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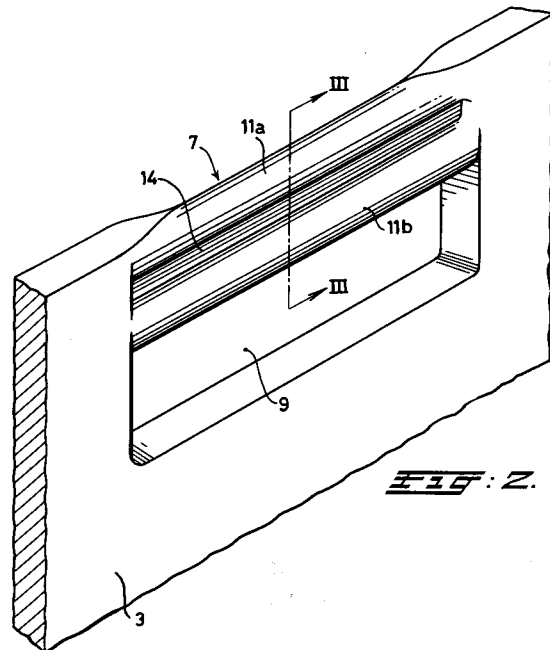
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Plastic crate with partially hollow handle.

In a plastic crate with a bottom (1) and vertical side walls (2-5), at least one of the side walls (2; 3) is provided near the top side with a handle (6; 7) bounded at the bottom side by a handle opening (8; 9). The handle (6; 7) is integral with the rest of the crate and is made partially hollow. The cavity in the hollow part (11a,11b) is the shape of an elongated channel (12a,12b) which is surrounded by wall parts (13a,13b) together forming an essentially closed wall. The channel-shaped cavity is U-shaped. The legs of the U run parallel to the bottom (1) of the crate, and the wall parts of the legs of the U-shaped cavity form the top and bottom part of the handle (6; 7). Adjacent wall parts of the channel-shaped cavity are connected to each other by a connecting wall part (14,14').



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The present invention relates to a plastic crate with a bottom and vertical side walls, in which at least one of the side walls is provided near the top side with a handle bounded at the bottom side by a handle opening.

In plastic crates efforts are made to keep the thickness of the walls as low as possible, so that the wall thickness of the handle will also be relatively low. This means that special requirements have to be set for the shape of the handle, so that, on the one hand, the filled crate can be carried as pleasantly as possible and, on the other, the handle is strong enough to bear the weight of the filled crate. Various solutions to this problem have been put forward, but they all have certain disadvantages.

In a first solution the handle is formed as a U-shaped section with the open side outwards. This design is good per se, but it is visually not very attractive due to the fact that a recessed area can be seen on the outside of the handle. Besides, such a handle is difficult to clean.

In another solution the handle is also formed as a U-shaped section, but the open side now faces inwards. This designed can be produced only with complex and fragile moulds, and is therefore little used.

Crates with a completely hollow handle are also known. In a certain embodiment of such a known crate the handle is a separately pre-moulded hollow part which is connected to the remainder of the crate while the crate is being moulded. A problem occurring here is, however, that the most heavily loaded part of the crate lies precisely at the position of the transition between the handle and the rest of the crate, which makes the production of the crate extremely critical and reduces the reliability. Another embodiment of a known crate with hollow handle is formed by rotational moulding. However, the moulding of a crate by rotational moulding takes a long time, and is not economically attractive for very large series.

The object of the present invention is to provide a plastic crate with a handle which is strong, lies easily in the hand, and can be moulded in an economical manner.

This object is achieved in the case of a plastic crate of the type mentioned in the preamble in that the handle is integral with the rest of the crate and is made partially hollow, the cavity in the hollow part being the shape of an elongated channel which is surrounded by wall parts together forming an essentially closed wall.

In a plastic crate according to the invention the hollow part of the handle can be fitted at such a place that the handle lies easily in the hand and also has the required strength. Due to the fact that

the cavity is the shape of an elongated channel, it is possible to mould the handle in a technically and economically advantageous manner.

Preferred embodiments of a crate according to the invention are claimed in the sub-claims.

The invention is explained in greater detail in the example of an embodiment which follows with reference the drawing, in which:

Fig. 1 is a view in perspective of a plastic crate according to the invention;

Fig. 2 is a view in perspective and on an enlarged scale of a handle part of the crate of Fig. 1, viewed from the inside of the crate;

Fig. 3 is a cross-section on a further enlarged scale of the handle of Fig. 2, along the line III-III in Fig. 2;

Fig. 4 is a longitudinal section on the same scale as in Fig. 3 of the handle of Fig. 2, along the line IV-IV in Fig. 3; and

Fig. 5 is a cross-section similar to Fig. 3 of a slightly modified embodiment of a handle of a crate according to the invention.

The crate shown in Fig. 1 comprises a bottom 1, two long vertical side walls 2 and 3, and two short vertical side walls 4 and 5. The side walls of the crate are made double-walled. The two long side walls 2 and 3 lying opposite each other are each provided at the top side with a handle 6, 7 respectively, which at the bottom side is bounded by a handle opening 8, 9 respectively.

The handles 6 and 7 are integral with the rest of the crate and are made partially hollow.

In Fig. 2 the handle part with the handle 7 is shown on an enlarged scale, the hollow part being indicated by the reference numbers 11a and 11b.

As indicated in Figs. 3 and 4, the cavity in the hollow part 11a, 11b is in the form of an elongated channel 12a, 12b which is surrounded by wall parts 13a, 13b together forming an essentially closed wall. In the embodiment shown, the channel-shaped cavity 12a, 12b is U-shaped, and the wall parts 13a, 13b form, as it were, a U-shaped tube. The channel-shaped cavity 12a, 12b has an essentially round cross-section. The legs of the U run parallel to the bottom 1 of the crate, and the wall parts 13a and 13b of the U-shaped channel 12a, 12b form the top and bottom part of the handle 7. A handle formed in this way lies well in the hand, so that great carrying comfort is achieved.

The wall parts 13a, 13b of the U-shaped channel 12 are connected to each other by a connecting wall part 14. In the embodiment of Figs. 3 and 4 this wall part 14 lies on the outside of the crate, with the result that the handle 7 on the outside of the crate is smooth.

The handle 6 is designed in the same way as the handle 7.

It is pointed out that the side walls 4 and 5 of the crate can also be provided with a handle, like the handles 6 and 7.

As indicated in Fig. 5, in a modified embodiment of a handle according to the invention the wall part 14' connecting the wall parts 13a, 13b can also be provided approximately in the longitudinal centre plane 15 of the handle. The advantage of this is that the stress distribution in the handle is better.

In the embodiment shown the channel-shaped cavity 12a, 12b is the shape of a U. The channel-shaped cavity can, however, be other shapes, for example the shape of a Z or an S.

A handle of a crate designed in the manner described above lies easily in the hand and can be formed in a technically and economically advantageous manner. A method for forming a handle according to the invention is described in Applicant's Netherlands patent application No. 9002483 entitled: "Method and device for forming a cavity in a plastic injection-moulded product".

In the example of an embodiment the invention is described for a crate of a particular shape. The invention is not, however, limited to such a crate, and can equally well be used for crates or trays of a different shape and different dimensions, provided with a framework or not.

Claims

5. Crate according to any of claims 1 - 4, **characterised in that** in the plane of the handle (6; 7) adjacent wall parts (13a; 13b) of the channel-shaped cavity (12a, 12b) are connected to each other by a connecting wall part (14; 14').
 6. Crate according to claim 5, **characterised in that** the connecting wall part (14) lies in the outside face of the respective side wall (2, 3) of the crate.
 7. Crate according to claim 5, **characterised in that** the connecting wall part (14') lies in the longitudinal centre plane (15) of the handle (6; 7).
1. Plastic crate with a bottom (1) and vertical side walls (2-5), in which at least one of the side walls (2; 3) is provided near the top side with a handle (6; 7) bounded at the bottom side by a handle opening (8; 9), **characterised in that** the handle (6; 7) is integral with the rest of the crate and is made partially hollow, the cavity (12a, 12b) in the hollow part (11a, 11b) being the shape of an elongated channel which is surrounded by wall parts (13a, 13b) together forming an essentially closed wall.
 2. Crate according to claim 1, **characterised in that** the channel-shaped cavity (12a, 12b) is made curved in the plane of the handle (6; 7).
 3. Crate according to claim 1 or 2, **characterised in that** the channel-shaped cavity (12a, 12b) has an essentially round cross-section.
 4. Crate according to claim 1, **characterised in that** the channel-shaped cavity (12a, 12b) is U-shaped, the legs of the U running parallel to the bottom (1) of the crate, and the wall parts (13a, 13b) of the legs of the U-shaped cavity (12a, 12b) forming the top and bottom part of the handle (6; 7).

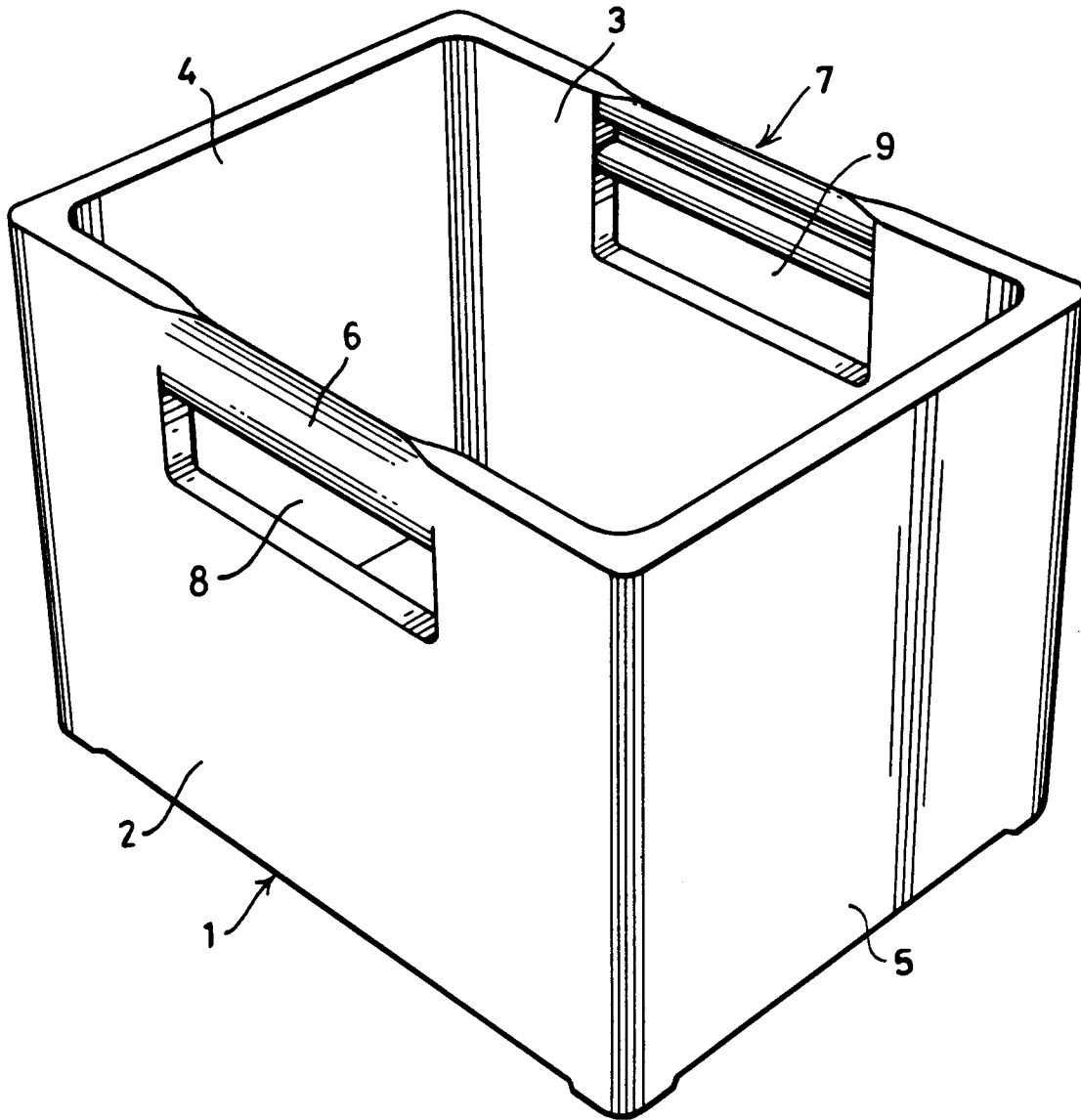


FIG. 1.

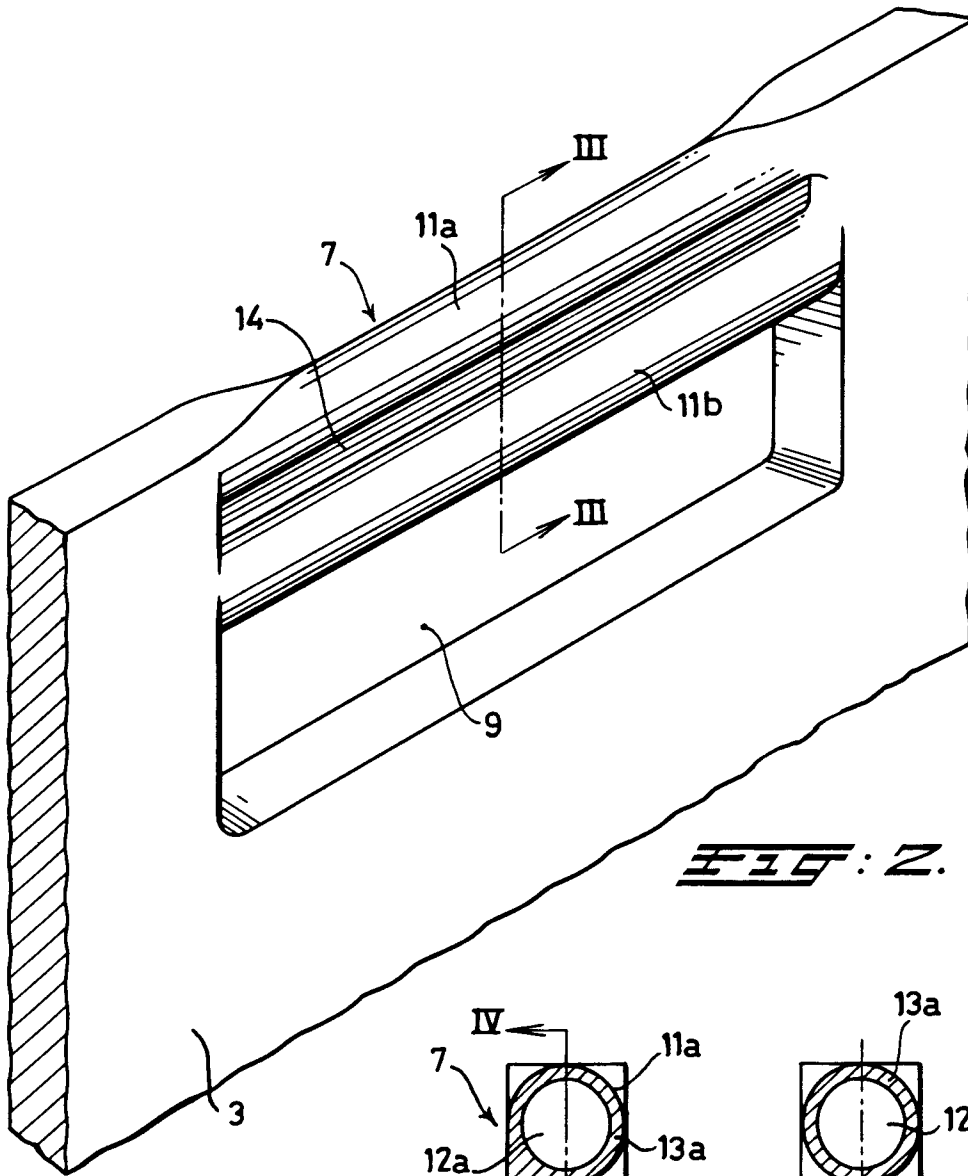


FIG. 2.

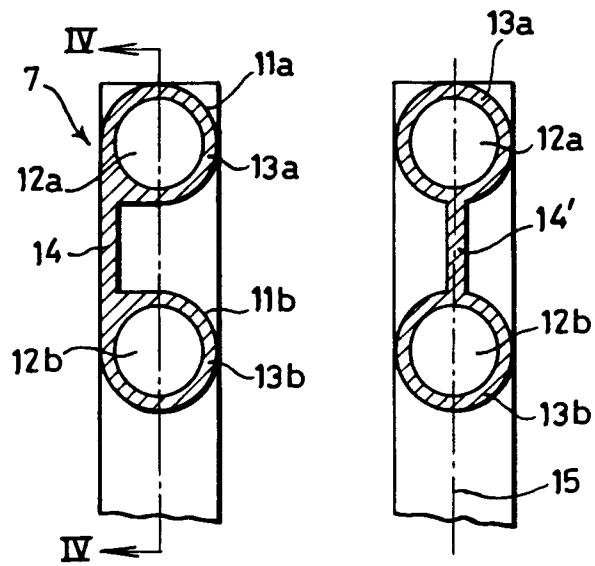


FIG. 3. FIG. 5.

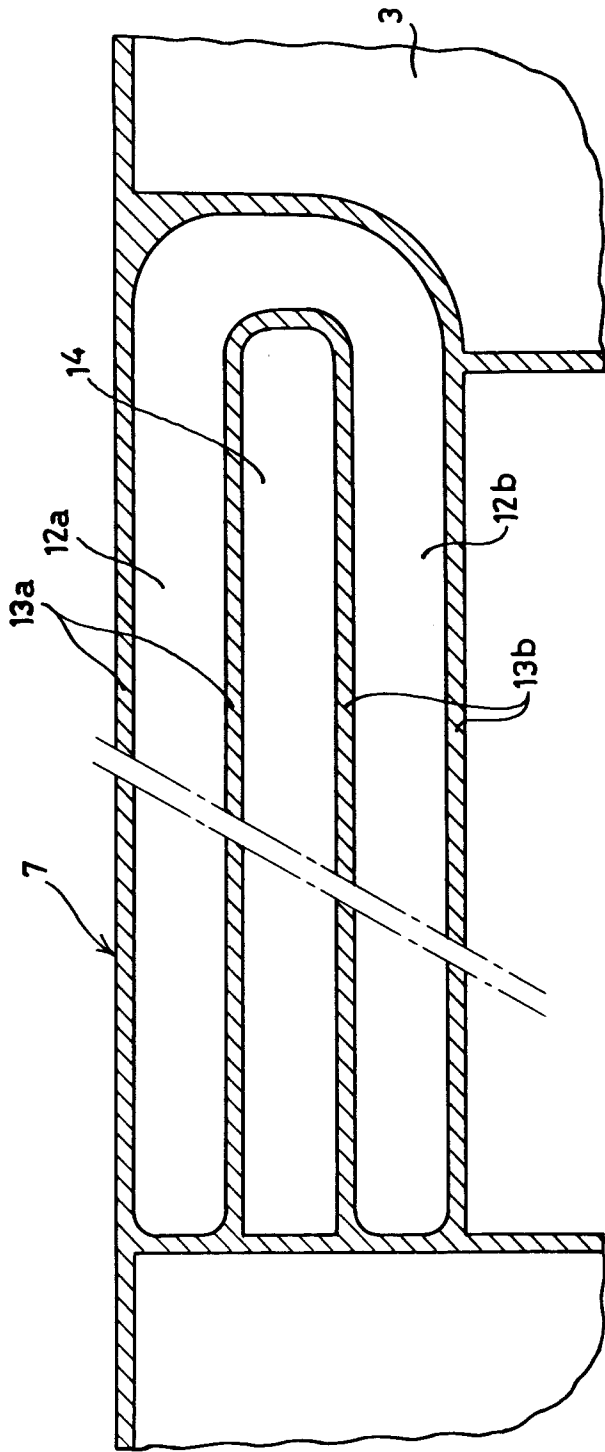


FIG. 4.



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.5)
X	DE-A-3 823 650 (GOMANN) * column 2, line 22 - line 33 * * column 3, line 3 - line 8; figures 1,2,10 *	1,3	B65D25/30
A	---	5-6	
X	GB-A-1 033 111 (FARBWERKE HOECHST AKTIENGESELLSCHAFT) * page 1, line 94 - line 112; figures 2-3 *	1-2	
X	US-A-3 506 154 (BARNES) * column 2, line 53 - column 3, line 4; figures 1,14,15 *	1-2	
A	-----	4	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B65D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12 FEBRUARY 1992	Examiner BRIDAULT A. A. Y.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			