**Title:** SHOPPING TROLLEY CONSTRUCTION AND IDENTIFICATION SYSTEM

**Abstract**

A trolley, for example a shopping trolley, is constructed from essentially planar plastic moulded components, for storage and transport in a dismantled condition. The trolley basket is formed from side panels (31), bottom panel (30), front panel (32), rear panel (33) with integrally moulded child's seat, and a handle, while the base is formed by side rails (35) and a front joining plate (36). The trolley is assembled using interlocking means in such a way that once each component is assembled onto the trolley, it cannot be dismantled until the final component is dismantled. The trolley may incorporate a scannable identification device and means responding to trolley identification are used to provide information as to the pattern of movement of the trolleys and also to cause the conduct of a financial transaction.
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"Shopping Trolley Construction and Identification System

FIELD OF THE INVENTION

This invention relates to trolleys and carts, for example shopping trolleys of the kind provided for use in supermarkets.

SUMMARY OF THE INVENTION

An object of the invention is the provision of such a trolley or the like which can be manufactured principally from plastics material and which can be shipped in a knocked down state and assembled with simple tools.

In its preferred form the trolley cannot be disassembled without damage once it has been assembled.

In an alternative preferred form of the invention the trolley or the like includes a number of components (which are not necessarily all of the components of the trolley) which are provided with interlocking means such that upon the assembly of the last component with the preceding components none of the preceding components may be disassembled. These components may be designed so that they must be assembled in a given order.

In a further alternative preferred form of the invention the last component referred to is permanently fixed to another component so that the assembly of these components cannot be disassembled.

As a matter of convenience, throughout the description
and in the claims, a reference to disassembly or to removal of a unit from the assembly is to be understood as a reference to such disassembly or removal without damage, since it will be clear that an assembly may embody this aspect of the invention although it may be disassembled by force in a more or less destructive manner.

In another alternative form the invention resides in a trolley including a basket, the basket being assembled from generally planar units comprising a bottom, sides and a front panel each of which is formed by moulding in plastics material.

Preferably the base is provided with interlocking means and the sides are provided on their lower edges with complementary interlocking means. Preferably also the sides are provided with interlocking means on their forward edges and the front panel is provided with complementary interlocking means on its sides for engagement with the ends of the basket sides.

Preferably also the front panel is provided with interlocking means engageable with complementary interlocking means on the basket bottom. Preferably also the various interlocking means are such that the basket cannot be disassembled other than in the reverse order to that of its assembly.

Preferably also means are provided permanently to interlock the last of the components to be interlocked.

The base of the trolley preferably includes a pair of side rails and a joining plate, each being substantially planar and moulded of plastics material, the rails and the plate being provided
with complementary interlocking means for the assembly of the base.

Preferably, the trolley incorporates identification means, for example, a scannable device, and the supermarket or other location of its use is equipped at salient locations with identification responsive apparatus, for example interrogating devices, responsive to the presence of a trolley, for various purposes as will be described below.

The invention also resides in identification apparatus associated with a space in which trolleys of this kind are deployed, responding to the identification of a trolley in a chosen area within said space to cause the conduct of a financial transaction in relation to the identified trolley.

BRIEF DESCRIPTION OF THE DRAWINGS

The preferred form of the invention described herein by way of example, also provides other advantages which will become apparent from the following description of this embodiment, with reference to the accompanying drawings in which:

Fig. 1 is a side elevation of a trolley;
Fig. 2 is a plan view of the trolley;
Fig. 3 is a front elevation of the trolley;
Fig. 4 is a plan view of the basket base;
Fig. 5 is a side elevation of the basket base;
Fig. 6 is an end elevation of the basket base;
Fig. 7 is a side elevation of a basket side;
Fig. 8 is a section taken on the line 8-8 of Fig.
Fig. 8a is a partly sectioned plan view of the basket side;
Fig. 9 is an end elevation of the basket end panel;
Fig. 10 is a plan view of the basket end panel;
Fig. 11 is a side elevation of the end panel;
Fig. 12 is a side elevation of a rear panel and
child's seat unit;
Fig. 13 is a rear elevation of the rear panel unit;
Fig. 14 is a plan view of the rear panel unit;
Fig. 15 is a side elevation of a side rail;
Fig. 16 is a plan view of the side rail;
Fig. 17 is a plan view of a front plate;
Fig. 18 is a side elevation of the front plate;
Fig. 19 is a plan view and end elevation of a
handle;
Fig. 20 is an end and side elevation of a typical
wheel; and
Fig. 21 is a schematic supermarket layout.

DESCRIPTION OF THE EMBODIMENTS

The illustrated trolley includes a basket assembled
from 6 major components: a basket base 30, a pair of
basket sides 31, a front panel 32, and a hinged rear
panel with integral child's seat 33, and a handle 34.

The basket is mounted on a base unit which consists of
a pair of side rails 35, a front plate 36, front
wheels 37 and rear wheels 38.

The basket and the base unit are tapered in all
relevant planes to enable the trolley to nest with
other similar trolleys in the manner well known in the
prior art.

The base unit is assembled by joining the side rails
35 at the front of the trolley by means of the front
plate 36. For this purpose the side rails 35 include
forward blade portions 39 provided with downwardly
directed barbed detents 40, and the sides of the front plate 36 are provided with slots 41 dimensioned to receive the blade portions 39. The base of the slots 41 is penetrated by apertures 42 dimensioned to receive the detents 40, the barbs of which snap into engagement with the underneath surface 43 of the front plate. Moulded into the front plate are bosses 44 for the reception of the upper bearing assemblies 44 of the front wheels 37. Bosses 45 are provided at the rear of the side rails for the reception of the upper bearing assemblies of the identical rear wheels 38.

Structurally, the base unit is completed by fixing to it the basket base 30, which will therefore now be described.

The basket base consists of a bottom 45 with a pattern of apertures 46 extending over most of its area, and a raised wall 47 around the sides and front. From the rear part of the underneath side of the bottom on each side thereof extends a pair of downwardly directed walls 48. Between these pairs of walls extends a lateral reinforcing rib 49. The lower free edges of the walls 48 are provided with opposed inwardly directed flanges 50, and are joined by bridging walls 51 and 52. The basket bottom 45 has a through slot 53 in register with the space between each pair of walls 48.

Reference to Figs. 15 and 16 will show the corresponding elements of the side rails 39, which comprise an upright wall 54 the width of which corresponds to the spacing of the walls 48, slotted at 55 and 56 to receive the bridging walls 51 and 52. At the base of the wall 54 is a slot 57 dimensioned to receive the flanges 50.
One face of the wall 54 is relieved at 58 for a distance and in a pattern which respectively correspond to the thickness and shape of a wedge 59 which has a flange 60 extending from its upper edge. The wall 54 in the relieved portion 58 is provided with blind holes 61 in a pattern corresponding to barbs 62 provided on the inner surface of the wedge 59.

The basket base is thus assembled with each side rail 35 by forcing the wall 48 down over the wall 54 with the walls 51 and 52 located in the slots 55 and 56, until the flanges 50 snap into the slot 57. The wedge 59 is then driven down from the upper side of the base through the slot 53. As it is driven home, the barbs 62 locate in the holes 61 locking the wedge in position, and thus concealing the manner in which the components have been fixed.

To enable the locking-in of the basket sides 31 as will be described below, the side walls 46 of the basket base 30 are provided with a series of slots 63 of inverted L configuration, providing an entry region 64 and a lip 65.

The basket sides 30 consist of panels 66 provided with a pattern of apertures 67 and thin wall sections 68 surrounded by a decorative flanged border section 69. At the upper rear corner there is provided a handle-mounting formation 70. Along the bottom edge of the basket sides is a series of locking feet 71, each having a toe portion 72 directed towards the rear of the trolley. Similar locking feet 73 are provided on the front edge of the basket sides, with toe portions 74 in this case directed upwardly.

The feet 72 are dimensioned to fit the slots 63, and
each side is assembled with its respective side rail by locating the feet within the slots, and driving the side rearwardly to force the toe portions underneath the lips 65 thereby locking the side in place on the rail.

As shown in Figs. 9-11, the front panel 32 is similarly provided with side walls 75 and slots 76 similarly shaped to provide an entry portion 77 and lip 78, so the front panel can be assembled with the two sides in the same manner as the sides were attached to the side rails.

It will be observed, however, that the lower edge of the front panel 32 is provided with a downwardly directed bead 79, and the front portion of the wall 46 of the basket base 30 is provided with an upwardly facing groove 80 the part-cylindrical cross-section of which is complementary to that of the bead 79. As the front panel is driven home in its engagement with the sides therefore, the bead 79 is driven into the groove 80.

In the most preferred practice of the invention in this embodiment thereof, the groove 80 is provided with a quantity of adhesive, so the bead 79 is immovably held in the groove 80 after assembly of the trolley. This will prevent disengagement of the feet 72 from the slots 63, and in turn prevent the removal of the sides 31, since they must be moved forward to enable the disengagement of the feet 71 from the slots 63. Simply by permanently fixing at one location, therefore, disassembly of the basket has been prevented.

The assembly of the basket is completed by the attachment of the handle 34 and the rear panel and
child's seat unit 33. The latter is moulded in one piece and provides a contoured seat 81 which provides a degree of comfort superior to that obtained by prior art designs. The upper edge of the unit is formed with hand grips 82 and a moulded support bar 83 which extends to form support axles 84 having enlarged ends.

The rear panel and seat unit 33 is mounted by passing the support axles 84 into keyhole-shaped slots 85 provided in the handle mounting formations 70, and allowing the axles to rest at the foot of these slots. The handle 34 may then be mounted. To this end each end of the handle has a cylindrical portion 86 backed by a flange 87, the diameter and depth of the portion 86 corresponding to those of a recess 88 in the mounting formation 70. End caps 89 similarly include a cylindrical portion 90 and flange 91, the portion 90 mating with a recess 92 in the outer face of the formation 70. The handle is fixed in place by fastening devices (not shown) fixing the end caps 89 to the handle through the wall 93 which separates the recesses 88 and 92.

Thus mounted, the rear panel and seat unit 33 is free to pivot about the axles 84 so that the unit can swing upwardly and forwardly to accommodate the basket of a nesting trolley driven in from the rear.

The entire trolley can thus be assembled by an unskilled person using only a spanner for mounting the wheels on the base and a mallet for the assembly of the major components. Trolleys according to the invention can thus be shipped and stored in their unassembled state, enabling a significant reduction in shipping and storage costs. Once assembled, however, the trolley cannot be knocked down, for example by a would-be thief, without destroying it.
All the parts other than the wheel bearings can be manufactured by injection moulding in plastics. Apart from the manufacturing advantages which flow from this, the absence of metal enables other advances.

In particular, the trolley can be provided with a transponder 95 embedded, for example, in the panel 94 in the front panel of the basket. The transponder 95, either of the active or passive interrogated type, is encoded with a unique code identifying the trolley, and preferably also identifying the owner.

By locating scanners as desired, and processing the data provided by the scanners with suitable software, the location of the trolley, the route taken by it through the supermarket, and its passage past chosen points such as building exits can be monitored.

The use of a transponder can enable the efficient automation of billing and refund of trolley usage fees, for example by debiting the customer's transaction at the checkout and enabling a refund to be obtained and recorded against the trolley at a remote point without the need for troublesome mechanical trolley-handling refund devices.

By recording the route taken through the supermarket by a number of trolleys, staff can obtain information as to the shopping habits of customers to assist in the planning of the supermarket layout, the location of promotional material, and in other marketing decisions.

Fig. 21 shows a schematic layout of a supermarket incorporating this aspect of the invention. The supermarket includes customer and trolley entry
points 100 and 101, aisles 102, peripheral cabinets 103, fresh food stands 104, and checkout points 105.

Trolleys of the kind already described are equipped with identification chips 95, and interrogating devices 106 are located as shown at salient points in the supermarket, including the entry and exit points, and the ends of the aisles. Interrogating devices are also positioned at the entry and exit to the building in which the supermarket is located, and the areas of access to the car park.

At the car park a trolley return area is provided, with a trolley fee refund machine also equipped with an interrogator, ensuring that refunds are made on the return only of trolleys in respect of which a charge has been made at one of the checkout points 105, or alternatively only in respect of a trolley identified as belonging to the supermarket in question. Because the trolley is identified once it is in the proximity of the return station, there is no need for mechanical return equipment.

The interrogators 106 are connected with a data collection system (not shown) incorporating software for analysis of the recordals of passing of a given trolley to provide management information of the kind already described.

At locations such as 107 and 108, point of sale promotions may be made by audio or video equipment triggered by the presence of a trolley detected by interrogators 106.

An interrogator 106 is located at a sales point for a manned specialty products counter 109, enabling purchases of goods there to be recorded against the
customer's trolley for subsequent processing at the checkout.

It will be appreciated that the features of detail in the embodiment which has been described and illustrated are not essential to the invention, and many changes may be made to the trolley without departing from the scope of the invention. For example, fixing formations other than those described may be used for the joining of the components of the trolley and the configuration of the various components may be altered to suit the particular application for which it is intended. Neither is any particular order of assembly of the components essential to the invention as such, and the order adopted will depend on design choices influenced by the application in question.

The invention is not limited to use in supermarket trolleys, but will also find application in other areas such as airport luggage trolleys and in industrial applications.
CLAIMS:

1. A trolley or the like including basket supported above a base, the basket including a bottom, sides and a front panel, at least some of these being manufactured as separate units for storage and transport in a disassembled condition, each unit carrying interlocking means for engagement with another of said units, the interlocking means of respective units being such that upon sequential assembly of the units together none of the units assembled before the last assembled unit can be removed from the assembly before the last assembled unit.

2. A trolley or the like according to claim 1 further including means for the permanent fixing of said last unit to at least one previously assembled unit so that said units cannot be disassembled.

3. A trolley including a basket, the basket being assembled from generally planar units comprising a bottom, sides and a front panel each of which is formed by moulding in plastics material.

4. A trolley according to claim 3 in which the basket bottom is provided with peripheral interlocking means and the sides are provided on their lower edges with complementary interlocking means.

5. A trolley according to claim 4 in which the sides are provided with interlocking means on their forward edges and the front panel is provided with complementary interlocking means on its sides for engagement with the ends of the basket sides.

6. A trolley according to claim 5 in which the front...
panel is provided with interlocking means engagable with complementary interlocking means on the basket bottom.

7. A trolley according to any one of claims 3 to 6 in which the various interlocking means are such that the basket cannot be disassembled other than in the reverse order to that of its assembly.

8. A trolley according to any one of claims 3 to 6 in which the various interlocking means are such that the basket cannot be disassembled other than in the reverse order to that of its assembly, and in which means are provided permanently to interlock the last of the components to be interlocked.

9. A trolley according to claim 3 in which the base includes a pair of side rails and a joining plate, said rails and said plate being substantially planar and of moulded plastics material, the rails and the plate being provided with complementary interlocking means for the assembly of the base.

10. A trolley according to claim 9 wherein each side rail includes means for interlocking engagement with the basket.

11. A trolley according to claim 10 including front and rear wheel assemblies, wherein each side rail includes means for the engagement therewith of said rear wheel assemblies.

12. A trolley according to claim 10 including front and rear wheel assemblies, wherein said joining plate includes means for the engagement therewith of said front wheel assemblies.
13. A trolley according to claim 3 in which the basket includes a rear panel adapted for hinged support in the region of its upper corners.

14. A trolley according to claim 13 in which said rear panel is of moulded plastics material and incorporates a child's seat.

15. A trolley according to claim 13 or 14 in which said rear panel includes support axles extending laterally of the upper corners of the panel, and the basket side panels are provided with slots for the reception of said axles.

16. A trolley according to claim 3 in which the basket side panels are joined in the region of their upper rear corners by the assembly therewith of a trolley handle extending between them.

17. A trolley according to claim 3 further including identification means capable of interacting with identification responsive apparatus to provide an indication of the location of an identified trolley.

18. A trolley according to claim 17 wherein said identification means includes a trolley identification code.

19. A trolley according to claim 18 wherein said identification means is scannable by scanning means.

20. In association with a space in which trolleys according to claim 17 are deployed, identification apparatus responding to the identification of trolleys in at least some areas within said space to provide data as to the instantaneous location of
trolleys in said areas, and data processing means deriving from said data information as to the pattern of movement of trolleys within said space.

21. In association with a space in which trolleys according to claim 17 are deployed, identification apparatus responding to the identification of a trolley in a chosen area within said space to cause the conduct of a financial transaction in relation to the identified trolley.

22. Apparatus according to claim 21 in which said transaction includes the debiting of a trolley deposit.

23. Apparatus according to claim 21 in which said transaction includes the crediting of a trolley deposit.

24. Apparatus according to claim 21 in which said transaction includes the refund of a deposit previously debited in respect of that trolley.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

Int Cl: B62B 3/14, 3/02; G08G 1/01, 9/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC B62B 3/14, 3/00, 3/02, 1/06, 1/14; G08G 1/01, 9/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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**Date of the actual completion of the international search**

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