Oct. 27, 1970 J. Y. LOWE 3,536,283

MATERIAL CARRIER

Original Filed April 18, 1967

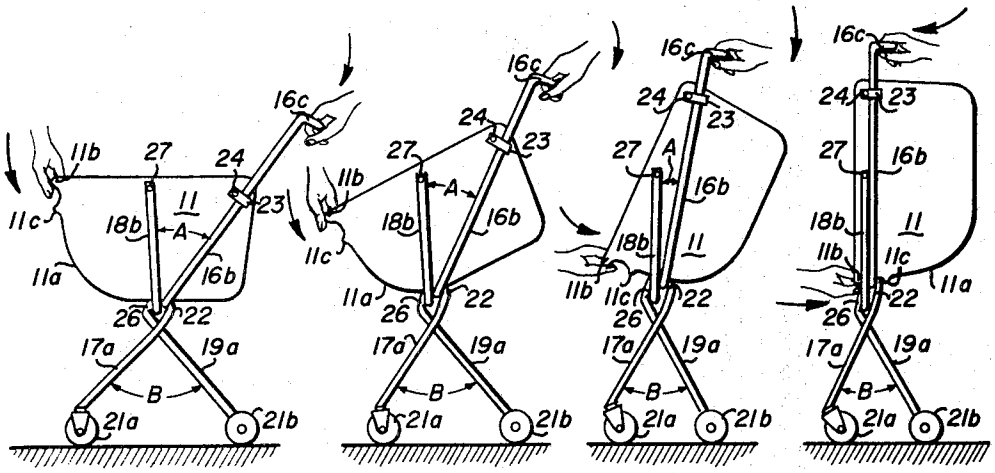


Fig_3A Fig_3B Fig_3C Fig_3D

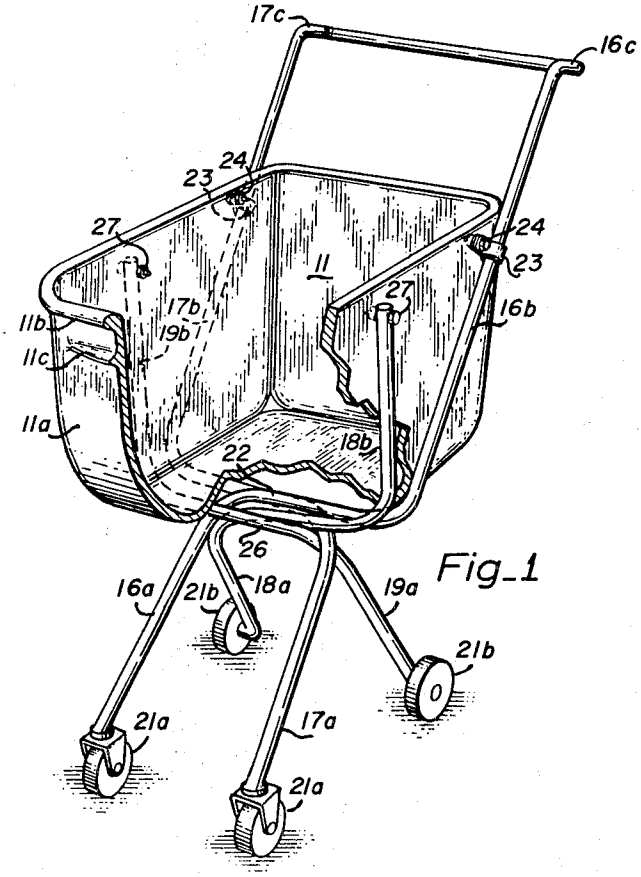


Fig_1

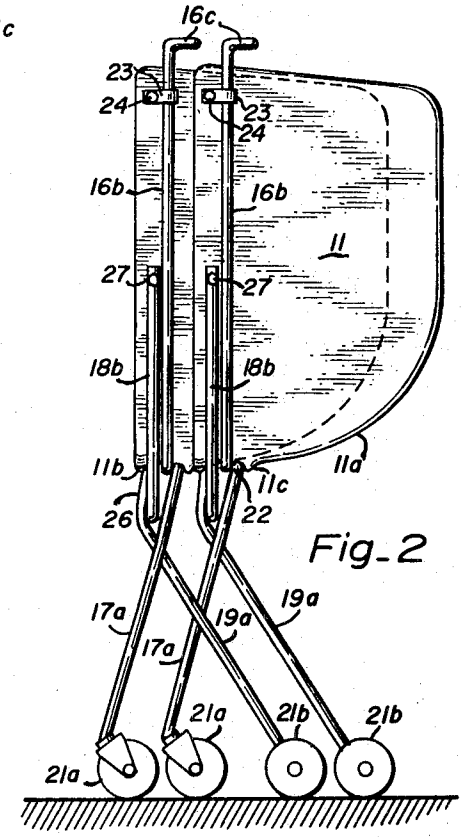


Fig_2

INVENTOR.
JUNG Y. LOWE

Harvey J. Hawkins
ATTORNEY

United States Patent Office 3,536,283 Patented Oct. 27, 1970

3,536,283

MATERIAL CARRIER

Jung Y. Lowe, San Francisco, Calif.
(3956 Koko Drive, Honolulu, Hawaii 96816)

Original application Apr. 18, 1967, Ser. No. 631,675, now Patent No. 3,442,406, dated May 6, 1969. Divided and this application Sept. 10, 1968, Ser. No. 798,475
Int. Cl. B62b *3/02, 3/08*
U.S. Cl. 248—129 17 Claims

ABSTRACT OF THE DISCLOSURE

A material carrier including a basket which is generally horizontal while carrying the material and which can be tilted by manipulation of the basket and the carrier frame to unload the basket contents. The basket is maintained in a stable tilted position by frictional engagement of the basket with the frame.

This application is a division of my copending application Ser. No. 631,675, filed Apr. 18, 1967, and now Pat. No. 3,442,406 granted May 6, 1969.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates in general to material carriers, and relates more particularly to such carriers which can be manually or automatically unloaded.

Description of the prior art

In many industries and businesses there is a need for improved materials handling equipment and techniques. Basket type carriers are especially valuable to transport and position articles, materials and other objects, particularly when the carriers can be nested into one another during storage to occupy a minimum of floor space. Since storage area is relatively expensive in all commercial buildings, the nesting type wheeled carrier with basket is often exclusively used as an integral and important part of the business system, such as in small parts inventory warehouses and in supermarkets.

Commercially available nesting carriers are usually constructed of rigid metal tubing and latticed welded strips of wire which comprise the basket portion. Such construction has many drawbacks, including the inability to hold liquids and very small objects, the non-smooth interior of a basket constructed out of crossed wires with open spaces, and the difficulty of emptying such baskets due to their rigid horizontal posture and generally box-like construction with high vertical walls. A nesting carrier so constructed to eliminate these objections would provide a new and valuable piece of equipment to many diverse industries because of the increased efficiency and versatility associated with its use.

For example, the food retailing industry is the largest retail business in this country in terms of sales, and the tens of thousands of supermarkets presently operating include thousands which sell over a million dollars worth of food and other items annually. In order to produce this volume of business, each of the several checkout stands in such a market may sell approximately $7500–$10,000 worth of merchandise each week. The cashier who handles such a checkout stand on a busy day may sell as much as $3000 worth of merchandise, which, according to published research, could require the exercise of over 7500 head and eye muscle movements, as well as the expenditure of a great deal of energy in hand and leg movements. As an example, it has been shown that a cashier who bends down to unload groceries from shopping carts may lift a total of two to three tons weight on a busy day.

Employee fatigue under these conditions is well known to the management of supermarkets, and they are also aware that it causes serious cumulative mistakes in ringing up prices on the cash register, thus costing the store substantial sums each year in addition to higher labor and time costs for unloading of the carts. Additionally, studies have shown that the greatest source of customer dissatisfaction with a supermarket is waiting to be checked out by the cashier, and there is at present a substantial need for new efficient methods and apparatus to carry and unload articles, which will also minimize this waiting time.

SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided novel apparatus to support a load, transport it by carrier to an unloader, and discharge the load quickly and efficiently. This apparatus includes a carrier, which may be wheeled, with a basket pivotally secured to its superstructure, and cooperative unloader apparatus with an elevator ramp. The basket is tiltable from the generally horizontal load-carrying position for discharging the contents thereof. The basket co-acts with its associated superstructure in such a manner that the basket will remain in the tilted position in a stable condition, if desired, so that the carrier may be stored in a nesting posture with like carriers to collectively occupy a minimum of floor space. In addition, the superstructure of the carrier includes supporting members which can move closer together for nesting, thereby reducing a unit's floor space requirements.

When the carrier is utilized with the unloader disclosed in U.S. Pat. No. 3,442,406, the loaded carrier is placed on the ramp of the unloader and the ramp is then elevated, causing the carrier superstructure to move and its configuration to change because the top of the basket is placed under a restraining force by members of the unloader. This causes the basket to tilt, controllably discharging its contents onto suitable apparatus which serves to temporarily hold all or part of the discharged contents before they are conveyed away. After the basket is emptied, the operator can select whether the carrier is released from the unloader with its basket in horizontal or tilted position.

It is therefore an object of this invention to provide a material carrier having a generally horizontally positioned basket which can be tilted to discharge the contents thereof and to permit efficient nested storage of the carrier when not in use.

It is another object of this invention to provide a material carrier having basket support pivot points located adjacent to the basket rim to permit deep nesting of the carriers and baskets, thereby conserving valuable storage area.

It is a further object of the present invention to provide a carrier having a load-supporting tiltable platform, and a superstructure supporting the platform including base members which draw closer together when the platform is tilted to reduce the floor area occupied by the carrier.

Another object of this invention is to provide a carrier with basket that can rest directly upon portions of the carrier support members when substantially horizontal, or tilted to an upright position to thereby maintain its posture for operational stability and simplicity in construction.

It is an additional object of this invention to provide methods and apparatus for receiving and transporting articles, materials, liquids or other objects in a mobile carrier having a load-supporting basket or platform, the carrier being sturdy and of relatively simple lightweight construction and capable of being manipulated for unloading at a controlled rate of discharge.

A further object of this invention is to provide methods and apparatus for easily separating a carrier nested with others, and pivoting its basket rearward to the horizontal by moving its handles rearward and downward in a single motion.

Objects and advantages other than those set forth above will be apparent from the following description when read in connection with the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a preferred type of wheeled carrier and basket in accordance with this invention, with certain parts broken away;

FIG. 2 illustrates a pair of the wheeled carriers of FIG. 1 with baskets arranged in nested relation; and

FIGS. 3A–3D are a sequential series of side views of the carrier as it moves from the position with its basket horizontal to the position with its basket vertical.

DESCRIPTION OF THE PREFERRED EMBODIMENT

One embodiment of the wheeled carrier of this invention is illustrated in FIGS. 1 and 2. Generally, the carrier comprises a basket **11** which is supported on a base. Basket **11** is preferably formed from a suitable lightweight rigid, solid material of substantial strength, such as aluminum or other suitable metal, plastic, resin-treated fiberglass, or plywood. As an alternate to such solid construction, however, basket **11** may be formed of wire or shaped strips, or comprise a combination of rigid material for portion of front wall, basket rim including pivot adjuncts, and flexible material for the load carrying basket portion which is suspended below.

Basket **11** has a front wall **11***a* which is arcuately contoured to facilitate the gravitational flow of objects, materials or liquids down this front wall when the basket is tilted for discharge of the contents thereof. This contoured front wall also permits the basket to pivot clear of the carrier frame, as will be described in detail below. The basket sides and rear walls are tapered inward toward the bottom wall to permit nesting with like baskets.

The basket is also provided with a reinforced lip **11***b* on at least the front wall thereof to provide desirable rigidity along this wall and to act as a stop to prevent the basket from tilting past the vertical. Front wall **11***a* is also preferably provided with a raised transverse rib **11***c* which is spaced from and generally parallel with the lip **11***b*. The space between rib **11***c* and lip **11***b* engages a portion of the frame when the basket is in the vertical position, in a manner to be described below, to firmly hold the basket in the vertical position.

The carrier frame for supporting basket **11** comprises a pair of front base members **16***a* and **17***a*, and a pair of rear base members **18***a* and **19***a*. The front and rear base members are preferably formed of a lightweight metal tubular material. The lower ends of these front and rear base members may preferably receive casters and wheels **21***a*, **21***b*, respectively. Front base members **16***a*, **17***a* are in generally parallel spaced relation and are inclined upward toward the center of basket **11**. Rear base members **18***a*, **19***a* converge at their upper parts and are farther apart than front base members **16***a*, **17***a*, to permit the front base members of another carrier to enter therebetween and nest closely, as shown in FIG. 2.

Front base members **16***a*, **17***a* are bent inwardly underneath basket **11** and cross each other to form a junction **22** which is secured together by welding or the like. The members then continue upwardly and rearwardly from junction **22** to form rear basket support members **16***b*, **17***b*. Rear support members **16***b*, **17***b* pass freely through collars **23** which are pivotally secured to opposite sides at the rear of basket **11**. Collars **23** are preferably formed of flat stock bent into a loop with flattened end portions which are provided with openings to receive a pivot pin **24**, such as a rivet, which is secured to basket **11**.

Members **16***b*, **17***b* continue upwardly and rearwardly above basket **11** and are provided at their upper ends with handle portions **16***c*, **17***c* which are joined together to form a handle for pushing and steering the carrier.

Rear base members **18***a*, **19***a* similarly are bent inwardly underneath basket **11** to form a junction **26** which may be formed by welding or the like. These members continue upwardly from junction **26** to form central basket support members **18***b*, **19***b*. The upper ends of central basket support members **18***b*, **19***b* are provided with openings which receive pivot pins **27**, such as rivets, which are secured to the walls of basket **11**. Spacer washers may be provided on pivot pins **27** between support members **18***b*, **19***b* and the walls of basket **11**, as well as on pivot pins **24** between rear basket support members **16***b*, **17***b* and the basket walls.

While basket **11** is in the horizontal position shown in FIG. 1, its bottom rests on junction **22** which is located approximately midway between the front and rear basket walls. Front base members **16***a*, **17***a*, which are connected to junction **22**, fit in close sliding relation astride the adjacent junction **26** and are restrained from moving downward out of place by the converging portions of members **18***a*, **19***a* which meet to form junction **26**. The upper shoulders of members **18***a*, **19***a*, and the lower shoulders of members **18***b*, **19***b* are spaced wider apart than members **16***a*, **17***a*, and this prevents members **16***a*, **17***a* from moving either laterally or upwardly out of place when junction **22** pivots about junction **26**, despite the increasing speration between these junctions as members **16***b*, **17***b* move forward into parallel alignment with members **18***b*, **19***b* as basket **11** tilts forward toward the nesting position, which will be described more in detail below.

This above-described sturdy interlocking pivotal arrangement provides longitudinal flexibility for the cooperating junctions **22**, **26** which is essential so that basket **11** can be tilted to a vertical position and held in place by junction **22** moving upward until it makes frictional contact with the portion of front wall **11***a* between lip **11***b* and rib **11***c*.

The action of the carrier is most clearly shown in FIGS. 3A–3D which illustrate the motions involved as the basket moves from the horizontal position to the nesting position. In FIG. 3A, basket **11** is in the horizontal position and a downward force is applied to the front of the basket in the area of lip **11***b* while a restraining force is applied to the carrier handle to prevent undesired movement of the carrier. In FIG. 3B, basket **11** has started to tilt under the action of the force on lip **11***b*, and collars **23** and the rear of the basket have moved upwardly on basket support members **16***b*, **17***b*. This movement of collars **23** and the rear of the basket also has caused members **16***b*, **17***b* and front base members **16***a*, **17***a* to pivot about junction **22** relative to members **18** and **19**. This movement is shown by the decrease from FIG. 3A to FIG. 3B in the angle A between members **16***b* and **18***b*, and the decrease in the angle B between members **17***a* and **19***a*.

In FIG. 3C, force continues to be applied to lip **11***b* to tilt the basket, and angles A and B continue to decrease as members **16***b*, **17***b* approach a vertical position. The function of the arcuately contoured front wall **11***a* to facilitate the basket **11** clearing junctions **22** and **26** as the basket tilts is clearly seen in FIGS. 3B and 3C. As the basket is moved through the positions shown in FIGS. 3B and 3C, the contents thereof will begin to be discharged over lip **11***b*.

Shortly after the basket rotates past the position shown in FIG. 3C, rib **11***c* encounters junction **22** and is forced over this junction so the junction is positioned between rib **11***c* and lip **11***b*. In this position, as shown in FIG. 3D, basket **11** is vertical and rests its weight on junction **22**. It will be seen from FIG. 3D that junction **22** has moved upwardly from its original position in FIG.

3A until it is nearly directly above junction **26**. The weight of basket **11** thus acts in nearly a straight line downwardly through pivot pins **27** and junction **22** and is supported by these elements. The basket is very stable in this position by virtue of the gripping action provided on junction **22** between lip **11***b* and rib **11***c*. Similarly, the entire carrier assembly is stable against overturning because of the weight of the basket acting nearly straight downwardly in a line which is approximately midway between the front and rear wheels in FIG. 3D.

After the contents of basket **11** have been removed, either by hand or by gravitational forces as the basket is tilted or by a combination of these forces, the carrier may be moved to a position for storage where it may be nested with other carriers. As described above, the front wheels and front base members **16***a*, **17***a* of one cart will fit between the rear wheels and rear base members **18***a*, **19***a* of a carrier in front of it. Thus, as shown most clearly in FIG. 2, the carriers may be nested with one basket into another and with front and rear wheels nested. This results in a minimum requirement of storage space for the carriers when not in use.

To separate a carrier for use, the operator may withdraw the most rearward nested carried simply by pulling back on handles **16***c*, **17***c*, and it easily separates from the preceding carrier because of minimum friction. Continued pulling on the handles draws the carrier clear and by abruptly forcing the handle down and rearward in an arcing direction, the basket **11** is lifted up from junction **22** and, due to the rearward force applied to pivots **24**, pivots rearward down to the horizontal. Bottom wall of basket **11** settles to rest on top junction **22** for optimum platform stability, and front base members **16***a*, **17***a* move away from rear base members **18***a*, **19***a* to increase carrier stability.

From the above description, it will be seen that the carrier of this invention is useful by itself to provide a device which can be easily unloaded by tilting as described above and which can be nested together with other carriers in a minimum of space when not in use. The carrier of this invention is also useful in conjunction with essentially fully automatic means for unloading it and for controlling its release from the loading station to place the basket in either the horizontal position or the tilted position, such as is disclosed in U.S. Pat. No. 3,442,406.

While the above detailed description has shown, described and pointed out the fundamental novel features of the invention as applied to various embodiments, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. A tiltable carrier, comprising:

a tiltable basket having a front wall and a bottom wall;

a supporting structure for said basket, said supporting structure including front base members, rear base members, rear basket support members, and central basket support members;

means joining said front base members to said rear basket support members to form a first junction extending laterally under said basket;

means joining said rear base members to said central basket support members to form a second junction extending laterally under said basket and adjacent said first junction;

first pivot means pivotally connecting said basket to the upper ends of said central basket support members; and

second pivot means pivotally and slidably connecting the rear of said basket to the upper portions of said rear basket support members, whereby when a downward force is applied to the front of said basket, with said rear basket support members moved toward the vertical, said basket pivots about said first pivot means and said second pivot means, and said second pivot means slide upwardly on said rear basket support members to tilt said basket towards the vertical with a portion of said front wall resting on said first junction.

2. Apparatus in accordance with claim **1** in which said basket has a lip portion at the top edge of said front wall for engaging one of said junctions when said basket is tilted towards the vertical.

3. Apparatus in accordance with claim **2** in which said basket has a raised rib portion spaced from and generally parallel to said lip portion, the portion of said basket between said rib portion and said lip portion defining a groove for receiving and retaining said first junction when said basket is tilted towards the vertical.

4. Apparatus in accordance with claim **1** in which said basket bottom wall rests on said first junction when said basket pivots to the substantially horizontal position.

5. Apparatus in accordance with claim **1** in which said rear basket support members are provided at their upper ends with handle means for maneuvering said carrier.

6. Apparatus in accordance with claim **5** in which said handle means are movable along a line describing a segment of an arc whereby said basket can be pivoted to the substantially horizontal position.

7. Apparatus in accordance with claim **5** in which the upper ends of said rear basket support members are joined together.

8. Apparatus in accordance with claim **1** in which the front wall of said basket is arcuately contoured inwardly from top to bottom to facilitate the discharge of the basket contents as said basket is tilted toward he verical.

9. Apparaus in accordance with claim **1** in which said basket has solid walls and a solid floor capable of holding liquids.

10. Apparatus in accordance with claim **1** in which a portion of said basket is comprised of flexible material.

11. Apparatus in accordance with claim **1** in which said front base members and said rear base members comprise sections extending from the ground to said first, and second, junctions, respectively, at an angle to the vertical, said front base members pivoting about said first junction and approaching said rear base members as said basket tilts toward the vertical, whereby the distance between said front base members and said rear base members is decreased when said basket tilts toward the vertical, thereby decreasing the storage area requirements for said carrier.

12. Apparatus in accordance with claim **11** in which the lower ends of said rear base members are separated transversely of said basket by a greater distance than the transverse separation of the lower ends of said front base members, whereby a plurality of carriers may be nested within one another by inserting the front base members of one carrier between the rear base members of another carrier.

13. Apparatus in accordance with claim **12** in which said first pivot means and said second pivot means are pivotally located adjacent the upper rim along the mouth of said basket, whereby a plurality of carriers may be nested within one another by inserting the basket of one carrier deeply within the basket of another carrier as the baskets are tilted towards the vertical.

14. Apparatus in accordance with claim **12** in which said front base members are generally equidistant from each other along their length and said rear base members taper inwardly toward each other from their lower ends to their upper ends.

15. Apparatus in accordance with claim **12** in which said first junction moves upwardly as said front base members pivot toward said rear base members, and said central basket support members and said rear basket support mem-

bers approach a generally parallel relationship with each other along their coextensive lengths.

16. Apparatus in accordance with claim 15 in which the upper ends of said front base members extend between the upper ends of said rear base members and the lower ends of said central basket support members to limit the transverse motion of said front base members as said first junction moves upwardly.

17. A carrier, comprising in combination:

a basket means;

four basket means support members, each member having a generally upwardly extending upper portion, a generally downwardly extending lower portion and a laterally extending intermediate portion disposed between said upper and lower portions;

means pivotally connecting each of said upper portions to said basket means, two of said pivotal connecting means being laterally aligned and having means slidable along their respective upper portions within predetermined limits; and

means connecting the intermediate portions of laterally aligned platform support members in pairs and in

hinged relation, whereby said basket means is supported in a stable horizontal position and is tiltable toward a stable vertical position to rest upon said intermediate portions when said pairs of basket means support members are rotated towards parallelism with one another.

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ROY D. FRAZIER, Primary Examiner

U.S. Cl. X.R.

248 —136, 137; 280—33.99, 47.37