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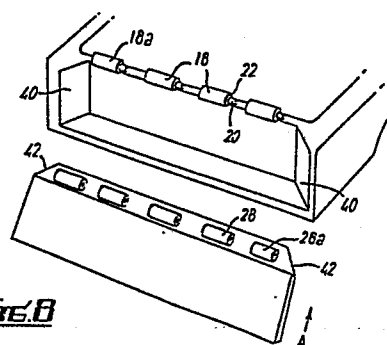
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54 Improvements in or relating to hinges.

57 A hinge intended especially but not exclusively for pivotally mounting a flap or bail arm to the side of a stackable/nestable container includes two leaves each provided with interfitting knuckles (18, 28), the knuckles of one leaf, with the exception of the outermost knuckle, having bosses (30) formed thereon adapted to be received in recesses (22) formed in the knuckles of the other leaf by snap fitting the bosses through slots (26) formed in the knuckles (22) of the other leaf, said outermost knuckle having a recess formed in its outer end rather than a boss, which receives a cylindrical pin also received in the adjacent recess.



Improvements in or relating to hinges

The present invention concerns improvements in or relating to hinges, especially but not exclusively hinges for stacking/nesting containers, for example bread trays.

The means for enabling a bread tray to be stacked on a similar bread tray often comprise a flap or bail arm arranged along a pair of opposed walls of the tray and pivotal from a position outside the top opening of the tray to a position across this top opening. When the flaps or bail arms are swung clear of the tray a similar tray can be nested therein whereas when they are swung over the tray a similar tray can be stacked thereon. Trays of this nature are disclosed in our co-pending U.K. Patent Application 8328387.

Where flaps are employed, especially when the trays are manufactured by a moulding from plastics materials, the hinges connecting the flaps to the respective sides of the tray are often difficult and expensive to manufacture. The specification of these hinges is high in that they must be robust, efficient in their operation, relatively tamper-proof and at the same time, relatively simple to manufacture and assemble.

According to the present invention there is provided a hinge comprising a pair of leaves provided with projecting knuckles arranged in interleaved relationship, the or each knuckle on a first leaf being provided with a recess in each end thereof and the or each knuckle of a

second leaf being provided with a protrusion at at least one end thereof so that with a protrusion accommodated in the recess of an adjacent knuckle one leaf is pivotable relative to the other, the knuckles of said first leaf being provided also with slots leading from the outer surface thereof to said recesses whereby a protrusion may be passed through a slot on interfitment of the leaves.

Preferably the said leaves and knuckles are manufactured from plastics material by injection moulding.

Preferably the recesses in the knuckles from the first leaf are cylindrical and extend through said knuckles. The slot in each knuckle of the first leaf preferably has a width less than the corresponding width of a protrusion whereby on deforming the knuckle the protrusion may be passed through the slot to be accommodated in the recess. The recesses may be frusto-conical rather than cylindrical.

Preferably there are at least three knuckles on the second leaf and the protrusions from the inner knuckles of the second leaf are frusto-conical bosses, having their maximum diameter at that part thereof adjacent the knuckle.

Preferably the outer knuckles of said second leaf have protrusions provided by pins mounted in a recess in the inner end of said knuckle, the diameter of the recess being substantially equal to the diameter of the recess in the knuckles of the first leaf. The pin may be cylindrical and removable and is preferably slidably mounted in the recesses of the outer faces of the end most knuckles of the first leaf and means are provided, after interfitment of

the first and second leaves for sliding said cylindrical member into the recess in the end most knuckles of the second leaf. No slots are provided in said knuckles which accommodate said slidable pin.

5 Preferably the leaves are formed integrally with the opposed sides and flaps of a stackable/nestable container manufactured by injection moulding from a plastics material.

In this instance the first leaf is formed integrally with a side of the container and the second leaf with a flap.

10 Preferably the slots in the knuckles in the first leaf is placed in the direction of the base of the container.

Preferably co-operating means are provided on the first and second leaves whereby the flap may be interfitted with the side only when it is disposed at ~~one~~ angular disposition relative to the side.

15 The present invention provides also a stackable/nestable container have a flap hinged to each of two opposed sides by a hinge as set out in any one of the preceding nine paragraphs.

20 An embodiment of the present invention will now be described by way of example only with reference to the accompanying drawings in which:-

Fig. 1 shows a partial plan of a stackable/nestable container with the stacking flap removed;

25 Figs. 2, 3, 4 and 5 show partial sectional elevations through the lines II-II, III-III, IV-IV, and V-V respectively.

Fig. 6 shows a plan of a flap for the tray, the left hand side being shown from the under side the right hand side from above;

Fig. 7 shows a view on the line VII - VII of Fig. 6 and

Fig. 8 shows diagrammatically the fitment of a flap to a container.

A stackable/nestable bread tray is manufactured by injection moulding from a plastics material and comprises a reticular base 10, front and rear walls (only the front wall 12 of which is shown in Fig. 1) and side walls 14 and 16. Flaps are hinged to the upper ends of the side walls 14, 16 and are pivotable from a position in which they lie alongside the outer surface of the walls 14, 16 to a position in which they overlie the top opening of the container. In the former position a similar container can be nested within the container whereas in the latter position a similar container can be stacked thereon. The hinges for pivotally attaching the flaps to the container sides are moulded integrally with the sides and the flaps. The first hinge leaf is moulded in with the side 14 and is provided with a plurality of spaced apart cylindrical knuckles 18 projecting therefrom, the endmost knuckles 18a being inwardly spaced from the front and rear of the tray. Circular cross-section recesses 20 extend inwardly from the end circular faces 22 of the knuckles 18 and can either take the form of a through passage as illustrated in Fig. 4 or a frusto conical recess as illustrated in Fig. 2, the recess terminating in a central partition 24. A slot 26 is provided on the underside of each knuckle and extends from the outer surface thereof to the recess. The walls of the slot converge inwardly and the width of the slot varies in accordance with the part of the passage 20 to which it leads.

The flap shown in Fig. 6 has the second leaf of the hinge formed therewith and is provided with cylindrical cross-section

knuckles 28 which are so dimensioned and spaced apart that when the flap is presented to the top of the side of the tray the respective knuckles interfit. The knuckles of the flap, with the exception of the end most knuckles 28a, are each
5 provided with frusto-conical or cylindrical protrusions 30 extending outwardly from their end faces 32, the end faces 32 of the end knuckles 28a being each provided with cylindrical recesses 34.

It will be realised that if a flap is placed with its
10 knuckles below the corresponding knuckles of the first leaf formed at the top of the side of the tray and the flap is pushed upwardly, owing to the resilience of the plastics material from which the tray is made the knuckles 18 of the
15 first leaf will deform outwardly to allow the protrusions 30 from the knuckles 28 of the flap to pass through the slots 26 until they are engaged in the cylindrical recesses 20. When they are so engaged the resilience of the material of the knuckles 18 causes them to return to their original position so that the hinge is locked in place.

20 To provide a first safety measure to prevent accidental or deliberate removal of a flap, a movable cylindrical hinge pin (not shown) is provided in the recess of the end-most knuckles 18a of the first leaf. After fitment of the flap this pin can be slid outwardly of the recess such that it
25 occupies the recess 34 formed in the end-most knuckle 28a of the flap. This prevents the flap from being removed from the side of the tray by pulling it such that the protrusions 30 are pulled through the slots 26.

A further safety measure is best seen in Fig. 8 and comprises angled surfaces 40, 42 provided at the ends of the first and second leaves. The angles of these surfaces correspond at only one position of the flap relative to the side of the tray (that is when it lies in the plane of arrow A) in which position the surfaces are parallel to the central axis of the slots 26, that is the direction of insertion of the flap on to the side. This provision means that the flaps can only be removed when they occupy one angular disposition relative to the sides and not only does this provide tamper-proof feature, but on carefully choosing the angle such that it is one which is not normally occupied by the flap in most operational conditions, accidental removal of the flap from the tray is prevented.

It will be realised that a hinge has been described above with reference to a bread tray but it is equally applicable to any other components which have to be hinged together or in fact may be provided as a hinge adapted for attachment to two components which have to be hinged together.

Various modifications can be made without departing from the scope of the invention. For example, the flap need not be moulded from plastics material, the protrusions need not be moulded integrally therewith but could be pins press-fitted into recesses.

CLAIMS:

1. A hinge comprising a pair of leaves provided with projecting knuckles arranged in interleaved relationship, characterised in that the or each knuckle (18) of the first leaf is provided with a recess (22) in each end thereof and the or each knuckle (28) of the second leaf is provided with a protrusion (30) at at least one end thereof so that with the protrusions accommodated in the recesses of adjacent knuckles one leaf is pivotal relative to the other, and in that the knuckles (18) of said first leaf are provided with slots (26) leading from their outer surfaces to their recesses whereby a protrusion may be passed through a slot on interfitment of the leaves.

2. A hinge as claimed in claim 1, characterised in that the said leaves and knuckles (18,28) are manufactured from plastics material by injection moulding, the recesses (22) in the knuckles (18) of the first leaf are cylindrical or frusto-conical and the slot (26) in each knuckle (18) of the first leaf has a width less than the width of a protrusion whereby on deforming the knuckle the protrusion may be passed through the slot to be accommodated in the recess.

3. A hinge as claimed in claim 1 or claim 2, characterised in that there are at least three knuckles (28)

on the second leaf and in that the protrusions (30) from the inner knuckles (28) are frusto-conical bosses, having their maximum diameter at that part thereof adjacent the knuckle.

4. A hinge as claimed in claim 3, characterised in that the outer knuckles (28a) of the second leaf have protrusions provided by pins mounted in a recess (34) in the inner end of the knuckle (28a), the diameter of the recess (34) being substantially equal to that of a recess (22) in a knuckle (18) of the first leaf adjacent to said outer knuckle (28a).

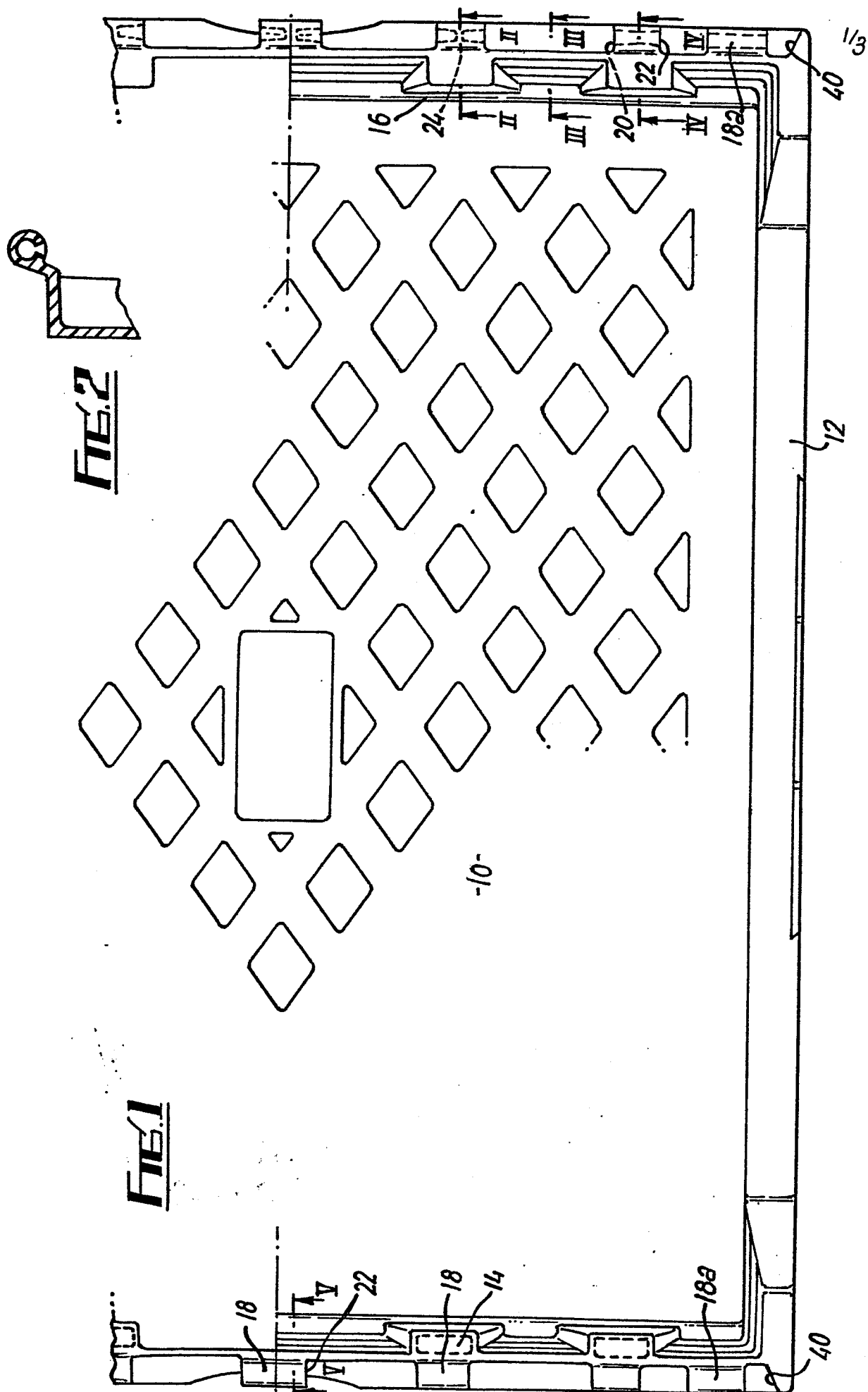
5. A hinge as claimed in claim 4, characterised in that the pin is slidably mounted in the recess of the outer face of the endmost knuckle of the first leaf.

6. A hinge as claimed in any one of the preceding claims, characterised in that the leaves are formed integrally with the opposed sides and pivotal flaps of a stackable/nestable container manufactured by injection moulding from a plastics material.

7. A hinge as claimed in claim 6, characterised in that the first leaf is formed integrally with a side (14,16) of the container and the second leaf with a flap and the slots (26) in the knuckles (18) in the first leaf face generally in the direction of the base (10) of the container.

8. A hinge as claimed in claim 6 or claim 7, characterised in that co-operating means (40,42) are provided on the first and second leaves whereby the flap may be interfitted with the side (14,16) only when it is disposed at one angular disposition relative to the side.

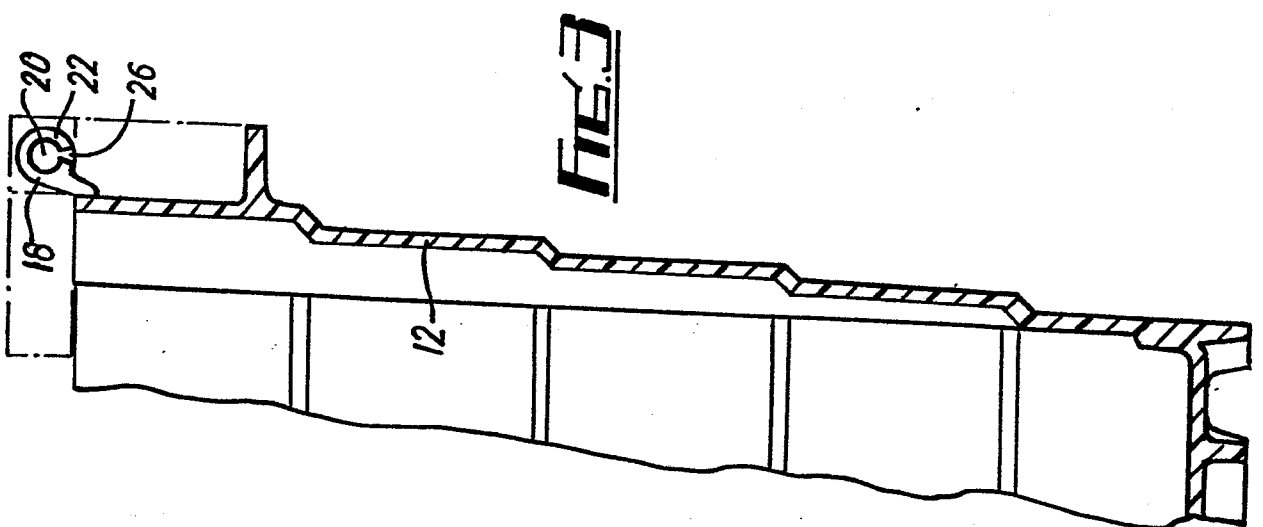
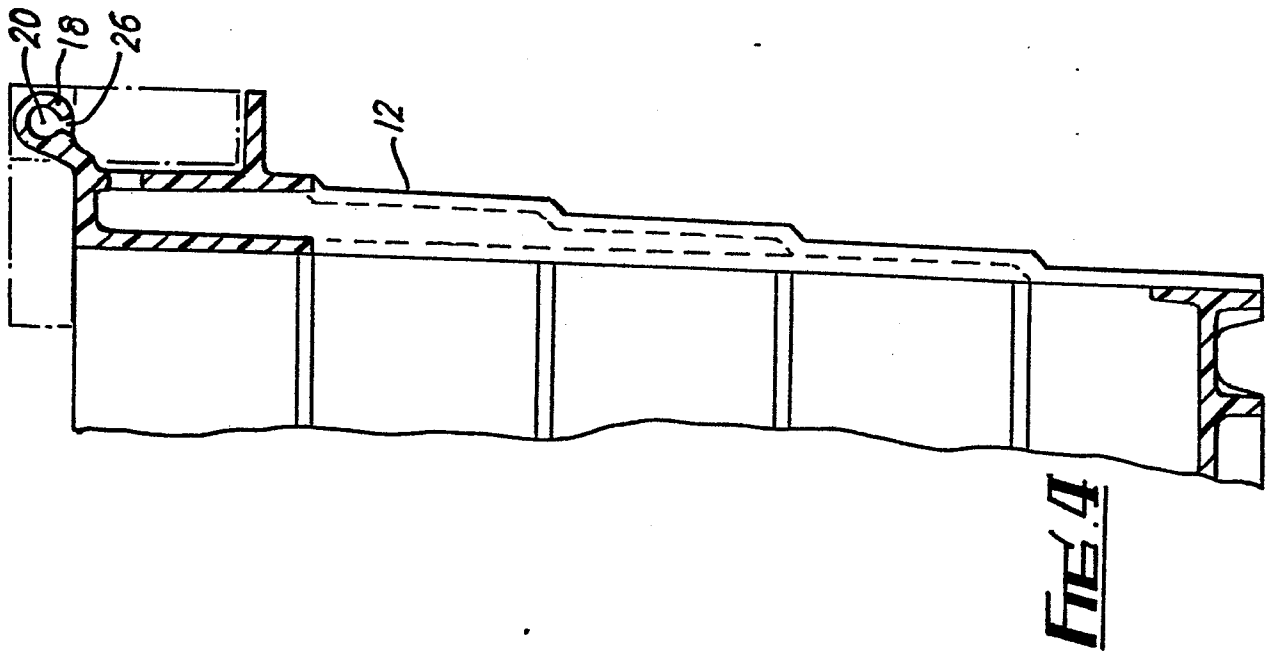
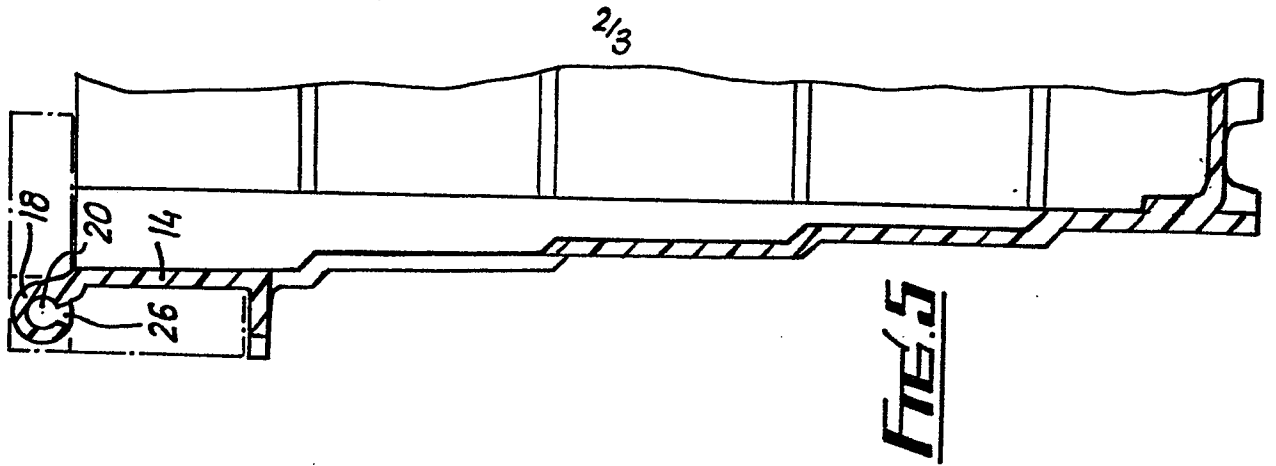
9. A stackable/nestable container including flaps pivotally mounted to two opposed sides at the top thereof characterised in that the flaps are mounted on the sides by hinges as claimed in any one of claims 1 to 5.



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FIG. 2

FIG. 1



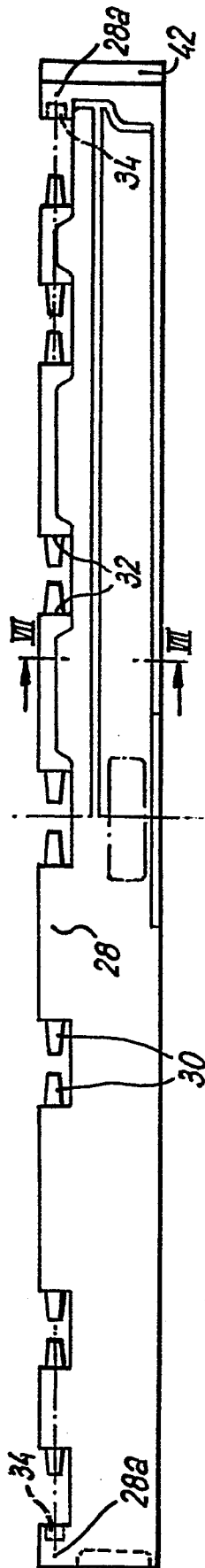


FIG. 6



FIG. 7

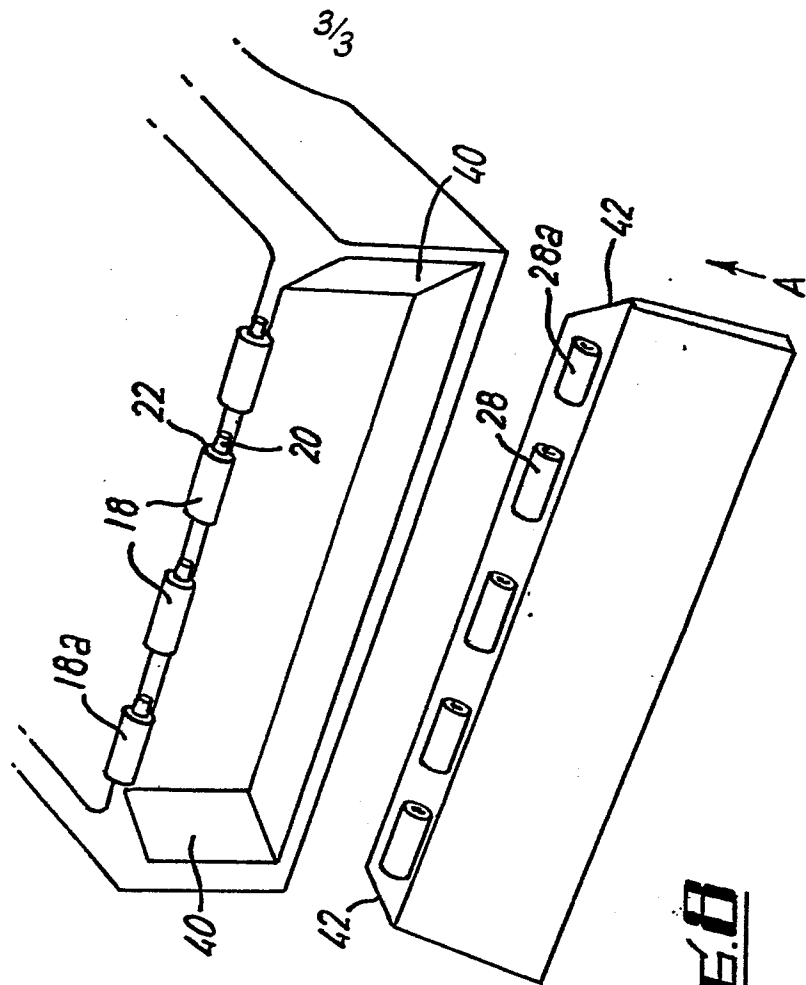


FIG. 8