

[54] **LOCKING MATERIAL-HANDLING TRAY**
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[52] U.S. Cl. **206/72, 206/46 H, 206/65 R, 214/10.5 R**
 [51] Int. Cl. **B65d 1/36, B65d 71/00**
 [58] Field of Search **206/45.19, 46 R, 206/46 FR, 46 H, 46 M, 65 R, 68, 72; 214/10.5 R; 217/26.5, 28; 220/23.83; 229/2.5**

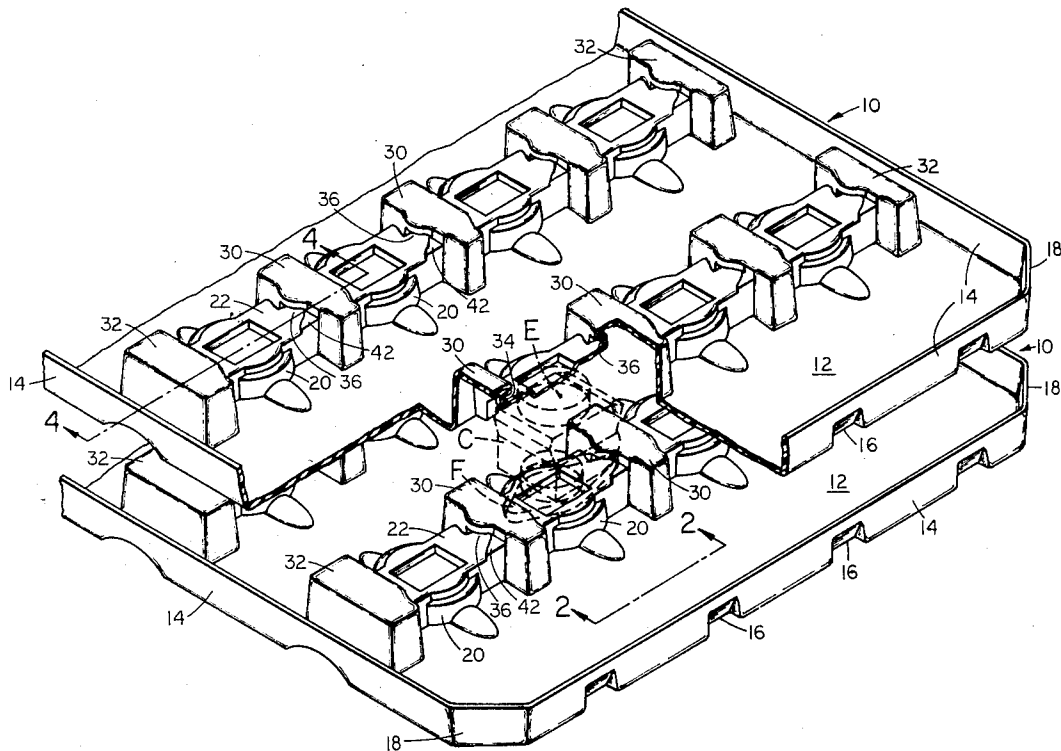
[57] **ABSTRACT**

A molded plastic tray having adjacent seats and posts for locating articles thereon, in which the posts have complementary opposing indentations or recesses for locking engagement with opposite projections on the articles. One of each pair of opposing detents has a wedging and stepped groove through which one of the article projections slides for mounting and removing the article from the tray. The trays are nestable when empty, and stackable when loaded with articles.

[56] **References Cited**
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9 Claims, 8 Drawing Figures



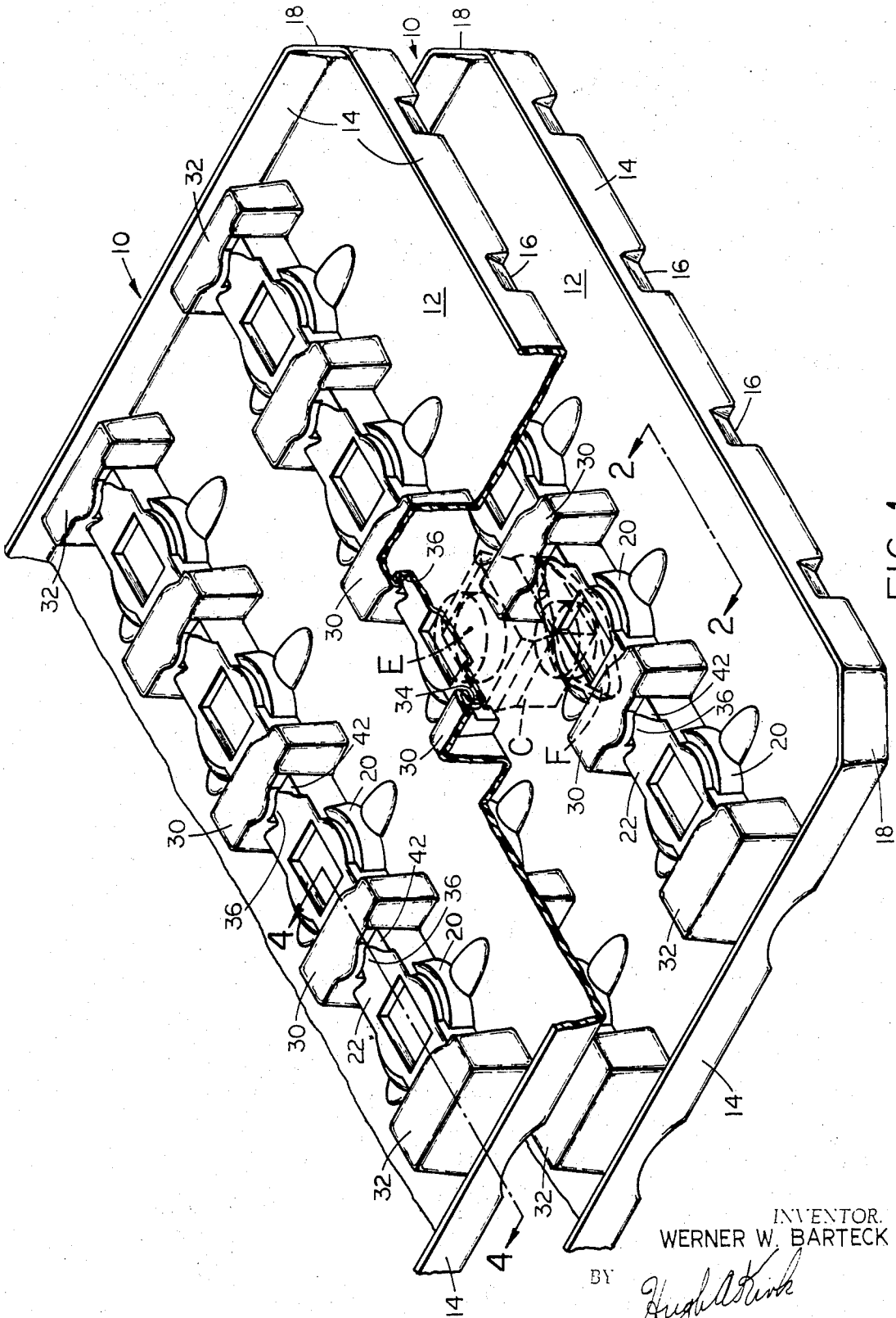


FIG. 1

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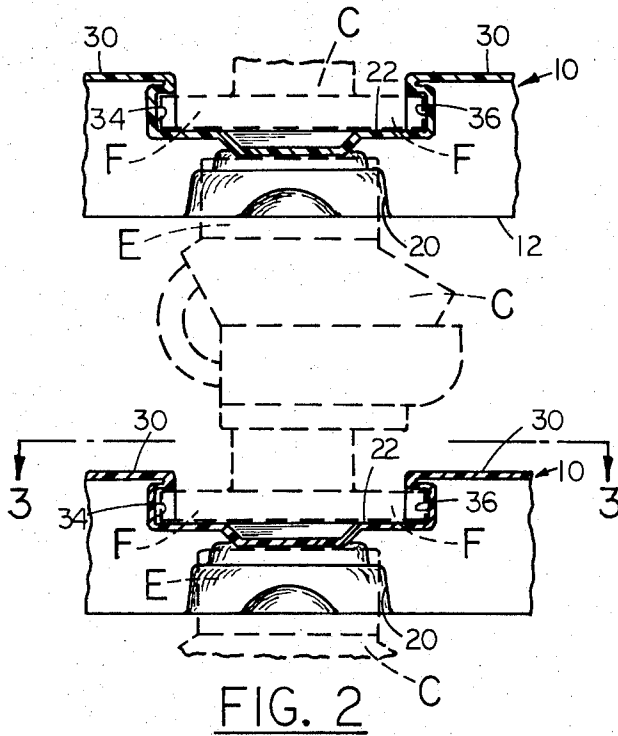


FIG. 2

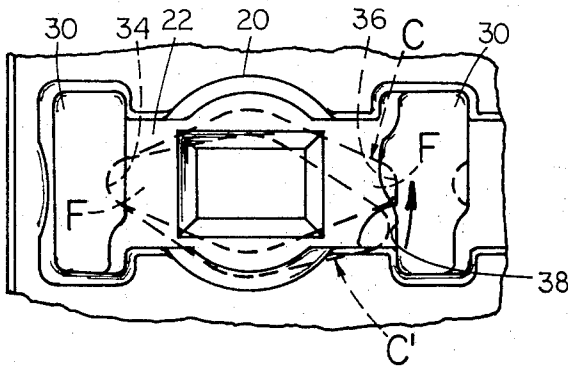


FIG. 3

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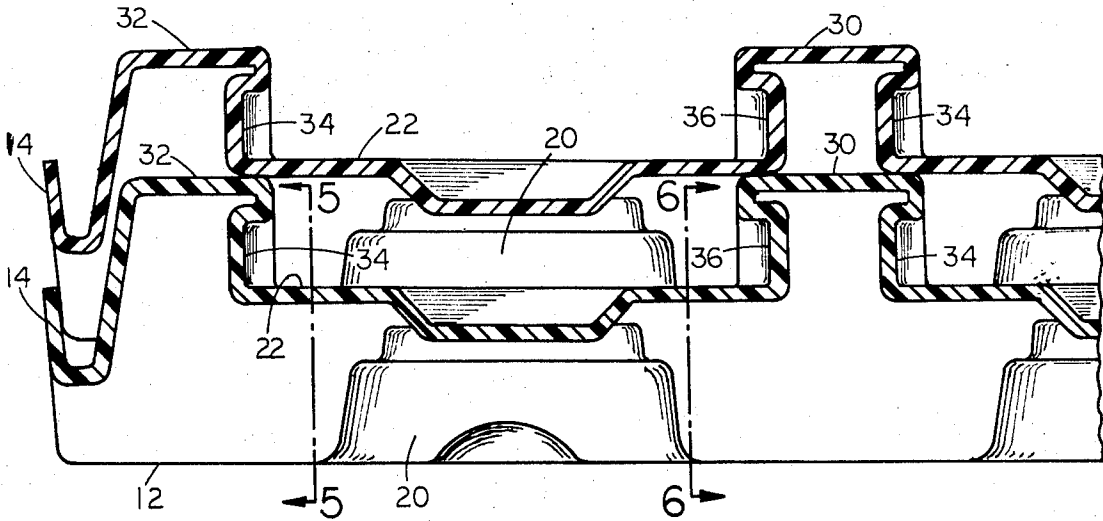


FIG. 4

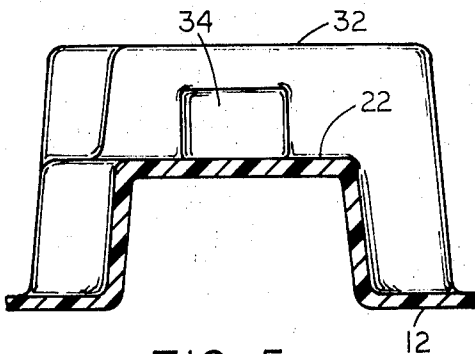


FIG. 5

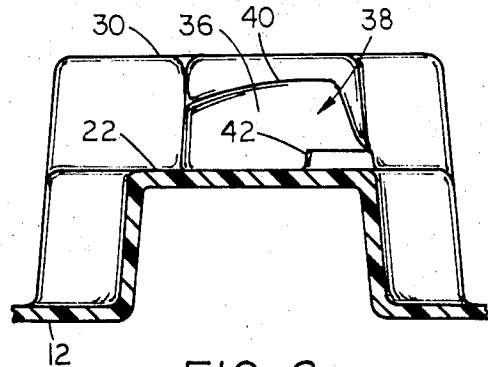


FIG. 6

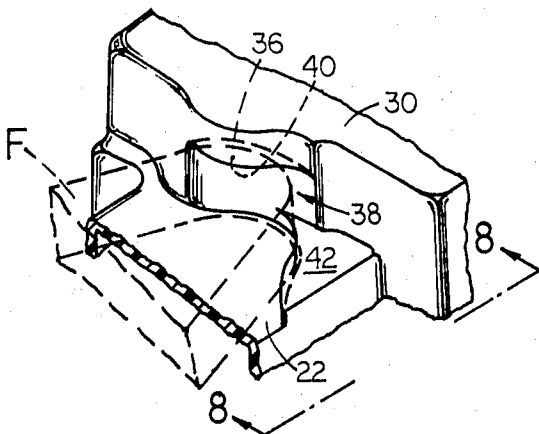


FIG. 7

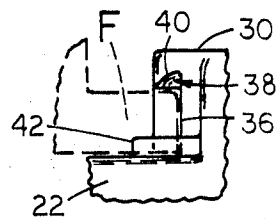


FIG. 8

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LOCKING MATERIAL-HANDLING TRAY**BACKGROUND OF THE INVENTION**

Molded plastic and other types of material handling trays or pallets are known in which special seats and/or posts are provided for locating the articles to be placed on such pallets. Also it is known to use pallets or trays which when empty are easily stackable to reduce space and also those which when filled may be stacked and bound together on a pallet or in a crate for shipping. In fact there are known material trays which not only include seats for the articles they are to carry but also ribs for frictionally engaging the articles, but none are known in which the articles are completely locked in indentations or recesses to prevent their dropping from the trays in the event the trays are tilted or inverted.

SUMMARY OF THE INVENTION

Generally speaking, the material handling tray of this invention comprises a planer base portion and at least a pair of spaced pedestals or posts extending away from the plane of the base portion which posts have on their adjacent sides detents into which oppositely extending projections on the article to be carried in the tray, lockingly engage, so that inversion of the tray will not cause the article to fall therefrom. These trays may be molded from a plastic material such as polyethylene, that may be reinforced or not as desired, so the projections from the surface thereof will be hollow on the opposite side of the surface of the tray, to provide seats for the articles in an adjacent tray of articles.

The trays may comprise a plurality of rows of regularly spaced seats and posts or pedestal portions with the seats in between adjacent pairs of pedestals. The configuration is regular for each tray, and the pedestals and seats may have tapered sides and rims to permit the trays to be easily nested when empty to reduce space for return shipping. The seats also permit stacking of the trays when articles are in place on them so that a stack of several trays of articles may be bound to a pallet for transport.

A primary feature of the present invention comprises detents or recesses which are located in facing sides of adjacent pairs of posts or pedestals so that oppositely extending flanged portions of the articles to be carried by the trays may be locked in and between such complementary pairs of indentations or recesses. Preferably these indentations or recesses are not holes in the posts and are reinforced throughout to add strength. One of the recesses of each pair may be provided with a side entry groove substantially parallel to the plane of the base of the tray. One side wall of this groove may be angular to act as a wedge and the other side wall may have a step portion at the edge of the recess, so that the flange on the article to be held therein may be easily inserted and snapped into and between the recesses, as well as removed therefrom. Thus one of the opposite flanges on the article is inserted into the non-grooved recess on one post of the pair and then the other flange is moved through the groove into locked position in the other recess by being rotated slightly about the flange in the first mentioned recess. When the article is to be removed from the tray, it is tilted slightly to raise said other flange from the stop in the groove and then rotated slightly in the opposite direction.

One of the types of articles which may be carried and locked in the trays of this invention is carburetors,

which have a pair of oppositely extending ears or flanges for bolting them to the intake manifolds of an engine, which flanges are used to lock the carburetors in the recesses between the posts on the trays. Also the mouth of the carburetor may be provided with a cap which may seat in a cavity in an adjacent tray for stacking of the loaded trays.

Accordingly it is an object of this invention to provide a tray for handling articles, which tray may be molded from a plastic material and contain complementary indentations or recesses for locking the articles to the tray so they cannot fall out of the tray even if the tray is inverted.

Another object of this invention is to provide such locking trays that may be stacked when loaded and nested when empty.

A further object is to produce such trays which may be readily and completely formed of plastic in a single mold without having to re-form the recesses in their posts.

BRIEF DESCRIPTION OF THE VIEWS

The above mentioned and other features, objects and advantages and the manner of attaining them are described more specifically below by reference to an embodiment of this invention shown in the accompanying drawings, wherein:

FIG. 1 is a perspective view of two stacked trays with parts thereof broken away and showing in dotted lines a carburetor held between them;

FIG. 2 is an enlarged section taken along line 2 — 2 of FIG. 1 showing parts of three carburetors in dotted lines locked and seated respectively between two stacked trays;

FIG. 3 is a plan view taken along lines 3 — 3 of FIG. 2 showing in dotted lines the two positions of the flanges on a carburetor for locking it into the recesses between the posts in the tray;

FIG. 4 is a vertical section of two nested empty trays, as if taken along line 4 — 4 of FIG. 1;

FIG. 5 is a section taken along line 5 — 5 of FIG. 4 showing one of the recesses in one of the posts;

FIG. 6 is a vertical section taken along line 6 — 6 of FIG. 4 showing the other recess in the other post having a grooved entry thereto;

FIG. 7 is an enlarged perspective view of the groove entry recess in the post shown in FIG. 6 with a flange of a carburetor in dotted lines shown locked therein; and

FIG. 8 is a side elevation taken in the direction of the arrows of line 8 — 8 of FIG. 7 showing the flange in dotted lines locked in position behind the step in the entry groove to the recess.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

FIG. 1 shows a pair of molded plastic material article handling trays 10 with a corner of the upper tray broken away to show how an article, herein an engine carburetor C, may be held in the particular molded configurations adapted therefor in the planar base portion 12 of these trays. Each of the trays 10 may also have an edge flange or rim 14 which may be flared outwardly (see FIG. 4) so that the trays may be nested when empty for easy return shipment without taking up much space. This rim flange 14 may be notched 16 at intervals for reinforcing purposes, and the trays 10 may

have bevelled corners 18. Each of the trays may be provided with a plurality of rows of a plurality of seats and pedestals formed in the direction of the rim 14 out of the planar base 12 of the tray, which seats and pedestals are particularly adapted for engagement with the article to be carried, herein the carburetor C and its bottom flanges F.

These particular configurations for the carburetors C comprise a series of circular raised hollow seat portions 20 having top planar portions 22, between which seat portions 20 are further raised posts or pedestal portions 30 and 32 at the ends of the rows. This combination of an intermediate seat 20 and side posts 30, or 30 and 32, may form a U-shaped pedestal on the base 12 with the posts as its legs. These post portions 30, 32 have in their sides different types of recesses 34 and 36 for locking engagement with the flange portions F of the Carburetors C, that is, on one side of each raised seat 20 there is a recess 34 and on its other side in the adjacent pedestal is the other complementary recess 36. Thus, the upper capped ends E of the carburetors C may be held in hollow seats 20 on the tray above the one which clamps the base flanges F (see FIGS. 1 and 2). These different types of recesses 34 and 36 may be substantially adjacent the tops or platforms 22 of the seats 20 so that the platforms 22 act also as supports (see FIG. 2) for the lower flanged F ends of the carburetors C. The intermediate posts 30 have on opposite sides thereof one of each type of recesses 34 and 36, while the posts 32 at the ends of the rows are provided with only one type of recess, namely 34 at one end of each row as shown in FIG. 1, while the posts 32 at the opposite ends are provided with the other type of recess 36.

These recesses 34 and 36 are formed in these hollow pedestals or parts by flippers on the die or mold, which flippers comprise spring pressed pivoted levers that permit removal of the molded tray from the mold after the overhang of these recesses are formed. These recesses or indentations 34 and 36 are preferably provided with completely enclosed walls, including back walls, to add additional strength thereto for better support of the articles that are held in and between them. These posts or pedestals 30 and 32 including the seat portions 20 are preferably provided with tapered sides so that they also may easily be removed from their molds, and this also permits the trays 10 to be easily nested when empty as shown in FIG. 4.

One of the types of recesses, namely recess 34 as shown specifically in FIG. 5, may be substantially symmetrical so as to receive one of the flanges F and hold it therein as shown specifically in FIGS. 2 and 3. However, the other recess 36, since the molded tray is not completely flexible or resilient, is formed with an entry groove 38 (see FIGS. 3, 6, 7 and 8) so when one flange F of the carburetor C is positioned in the recess 34 as shown in FIG. 3, the carburetor C may be rotated from the dotted line position C' into its position C by passing the other flange F through the groove 38 into the recess 36. As specifically shown in FIG. 6 this groove 38 may have a pair of opposite side walls, the upper one 40 of which may be at a slight angle to the plane of the base 12, while the other wall of which may be provided with a step portion 42, so that when said other flange F is moved into the position of C in FIG. 3, it will drop off of the step 42 down into the recess 36 and cannot be slid easily therefrom. Thus the upper wall 40 acts as a wedge as well as a guide for said other flange F in-

wardly and downwardly into the recess or detent 36 for insuring locking of the flanges F in and between the recesses 34 and 36.

When an article or the carburetor C is to be removed from its locked position shown in FIGS. 2, 3, 7 and 8, it may be tilted slightly about its vertical axis so that the lower end of the flange F in the recess 36 may be raised above the stop portion 42, and then the article or carburetor C is rotated in the opposite direction pivoting about its flange in the recess 32, to move out again into the position C' shown in FIG. 3 for easy removal from the tray 10.

Thus when the article or carburetor C is in the locking position between the recesses 34 and 36, the tray 10 may be tilted and even turned upside down, and the article or carburetor C locked therein will not fall out or be damaged. Accordingly, the trays 10 of this invention have the additional advantage of protecting the articles placed therein so they cannot easily be removed from their locked and seated positions, which thereby materially reduces the amount of damage to these articles when stacked and shipped on pallets.

While there is described above the principles of this invention in connection with a specific piece of apparatus, it is to be clearly understood that this description is only made by way of example and not as a limitation to the scope of the specific configuration or of the type articles to be locked in such material handling trays. The carburetors C were used herein merely for the purposes of illustration of the locking features of the trays of this invention. It should be understood, however, that the articles which are carried by such locking trays should have a pair of projections or flanged portions, such as F, which can readily be engaged by a pair of adjacent pedestals or posts having recesses or indentation therein, one of which recesses has a grooved channel in the side thereof for easy entry of one projection on the article into one of the complementary pair of recesses. This grooved channel also should be at an angle normally not parallel with the forces of gravity or other normal forces which would cause the article to become unlocked therefrom.

I claim:

1. An article handling tray comprising:
 - A. a planar base portion,
 - B. a pair of spaced pedestals extending from the plane of said base portion,
 - C. indentations in adjacent sides of said pair of pedestals, said indentations having completely enclosed walls at least two of which walls are parallel to said planar base portion for locking said article to said tray between said pedestals, and
 - D. a groove as a side entry channel into one of said indentations, said groove having opposite side walls, one of which has a slight angle to said planar base portion and the other which has a step portion adjacent said one indentation.
2. A tray according to claim 1 wherein said base portion between said pair of pedestals is provided with a seat portion extending from said base portion for said article.
3. A tray according to claim 2 wherein said base portion includes a rim portion around its periphery extending from said base portion at least as far as said seat portion.
4. An article carrying tray comprising:
 - A. a planar base,

- B. at least one U-shaped pedestal having a pair of vertical legs and a base portion projecting upwardly from the upper surface of said base,
 - C. said U-shaped pedestal having aligned locking indentations provided in the opposite faces of said vertical legs thereof, said indentations having completely enclosed walls at least two of which walls are parallel to said planar base for locking an article thereof, and
 - D. an inclined groove as a side entry channel to one of each complementary facing pair of said indentations.
5. An article carrying tray according to claim 4 wherein said base portion of said U-shaped pedestal has an article receiving cavity therein for stacking trays of articles.
6. An article receiving tray according to claim 4 wherein the vertical legs of said U-shaped pedestals have tapered sides for nesting trays when empty of articles.
7. A material handling tray for locking material between a pair of cooperating recesses in adjacent pedestals on said tray, comprising:
- A. a planar tray portion having an offset portion extending from one side thereof,
 - B. a pair of pedestals on opposite sides of said offset portion and extending from said planar tray portion on said one side,
 - C. said pedestals having a pair of complementary recesses facing said offset portion, and said recesses having completely enclosed walls at least two of which walls are parallel to said planar tray portion, and
 - D. one of said recesses having a side groove having one sloping wall and an opposite stepped wall for insertion, locking, and removal of one side of an article held between said recesses, while the other

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- side of said offset portion provides a seat for the other side of an article held in a tray below.
- 8. A material handling tray for articles having a pair of oppositely projecting flanged portions, said tray comprising:
 - a. a pair of pedestals between which one of said articles is to be held,
 - b. said pair of pedestals having complementary indented recesses with completely enclosed walls at least two of which walls are parallel to the surface of said tray for locking said flanged portions of said article,
 - c. one of said recesses having an entry groove for guiding one of said flanged portions after the other flanged portion is located in the other complementary recess, and
 - d. said groove having one side tapered to wedge one side of said flanged portions into said one recess, and the other side of said groove having a step adjacent said recess for locking said flange portion in said recess and between both said recesses.
- 9. A molded plastic material handling tray comprising:
 - A. a planar base portion,
 - B. a plurality of pedestals offset above one side of said planar base portion, said pedestals having tapered sides for nesting with another tray,
 - C. a pair of indented recesses in said pedestals substantially parallel to said base portion, said recesses in adjacent pedestals being complementary to each other, and
 - D. a side opening groove in one of said recesses, said groove having one side inclined toward one side of its said recess and its other side stepped to the other side of its said recess to lock the material to be held between said complementary recesses.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,777,885 Dated December 11, 1973

Inventor(s) Werner W. BARTECK

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Abstract, line 3, change "indentations" to - - indentations - - .

Column 1, line 16, change "titled" to - - tilted - -. Column 4, line 35, change

"indentation" to - - indentations - - .

Signed and sealed this 13th day of August 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents