

[54] **HAND CART FOR STACKING GOODS IN INTERLOCKING RELATIONSHIP**

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[57] **ABSTRACT**

A hand cart for stacking goods, such as cartons, beverage six-packs, etc., includes a vertical extending carrying space that is defined by a back main frame member, two vertical side structures, and a bottom platform structure, with the bottom platform structure being inclined relative to the horizontal so as to define with the back frame member an included angle less than 90°. In addition, the back main frame is inclined relative to the vertical whereby packaged goods stacked on the hand cart are prevented from toppling, and the goods are interlocked in such manner that the packages must be removed in a desired sequence from the stack of goods.

15 Claims, 6 Drawing Figures

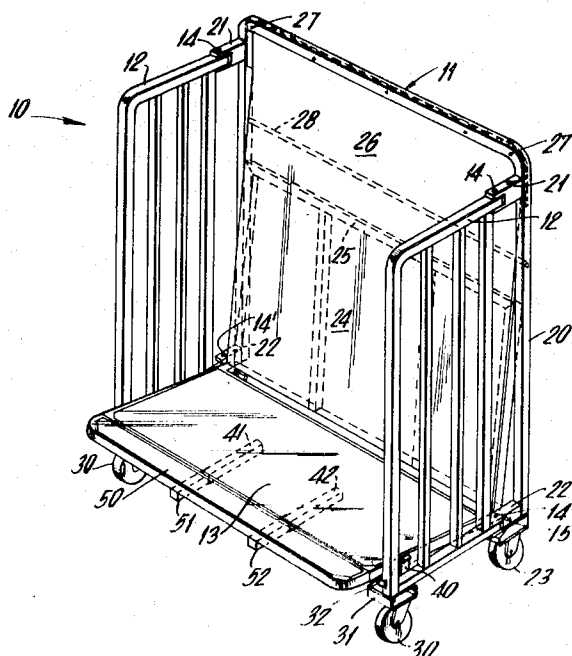


FIG. 3

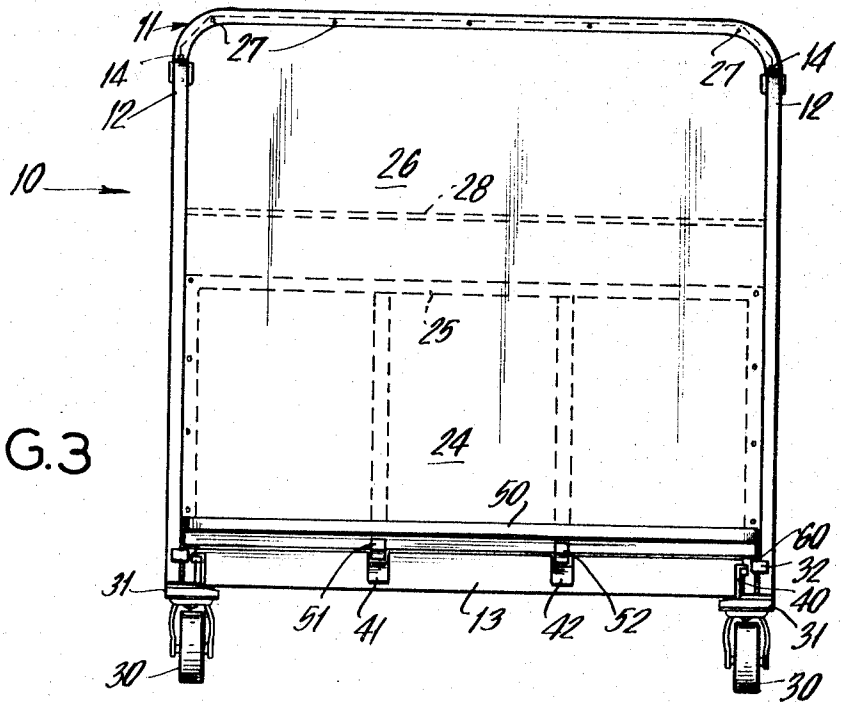


FIG. 4

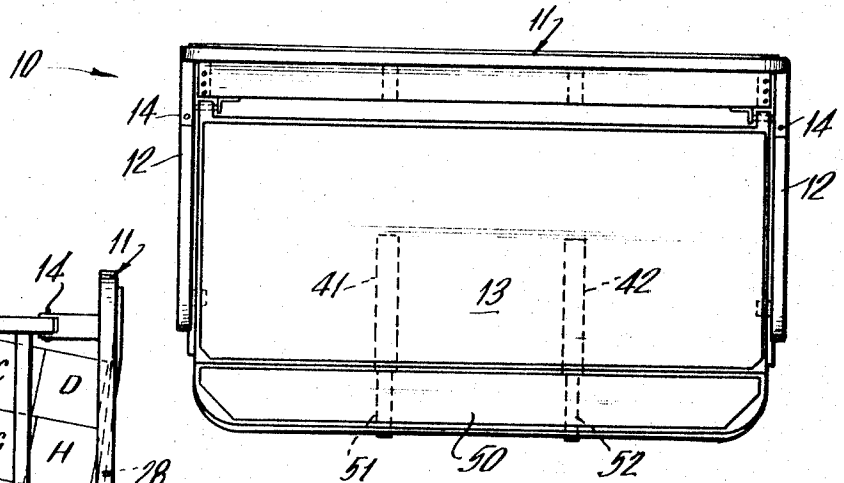
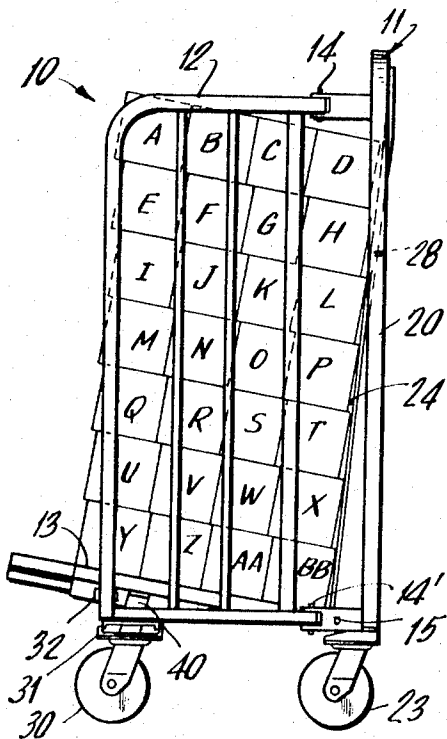


FIG. 5



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HAND CART FOR STACKING GOODS IN INTERLOCKING RELATIONSHIP

The present invention relates to hand carts, and more particularly, hand carts which are adapted to be stacked with goods at a warehouse and transported to a store while being maintained on the hand cart, with the hand cart also serving as the display stand in the store until all of the goods have been removed.

In the interest of reducing the cost of transporting and displaying goods in stores such as supermarkets, the food industry has resorted to the use of movable hand carts for holding stacked goods, such as beverage cartons (six packs), packages, etc. The hand carts may be collapsible, and are adapted to define a vertical extending carrying space that is open at its front end. Goods, such as bottles or cans of beverages contained in six-packs, packaged goods, and the like, are stacked on the hand carts and are delivered from the warehouse directly to the store, where the hand cart is placed into a suitable opening in the display space of the store so as to contain and display the product to customers. After the products have been removed from the hand cart, the hand cart may be readily collapsed by folding of the sides and bottom portions against a back main frame member, and the cart is returned to the warehouse for reuse. The provision of wheels greatly facilitates the transporting of the goods, and the carts greatly decrease the manual labor required for transporting and displaying the goods.

One of the primary considerations in the use of movable hand carts in applications as described above is the requirement that the goods be stacked in a manner which prevents inadvertent toppling or removal from the hand cart. The hand carts are generally constructed as including a back main frame, two vertical side frames, preferably pivotally connected to the back main frame, and a bottom platform or shelf member which is pivotally connected to the back main frame. The bottom shelf member is disposed parallel to the ground, with the back main frame member being vertical to the ground so as to define an included angle of 90° between said back main frame member and said bottom shelf member. This construction results in an arrangement where each stacked item is supported by the item directly beneath same, and in instances where a stacked item is pulled from the hand cart in such manner as to create a dragging force on the stacked item beneath same, there is a tendency for the lower package to move forwardly, thereby possibly toppling or falling from the hand cart.

In response to the problem associated with the stacking of goods on conventional hand carts, the industry has resorted to the use to some extent of a self-recoiling roll of plastic material disposed between each layer of stacked goods. The self-recoiling sheet provides a constant biasing force against a layer of goods so as to prevent the forwardmost item from inadvertently toppling from the stacked goods.

Another important consideration in the use of hand carts in the application as above mentioned is that the stacked goods must be substantially contained within the vertical extending carrying space of the hand cart. That is, the stacked goods must be arranged so as to fall within the confines of the vertical extending carrying space in that the space normally available in a supermarket is extremely limited and the carts are designed so as to fit within certain designated display areas.

Accordingly, it is an object of this invention to provide a hand cart that includes means for interlocking stacked goods so as to prevent the inadvertent toppling of goods, without resorting to additional holding means.

It is another object of this invention to provide a hand cart for stacking goods in interlocking relationship, with the stacked goods falling within the confines of the vertical extending carrying space that is open at the front of the hand cart.

It is another object of this invention to provide a new and improved hand cart having an inherent construction for retaining the stacked goods in place.

It is still a further object of this invention to provide a new and improved hand cart for stacking goods in interlocking relationship, which hand cart may be collapsible for space saving purposes.

These and other objects are obtained by the provision of a hand cart comprising a generally rectangular main frame to which are connected a pair of side structures and a bottom platform structure, with the bottom platform structure being inclined relative to the horizontal so as to define with said main frame an included angle less than 90°, and preferably within the range of 80° to 86°. In addition, the back main frame may include a secondary wall portion which is inclined relative to the vertical at an angle less than the angle formed by the bottom platform structure with respect to the horizontal. By this arrangement, goods stacked in the hand cart of the subject invention are caused to overlap slightly in such manner that the goods must be removed in a desired sequence thereby preventing the inadvertent toppling of the goods during removal of an item, and in such manner that in the static position, the goods are biased in a stable direction toward the back of the hand cart. Preferably, the hand cart is mounted on wheels, with the side structures and the bottom platform structure being pivotally connected to the main frame structure so as to be collapsible, and a shelf extension is provided for the bottom platform structure so as to increase the surface carrying area of the hand cart. In addition, the total space occupied by the stacked goods falls within the confines of the vertically extending carrying space defined by the hand cart so as to facilitate the use of the hand cart in spaces provided for it in supermarkets.

For a better understanding of the invention, reference should be made to the following detailed description and to the drawings in which:

FIG. 1 is a perspective view of the hand cart of the subject invention;

FIG. 2 is a side elevational view of the cart shown in FIG. 1;

FIG. 3 is a front elevational view of the cart shown in FIG. 1;

FIG. 4 is a top view of the cart shown in FIG. 1;

FIG. 5 is a side view of a hand cart of the subject invention including a plurality of packages stacked on the hand cart and

FIG. 6 is a detailed view of a locking means for securing a shelf to a vertical side structure of the subject hand cart.

Referring more particularly to FIGS. 1 through 4, the hand cart of the subject invention is designated by the numeral 10, and basically comprises a generally rectangular back frame number 11, a pair of side vertical frame members 12, and an inclined bottom platform or

shelf structure 13. Each vertical side structure 12 is pivotally connected about a generally vertical axis to the main frame member 11 by pivot connections 14, 14', while the inclined bottom self structure 13 is pivotally connected to the main frame member 11 about a generally horizontal pivot connection 15.

Referring to FIGS. 1-3, the main frame member 11 includes an inverted U-shaped tubular member 20 to which are secured the flanges 21, 22 forming the pivot connections 14, 14' for the side structures 12. In addition, castors or wheels 23 are secured to the lower end of the member 20, and the main frame includes an inclined wall portion 24 extending from approximately the pivot axis 15 to a point intermediate the vertical height of the main frame 11. The inclined wall portion 24 of the main frame is rectangular in configuration and is formed by a tubular frame structure 25. Covering the front side of the frame structure 25 is a sheet or screen material 26 which extends from the lower tubular member of the structure 25 to a point adjacent the top of the main frame 11 where said screen extends between the legs of tubular member 20 and is attached to the back side thereof by screws 27.

The secondary frame structure 25 is approximately one-half the total vertical height of the main frame structure 20, and the plane of the wall portion 24 is inclined with respect to the generally vertical main frame 11 in a direction toward the bottom shelf structure 13. A reinforcing bar 28 extends between the legs of the U-shaped member 20 to provide additional support for sheet 26.

As a result of this construction, the front surface of the main frame member is generally inclined with respect to the vertical, with the degree of inclination varying from a generally vertical attitude at the upper end of the frame member to an inclined attitude adjacent to the lower end of the main frame member where the secondary frame structure defines the inclined wall portion 24 of the main frame member 11.

Each side structure 12 has mounted at the forward end thereof a castor or wheel 30, which castor or wheel member includes a horizontal support 31. Furthermore, as demonstrated in FIG. 6, each vertical side structure includes a generally U-shaped bracket 32 which cooperates with a suitable appendage 60, in the inclined bottom platform or shelf structure 13 so as to positively connect each side structure 12 to the bottom platform structure 13 when the hand cart is in its operative unfolded position.

The bottom shelf structure 13 is pivotally connected as at 15 to the flanges 22 of the main frame member 11, and includes two depending legs 40 disposed adjacent the front portion of said bottom platform 13. Each leg 40 is positioned to bear against the support surface 31 of a wheel 30 so that the bottom platform 13 is inclined with respect to the horizontal. Preferably, the angle of inclination is between 6° and 10°, whereby the bottom shelf portion, in conjunction with the back main frame member 11 defines an included angle of approximately 86°. Depending from the lower portion of the shelf structure 13 are two elongated tubular members 41 and 42 which are adapted to provide support for a removal shelf extension member 50. The shelf extension member 50 includes two elongated arms 51 and 52 which are adapted to fit within the tubular structures 41 and 42 when it is desired to increase the planar area of the bottom shelf structure 13. In another alternative the

shelf extension member 50 may be pivotally hinged to the bottom shelf member 13, along the front edge thereof. With this construction physical placement or removal of the extension member 50 is not required.

As is readily apparent, the hand cart 10 of the subject invention may be readily collapse by merely folding the bottom platform 13 about the axis 15 into a generally vertical position, and by folding inwardly the vertical side frame members 12 against the backframe member 11.

The unique configuration of the hand cart of the subject invention when in its fully operative position as shown in FIGS. 1 through 5 provides the inherent advantage of preventing stacked goods mounted on the cart from toppling. As shown in FIG. 5, a plurality of packages, designated by the letters A through BB are stacked, with the configuration of the cart causing the packages in the respective layers to overlap thereby resulting in an interlocked relationship. More particularly, package "B" overlaps both packages E and F so as to provide a restraining force which maintains package E in place as package A is removed from the stack. Assuming the purchaser "drags" package "A" from the stack, package E would have a tendency to pivot about its lower front edge possibly resulting in its inadvertent toppling from the stack. However with the arrangement of packages as provided by the hand cart of the subject invention, a portion of the weight of package "B" provides a restraining force at the upper rear corner of package "E" to prevent this inadvertent tumbling. Furthermore, the inclined shelf 13 causes the entire assembly of stacked goods to be inclined rearwardly thereby preventing the inadvertent tumbling of the front row of packages "A," "E," "I," etc.

After package "A" has been removed, the next purchaser must remove package "B" since package "E" is partially restrained from removal by the weight of package "B." Next package "E" may be removed, followed by package "C." Accordingly, the hand cart of the subject invention provides the additional advantage of causing customers to remove packages in a desired sequence, thereby further contributing to the orderly removal of goods from the cart.

As mentioned above, the bottom shelf structure 13 is inclined with respect to the horizontal so as to define with the back main frame 11 an included angle less than 90°. The inclination of the bottom shelf structure provides two inherent advantages. Firstly, all of the goods stacked on the cart are tilted rearwardly against the back frame member, thereby increasing the stability on the cart when in static display and also when the cart is being moved from the truck to the display location in the store. Secondly, the inclination of the bottom shelf portion causes the overlapping relationship of the layers of stacked goods thereby providing the interlocking arrangement between adjacent packaged goods to prevent inadvertent toppling of a package upon the removal of another package. Preferably, the lower portion of the back frame member is inclined with respect to the vertical to a degree less than the angle assumed by the bottom platform 13 with respect to the horizontal. In effect, this difference in angles results in a decreased overlapping between the layers of the stacked goods, but this is desirable in that the first advantage of the inclined bottom shelf structure (i.e., to incline the packaged goods rearwardly) is still maintained. Because of this geometric relationship of elements, as il-

illustrated in the diagrams, the angle assumed by the sheet material 26 decreases from the lower portion of the main frame member 11 to the upper portion thereof. In fact, as illustrated, the angle assumed by the sheet material 26 with respect to the vertical is zero at the upper end of the rectangular main frame member 11. This particular consideration provides the inherent advantage of confining the packaged goods to the vertical front open space defined by the cart. This is particularly important in that the space available for the display of goods in a supermarket is generally limited, and if the back main frame member were disposed at right angles to the inclined body shelf platform, the cart would be of greater dimensions than desired for use in present display spaces.

Although the preferred embodiment of the subject hand cart has been described and illustrated, it is readily apparent that various modifications and alterations may be made therein without departing from the scope of the invention.

What is claimed:

1. A hand cart for stacking goods in interlocking relationship comprising a vertically extending, generally rectangular main frame, a pair of side structures connected to parallel side portions of said main frame, a bottom platform structure connected to a horizontal lower portion of said main frame, said bottom platform structure being inclined so as to define with said main frame an included angle of less than 90°, said main frame including a wall portion which is inclined at an angle relative to the vertical and of a magnitude less than the angle assumed by the bottom platform structure with the horizontal, with the said wall portion being connected at its lower end to said bottom platform structure to define said included angle less than 90°, and said wall portion being connected at its upper end to points intermediate the parallel side portions of said main frame, whereby said side and bottom platform structures, together with said main frame, serve to define a vertically extending carrying space that is open at its front.

2. A hand cart as in claim 1 further including wheel means mounted on the lower end of said hand cart.

3. A hand cart as in claim 1 wherein said side structures are pivotally connected to said main frame about generally vertical axes, and said bottom platform structure is pivotally connected to said horizontal lower portion of said main frame about a generally horizontal axis, whereby said side and bottom platform structures are collapsible upon each other adjacent to the front side of said main frame.

4. A hand cart as in claim 3 wherein locking means are provided for securing said side structures to said bottom platform structure when said structures are in their extended positions defining the vertical extending carrying space that is open at the front end of the hand cart.

5. A hand cart as in claim 1 further including shelf structure which is connected to the bottom platform structure for increasing the surface area of said bottom platform structure.

6. A hand cart as in claim 1 wherein the wall portion of said main frame comprises a generally rectangular secondary frame which is smaller in size than said rectangular frame, and is connected thereto at a point intermediate the side portions of said main frame.

7. A hand cart as in claim 1 wherein said wall portion is inclined relative to the vertical at a greater angle than the portion of the main frame above said intermediate points on the parallel side portions thereof.

8. A hand cart for stacking goods in interlocking relationship comprising a back main frame member having two spaced apart supporting roller means at the bottom portion thereof; opposite side vertical frame members connected to the opposite side portions of said main frame member, each said opposite vertical frame member having roller means mounted at its front portion; a bottom shelf member mounted at the bottom portion of said main frame member and between said opposite vertical frame members, said bottom shelf member including depending extensions which bear against the roller means mounted at the front portions of said side vertical frame members so as to support said bottom shelf member at an inclined angle with respect to the horizontal so as to define with said back main frame member an included angle less than 90°.

9. A hand cart as in claim 8 wherein said opposite side vertical frame members and said bottom shelf member are pivotally connected to said back main frame member whereby said bottom shelf member may be pivotally moved manually from a generally inclined horizontal position to a folded vertical position substantially parallel with and in close proximity to said main frame member, and said vertical frame members adopted to be moved pivotally manually from the open position at substantially right angles to said main frame member to an angle of approximately 90° to a collapsed position substantially parallel with and close to said main frame member.

10. A hand cart as in claim 8 wherein a shelf extender means is provided and adapted to be connected to said bottom shelf member for increasing the planar surface area thereof.

11. A hand cart as in claim 8 wherein said included angle is in the range of 80°-86°.

12. A hand cart as in claim 8 wherein the back frame member is generally vertical and includes a sheet material secured to said back main frame member in such manner that the angle assumed by the sheet material with respect to the vertical decreases from the lower portion of the main frame member to the upper portion thereof.

13. A hand cart as in claim 12 wherein the uppermost portion of said sheet material is vertical.

14. A hand cart for stacking goods in interlocking relationship comprising a back main frame member having two spaced apart supporting roller means at the bottom portion thereof; opposite side vertical frame members connected to the opposite side portions of said main frame member, each said opposite vertical frame member having roller means mounted at its front portion; a bottom shelf member mounted at the bottom portion of said main frame member and between said opposite side vertical frame members, said bottom shelf member being inclined with respect to the horizontal so as to define with said back main frame member an included angle less than 90°; said back main frame member including a wall portion extending at an angle to the plane of said main frame member, which angle is less than the angle of inclination of said bottom shelf member with respect to the horizontal, and wherein said bottom shelf member is connected to said wall portion of said back main frame member.

15. A hand cart as in claim 14 wherein said wall portion is inclined relative to said back main frame member approximately 3°-5°.

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