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(54) **Tray, adapted for packing articles.**

(57) Tray, adapted for packing articles by means of shrinking foil, said tray (1) being substantially rectangular, having an apertured bottom and wavy, upstanding circumferential walls (3). The upstanding circumferential walls are provided with an outwardly directed flange (4) aligned with the waved top edge of the wall and ending at the location of the outermost tips (3'') of the waves.

Preferably the flange (4) is situated in a plane parallel to the bottom plane of the tray.

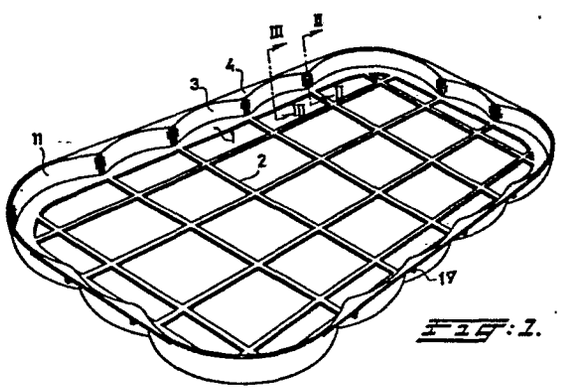

Fig. 1.

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Tray, adapted for packing articles.

The invention relates to a tray, adapted for packing articles, the entirety of the articles arranged on a single tray or between two similar trays being surrounded by shrinking foil, said tray being substantially rectangular, having an apertured bottom and having upstanding circumferential walls extending obliquely outwardly and being waved.

Such trays are known in various embodiments and for various applications. They are manufactured in plastic, which has amongst other things the advantage, as compared with cardboard, that it is not influenced by conditions of humidity, which is of great importance for certain applications, particularly in the foodstuff-industry.

Manufacturing the tray as an injection moulding product is particularly contemplated. The most important advantage of this, as compared with manufacturing in vacuum drawn plastic, is a great economy in material, particularly at the location of the bottom, because generally no great amount of material is required there. A bottom indicated as "apertured" is sufficient, thereby being understood a frame having a plurality of narrow strip-shaped connections.

A common disadvantage of virtually all existing trays which are used for packing articles whilst employing shrinking foil, is that the tray design is not sufficiently adapted to encircling by shrinking foil, so that at certain points the foil is weakened to much or may even be damaged.

The tray according to the invention is characterized in that the upstanding circumferential walls are provided with outwardly directed flange aligned with the waved top edge of the wall and terminating at the location of the outermost tips of the waves of the walls, such that a stark circumferential line of the tray as a whole, extending at minimum distance past said outermost tips of the waves, is obtained.

In this way it is attained that those places of the package which lie farmost at the outside, determining deformation and possibly damage, and against which the foil comes to lie, are formed by the stark edge of the flange which extends over the entire circumference, and with which the line of the outermost tips of the waves are aligned. Thereby one obtains such a uniform distribution of the tension that no unadmissible deformation will occur and therefore so much the less risk of damage exists.

By the tension in the foil the obliquely outwardly standing tray wall will, when the nature of the articles packed admits it, be urged inwardly, so that the greatest dimensions of the whole block of products in the final condition will only slightly exceed the outer dimension of the packed articles themselves.

Despite this fact the trays remain still nestable. The automatic denesting of a pile of trays is simple in an embodiment which is characterized in that at locations distributed along the circumference cams are provided at the bottom face of the flanges at a certain distance within the circumferential line thereof. In this way it is possible to insert one or more members of the denesting apparatus in the space between two flanges lying one on top of the other, this space being created by the provision of said cams, in order to remove the top-most tray in this way. The cams are lying at a sufficient spacing within the outer circumference of the flanges in connection with the fact that the upstanding tray walls, as indicated above, can be urged inwardly by the tension in the foil. As a matter of course the cams may then not cause local tensions in the foil by starting to project outside the deformed plane through the circumference of the flanges and the lines of the outermost tips of the waves.

The invention will hereinafter be clarified with reference to the accompanying drawing of several embodiments.

Fig. 1 shows perspectively a first embodiment of the tray;

fig.2 is a cross-sectional view according to the arrows II-II of fig. 1;

fig. 3 is a cross-sectional view according to the arrows III-III of fig. 1;

fig. 4a and 4b show cross-sectional views through the same tray

with various articles arranged in the tray, in either case in the left-hand half drawn in the condition before arranging the shrinking foil, and in the right-hand half with the foil in shrunken condition;

fig. 5, finally, shows perspectively part of an other embodiment of a tray.

The tray represented in fig. 1 comprises a substantially rectangular frame 1 within which there is a very coarse network of crossing sets of connection strips 2.

At all four sides an obliquely outwardly extending upstanding wall 3 is connected with the bottom 1, 2. This outer wall is waved. At the location of the waved top edge the wall 3 merges into an upwardly directed flange 4 which, in this embodiment, also extends horizontally, i.e. parallel to the bottom plane.

Fig. 2 gives a cross-sectional view through the wall at the location of an innermost tip 3' of the waves. In this figure the presence of the flange 4 is visible.

Fig. 3 is a cross-sectional view at the location of an outermost tip 3" of the waves in the wall. It is visible that the flange does no longer project outwardly beyond this line. The circumferential line 4' of the flange is aligned with the line representing the outermost tip of the wave. In this way sharp projecting parts are prevented, which might give rise to overtensioning and tearing of the foil.

In fig. 4a a cross-sectional view through the tray is visible, with diagrammatic indication of the outlines of two glass jars such as 5, having a rounded portion 6 where the bottom face passes into the circumferential wall. For this example of application the place of contact, indicated by 7, between the curved edge 6 of the jar and the waved tray wall 3 will be situated rather high, i.e. practically close to the top edge of the wavy wall 3, so the flange. When a foil is shrunk around the whole, as indicated diagrammatically in the right-hand half of fig. 4a, there will be hardly any deformation of the upstanding tray wall 3, or no deformation at all, at the location of the outwardly directed wave in which a jar is contained, whilst nevertheless such foil 8 will be situated at very short spacing from the jar 5. In the inwardly directed waves, between the locations where the jars are, the edge will be drawn somewhat more inwardly by the foil. The final exterior dimensions of the packed block will exceed only very little the dimensions of the group of jars proper which has been packed.

In fig. 4 the application of packing two tins 9 is visible. In this case the lower folded edge 10 of each tin will be situated in the bottom corner against the oblique upstanding wall 3. Close to the top edge the wall therefor remains at some spacing from the circumference of the tin. When shrinking the foil 8 the wall will, as indicated diagrammatically in the right-hand half of fig.4b, be urged inwardly under the influence of the tension in the foil. Therefore, in this way, the exterior dimensions of the entirety will become less than the exterior dimensions of the unpacked tray. Also in this case one attains that the final

total dimensions of the packed block will only little exceed the dimensions of the packed tins themselves.

Reverting to fig. 1 it is visible that in the corners the wavy walls merge into one another in a rounded shape 11. The embodiment represented in fig. 1 is adapted for packing relatively big articles such as those which indeed have been drawn in fig. 4a and 4b. In the rounded corner such as 11 such an article can then be placed, substantially the same diameter will thereby be given to this rounded corner as the one of the articles. Thus, with the embodiment drawn, there can be placed two jars or tins one beside the other at the shorter side, and three at the longer side. Between those waves in which an article is situated, there is always one more wave in the wall.

The second embodiment, which has been drawn in part in fig. 5, is adapted for packing articles having a smaller diameter. More particularly articles are contemplated which are so small that they fit within the first outwardly directed wave 12 at the longer side, 13 respectively at the shorter side, subsequently an article in the third outwardly directed wave 14, etc. The waves in this embodiment have furthermore been styled into wall portions, such as indicated by 15, substantially flat in themselves, and zigzagging to and fro. Again the structure of the flange 4 meets the same requirements as those defined above for the first embodiment.

The rounded corner 16 in this embodiment, however, has a much

smaller radius, especially a radius which is much smaller than the one of the articles to be packed, because here it is not the intention that the articles are placed in this rounded corner. It is pointed out, though, that the embodiment according to fig. 5 is not only adapted for packing a greater number of smaller articles, but for example also for packing articles like books. The books in this case lie confined between the inwardly directed tips of the waves in the wall, but the corners, which are the most sensitive, are kept free by the outwardly directed roundings like 16.

In fig. 1, 17 indicates one of the cams provided at the bottom face of the flange in order to enable nesting and denesting of the trays.

In the appended claims the reference numerals have been included only in order to facilitate a quick understanding; they must in no way be construed as constituting a limitation whatsoever of the scope of protection of the claims.

Claims:

1. Tray, adapted for packing articles, the entirety of the articles arranged on a single tray of between two similar trays being surrounded by shrinking foil, said tray (1) being substantially rectangular, having an apertured bottom and having upstanding circumferential walls (3) extending obliquely outwardly and being waved, characterized in that the upstanding circumferential walls (3) are provided with an outwardly directed flange (4) aligned with the waved top edge of the wall and terminating at the location of the outermost tips (3") of the waves of the walls, such that a stark circumferential line of the tray as a whole, extending at minimum distance past said outermost tips of the waves, is obtained.

2. Tray, according to claim 1, characterized in that the flange (4) lies in a plane parallel to the plain of the bottom of the tray.

3. Tray, according to claim 1 or 2, characterized in that at locations distributed along the circumference cams (17) are provided at the bottom face of the flanges at a certain distance within the circumferential line thereof.

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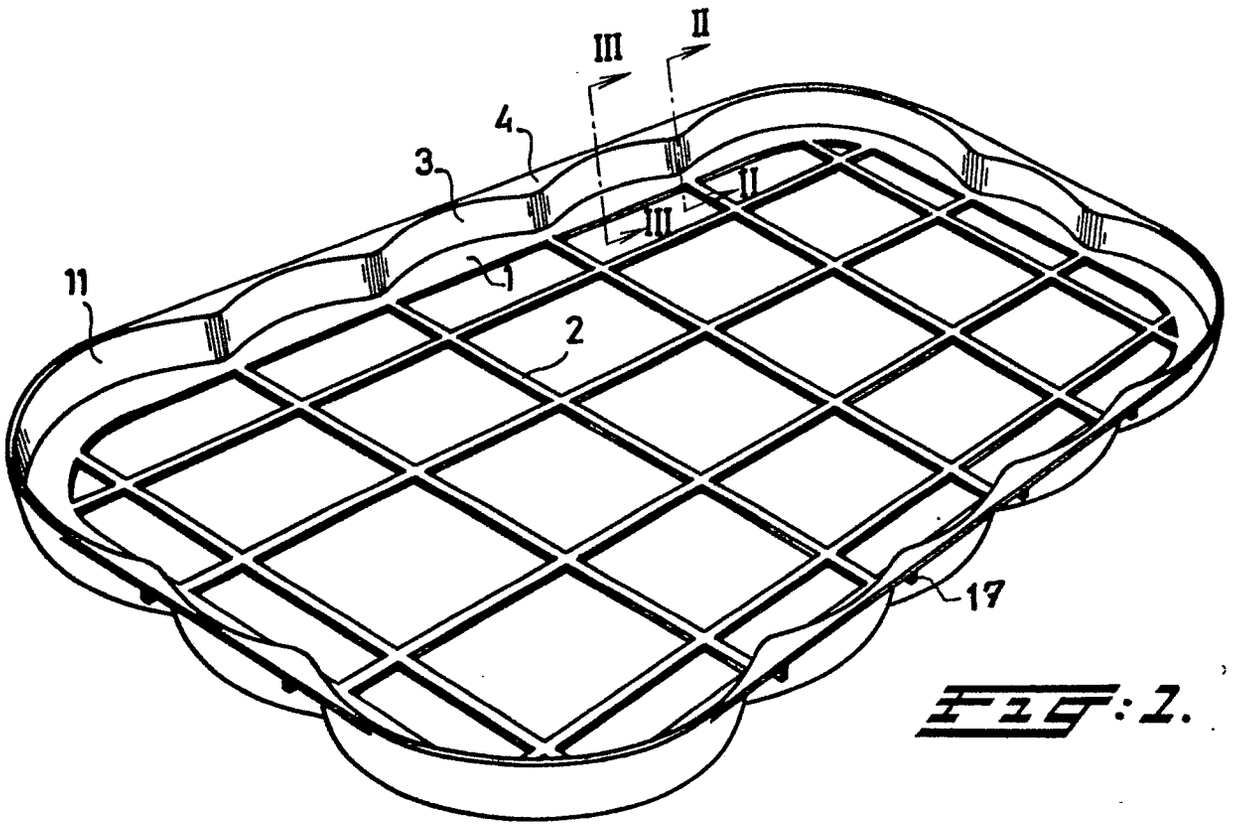

Fig: 1.

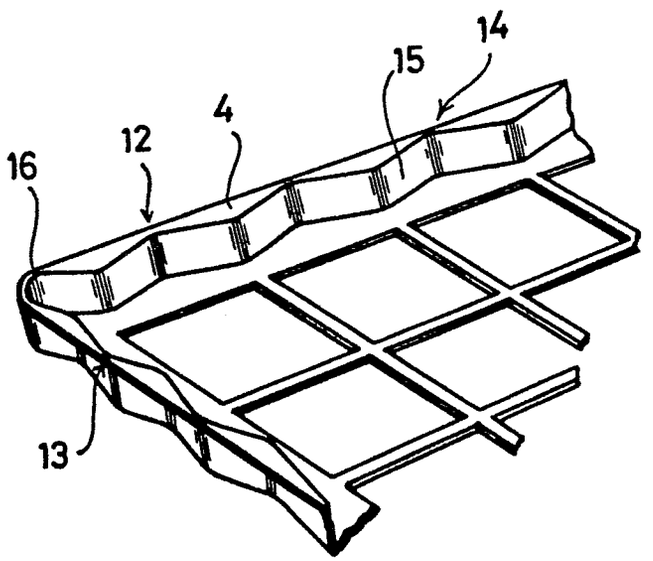

Fig: 5.

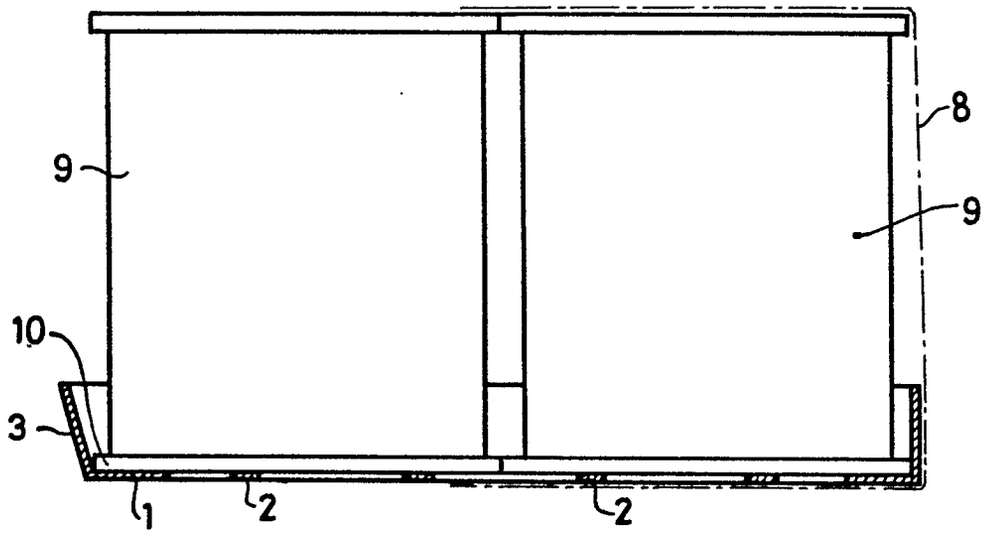

Fig: 4b.

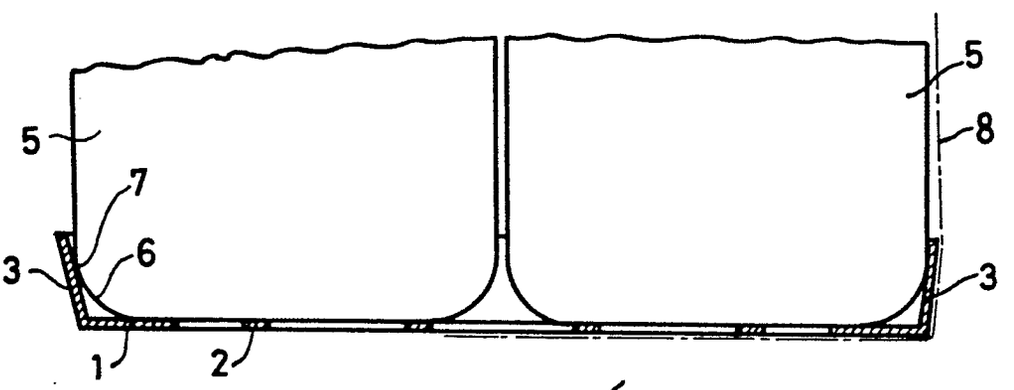

Fig: 4a.

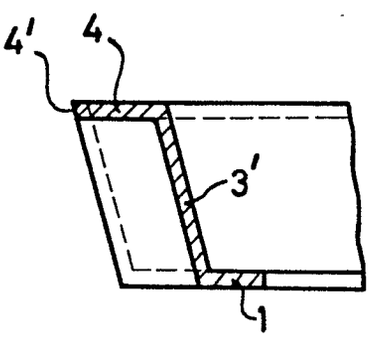

Fig: 2.

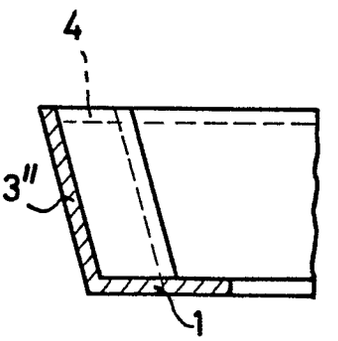

Fig: 3.

European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 82 20 0442

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	FR-E- 91 139 (KEYES) *The whole document* ---	1-3	B 65 D 71/00 B 65 D 1/34
X	FR-A-2 351 026 (VATTO) *Page 6, line 40 to page 7, line 19; figures 10-13* -----	1-3	

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13-07-1982	MARTIN A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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