May 31, 1949. S. G. ZUCKERMAN 2,471,553

COLLAPSIBLE PORTABLE CART

Filed March 18, 1947 2 Sheets-Sheet 1

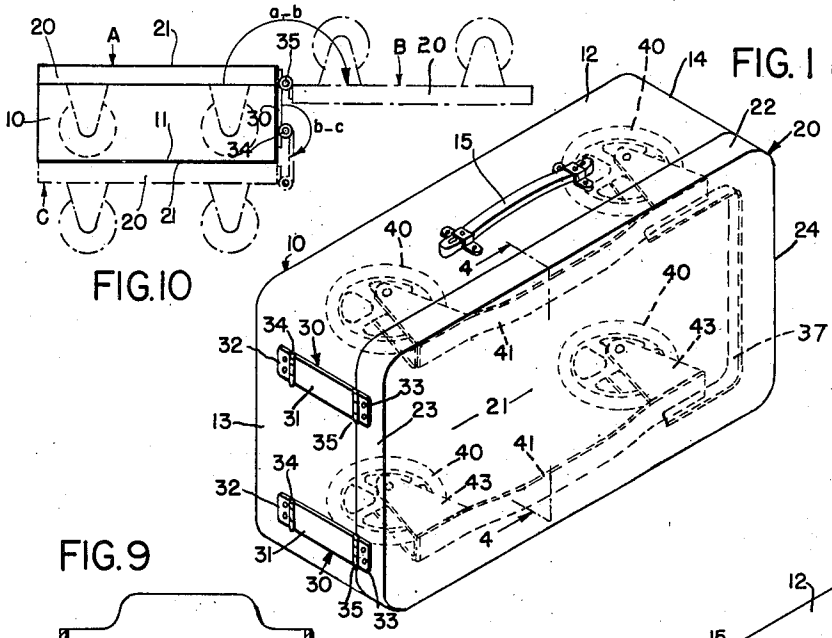


FIG. 10

FIG. 1

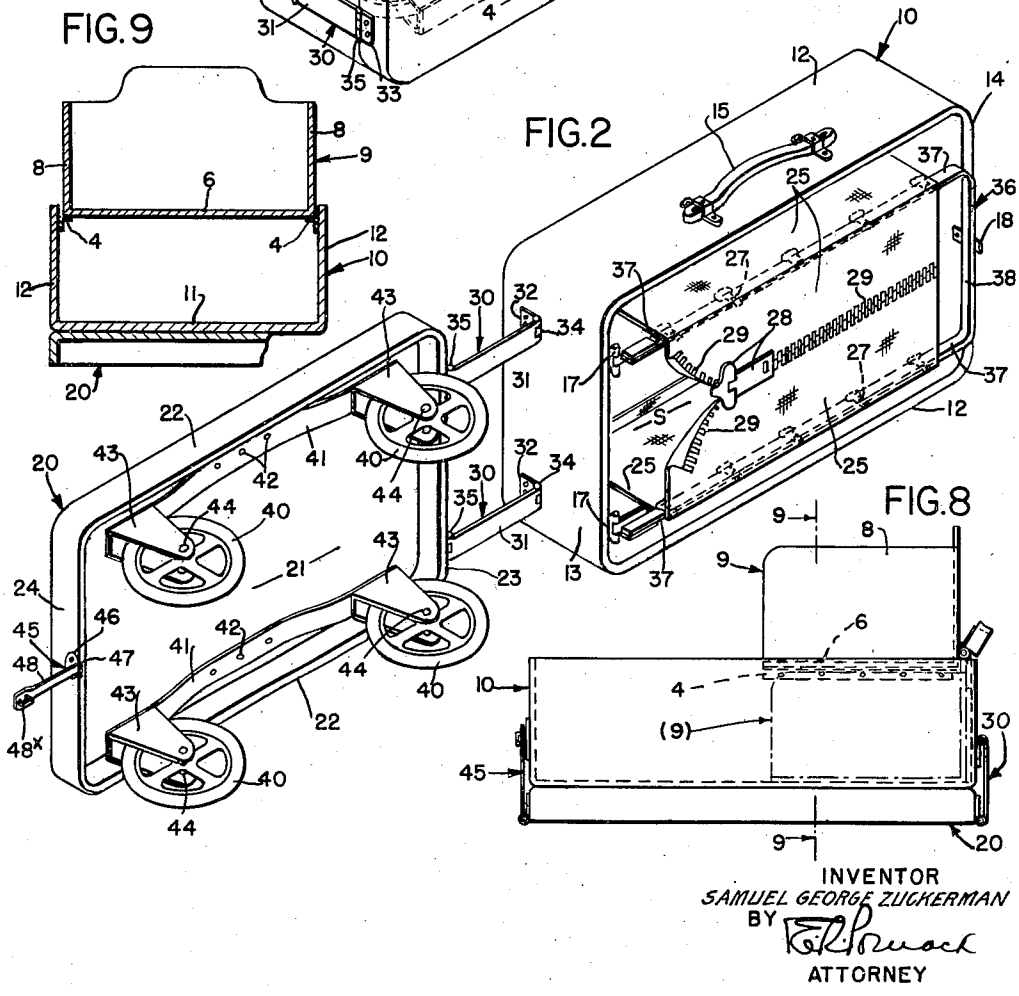


FIG. 9

FIG. 2

FIG. 8

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FIG. 3

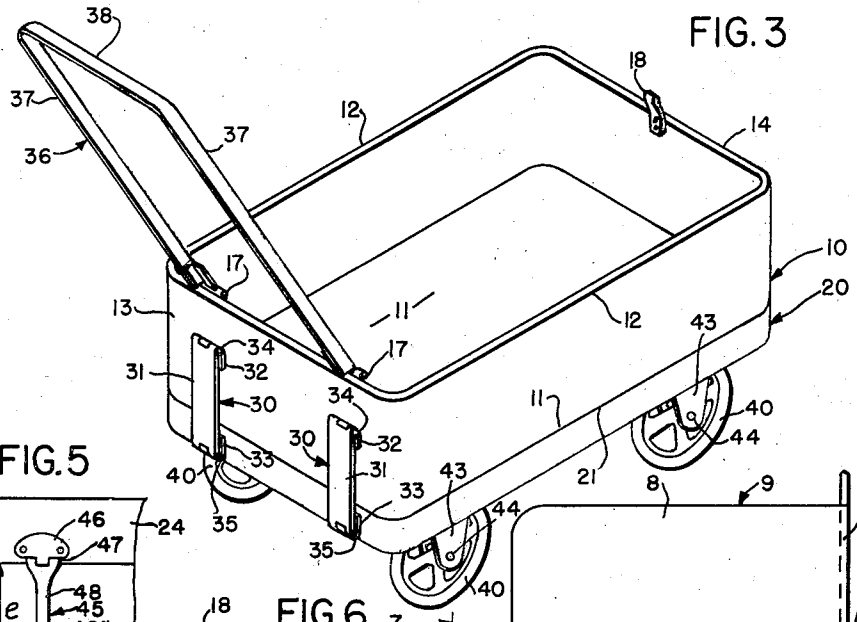


FIG. 5

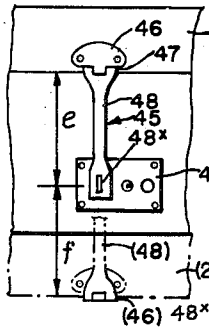


FIG. 6

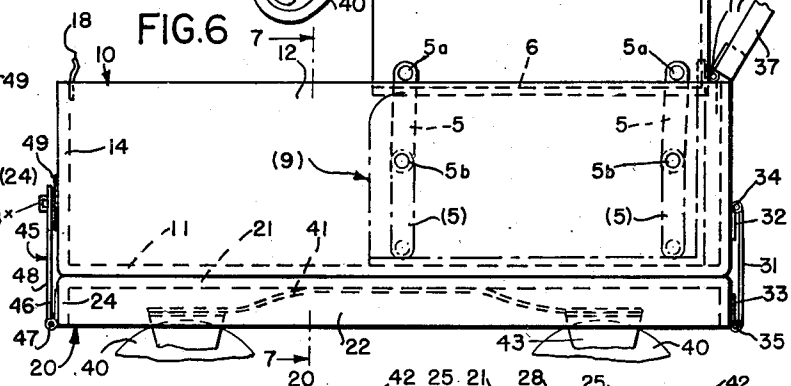
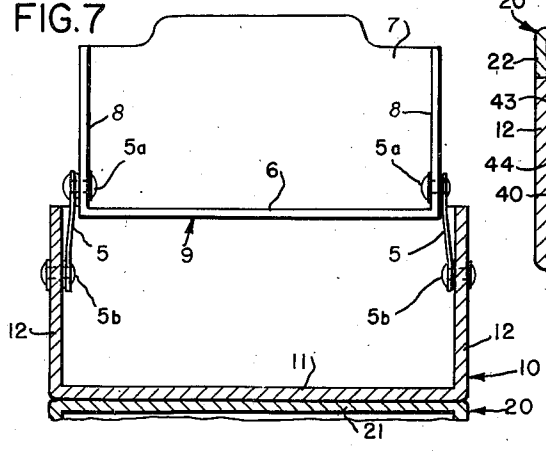


FIG. 7



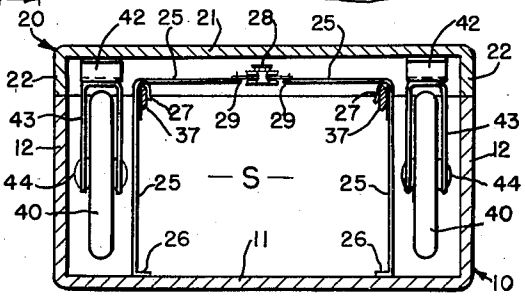


FIG. 4

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UNITED STATES PATENT OFFICE

2,471,553

COLLAPSIBLE PORTABLE CART

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Application March 18, 1947, Serial No. 735,490

11 Claims. (Cl. 280—37)

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This invention relates to a hand-cart device which may be conveniently collapsed into a suitcase or valise of conventional proportions and appearance, and which may be readily opened and extended to provide an operative cart, complete with four wheels and a handle bar frame.

The improved portable cart of this invention may be of the type which provides, when opened, a baby carriage or go-cart; or it may be of the type used for delivery or goods conveyance, i. e., in which no seat is provided, so that the device unfolds into an open delivery wagon having simply four wheels and a handle-bar frame. The go-cart embodiment of my invention is shown, for convenience, in the accompanying drawings, but it will be understood that the invention is applicable to portable or collapsible delivery wagons and to other conveyances.

The prime object of the invention is to provide a novel and improved portable and collapsible hand-cart, as described above. Allied objects are to provide a portable hand-cart which may be readily and quickly collapsed into suitcase form for easy transportation and carrying, and readily and quickly extended, from its collapsed condition, into go-cart form to provide a neat, sturdy and easily propelled hand-cart—one which may be economically produced, which will have no separable parts—such as a separate lid—but in which all parts are operatively united or associated.

A further object of my invention is to provide, in a portable hand-cart construction, a separate, completely enclosed compartment, when in closed, suitcase condition, which will be completely water-proof and which will provide a convenient place for safely storing a mattress, blanket, clothes, food and other baby accessories.

A still further object of the invention is to provide in a portable go-cart device, a seating arrangement which is readily placed in lowered position for reception in to the suitcase when the device is closed, and which is readily elevated or brought to raised operative position.

It is also within the contemplation of my invention to provide a trunk or suitcase with a normally concealed wheeled structure adapted to be readily converted to an undercarriage or wheeled support, whereby when the trunk or suitcase is heavily loaded it can be readily and conveniently moved.

For the attainment of the foregoing and such other objects of invention as may appear or be pointed out herein, I have shown a preferred em-

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bodiment of my invention in the accompanying drawing, wherein:

Figure 1 is a perspective view of the improved collapsible cart of my invention in closed suitcase condition;

Figure 2 is a perspective view of the device of Figure 1 in open position preparatory to being extended to an open hand-cart condition;

Figure 3 is a perspective view of the device of Figures 1 and 2 in open hand-cart condition;

Figure 4 is a transverse section through the improved cart in closed suitcase condition, as in Figure 1, taken on the line 4—4 of that figure;

Figure 5 is a detail of the novel lock arrangement, with the composite lid and wheel base member shown in full lines in the closed suitcase condition of the device (the composite member functioning as a lid) and shown in dot-and-dash lines in the open hand-cart condition (the composite member functioning as the wheel base);

Figure 6 is a side view of the device in open hand-cart condition (lower portions of the wheels being broken off), and showing the seat in raised, operative position;

Figure 7 is a transverse section of the open device of Figure 6, taken on line 7—7 of that figure;

Figure 8 is a side view similar to Figure 6 but on a smaller scale, showing a slightly modified form of seat arrangement;

Figure 9 is a side elevation of the device of Figure 8, taken on the line 9—9 of that figure; and

Figure 10 is a semi-diagrammatic side view of the novel collapsible cart and showing, in dot-and-dash lines, the composite member in different positions, to explain the transformation of the device between its closed suitcase and its open hand-cart conditions.

The improved portable hand-cart device comprises two major parts, viz., a composite suitcase and wagon member or body 10 and a composite lid and wheel base member or lid-base 20. Both the composite body 10 and the composite lid-base 20 are hollow members of oblong shape, each having four sides, and a floor plate designated, respectively, 11 and 21. The two longer sides or side walls of members 10 and 20 are designated, respectively, 12 and 22, while the end walls are designated 13, 14, and 23, 24, respectively.

The two members are associated or operatively secured together by a pair of double-pivoted hinges, designated generally 30, and disposed so that when in closed suitcase condition of the device, as in Figure 1, the edges of the sides 12, 13, 14 of the composite suitcase and wagon body 10

and of the sides 22, 23, 24 of the composite lid and wheel base 20, abut one another to form a closed suitcase, shown in Figure 1.

The four wheels 40 of the device are rotatively secured to the interior side of floor plate 21 of the composite lid-base member 20, as best shown in Figure 2. For this purpose, two narrow, preferably resilient, metal strips 41, 41 are secured to the interior surface of floor plate 21, as by rivets 42. Both ends of each strip 41, 41 terminate in U-shaped brackets 43, at the distal ends of which the wheels 40 are rotatively mounted, as by spindles 44.

The aforesaid double-jointed hinges 30, 30 comprise a long central link 31 and end link 32, 33; end link 32 is pivotally articulated to the central link at 34, while the other end link 33 is articulated at 35. End links 32, 32 of the pair of double-jointed hinges 30, 30 are secured to the end wall 13 of the composite suitcase-wagon body 10, while the other end links 33, 33 are secured to the end wall 23 of the composite lid-wheel base member 20. The lengths of the respective links of the hinges and their position of securement on the end walls 13, 23 are such that the opposing edges of the four sides of the two members abut in the closed condition of the structure, as shown in Figure 1. In this position of lid-base 20, its wheels 40 are snugly received and encased within the suitcase formed by body member 10 and lid member 20. A suitable grip or handle 15, (Fig. 1), may be attached to one of the longer side walls 12 of the body member 10.

To open and extend the device from its closed, suitcase condition (Fig. 1), to its operative, hand-cart condition (Fig. 3), the composite lid and wheel base member 20, shown in full lines in Figure 10, which position is designated A, is turned substantially 180° on pivot 35 of the hinges 30, 30 to the position B, as indicated by the curved arrow *a*—*b*. It is then turned substantially 180° on pivot 34 to the position C, as indicated by the arrow *b*—*c*. In actual practice, the composite lid-base member 20 turns about both pivots 34, 35 concomitantly, the device being opened (and closed) in a single movement or sweep. The novel arrangement is hence such as to enable an upper portion, such as a lid, of a valise-like device to be rotatably swung through an arc of 360° into underlying engagement with the bottom of the device, whereby the upper portion, containing wheels, may serve as an undercarriage.

The two members 10, 20 may be secured together in either the closed, suitcase condition (Fig. 1) or open, hand-cart condition (Figs. 3 and 6), by a single fastening means designated generally 45. Fastening means 45 comprises a plate 46 secured to the end wall 24 of the composite lid-wheel base member 20, to which is hingedly articulated, at 47, a bar 48, at the distal end of which protrudes tongues 48^x. The composite lid and wheel base 20 is shown in closed (suitcase) position in Figure 5, wherein it is represented by the full line showing of end wall 24 of the lid-base member 20. The bar 48 of the fastening means 45 extends downwardly in Figure 5, with its distal tongue 48^x received in lock 49. When the novel device is opened and extended into hand-cart position, represented by the dot-and-dash showing of end wall 24, the latter is now in underlying position relative to the composite suitcase and wagon member 10, which is represented by its end wall 14 (this position in Figure 5 corresponds to that shown in Figure 6). In this hand-cart condition, bar 48 of the fastening means extends upwardly, and its distal tongue 48^x is received in lock 49; the parts and dimensions are such that the distance *e* (closed suitcase condition) equals the distance *f* (open hand-cart condition).

The hand-cart handle-bar frame, designated generally 36, comprises a U-shape frame having a pair of lateral bars 37, 37, which are pivotally articulated at their ends to hinge plates 17, 17 secured interiorly to end wall 13 of the composite suitcase and wagon member 10. The length of the frame 36 is such that, when turned to its non-operative position, as in Figure 2, its distal handle-bar portion 38 will be disposed close to the other end wall 14 of the member 10. A strip of resilient material 18 secured to wall 14 and bent as best shown in Figure 3, serves to releasably hold the handle-bar frame in non-operative position, its handle-bar 38 snapping past the strip 18, as shown in Figure 2.

It will be observed, best from Figure 4, that the two wheels 40, 40 of each of the two wheel strips 42, 42, are disposed, in the closed suitcase condition of the device, between the pair of lateral bars 37, 37 of the handle-bar frame and the respective side walls 12, 12 of the composite suitcase and wagon member 10. This provides an ample space—designated S—within which may be stored a blanket, clothes and other baby accessories. This storage space is converted into a storage compartment which may be completely enclosed and quickly opened, by a pair of sheets 25, 25 of textile fabric or other suitable pliable material. Sheets 25, 25 extend along a substantial portion of the length of the composite suitcase and wagon member 10, as best shown in Figure 2, and are secured along one of their long edges to the floor 11 thereof, as indicated by 26, 26 in Figure 4. The width of the compartment sheets 25, 25 is such that, when in closed compartment condition, as in Figures 4 and 2, their long distal edges will be in close adjacency. These edges are provided with "zipper" elements 29, 29, so that they may be united to form a laterally closed compartment by manipulation of "zipper" slider 28.

It should be noted, best from Figure 2, that the device may be opened and extended into hand-cart condition—by moving the composite lid and wheel member from closed position (Figure 1), to operative position, see Figure 2—without disturbing the closed storage compartment S. But if the handle-bar frame 36 is required to be erected into operative position (Fig. 3), the compartment must first be opened. This may be conveniently done by pulling the "zipper" slider 28 to the right (Fig. 2) to open the compartment.

The material of which compartment sheets 25, 25 is constituted is preferably water-proof, so that a completely enclosed, water-proof compartment may be provided to safeguard the blanket and other baby accessories. Preferably, this material should be elastic so that, when in closed condition—as in Figure 4—the sheets 25, 25 will fit tightly over the bars 37, 37 when their ends are brought together by the "zipper" closure. The sheets 25, 25 may be provided with hooks 27 (see Fig. 4), which snap over the respective bars 37, 37.

The baby seat, designated generally 9, comprises lateral sides 8, 8, a back 7 and a bottom 6. Seat 9 has an operative position, shown in

Figure 6 (full lines) and Figure 7, in which it extends above the top of the composite suitcase and wagon member 10, to provide leg room between its bottom 6 and the floor 11 of the wagon member 10. It may be readily moved to a position within the member 10, shown in dot-and-dash lines in Figure 6, when the device is to be converted to closed suitcase condition. For this purpose, seat 9 is supported by a pair of parallel links 5, 5 at each side, one end of the links being pivotally secured at 5a to the exterior of the respective lateral sides 8, 8 of the seat, their other ends 5b being pivotally secured interiorly to the respective side walls 12, 12 of the composite suitcase and wagon member 10. The lengths of parallel links 5, 5 and their pivots 5a, 5b are such that the seat 9 may be readily turned from operative position (full lines, Fig. 6) to non-operative position (dot-and-dash lines, Fig. 6). Suitable means (not shown) are provided for securing or impositively locking the seat in operative position.

Instead of hingedly securing the seat 9 to the composite suitcase and wagon member 10, as in Figures 6 and 7, the seat 9 may be made separable from member 10, as in Figures 8 and 9. In this case, a pair of angle irons 4, 4 are secured interiorly to the side walls 12, 12 of member 10 near their distal edges. In the operative position of seat 9, its floor 6 rests on the horizontal legs of angle irons 4, 4, as clearly shown in Figure 9. As in the case of the hinged seat of Figures 6 and 7, means (not shown) are provided to secure the seat in operative position. The seat is placed in non-operative position by sliding it under the pair of angle bars, as shown by its dot-and-dash position in Figure 8.

When the novel device is to be used as a delivery wagon or the like, as in Figure 3, the seat 9 and compartment sheets 25, 25, etc., may be omitted. And when it is to be used as a trunk or the like, the said seat and sheets are similarly omitted, and the wheels made considerably smaller than illustrated.

In the above description, the invention has been disclosed merely by way of example and in preferred manner; but obviously many variations and modifications may be made therein which will still be comprised within its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or manner of practicing same, except in so far as such limitations are specified in the appended claims.

I claim:

1. A collapsible cart comprising a body member constituting a composite suitcase and wagon member having a floor, sides and end walls, a pivotal member constituting a composite lid and wheel base member having a floor, sides and end walls, a pair of double-joint hinges each having a main link and end links, one of the end links of the hinges being secured to an end wall of the body member and the other end links being secured to the corresponding end wall of the pivotal member whereby the two members may be turned about said hinges to a closed suitcase condition with the pivotal member over the body member, or to an open hand-cart condition with said floor of the pivotal member in underlying relation to the floor of the other member, a pair of strips secured interiorly to the floor of the pivotal member and disposed close to the sides thereof, four wheels rotatively mounted on said strips, a handle-bar frame having lateral bars pivotally secured on one end wall of the body member whereby it is movable between an inner and outer position,

its distal handle-bar portion being disposed close to the other end wall when the frame is in the inner position, a pair of sheets of pliable material secured along the floor of the body member to extend in substantially underlying relation to said lateral bars when the frame is in said inner position, a plurality of spaced hooks secured to said sheets and adapted to be hooked over said lateral bars, and a closure provided along the distal edges of said sheets to form an enclosed compartment, said wheels being received, when the device is in said closed suitcase condition, in the spaces between the sides of said compartment and the respective sides of the body member, and fastening means comprising a lock plate, a bar and plate to which said bar is pivotally secured, said bar having a tongue at its distal end, said lock plate being secured to a wall of the body member and said hinge plate being secured to the corresponding wall of the other member, whereby in said closed suitcase condition of the device, said bar tongue is received in said lock plate and when turned substantially 180° in said open hand-cart condition is received in the lock plate to lock the parts in said condition.

2. A collapsible cart comprising a body member constituting a composite suitcase and wagon member having a floor, sides and end walls, a pivotal member constituting a composite lid and wheel base member having a floor, sides and end walls, a double-joint hinge structure having a main link and end links, one of the end links being secured to an end wall of the body member and the other being secured to the corresponding end wall of the pivotal member whereby the two members may be turned about said hinge structure to a closed suitcase condition with the pivotal member over the body member, or to an open hand-cart condition with said floor of the pivotal member in underlying relation to the floor of the other member, a pair of strips secured interiorly to the floor of the pivotal member and disposed close to the sides thereof, four wheels rotatively mounted on said strips, a seat having a back, sides and a bottom adapted to be received at one end of said body member, and a pair of parallel links at each side of said seat, one end of the links being pivotally articulated to said side of the seat with the other ends of the links pivotally articulated to said side of the member, whereby the seat may be turned to operative position above the member and to non-operative position within the member.

3. A collapsible cart comprising a body member constituting a composite suitcase and wagon member having a floor, sides and end walls, a pivotal member constituting a composite lid and wheel base member having a floor, sides and end walls, a double-joint hinge structure having a main link and end links, one of the end links being secured to an end wall of the body member and the other being secured to the corresponding end wall of the pivotal member whereby the two members may be turned about said hinge structure to a closed suitcase condition with the pivotal member over the body member, or to an open hand-cart condition with said floor of the pivotal member in underlying relation to the floor of the other member, four wheels rotatively mounted interiorly of the body member and close to the sides thereof, a seat having a back, sides and a bottom, adapted to be received at one end of said body member, and a pair of strips disposed interiorly at said end of the member parallel to one another and disposed near the

distal edges of said side of the member, whereby said seat may be rested on the strips in operative position above the member or disposed within said member with the distal edge of its said sides in underlying relation to the strips.

4. A collapsible cart comprising a body member constituting a composite suitcase and wagon member having a floor, sides and end walls, a pivotal member constituting a composite lid and wheel base member having a floor, sides and end walls, a double-joint hinge structure having a main link and end links, one of the end links being secured to an end wall of the body member and the other being secured to the corresponding end wall of the pivotal member whereby the two members may be turned about said hinge structure to a closed suitcase condition with the pivotal member over the body member, or to an open hand-cart condition with said floor of the pivotal member in underlying relation to the floor of the other member, a pair of strips secured interiorly to the floor of the pivotal member and disposed close to the sides thereof, four wheels rotatively mounted on said strips, a handle-bar frame having lateral bars pivotally secured on one end wall of the body member whereby it is movable between an inner and outer position, its distal handle-bar portion being disposed close to the other end wall when the frame is in the inner position, a pair of sheets of pliable material secured along the floor of the body member to extend in substantial underlying relation to said lateral bars when the frame is in said inner position, a plurality of spaced hooks secured to said sheets and adapted to be hooked over said lateral bars, and a closure provided along the distal edges of said sheets to form an enclosed compartment, said wheels being received, when the device is in said closed suitcase condition, in the spaces between the sides of said compartment and the respective sides of the body member, and fastening means for securing said members in said suitcase condition and in said hand-cart condition.

5. A collapsible cart comprising a body member constituting a composite suitcase and wagon member having a floor, sides and end walls, a pivotal member constituting a composite lid and wheel base member having a floor, sides and end walls, a double-joint hinge structure having a main link and end links, one of the end links being secured to an end wall of the body member and the other being secured to the corresponding end wall of the pivotal member whereby the two members may be turned about said hinge structure to a closed suitcase condition with the pivotal member over the body member, or to an open hand-cart condition with said floor of the pivotal member in underlying relation to the floor of the other member, a pair of strips secured interiorly to the floor of the pivotal member and disposed close to the sides thereof, four wheels rotatively mounted on said strips, a handle-bar frame having lateral bars pivotally secured on one end wall of the body member whereby it is movable between an inner and outer position, its distal handle-bar portion being disposed close to the other end wall when the frame is in the inner position, a pair of sheets of pliable material secured along the floor of the body member to extend in substantial underlying relation to said lateral bars when the frame is in said inner position, a plurality of spaced hooks secured to said sheets and adapted to be hooked over said lateral bars, and a closure provided along the

distal edges of said sheets to form an enclosed compartment, said wheels being received, when the device is in said closed suitcase condition, in the spaces between the sides of said compartment and the respective sides of the body member.

6. A collapsible cart comprising a body member constituting a composite suitcase and wagon member having a floor, sides and end walls, a pivotal member constituting a composite lid and wheel base member having a floor, sides and end walls, a double-joint hinge structure having a main link and end links, one of the end links being secured to an end wall of the body member and the other being secured to the corresponding end wall of the pivotal member whereby the two members may be turned about said hinge structure to a closed suitcase condition with the pivotal member over the body member, or to an open hand-cart condition with said floor of the pivotal member in underlying relation to the floor of the other member, a pair of strips secured interiorly of the floor of the pivotal member and disposed close to the sides thereof, four wheels rotatively mounted on said strips, a pair of sheets of pliable material secured along the floor of the body member to extend in substantial underlying relation to said lateral bars when the frame is in said inner position, a plurality of spaced hooks secured to said sheets and adapted to be hooked over said lateral bars, and a closure provided along the distal edges of said sheets to form an enclosed compartment, said wheels being received, when the device is in said closed suitcase condition, in the spaces between the sides of said compartment and the respective sides of the body member, and fastening means for securing said members in said suitcase condition and in said hand-cart condition.

7. A collapsible cart comprising a body member constituting a composite suitcase and wagon member having a floor and lateral walls, a pivotal member constituting a composite lid and wheel base member and proportioned to fit upon the body member, hinges connecting the body member and pivotal member whereby the two members may be turned about said hinges to a closed suitcase condition with the pivotal member over the body member, or to an open hand-cart condition with the pivotal member in underlying relation to the floor of the other member, wheel mountings fixedly secured within said pivotal member and adjacent opposite side walls thereof, and wheels rotatively supported on said mountings, said wheels being fixedly held by said mountings interiorly adjacent and extending outwardly beyond said side walls of the pivotal member; said body member being proportioned completely to accommodate therein said wheels when the body and pivotal members are in closed suitcase relation, the planes of said wheels being at all times parallel to said adjacent side walls of the pivotal members and parallel to the corresponding side walls of the body member when the cart is in said closed suitcase condition.

8. A collapsible cart according to claim 7, further provided with a handle-bar frame having lateral bars pivotally secured on one end wall of the body member whereby it is movable between an inner and outer postion, a pair of sheets of pliable material secured along the floor of the body member to extend in substantial underlying relation to said lateral bars when the frame is in said inner position, fasteners secured to said sheets and adapted to be attached to said lateral

bars, and a closure provided along the distal edges of said sheets to form an enclosed compartment, said wheels being received, when the device is in said closed suitcase condition, in the spaces between the sides of said compartment and the respective sides of the body member.

9. A collapsible cart according to claim 7, further provided with a compartment attached to and disposed over the floor of said body member, two opposite lateral sides of the compartment being spaced from the corresponding sides of the body member, said wheels being received, when the cart is in said closed suitcase condition, in the spaces between the said lateral sides of the compartment and the respective sides of the body member.

10. A collapsible cart according to claim 7, said hinges comprising a double-joint hinge structure having a main link and end links, one of the end links being secured to an end wall of the body member and the other being secured to the corresponding end wall of the pivotal member.

11. A collapsible cart according to claim 7, further provided with a handle-bar frame having lateral bars pivotally secured on one end wall of the body member whereby it is movable between an inner and outer position, the said lateral bars being spaced from the corresponding lateral sides of the body member when the frame is in the inner position, said wheels being received, when the device is in said closed suitcase condition, in the spaces between said lateral bars and the corresponding sides of the body member.

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The following references are of record in the file of this patent:

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