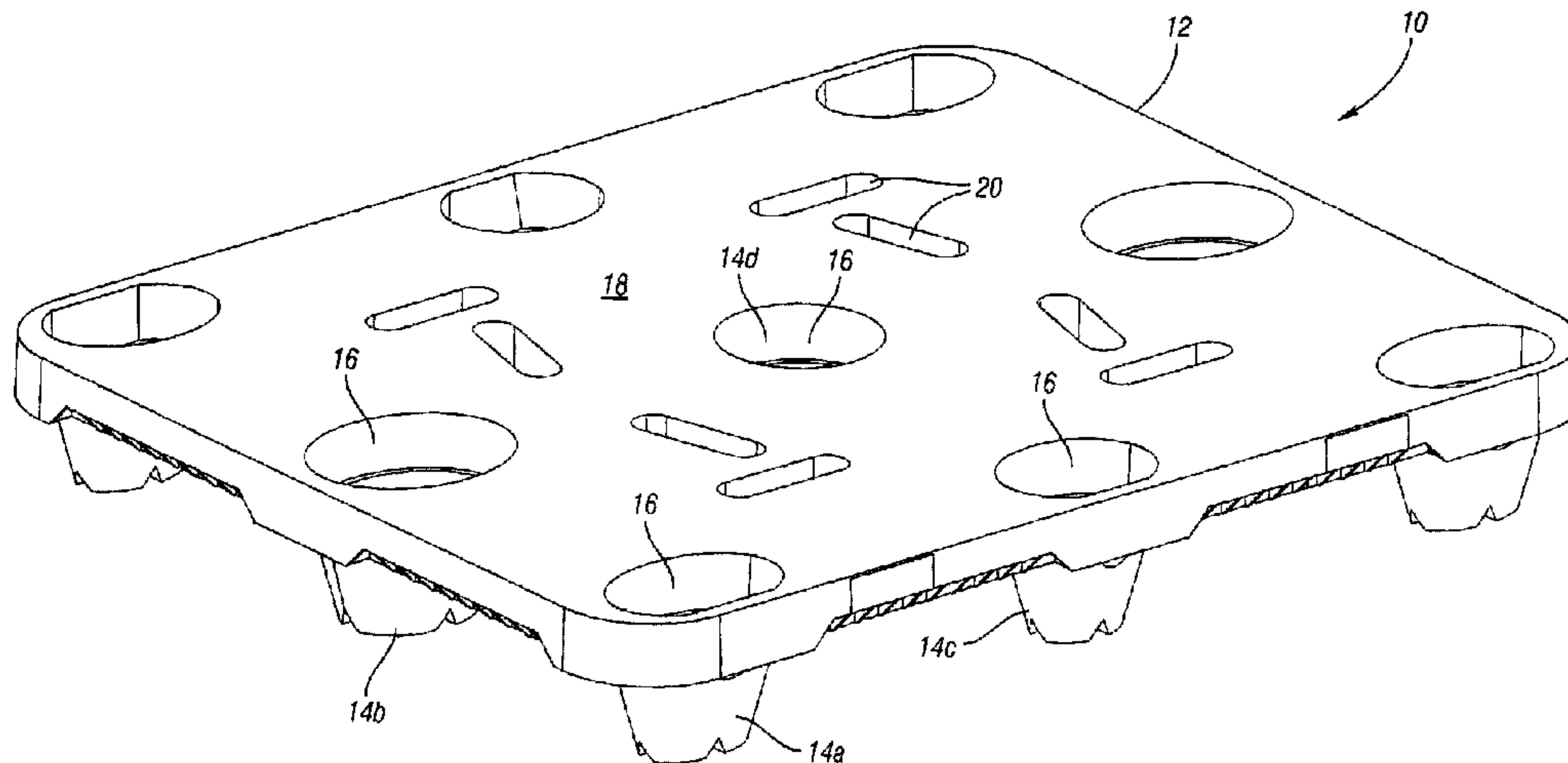




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(54) **Titre : PALETTE EMBOITABLE**  
 (54) **Title: NESTABLE PALLET**



(57) **Abrégé/Abstract:**

A nestable pallet includes an upper deck from which a plurality of feet extend downwardly. The upper deck includes an upper planar member and cross-ribs extending downwardly therefrom. The pallet is sturdy yet light weight and can be optionally provided with a reinforcement sheet secured to the lower ends of the ribs to provide a stronger, stiffer pallet.

**ABSTRACT OF THE DISCLOSURE**

A nestable pallet includes an upper deck from which a plurality of feet extend downwardly. The upper deck includes an upper planar member and cross-ribs extending downwardly therefrom. The pallet is sturdy yet light weight and can be  
5 optionally provided with a reinforcement sheet secured to the lower ends of the ribs to provide a stronger, stiffer pallet.

## NESTABLE PALLET

### BACKGROUND

This invention relates to a nestable pallet for storing or transporting goods. Pallets are often used to store and transport goods. The pallets maintain the goods at a distance above the floor such that they can be readily lifted and moved by a fork of a lift truck. Some pallets have stringers or double decks forming openings which receive the forks of the lift truck. Other pallets are nestable within one another to facilitate storage and transport when empty. Generally, nestable pallets typically have openings in their upper surface, which receive corresponding shaped feet of a similar nestable pallet. Thus, the nestable pallets occupy less space for storage and transport when empty.

Depending on the type of goods that are being transported, sometimes a pallet with greater strength and stiffness is required. Other times, for storing and shipping lighter goods, a lighter weight pallet would be desirable. Currently pallets of different weights and strengths are made in different molds, which increases cost.

### SUMMARY

The present invention provides a nestable pallet with an optional welded bottom. The pallet includes an upper deck and feet extending downward therefrom. The upper deck includes an upper planar member. A plurality of cross-ribs are formed on the under side of the planar member to reinforce the upper surface of the upper deck. The feet are generally hollow and open upwardly, such that they can receive nested therein corresponding feet of a similar container stacked thereon when empty. This provides a light weight pallet.

An optional welded bottom can be secured to the ribs of the upper deck. The welded bottom may be a lower planar member, such as an injection molded flat sheet. The planar member includes openings through which the feet are inserted. The planar member is then secured to the outer ends of the ribs, such as by vibration welding or hot plate welding. Alternatively, adhesives or other types of bonding could be utilized.



Thus, a single pallet can be provided in two different variations, with or without the welded bottom. The pallet can be provided in the light weight version without the welded bottom, or the stronger, stiffer pallet with the welded bottom.

5 These and other features of the application can be best understood from the following specification and drawings, the following of which is a brief description.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is a perspective view of a pallet according to one embodiment of the present invention.

10 Figure 2 is a bottom perspective view of the pallet of Figure 1.

Figure 3 is a bottom view of the pallet of Figure 1.

Figure 4 is an exploded view of the pallet of Figure 1 with an optional reinforcement sheet.

Figure 5 is a top view of the pallet and reinforcement sheet of Figure 4.

15 Figure 6 is a side view of the pallet of Figure 4.

Figure 7 is a section view taken along line 7-7 of Figure 5.

Figure 8 is an end view of the pallet of Figure 4.

Figure 9 is a section view taken along line 9-9 of Figure 5.

Figure 10 is a bottom view of the assembled pallet of Figure 4.

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#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

A pallet 10 according to one embodiment of the present invention is shown in Figure 1. The pallet 10 includes an upper deck 12 down from which extend a plurality of feet 14a-d, including corner feet 14a, end feet 14b, side feet 14c and a center foot 14d (unless otherwise more specifically referenced, the referenced numeral "14" used below will refer to all of the feet 14a-d).

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Each of the feet 14 has defined therein a recess opening upwardly for receiving a corresponding foot of a similar container nested therein. The upper deck 12 includes an upper planar member 18 through which the openings 16 and the feet 14 are also

defined. Handle openings 20 also extend through the upper planar member 18 of the upper deck 12.

Referring to Figure 2, the upper deck 12 includes an upper planar member 18 from which extend a plurality of cross-ribs 24. The ribs extend in an intersecting pattern on the bottom of the deck 12. A peripheral rib 26 extends about the periphery of the container 10. Outside the peripheral rib 26, a plurality of tapered ribs 28 form a chamfer, thus facilitating lifting the pallet 10 with a forklift. Figure 3 is a bottom view of the pallet of Figure 2.

Figure 4 is an exploded view of the pallet 10 with an optional reinforcement sheet 30. The reinforcement sheet 30 is an injection molded thermoplastic, but other materials and other manufacturing techniques could also be utilized. The sheet 30 includes a plurality of openings 32, each corresponding to one of the feet 14. The sheet 30 further includes a plurality of openings 34 aligning with the handles 20 of the upper deck 12. The sheet 30 further includes a plurality of small apertures 36 for drainage.

When increased strength and stiffness of the pallet 10 is desirable, the sheet 30 is vibration welded to the ribs 24 (Figure 2) of the upper deck 12.

Figure 5 is a top view of the pallet 10 of Figure 4. Figure 6 is a side view of the pallet 10.

Figure 7 is a section view taken along line 7-7 of Figure 5. As shown, the reinforcement sheet 30 is secured to the ribs 24 of the upper deck 12. This creates box beam sections in the upper deck 12. This significantly increases the strength and stiffness of the upper deck 12.

Figure 8 is a front view of the pallet 10. Figure 9 is a section view of the pallet 10 and reinforcement sheet 30 taken along line 9-9 of Figure 5. The reinforcement sheet 30 is vibration welded to the ribs 24, which extend perpendicular to one another in the upper deck 12. This creates the box beam sections.

Figure 10 is a bottom view of the pallet 10 with the reinforcement sheet 30 secured thereto. The feet 14 are received within the openings 32 in the sheet 30. The center foot 14 is completely circumscribed by the center opening 32, while the side feet

14c are partially circumscribed (more than 180 degrees, but less than 360 degrees), and the corner feet 14b are circumscribed less than 180 degrees. Further, the openings 34 align with the handle openings 20. The apertures 36 provide drainage to the box beam sections, i.e. the cavities defined among the upper planar member 18 (Figure 1,) the cross-ribs 24 (Figure 2) and the reinforcement sheet 30 (“lower planar member”).

The pallet 10 can thus be easily provided in two versions, one with the reinforcement sheet 30, or alternatively without the reinforcement sheet 30, to provide either a stronger, stiffer pallet 10 or a lighter pallet 10.

The scope of the claims should not be limited by the preferred embodiments set forth in the examples, but should be given the broadest interpretation consistent with the description as a whole.



## CLAIMS

1. A nestable pallet comprising:
  - a deck;
  - 5 a plurality of feet extending downward from the deck;

the deck including a planar member having a plurality of holes therethrough for receiving feet of a similar pallet, each of the holes aligned with one of the plurality of feet, the deck further including at least one handle hole;

  - 10 the deck including a plurality of ribs extending downward from the planar member; and
  - a reinforcement sheet having foot openings for receiving the feet and at least one handle opening for aligning with the at least one handle hole in the deck, the reinforcement sheet having a planar upper surface for mating with the plurality of ribs, the reinforcement sheet sized to be connected to the plurality of ribs of the deck, wherein
  - 15 the plurality of feet extend downwardly of the reinforcement sheet, such that lowermost surfaces of the plurality of feet are spaced downwardly from the reinforcement sheet; wherein at least a first foot opening of the foot openings completely circumscribes at least a first foot of the plurality of feet, each of the plurality of foot openings other than the first foot opening extends more than 180 degrees around a different one of the
  - 20 plurality of feet other than the first foot, but less than completely circumscribes its associated foot, such that a portion of the reinforcement of the reinforcement sheet is between a nearest periphery of the pallet and each of the plurality of feet.
2. The nestable pallet of claim 1 wherein the deck and the reinforcement sheet
- 25 form a plurality of box beam sections.
3. The nestable pallet of claim 2 wherein the feet are integrally molded with the planar member.

4. The nestable pallet of claim 1 wherein at least one of the plurality of ribs extends between each adjacent pair of the plurality of feet.
5. The nestable pallet of claim 1 wherein the upper surface of the reinforcement sheet is connected to the plurality of ribs.
6. The nestable pallet of claim 5 wherein the reinforcement sheet is vibration welded to the plurality of ribs.
7. The nestable pallet of claim 1 wherein the first foot opening is a center foot opening and the first foot is a center foot.
8. A nestable pallet comprising:
  - a deck having a planar member;
  - a plurality of hollow feet integrally molded with the planar member;
  - the planar member having a plurality of holes therethrough for receiving feet of a similar pallet, each of the holes aligned with one of the plurality of feet;
  - the deck including a plurality of ribs extending downward from the planar member; and
- a planar reinforcement sheet having openings for receiving the feet, a planar upper surface of the reinforcement sheet connected to the plurality of ribs of the deck, wherein at least a first opening of the openings completely circumscribes at least a first foot of the plurality of feet, wherein the reinforcement sheet circumscribes each of the plurality of feet more than 180 degrees, with each of the plurality of openings other than the first opening less than completely circumscribes its associated foot, such that a portion of the reinforcement sheet is between an immediately adjacent periphery of the pallet and each of the plurality of feet, wherein the plurality of feet extend downwardly of the reinforcement sheet, such that lowermost surfaces of the plurality of feet are spaced downwardly from the reinforcement sheet.



9. The nestable pallet of claim 8 wherein the deck and the reinforcement sheet form a plurality of box beam sections.
10. The nestable pallet of claim 8 wherein at least one of the plurality of ribs extends  
5 between each adjacent pair of the plurality of feet.
11. The nestable pallet of claim 8 wherein the reinforcement sheet is vibration welded to the plurality of ribs.
- 10 12. A nestable pallet comprising:  
a deck having a planar member and a plurality of cross-ribs extending downwardly therefrom;  
a plurality of hollow feet integrally molded with the planar member, the plurality of feet including a center foot and a plurality of peripheral feet;  
15 the planar member having a plurality of holes therethrough for receiving feet of a similar pallet, each of the holes aligned with one of the plurality of feet; and  
a reinforcement sheet having a planar upper surface and a planar lower surface, the planar upper surface of the reinforcement sheet secured directly to the plurality of cross-ribs of the deck, the reinforcement sheet having a center opening completely  
20 circumscribing a first foot of the plurality of feet and a plurality of peripheral openings each extending more than 180 degrees around but not completely circumscribing the plurality of peripheral feet such that a portion of the reinforcement sheet is between a nearest periphery of the pallet and each of the plurality of feet, the plurality of feet extending downwardly of the reinforcement sheet, such that a lowermost surface of the  
25 plurality of feet is spaced downwardly from the reinforcement sheet.
13. The nestable pallet of claim 12 wherein the plurality of cross-ribs extending downwardly from the deck includes a plurality of tapered peripheral ribs extending downwardly from a periphery of the deck.

14. The nestable pallet of claim 13 wherein the reinforcement sheet does not cover the tapered peripheral ribs.

15. A nestable pallet comprising:

5 a deck;

a plurality of feet extending downward from the deck, the plurality of feet including a center foot and a plurality of peripheral feet;

10 the deck including a planar member having a plurality of holes therethrough for receiving feet of a similar pallet, each of the holes aligned with one of the plurality of feet, the deck further including at least one handle hole;

the deck including a plurality of ribs extending downward from the planar member; and

15 a reinforcement sheet having foot openings for receiving the feet and at least one handle opening for aligning with the at least one handle hole in the deck, the reinforcement sheet having a planar upper surface for mating with the plurality of ribs, the reinforcement sheet sized to be connected to the plurality of ribs of the deck, wherein the plurality of feet extend downwardly of the reinforcement sheet, such that lowermost surfaces of the plurality of feet are spaced downwardly from the reinforcement sheet, wherein the reinforcement sheet further includes a plurality of  
20 drainage holes, and the at least one handle hole of the deck and the at least one handle opening of the reinforcement sheet have a different shape than the plurality of drainage holes, the at least one handle opening of the reinforcement sheet is located outwardly of a center foot opening and is completely surrounded by the material of the reinforcement sheet.

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16. The nestable pallet of claim 15 wherein the deck and the reinforcement sheet form a plurality of box beam sections.

17. The nestable pallet of claim 16 wherein the feet are integrally molded with the planar member.

18. The nestable pallet of claim 15 wherein at least one of the plurality of ribs  
5 extends between each adjacent pair of the plurality of feet.

19. The nestable pallet of claim 15 wherein the upper surface of the reinforcement sheet is connected to the plurality of ribs.

10 20. The nestable pallet of claim 19 wherein the reinforcement sheet is vibration welded to the plurality of ribs.

21. The nestable pallet of claim 19 wherein at least a first foot opening of the foot openings completely circumscribes at least a first foot of the plurality of feet.

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22. The nestable pallet of claim 21 wherein the first foot opening is the center foot opening and the first foot is a center foot.

23. The nestable pallet of claim 22 wherein each of the plurality of foot openings  
20 other than the first foot opening less than completely circumscribes its associated foot.

25



24. A nestable pallet comprising:  
a deck having a planar member;  
a plurality of hollow feet integrally molded with the planar member, the plurality of hollow feet including a center foot and a plurality of peripheral feet;

5 the planar member having a plurality of holes therethrough for receiving feet of a similar pallet, each of the holes aligned with one of the plurality of feet, the deck further including at least one handle hole;

the deck including a plurality of ribs extending downward from the planar member; and

10 a planar reinforcement sheet having openings for receiving the feet and at least one handle opening for aligning with the at least one handle hole in the deck, a planar upper surface of the reinforcement sheet connected to the plurality of ribs of the deck, wherein at least a first opening of the openings completely circumscribes at least a first foot of the plurality of feet, wherein the reinforcement sheet circumscribes each of the  
15 plurality of feet more than 180 degrees, such that a portion of the reinforcement sheet is between an immediately adjacent periphery of the pallet and each of the plurality of feet, wherein the plurality of feet extend downwardly of the reinforcement sheet, such that lowermost surfaces of the plurality of feet are spaced downwardly from the reinforcement sheet, wherein the reinforcement sheet further includes a plurality of  
20 drainage holes, and the at least one handle hole of the deck and the at least one handle opening of the reinforcement sheet have a different shape than the plurality of drainage holes, the at least one handle opening of the reinforcement sheet is located outwardly of a center foot opening and is completely surrounded by the material of the reinforcement sheet.

25

25. The nestable pallet of claim 24 wherein the deck and the reinforcement sheet form a plurality of box beam sections.

26. The nestable pallet of claim 24 wherein at least one of the plurality of ribs extends between each adjacent pair of the plurality of feet.

27. The nestable pallet of claim 24 wherein the reinforcement sheet is vibration  
5 welded to the plurality of ribs.

28. A nestable pallet comprising:

a deck having a planar member and a plurality of cross-ribs extending downwardly therefrom;

10 a plurality of hollow feet integrally molded with the planar member, the plurality of feet including a center foot and a plurality of peripheral feet;

the planar member having a plurality of holes therethrough for receiving feet of a similar pallet, each of the holes aligned with one of the plurality of feet, the deck further including at least one handle hole; and

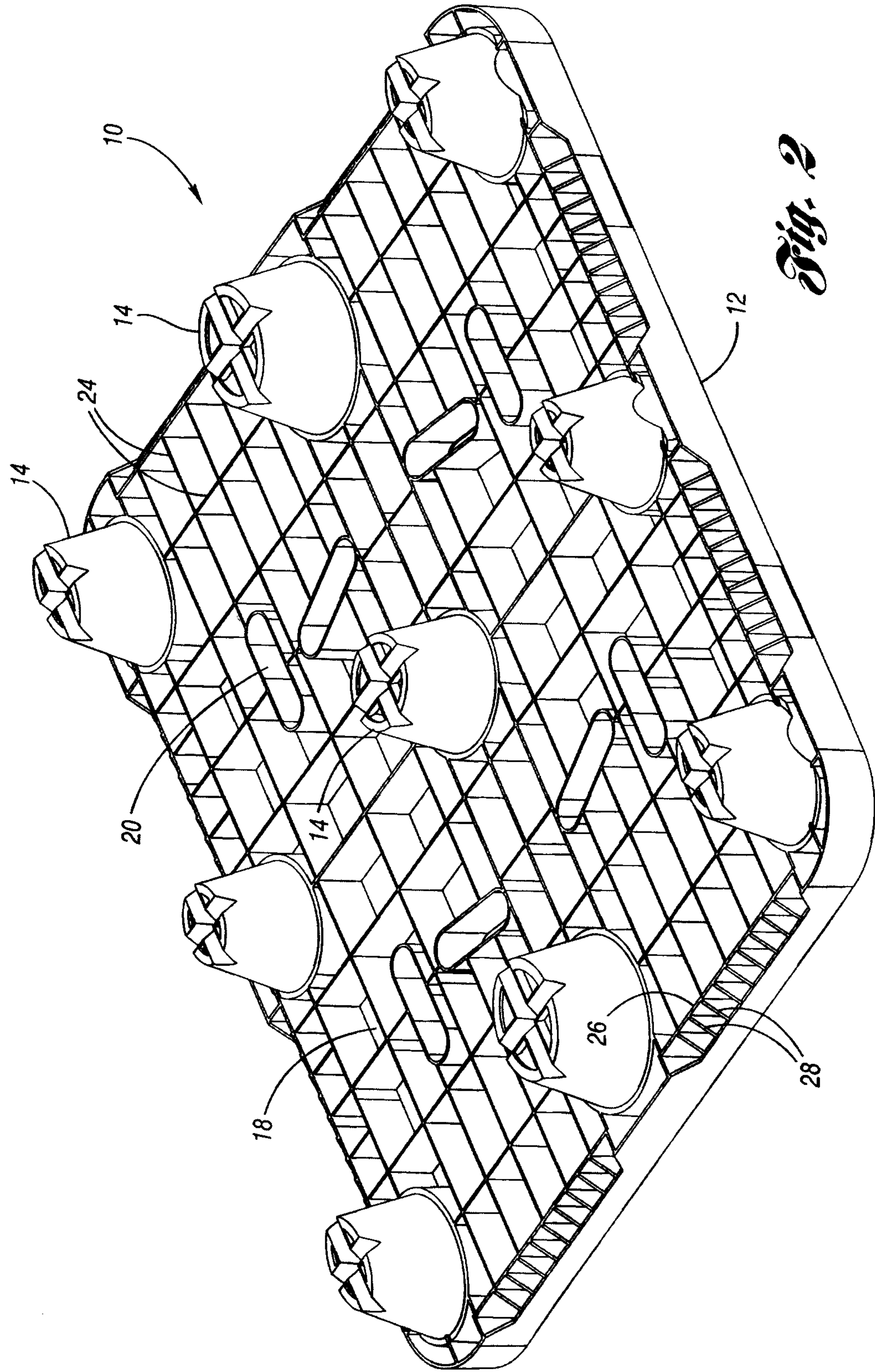
15 a reinforcement sheet having at least one handle opening for aligning with the at least one handle hole in the deck, a planar upper surface and a planar lower surface, the planar upper surface of the reinforcement sheet secured directly to the plurality of cross-ribs of the deck, the reinforcement sheet having a center opening completely circumscribing a first foot of the plurality of feet and a plurality of peripheral openings  
20 each partially but not completely circumscribing the plurality of peripheral feet such that a portion of the reinforcement sheet is between a nearest periphery of the pallet and each of the plurality of feet, the plurality of feet extending downwardly of the reinforcement sheet, such that a lowermost surface of the plurality of feet is spaced downwardly from the reinforcement sheet, wherein the reinforcement sheet further  
25 includes a plurality of drainage holes, and the at least one handle hole of the deck and the at least one handle opening of the reinforcement sheet have a different shape than the plurality of drainage holes, the at least one handle opening of the reinforcement sheet is located outwardly of a center foot opening and is completely surrounded by the material of the reinforcement sheet.

29. The nestable pallet of claim 28 wherein the plurality of cross-ribs extending downwardly from the deck includes a plurality of tapered peripheral ribs extending downwardly from a periphery of the deck.
- 5 30. The nestable pallet of claim 29 wherein the reinforcement sheet does not cover the tapered peripheral ribs.
31. The nestable pallet of claim 15 wherein the at least one handle hole of the deck and the at least one handle opening of the reinforcement sheet are substantially oblong.
- 10 32. The nestable pallet of claim 15 wherein the plurality of foot openings of the reinforcement sheet are almost entirely curved.
- 15 33. The nestable pallet of claim 15 wherein the at least one handle opening of the reinforcement sheet is located inwardly of a remainder of the foot openings.
34. The nestable pallet of claim 24 wherein the plurality of foot openings of the reinforcement sheet are almost entirely curved.
- 20 35. The nestable pallet of claim 28 wherein the plurality of foot openings of the reinforcement sheet are almost entirely curved.



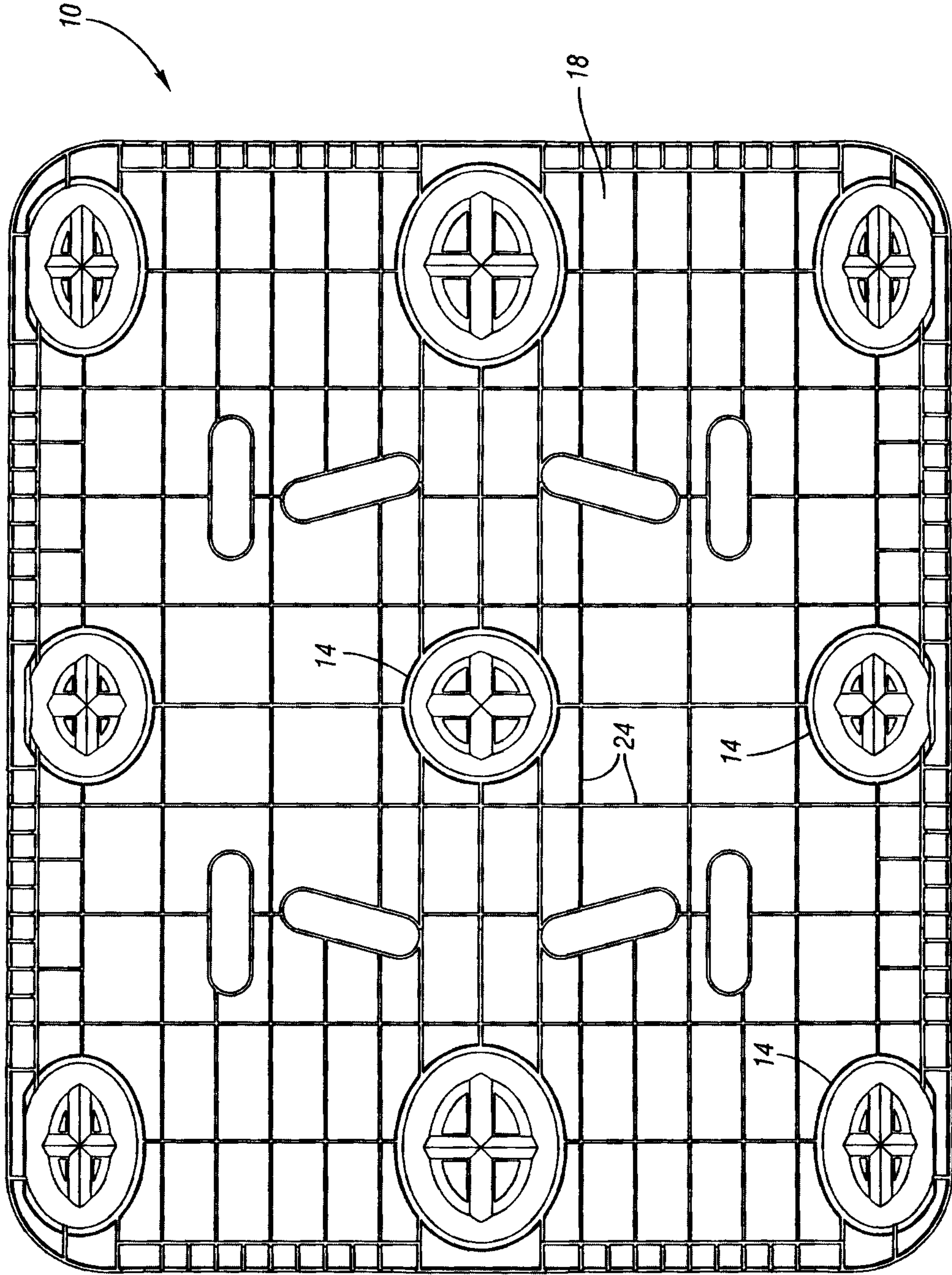


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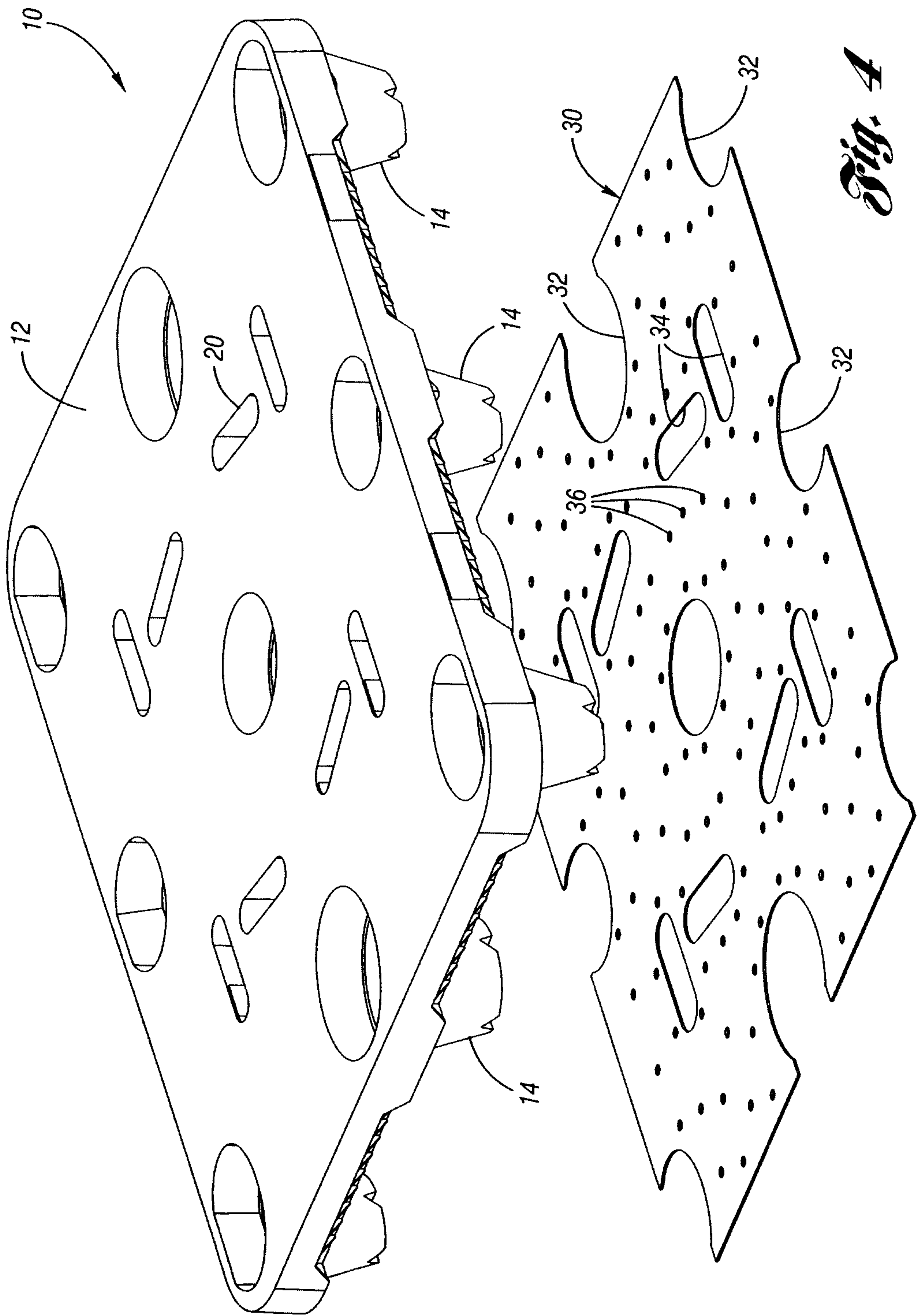
*Fig. 2*

3/8



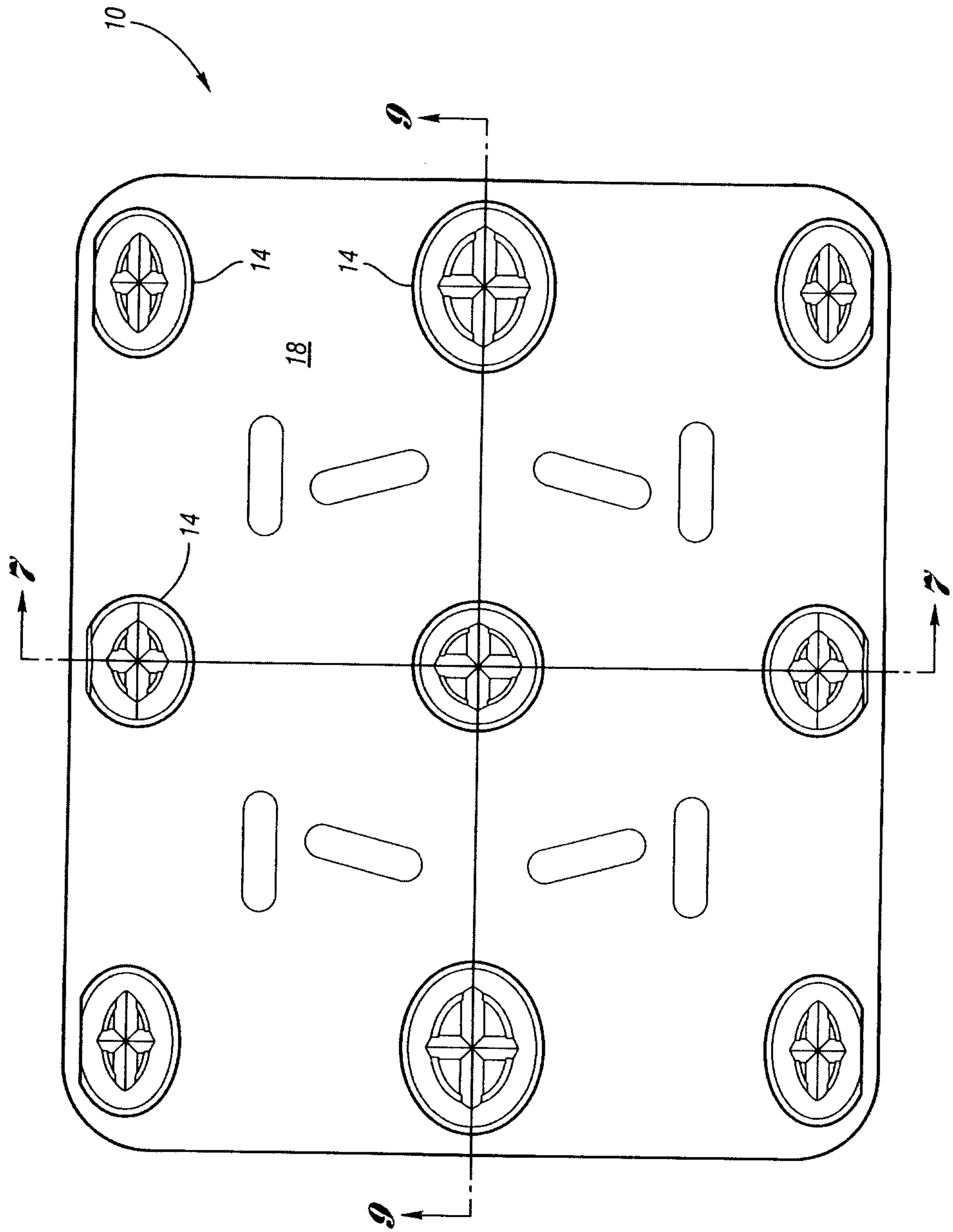
*Fig. 3*



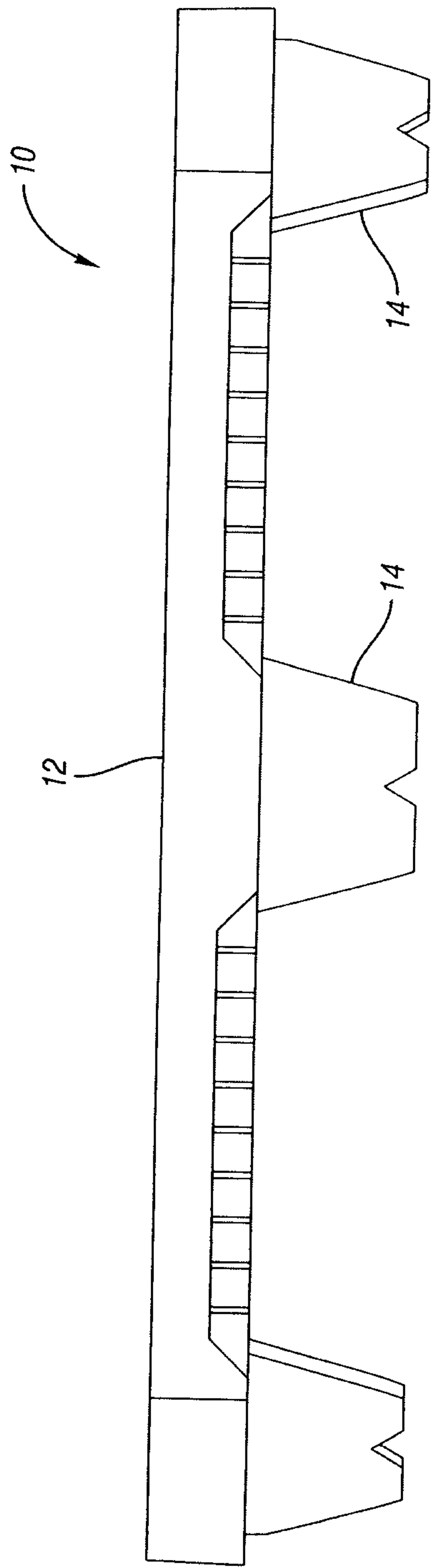


**Fig. 4**

5/8

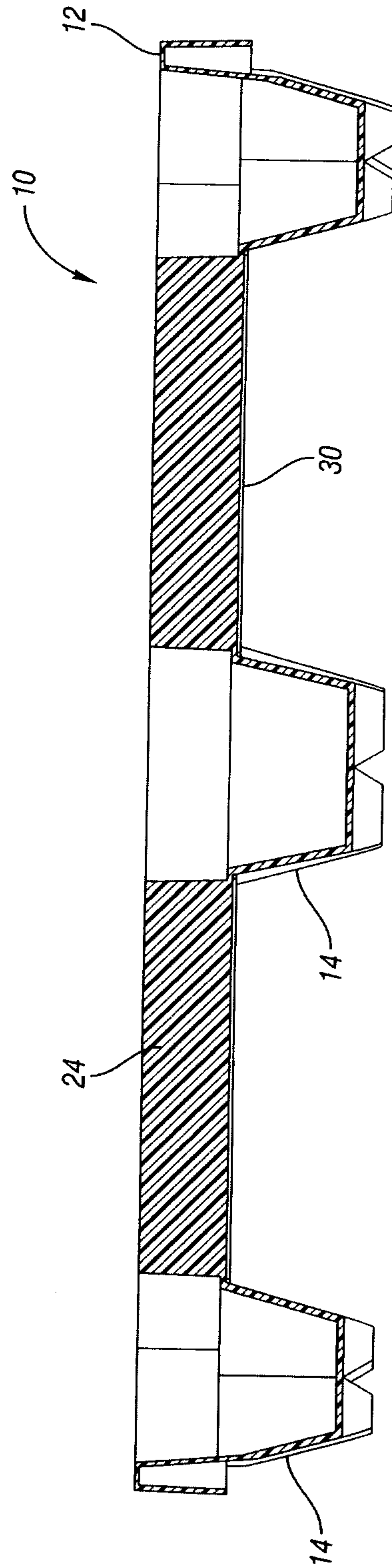


*Fig. 5*



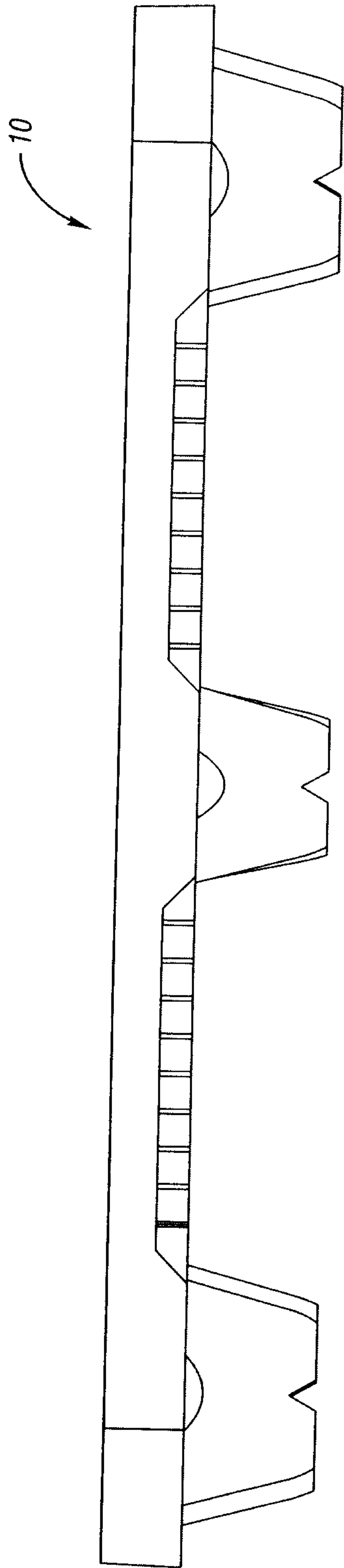
*Fig. 6*

6/8



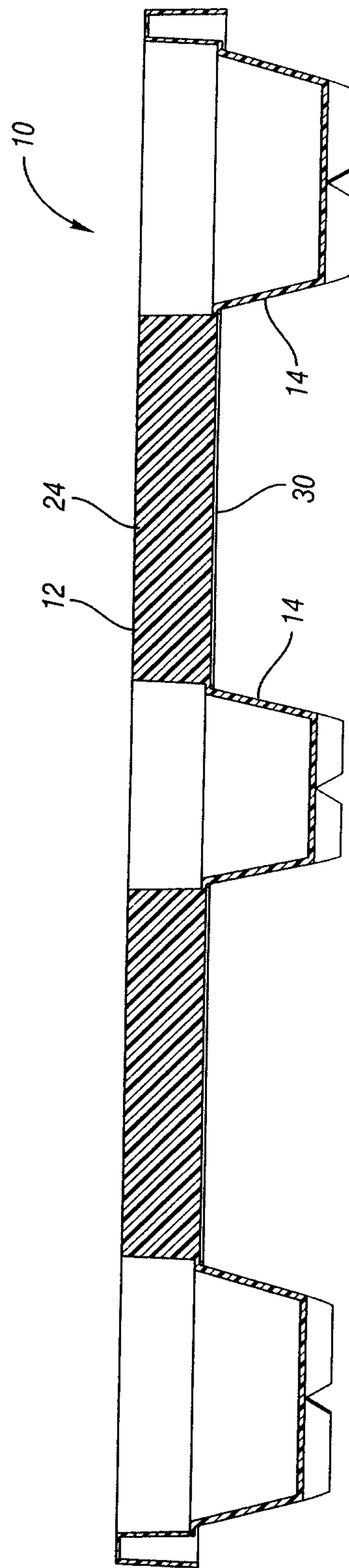
*Fig. 7*



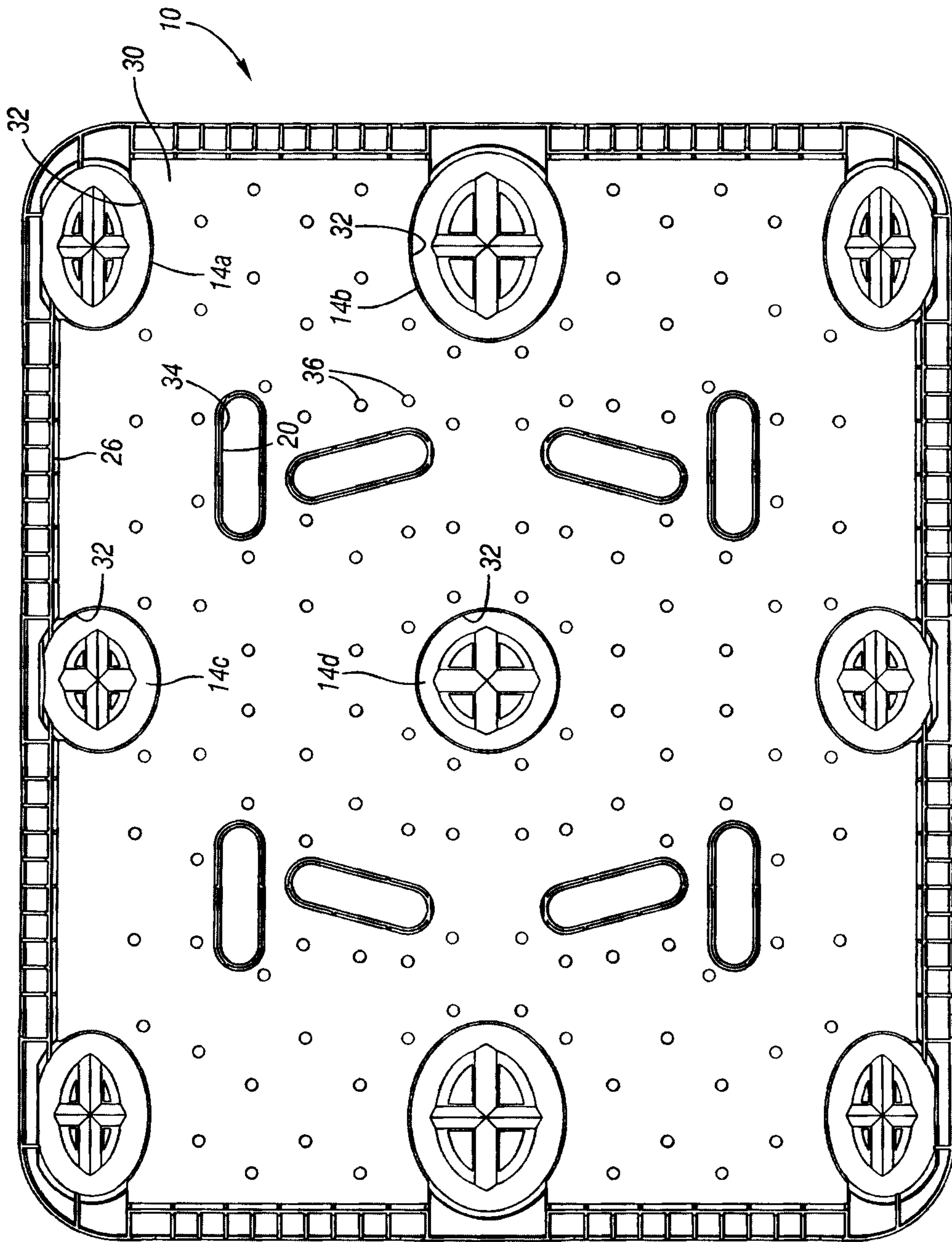


*Fig. 8*

7/8



*Fig. 9*



*Fig. 10*

