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2,727,751

COLLAPSIBLE OR FOLDING WHEELBARROW

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2 Sheets-Sheet 1

FIG. 1

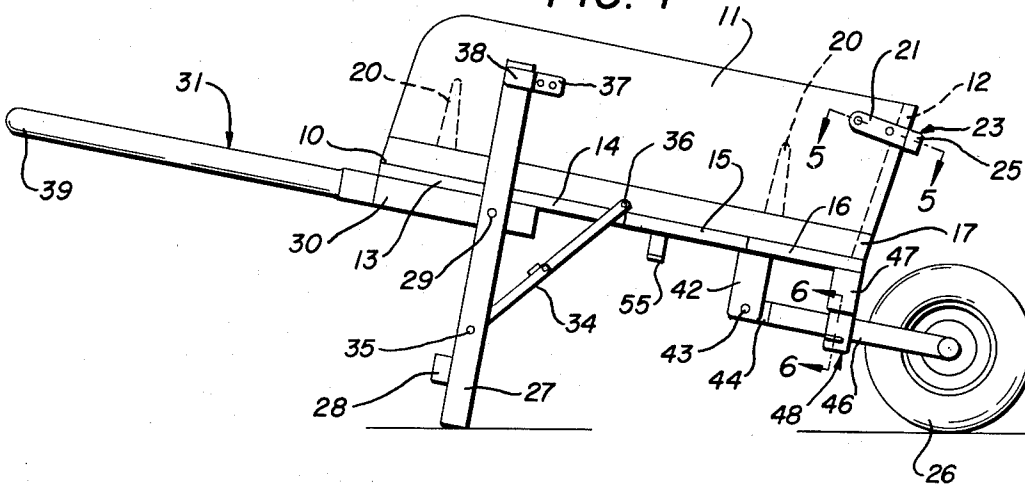


FIG. 2

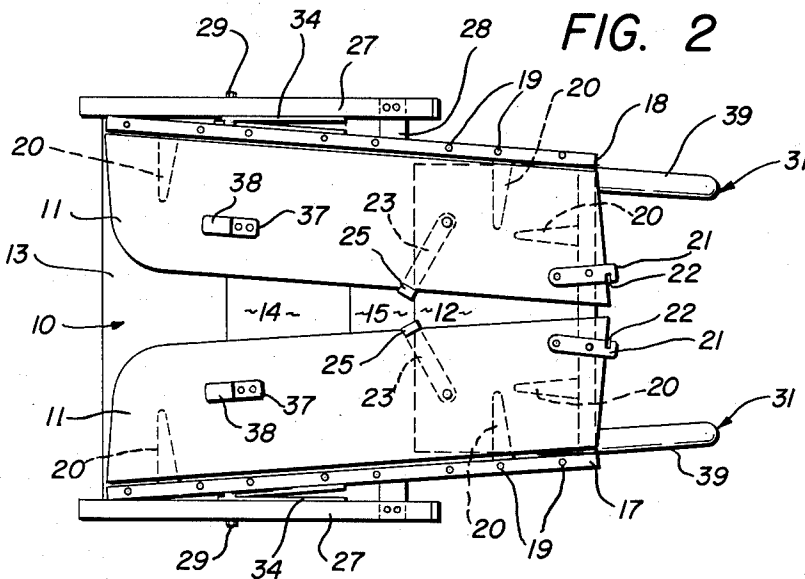
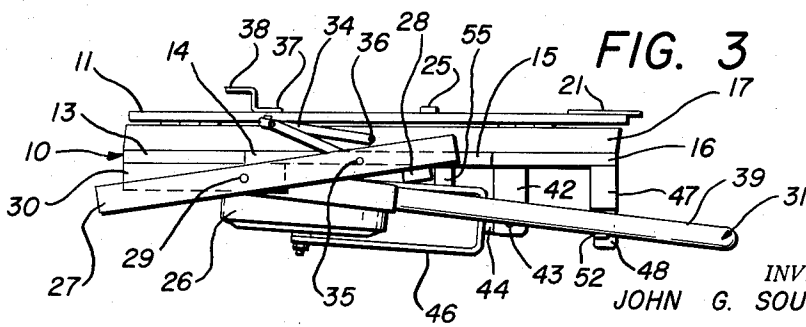


FIG. 3



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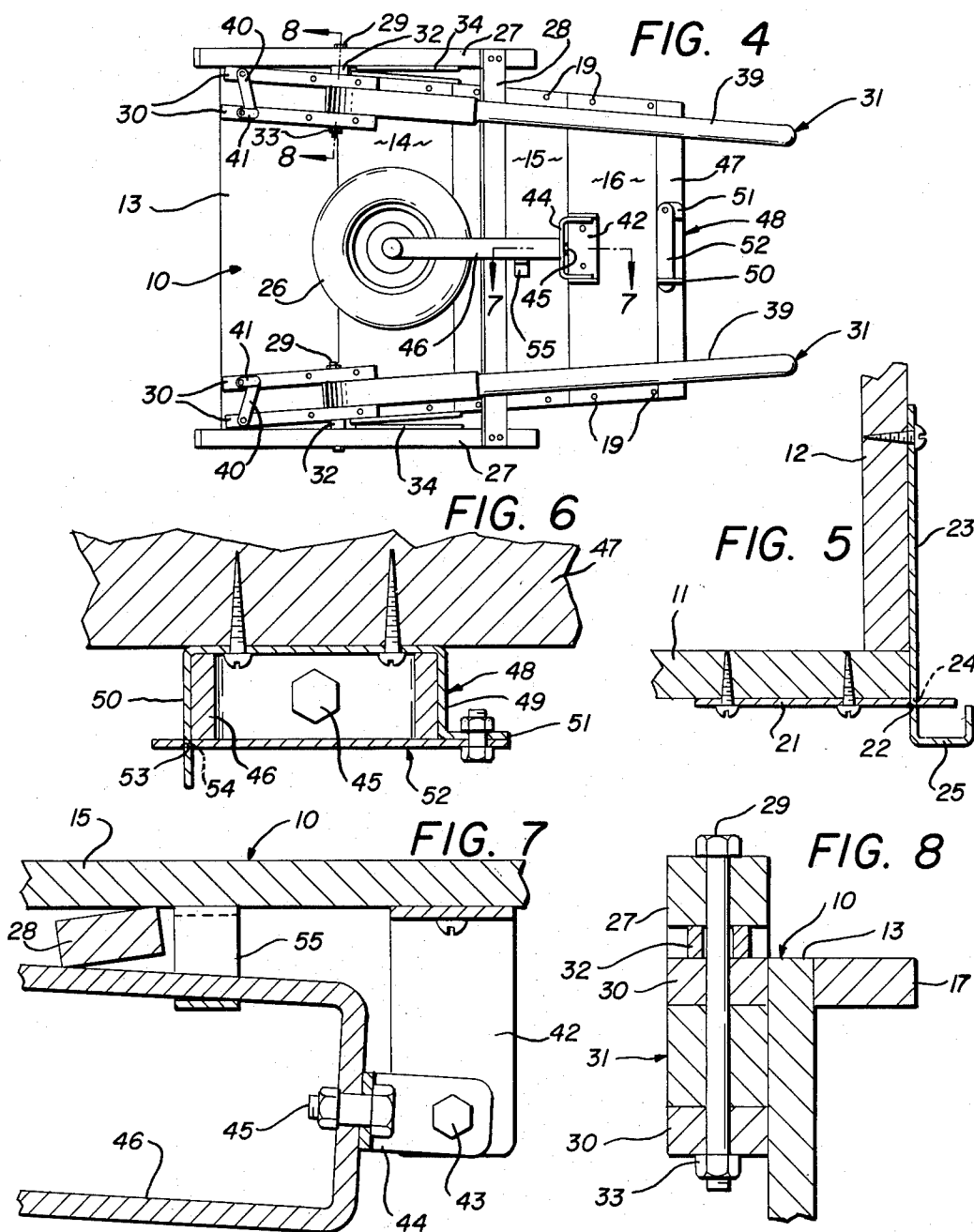
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COLLAPSIBLE OR FOLDING WHEELBARROW

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4 Claims. (Cl. 280—41)

The present invention relates to a collapsible or folding wheelbarrow, and more particularly to a collapsible wheelbarrow which can be compacted for storage without the removal or disassembly of any of its component parts.

Conventional wheelbarrows are generally bulky and occupy considerable floor space or storage area when they are not in use. This problem of storage space is of paramount importance to the home-owner who uses a wheelbarrow only occasionally and has only limited and inadequate storage facilities. However, even commercial users of wheelbarrows often find the bulkiness of the wheelbarrow to be an inconvenience during transport or storage.

It is a primary object of my invention to provide a wheelbarrow which can be folded into a compact form for storage purposes.

Another object of my invention is to provide a wheelbarrow of the character described in which none of the parts thereof have to be removed or disassembled in order to collapse or fold the wheelbarrow.

Still another object of my invention is to provide a folding wheelbarrow having improved means for supporting the wheel structure.

A further object of my invention is to provide an improved structure for a folding wheelbarrow wherein the quantity and complexity of the component parts is minimized, without detriment to the utility of the wheelbarrow.

Other objects and advantages of my invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is a side elevation of a collapsible wheelbarrow embodying the features of my invention.

Fig. 2 is a top plan view of the wheelbarrow in its collapsed or inoperative condition.

Fig. 3 is a side elevation of the collapsed wheelbarrow shown in Fig. 2.

Fig. 4 is a bottom plan view of the collapsed wheelbarrow shown in Fig. 2.

Fig. 5 is a fragmentary sectional view taken on line 5—5 of Fig. 1 and showing details of the side and end wall securing means.

Fig. 6 is a fragmentary sectional view taken on line 6—6 of Fig. 1 and showing details of the securement provided for the wheel when it is disposed in operative position.

Fig. 7 is a fragmentary sectional view taken on line 7—7 of Fig. 4 and showing securement of the wheel assembly in its inoperative position.

Fig. 8 is a fragmentary cross-section taken on line 8—8 of Fig. 4 to show the pivot bolt which is common to the legs and handles of the wheelbarrow structure.

Referring more particularly to the drawings, I have shown in Fig. 1 a preferred form of wheelbarrow, embodying the features of my invention, as it appears in operative or erected condition. The body or load-containing portion of the wheelbarrow is in the form of an open-box structure consisting of a bottom or bed 10, a pair of

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opposed side walls 11 and a front or end wall 12. The bottom 10 is made of a series of transverse panels 13, 14, 15 and 16 which are abutted in coplanar relationship and secured at their ends to a pair of horizontally-spaced longitudinally-extending frame members 17 and 18. The body may be formed of any suitable material, such as metal or synthetic resin, however, I have herein illustrated a wheelbarrow which is principally formed of wood. Any suitable fasteners 19 may be utilized to secure the bottom panels to the frame members 17, 18, although I have found it desirable to use bolts and T-nuts.

The bottom panels 13, 14, 15 and 16 are provided with angularly extending ends and are of progressively narrower width so that the side walls and the bottom tend to converge from a wide opening at the rear of the body to a narrower portion at the front of the body, as is customary in wheelbarrows.

The side walls 11 are vertically coplanar with the frame members 17 and 18 and are each hingedly secured to one of said frame members, by means of strap hinges 20, for inward pivotal movement. The end wall 12 is disposed intermediate the side walls 11 and is hingedly secured by hinges 20 to the forward end of the bottom panel 16, for inward pivotal movement.

As best seen in Fig. 5, each of the side walls 11 has fixedly secured to the exterior surface thereof a catch element 21 provided with a slot 22 extending downwardly from its upper edge. A pair of complementary latch bars 23 are pivotally secured to the exterior surface of the end wall 12, and are each provided with a slot 24 extending upwardly from the lower edge of said latch bars. Additionally, each latch bar 23 is provided with a rebent or hook portion 25 at the free end thereof, for a purpose to be described hereinafter. The slotted portions 24 of the latch bars 23 are pivotally movable into engagement with the slotted portions 22 of the catch elements 21 so as to lock the side walls and end wall to each other in predetermined erect relationship. It will be noted that the latch arrangement not only secures the end wall 12 against pivotal movement, but also secures the side walls 11 against pivotal movement relative to the end wall. Thus, the latch bars 23 in combination with the end wall 12 serve to prevent any undue strain from being placed on the hinges 20 when the body is loaded.

A three-point support is provided for maintaining the body in elevated position above ground level. The forward portion of the body is supported by a wheel 26 and the rearward portion of the body is supported by a pair of legs 27 which are preferably interconnected by a transverse tie rod or bar 28. Each of the legs 27 is pivotally secured to the body by means of a pivot bolt 29 which extends through a pair of spaced parallel handle braces or guides 30 which depend from the bottom panels 13 and 14 and are fixedly secured thereto. As best seen in Fig. 8, the pivot bolt 29 also serves as the pivotal axis and means for securement of a pair of handles 31 which are movably retained between each pair of guides 30. A spacer element 32 is mounted on the pivot bolt 29 between the inner face of each leg 27 and the outer handle guide 30, and the assembly is secured by a nut 33 which is threaded onto the end of pivot bolt 29. The nut 33 is preferably of the elastic stop-nut type so that it will not be loosened by vibration. The spacer element 32 provides a clearance space for a folding brace 34 which has one end thereof pivotally secured to the leg 27, as at 35, and has the other end thereof pivotally secured to the frame member 17 or 18, as at 36.

The upper end of each leg 27 is retained in a socket formed by a clip 37 which is fixedly secured to a side wall 11 and which has an offset portion 38 which overlies and frictionally engages the end of the leg. The upper portion of each of the legs 27 thus serves as a brace for

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the side walls 11 to supplement the action of the latch bars 23 and thereby increase the strength and rigidity of the body structure.

That portion of each handle 31 which lies between the guides 30 is preferably of square cross-section so that full surface engagement of the handles and the guides will occur. The rearward portion of each handle may preferably be of circular cross-section to provide a convenient hand-grip 39. In order to secure the handles 31 in the operative position shown in Fig. 1, each pair of handle guides 30 is provided with a pivotally movable lock bar 40 which can be moved to a position traversing the guides 30 so as to underlie the handle 31 and prevent it from moving pivotally downward. As best seen in Fig. 4, the lock bar 40 is frictionally retained by a spring clip 41 secured to one of each pair of guides 30.

An inverted U-shaped bracket 42 is secured to the underside of the bottom panel 16 and has pivotally secured thereto, as at 43, a U-shaped hinge member 44 which is free to rotate in a vertical plane. Pivotally secured to the web of hinge member 44, as by pivot bolt 45, is a U-shaped wheel fork 46 having the wheel 26 rotatably secured to the free ends thereof. In operative position, as in Fig. 1, the wheel 26 lies forwardly of the forward end of the body so that an extended fulcrum point is provided for ease in lifting and manipulating the loaded wheelbarrow. In this position, the fork 46 bears against a transverse bolster 47 which is secured to the bottom panel 16 intermediate the bracket 42 and the wheel 26.

An inverted U-shaped guide or retainer member 48 is fixedly secured to the underside of the bolster 47 in the path of movement of the fork 46. The spacing between the parallel legs of the member 48 is such that the fork 46 fits snugly therebetween. The guide member 48 thus serves to position and retain the wheel fork 46 in proper operating position so that the axis of wheel 26 will be parallel to the ground surface. As best seen in Fig. 6, one of the legs 49 of the guide member 48 is shorter than the other leg 50. The leg 49 is bent or flanged outwardly to provide an ear 51 to which is pivotally secured a latch bar 52 having a notch or recess 53 near the free end thereof. The leg 50 is provided with a complementary notch or recess 54 which is engaged by the latch bar 52 to underlie the wheel fork 46 and hold it firmly in the member 48. The wheel assembly is thus secured against pivotal movement in its operative position.

By reference to Figs. 2, 3 and 4 of the drawings, the manner of folding or collapsing the wheelbarrow for storage or transport, can be comprehended. The procedure is as follows: The wheelbarrow is preferably turned upside down and the leg braces 34 are then folded or released so that the legs 27 can be rotated (counter-clockwise as viewed in Fig. 1) approximately 90° until the tie bar abuts the bottom 10. The handle lock bar 40 is then released from its locking position and pivoted to a position where it does not interfere with the movement of the handles to a position where they abut the bolster 47 and overlie the tie bar 28. The frictional engagement between the handles 31 and the handle guides 30 is sufficient to retain the handles in the desired position, and also serves to hold the legs 27 in the collapsed position. The fork latch bar 52 is then released to permit the wheel fork 46 to be rotated approximately 180° in a vertical plane about the axis of the hinge member 44. The fork 46 is then rotated 90° about the axis of swivel bolt 45 so that it assumes the position shown in Figs. 3, 4 and 7. In this position, one leg of the fork 46 will be engaged and retained by a clip 55 which is secured to the underside of bottom panel 15. The wheelbarrow can then be up-ended to rest upon the legs 27 while the latch bars 23 are released. The end wall 12 can then be folded down upon the bottom 10 and the side walls 11 can be folded down upon the end wall 12, as shown in Fig. 2. The latch bars 23 underlie the side walls 11 and they can be pivoted to cause the hook portions 25 to engage the edges of the

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folded side walls and thus secure them in this position.

The wheelbarrow is thus completely collapsed and all parts are secured against movement. The fork latch bar 52 may now be returned to its locking position and will serve as a convenient hanging strap by which the wheelbarrow can be suspended from a hook or nail in a wall.

It will be understood that in order to erect the wheelbarrow for use, the above described folding procedure would be reversed.

I wish to call attention at this point, to the utility of the multi-panel bottom structure. By making the bottom 10 out of a plurality of panels, such as the four panels 13, 14, 15 and 16 which I have here illustrated, I can readily replace any worn or broken section of the bottom without replacing the entire bottom, as would be the case if the bottom 10 were a single piece structure. However, in addition to the advantage of easy replacement, it will be noted that the four panel structure permits the bottom panel 15 to be removed without interfering with the securement and arrangement of the other parts, except clip 55, which has no function during use or operation of the wheelbarrow. Accordingly, I can replace the bottom panel 15 with a similarly shaped panel or unit which forms no part of this invention, but which, for example, may be a wheel-driven spreader or the like. Thus, without any disassembly of the wheelbarrow, other than the removal of the aforesaid bottom panel, I am able to convert the wheelbarrow to other practical uses, as determined by the panel unit or device which replaces the removed bottom panel.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts, may be resorted to, without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In a collapsible wheelbarrow, the combination of a body, said body including a bottom and pivotally mounted walls secured to said bottom, said bottom including a plurality of coplanar panels secured in abutment with each other, a supporting wheel assembly pivotally secured to at least one of said panels, a supporting leg assembly pivotally secured to another of said panels, and one of said panels intermediate said first-named panel and said second-named panel removably secured in said bottom for selective removal.

2. In a collapsible wheelbarrow, the combination of a body comprising a bottom and upwardly extending walls hingedly secured to said bottom, said bottom comprising a plurality of coplanar panels secured in abutment with each other, a supporting wheel assembly pivotally secured to one of said panels, a supporting leg assembly, a pair of handles, means pivotally securing said leg assembly and said handles to another of said panels, and one of said panels intermediate said first-named panel and said second-named panel removably secured in said bottom for selective control.

3. In a collapsible wheelbarrow, the combination of a body, said body including a bottom, a pair of upright side walls hingedly secured to said bottom, and an upright end wall hingedly secured to said bottom, said end wall being pivotally movable between said side walls into overlying relationship to said bottom, said side walls being pivotally movable into overlying relationship to said end wall and said bottom, a pair of latch elements pivotally secured to said end wall and movable into locking engagement with said side walls when said side walls are in said overlying position, a catch element secured to each of said side walls, said latch elements being pivotally movable into locking engagement with said catch elements when said walls are in upright position, a wheel assembly pivotally secured to said bottom, a leg

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assembly pivotally secured to said bottom, and a handle assembly pivotally secured to said bottom.

4. In a collapsible wheelbarrow, the combination of a body; said body including a bottom, a pair of upright side walls hingedly secured to said bottom, and an upright end wall hingedly secured to said bottom; said end wall being pivotally movable between said side walls into overlying relationship to said bottom; said side walls being pivotally movable into overlying relationship to said end wall and said bottom; a pair of latch elements pivotally secured to said end wall and movable into locking engagement with said side walls when said side walls are in said overlying position; a catch element secured to each of said side walls, said latch elements being pivotally movable into locking engagement with said catch elements when said walls are in upright position; said bottom comprising a plurality of coplanar panels secured in abutment with each other; a wheel assembly pivotally secured to one of said panels for movement to-

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ward and away from said bottom; locking means provided on said bottom for retaining said wheel assembly in operative position away from said bottom; securing means provided on said bottom and engageable with said wheel assembly in response to pivotal movement thereof adjacent said bottom to secure said wheel assembly in inoperative position; a pair of handles; a pair of supporting legs; means for pivotally securing said handles and said legs to another panel of said bottom for movement toward and away from said bottom; and one of said panels, intermediate said first-named panel and said second-named panel, removably secured in said bottom for selective removal thereof.

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