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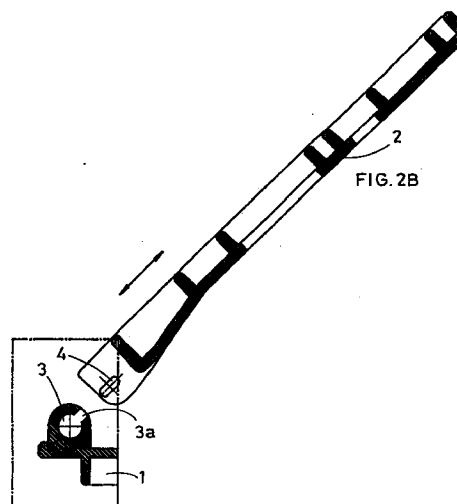
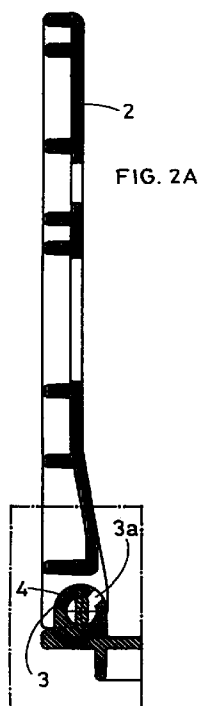
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(54) **Moulded plastic box with collapsible sides which are easily joined to the bottom supporting wall**

(57) This invention concerns a plastic moulded box with removable sides (2) which can easily be joined to the sides (2) and folded against the bottom supporting wall (1) when the box is not in use in order to reduce the overall sizes of the box.



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Description

[0001] This invention concerns a moulded plastic box with collapsible sides which can easily be joined and disjoined from the bottom supporting wall.

[0002] Plastic moulded boxes are today very commonly used; this type of container is extremely practical in that it is light, sturdy and inexpensive.

[0003] In order to facilitate storage and transport of these boxes, for some time now models have been available on the market with sides which fold inwards; in particular these sides can be rotated from the vertical to the horizontal axis until they are parallel and lie over the centre bottom wall.

[0004] It is evident that when these boxes are not used, they transform into a three layer "packet": the first and bottom layer consists of the bottom wall, the second and middle layer consists of the two transverse sides and the third and overlying layer consists of the two longitudinal sides.

[0005] In the existing models of boxes of this kind different structural solutions have been adopted in order to fold the four sides.

[0006] Both monoblock boxes (those with sides combined to the bottom during moulding) and boxes with removable sides with respect to the bottom have been provided with this characteristic.

[0007] In the case of boxes with monoblock structure the connection between the bottom horizontal edge of each side and the underlying bottom is realised by means of a longitudinal diaphragm having reduced thickness in the same plastic material used to mould the box; it is evident that the diaphragm is obtained by appropriately presetting the mould for boxes of this type.

[0008] The reduced thickness of said connection diaphragm in fact allows each side to rotate freely by 90° from vertical to horizontal position and vice versa, with respect to the bottom.

[0009] This solution however is not altogether satisfactory in view of the complexity and costs for preparing the mould required to produce a bulky and sophisticated item like a box complete with sides which are collapsible.

[0010] Moreover the diaphragms which connect the bottom to the sides are subject to rapid wear due to the repeated alternated folding of the same, and consequently may be damaged to the extent that the sides come away.

[0011] In the case of boxes with removable sides the various components are moulded separately (bottom and sides) and this considerably reduces the presetting operations of the moulds; this technology also permits replacing single components which may be damaged without having to throw away the entire box, as in the case of the monoblock boxes.

[0012] It should be noted however that the existing boxes with removable sides are penalised by the rather complex and lengthy method of connecting the sides

and bottom which to date have always been press fitted together.

[0013] Very frequently, a series of pivoting pins with horizontal axis which are forced into relevant pairs of jaws on the perimeter edges of the bottom have been realised along the bottom horizontal edge of the sides.

[0014] It is evident that said pins must rotate in the corresponding jaws so as to fold the sides by 90° as required.

[0015] In order to disjoin the sides from the bottom, the same must be pulled out in order to extract the pivoting pins from the jaws on the bottom.

[0016] The purpose of this invention is to produce a plastic moulded box with collapsible removable sides whereby the same can be joined and disjoined from the bottom quickly and easily and above all without forcing, as in the case of the press fitting solutions used in similar prior items.

[0017] The way in which the sides and bottom are joined also ensures great structural stability to the box as a whole and eliminates the possibility that the sides may fall out when the box is used.

[0018] To ensure these features to the box according to the invention, the bottom horizontal edge of each of the sides is provided with several upside down "L" shaped notches which form respective longitudinal rectangular fins positioned edgewise.

[0019] The perimeter edges of the bottom are provided with several cylindrical notches arranged transversally in positions corresponding to those of the above fins.

[0020] Each of these is provided at the centre with a circular hole whose diameter is slightly larger than the height of said fins, as well as a 45° entry slot to the centre hole; a notch which faces upwards and inwards with respect to the box.

[0021] In order to join a side of the box according to the invention to the supporting bottom, it is sufficient to fit the fin provided on the bottom edge of the side into the 45° slot of the corresponding notches provided on the edge of the underlying bottom; the side is then pushed forwards until the same fits into its fins in the circular holes of the cylindrical notches.

[0022] It is evident that during this operation, the sides must be kept at an angle of 45° with respect to the horizontal plane of the bottom since only in this way is it possible to perfectly align the above fins with the slots on the notches on the bottom wall.

[0023] Once the same have been housed into the holes of the corresponding slots, the fins can then be turned as a result of the rotations - from vertical to horizontal position and vice versa - of the sides to which they belong in that the height of each fin is slightly less than the diameter of the centre hole of the corresponding slot.

[0024] It is evident that the fins act as pins which allow the rotation of the sides; in the same way it is evident that for each fin the relevant slot acts as a hub which

guides and houses the alternating rotations.

[0025] Moreover each fin-slot pair acts to all effects and purposes as a hinge which allows a 90° rotation of the sides with respect to the bottom of the box according to the invention.

[0026] In order to disjoin the sides from the bottom it is sufficient to return the side to an angle of 45° in order to align the fins to the notches of the corresponding slots on the bottom; having done this it is sufficient to pull the fins away from the slots by pulling the side gently backwards.

[0027] As mentioned previously, this easy joining and disjoining of the sides and bottom walls also makes the box according to the invention very practical and safe to use as a whole; it is evident in fact that the accidental disjoining of the box components in question can not occur while the sides are in the two end of stroke operating positions: in other words the vertical and horizontal positions.

[0028] The reason is that in these positions the fins of the sides are not aligned to the notches at 45° of the corresponding slots and can therefore not escape from the latter.

[0029] For major clarity the description of the invention continues with reference to the enclosed drawings which are intended for purposes of illustration and not in a limiting sense, where:

- figure 1 is a half cross-section view of the box according to the invention with two special blow-ups of which the one on the right is a cross-section on a vertical plane;
- figures 2A, 2B and 2C illustrate the same number of cross-sections on a vertical plane of a collapsible side in three different positions and the section of the bottom wall on which one of the housing slots of the side is realised;
- figure 3 is the cross-section on a longitudinal vertical plane of a section of the bottom edge of a side on which a fin is realised;
- figure 4 is the cross-section on a longitudinal vertical plane of a section of the bottom on which a cylindrical slot is realised.

[0030] With reference to figure 1, the box in question consists of a conventional supporting bottom (1) and four sides (2):

[0031] The four perimeter edges of the bottom (1) are provided with cylindrical transverse slots (3); each of the slots (3) being provided with a 45° slot (3a) facing upwards and inwards with respect to the box.

[0032] The bottom horizontal edge of each side (2) is provided with several upside down "L" shaped notches (4a) which create the same number of horizontal rectangular longitudinal fins (4).

[0033] It should be noted that the positioning of the slots (3) on the four edges of the bottom wall (1) corresponds precisely to the position of the fins (4) realised

on the four sides (2); it should also be noted that the height of each fin (4) is slightly less than the diameter of the holes of each slot (3).

[0034] As mentioned previously, the fins (4) on the sides (2) fit into the notches (3a) of the corresponding slots (3) provided on the bottom wall (1) so that the same are housed precisely into the centre hole on the respective slots (3).

[0035] Once the fins (4) have been housed as above, the same can rotate together with the relevant side (2) in that they are guided and housed by the slots (3).

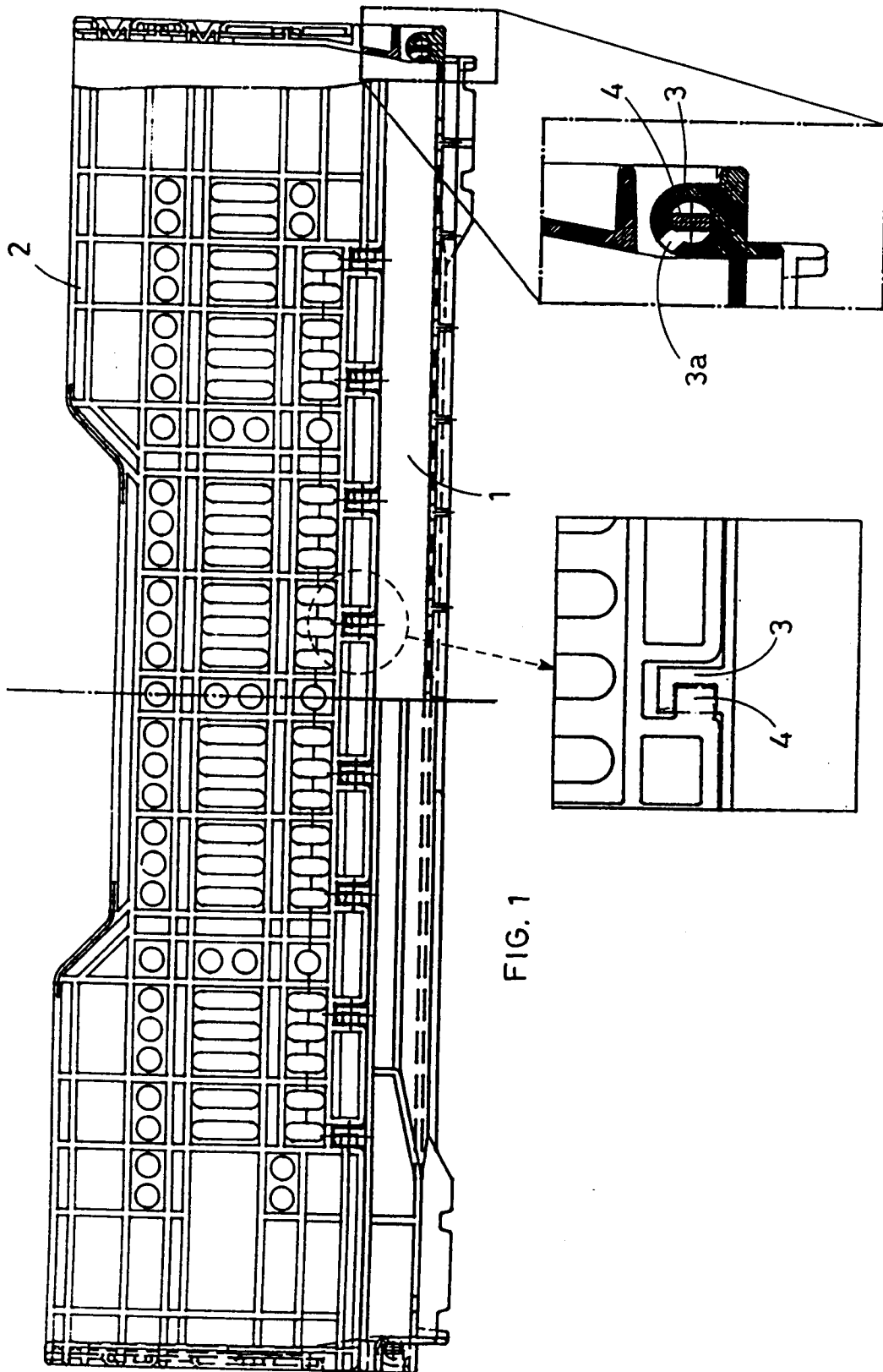
[0036] Figure 2B illustrates the 45° angle that a side (2) assumes in order to fit its fins (4) into the notches (3a) of the corresponding slots (3).

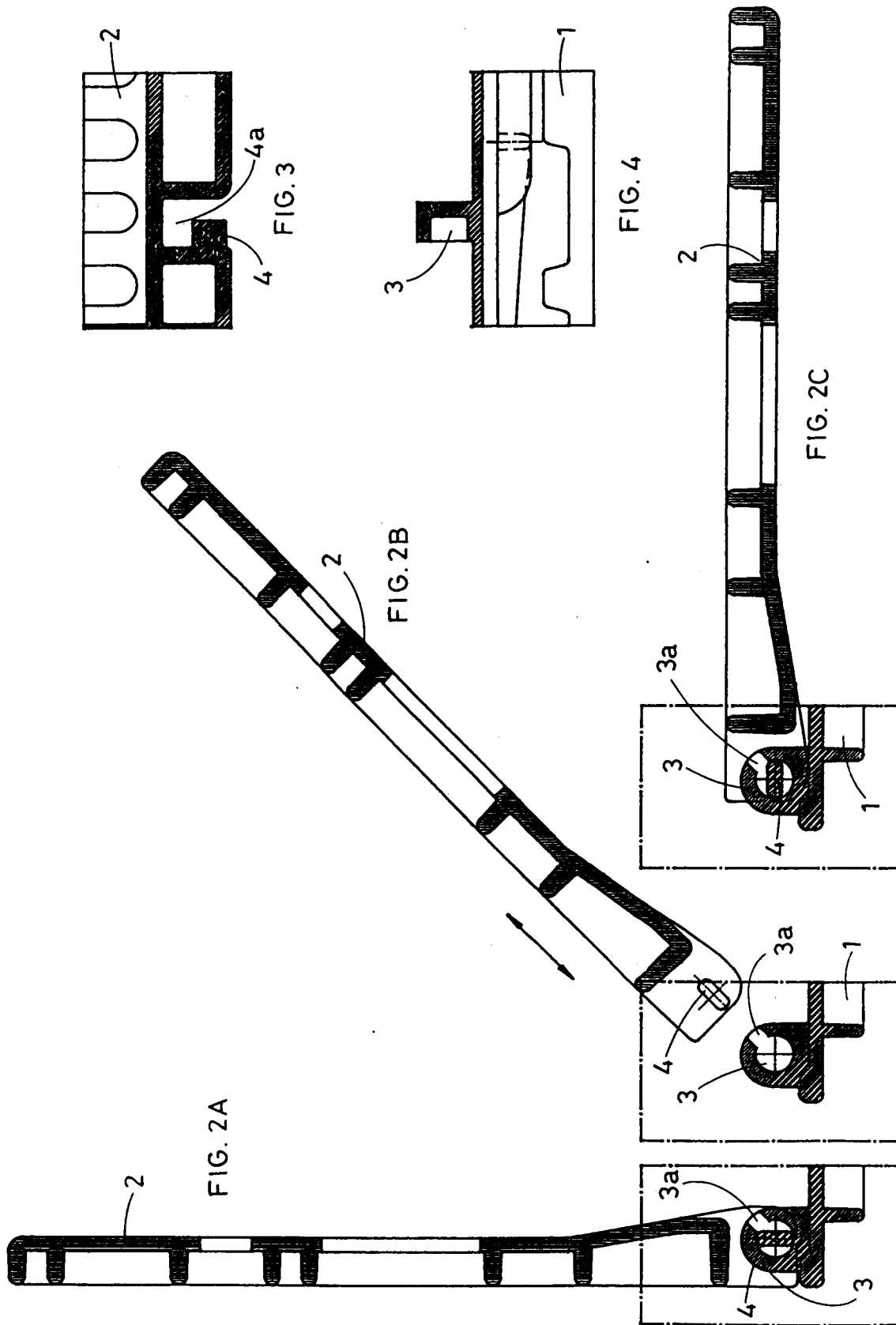
[0037] Figures 2A and 2C illustrate respectively the side (2) in vertical position when the box is in use and in horizontal position when the box is not in use; these two figures also illustrate the position assumed, in the two different situations, by one of the fins (4) of the side (2) with respect to the notch (3a) of the respective housing and guide slot (3).

[0038] It follows from the above that the side (2) can not accidentally disjoin from the relevant bottom wall (1) when the same is in vertical or horizontal position in that in these cases the fin (4) and notch (3a) of slot (3) are not aligned and the situation whereby the fin (4) of the slot (3) can slide out does not occur.

Claims

1. A moulded plastic box of the type provided with four removable and collapsible sides characterised in that the four perimeter edges of the bottom wall (1) are provided with several transverse cylindrical slots (3) each of which is provided with a 45° slot facing upwards and inwards; it being provided that the bottom horizontal edges of the four sides (4) are provided along the edges of the bottom (1) with several upside down "L" shaped notches (4a) in position corresponding to those of the slots (3) so as to create the same number of horizontal rectangular longitudinal fins (4) and having a height slightly less than the diameter of the hole of each slot (3).







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EUROPEAN SEARCH REPORT

Application Number
EP 97 83 0736

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.6)
A	US 5 515 987 A (JAQUES) 14 May 1996 * column 3, line 1 - line 31; figures 1-8 *	1	B65D6/18 E05D7/10
A	EP 0 662 426 A (TETRA LAVAL) 12 July 1995 * figures 1-5 *	1	
A	US 3 870 185 A (SANDERS) 11 March 1975 * column 3, line 56 - column 4, line 20; figures 10-12 *	1	
A	DE 79 22 398 U (OSTHUES & BAHLMANN) 8 November 1979 * figure 4 *	1	
A	DE 88 12 137 U (AHA-PLASTIC KARL KREIM) 17 November 1988 * figures 1-4 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65D E05D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23 November 1998	Examiner Berrington, N
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