



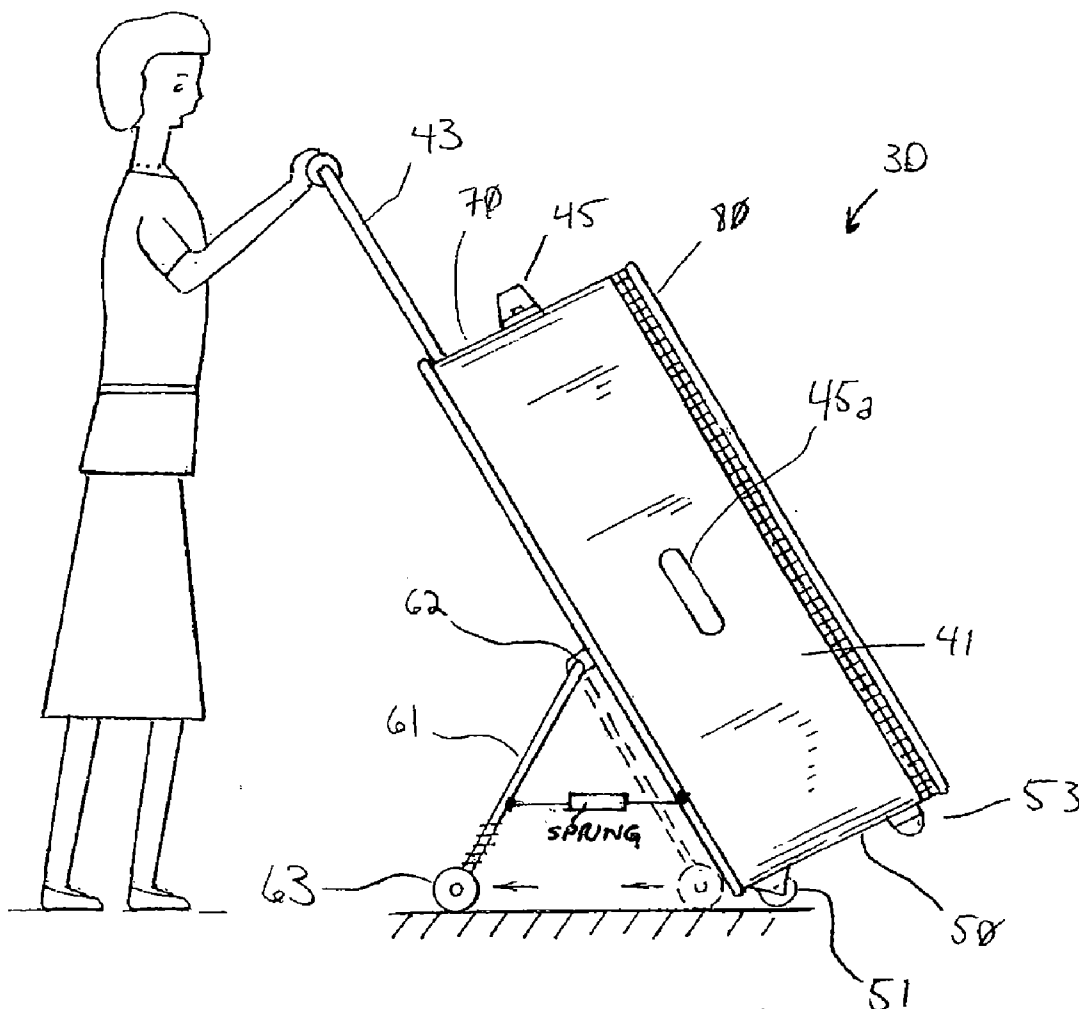
US 20080135366A1

(19) **United States**(12) **Patent Application Publication**
KATZ et al.(10) **Pub. No.: US 2008/0135366 A1**(43) **Pub. Date: Jun. 12, 2008**(54) **WHEELED SUITCASE WITH AUXILIARY
WHEELS ON LEGS AND UNDERCARRIAGE
THEREFOR****Publication Classification**(51) **Int. Cl.**
A45C 5/14 (2006.01)(52) **U.S. Cl.** 190/18 A; 190/11(57) **ABSTRACT**

A suitcase movable in a standing position and a suitcase undercarriage system including a first pair of wheels disposed on or adjacent to a bottom surface of the suitcase, a pair of auxiliary wheels arranged at ends of a pair of legs, a first wheel arranged at an end of a first leg and a second arranged at an end of a second leg. The legs are adjustable so as to secure into place at a deployed position and to secure into place at a stowed position. The suitcase is moveable in the standing position on the wheels and the auxiliary wheels in the deployed position. The stowed position may be adjacent to the main wheels or to a back surface of the suitcase.

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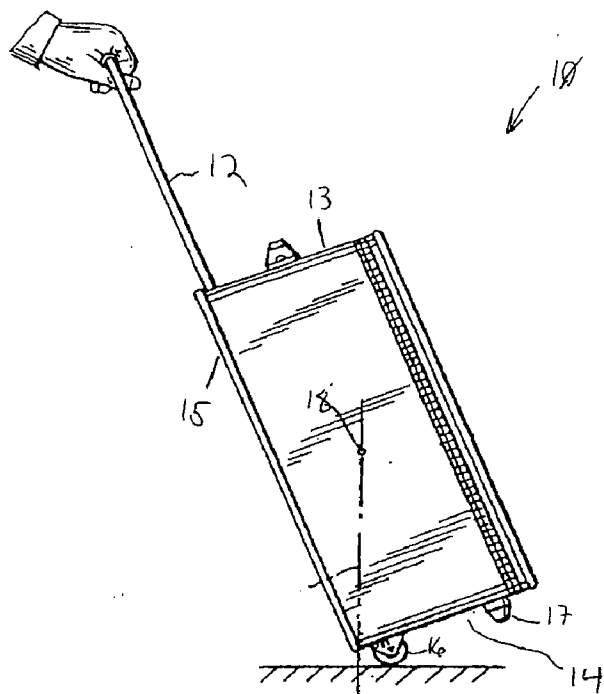


FIG. 1
PRIOR ART

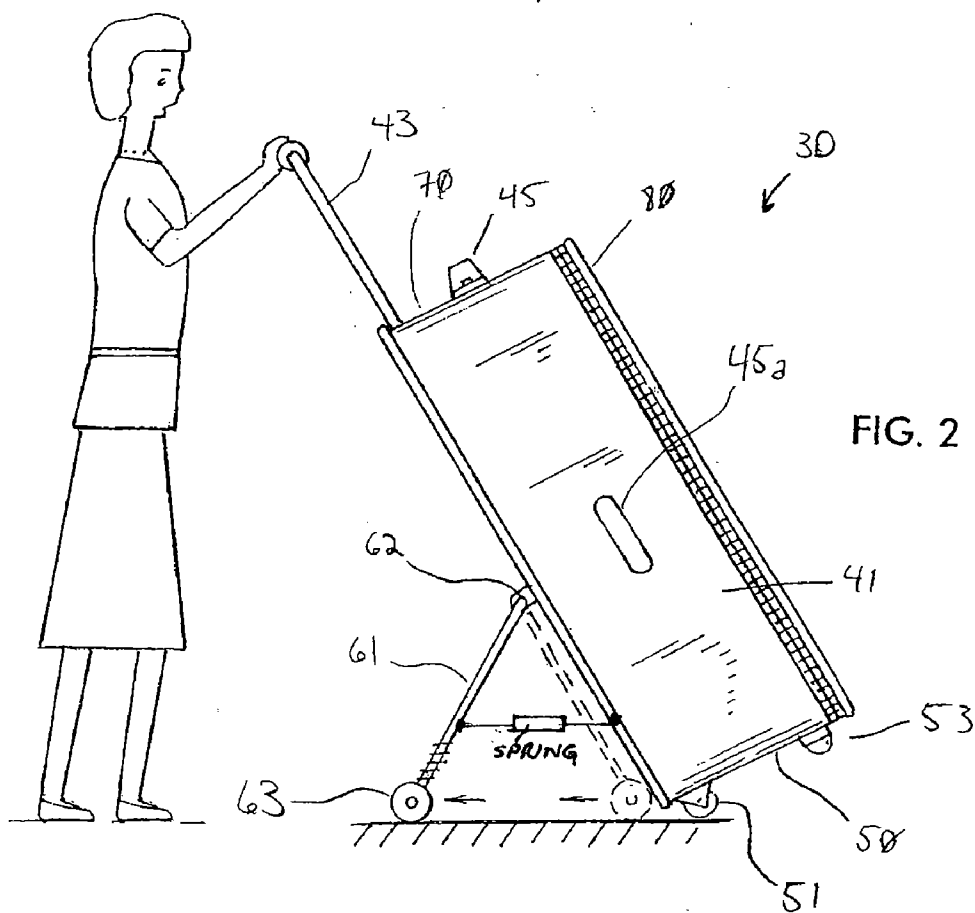


FIG. 2

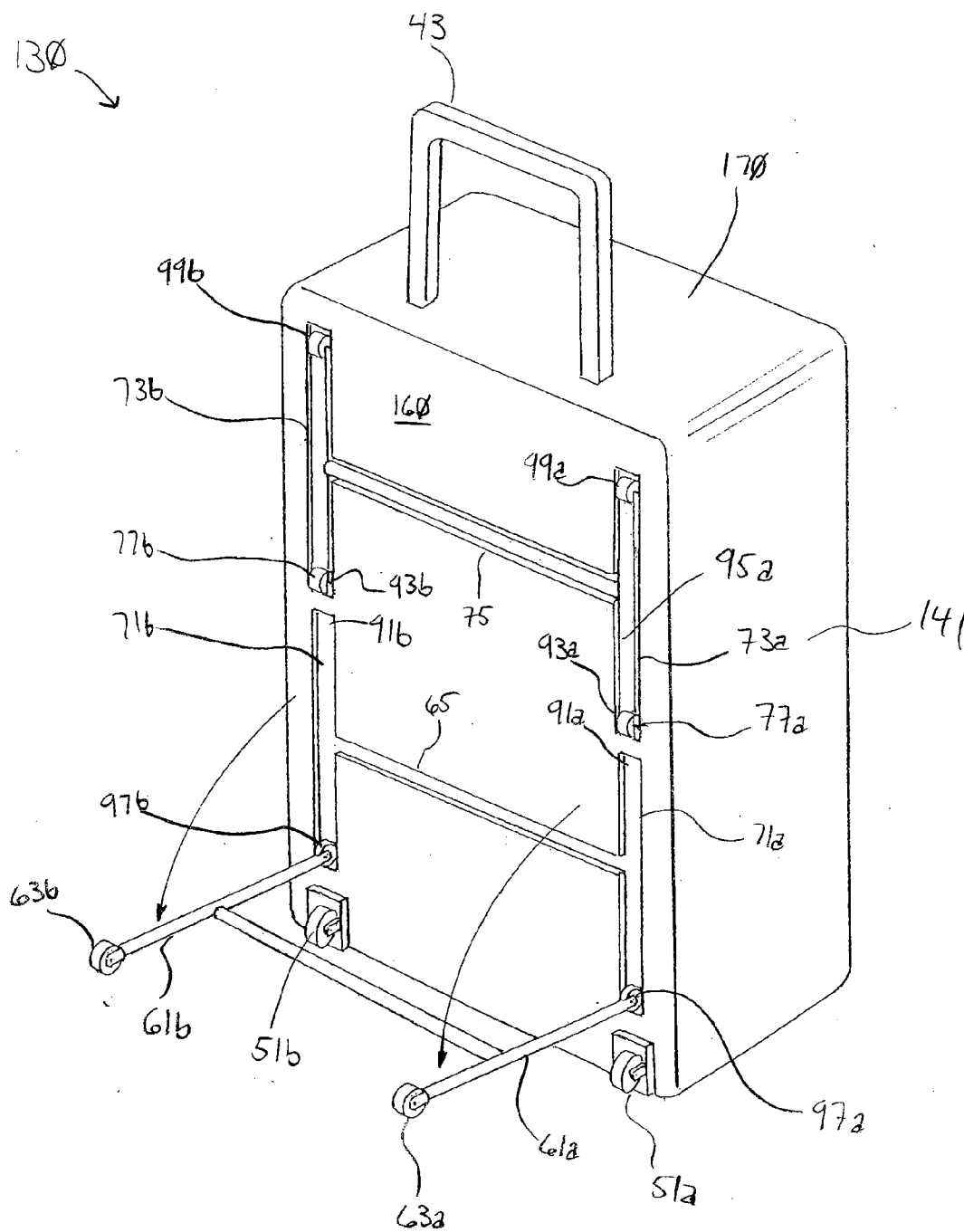


FIG. 3

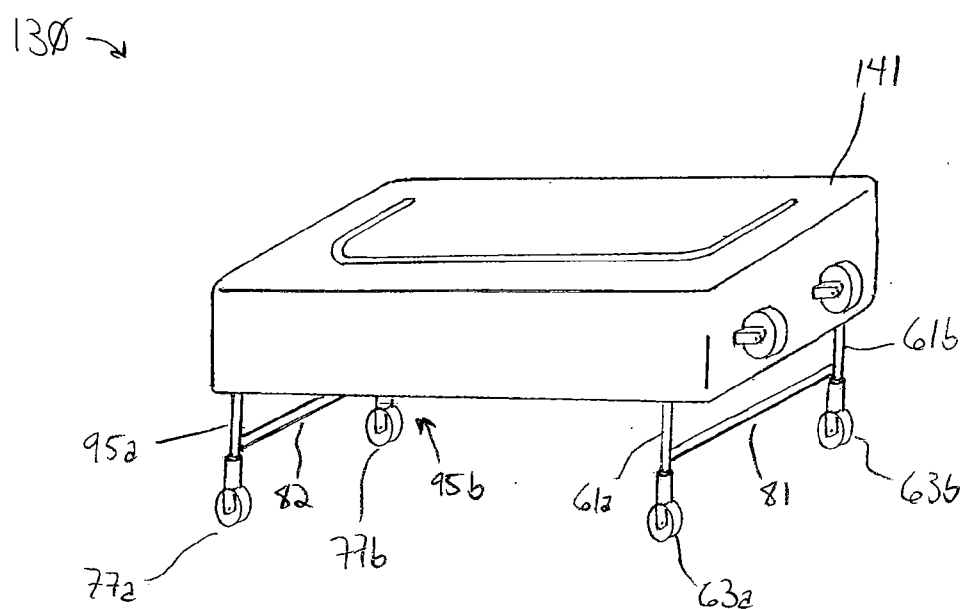


FIG. 4

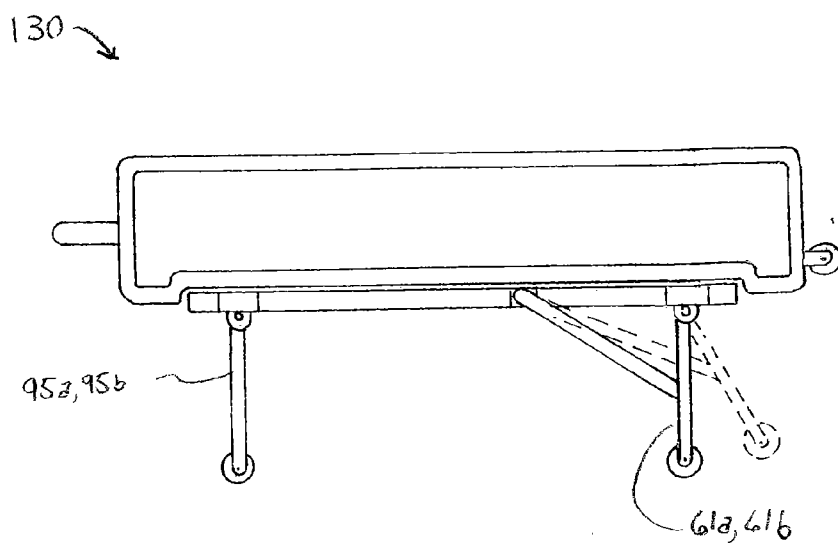


FIG. 5

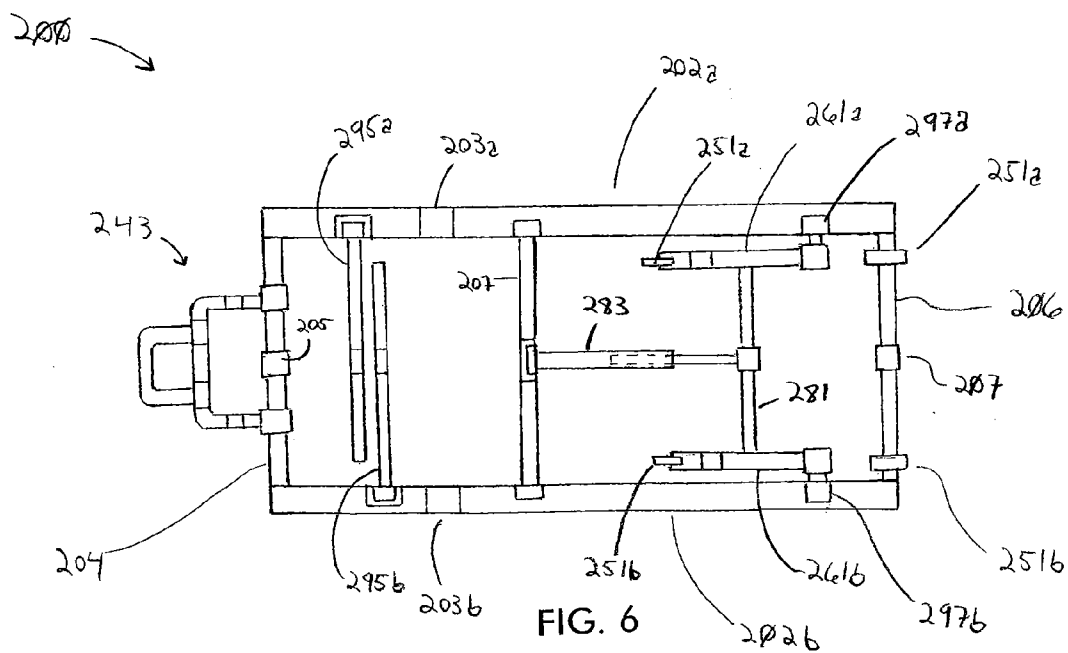
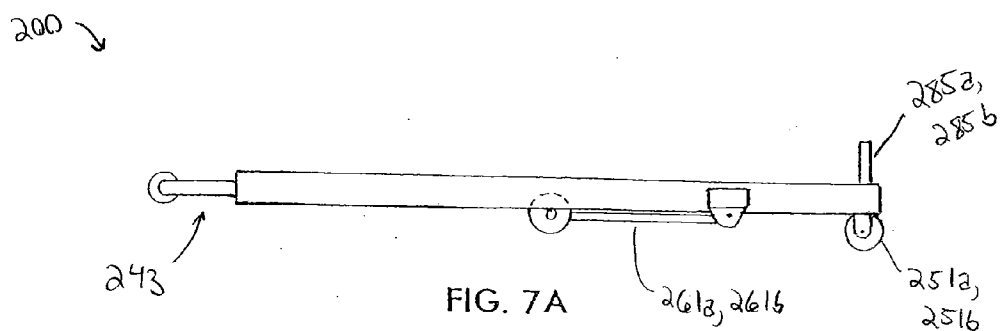
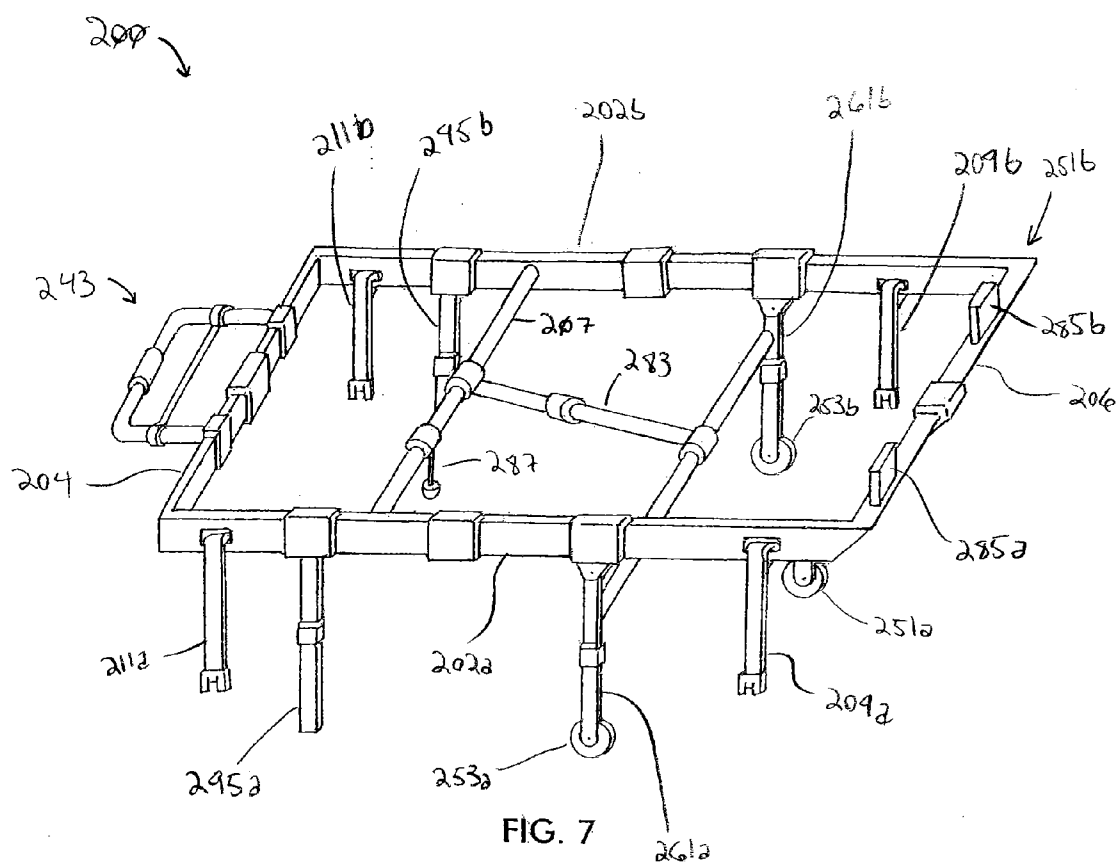


FIG. 6



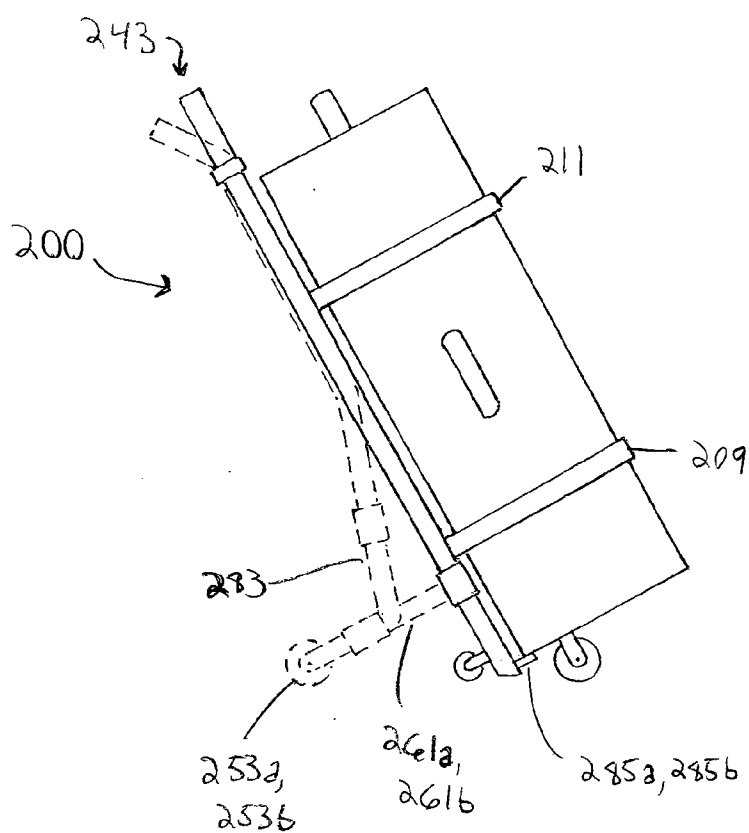


FIG. 8

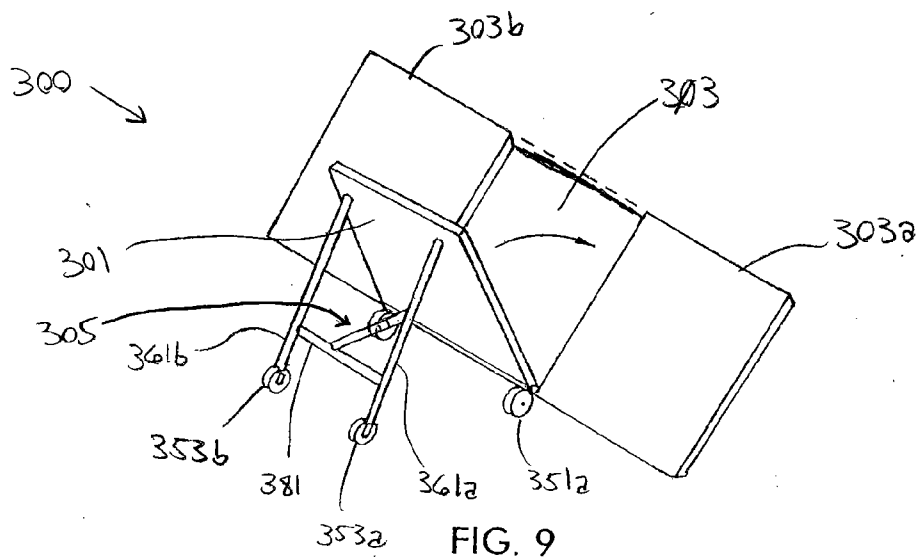


FIG. 9

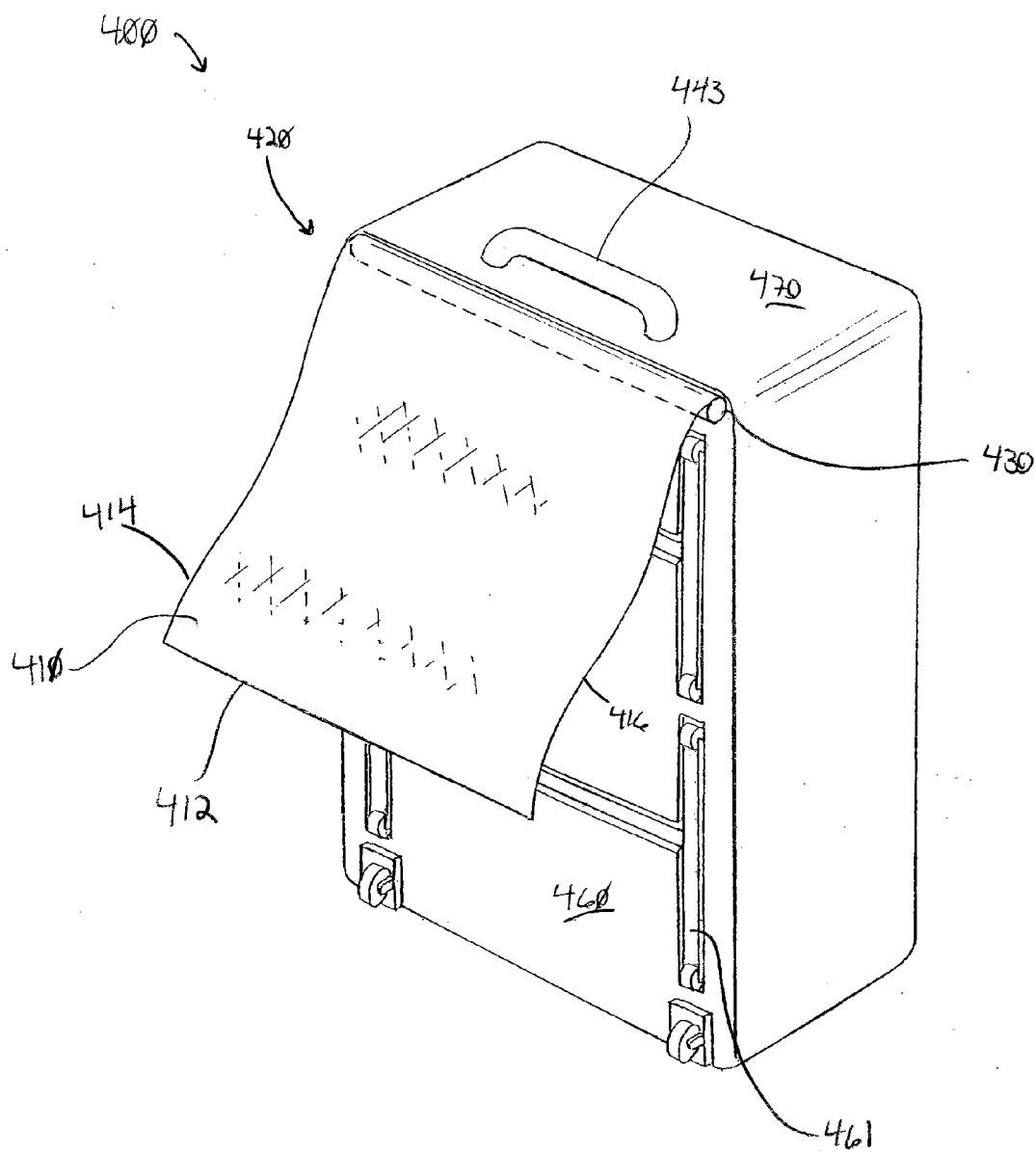


FIG. 10

WHEELED SUITCASE WITH AUXILIARY WHEELS ON LEGS AND UNDERCARRIAGE THEREFOR

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates to the field of wheeled suitcases and, more particularly, to more easily rollable suitcases, to suitcase stands for convenient access to contents of suitcases, and to wheeling frames for suitcases.

BACKGROUND OF THE DISCLOSURE

[0002] Wheeled upright luggage, including smaller carry-on bags or larger suitcases are well known. FIG. 1 shows a related art upright luggage 10 as it is being moved using a handle 12 on its top surface 13 and a set of wheels 16 attached to its bottom surface 14. Typically, the set of wheels 16 is comprised of two wheels separated by approximately the width of the luggage 10, one near each end of an edge of back surface 15, or of the bottom surface 14, to provide stability during movement of the suitcase. Bumpers 17, together with wheels 16, permit the luggage 10 to stand when not moving.

[0003] In such a conventional system, some of the weight of the suitcase, centered at point 18, is borne by the person pulling it. A considerable portion of the weight of the suitcase is located between the set of wheels 16 and the handle 12, therefore the set of wheels 16 do not necessarily bear all the weight during movement. The more tilted the luggage 10, the more weight is shifted to the side of handle 12. This fatigues the user, particularly when the suitcase is pulled on a rougher or less even surface, or over long distances.

[0004] U.S. Pat. No. 6,148,971 discloses luggage with front wheels provided on the bottom surface, two auxiliary wheels forward of two main wheels, with the main wheels are provided near the center of the bottom surface of the luggage. However, as shown in FIG. 2 of U.S. Pat. No. 6,148,971, when the person pulling the luggage walks normally, dragging the suitcase behind, the auxiliary wheels would typically be of no use, since they do not touch the ground between the main wheels and the handle.

[0005] U.S. Pat. No. 7,011,195 shows a single auxiliary wheel, similar to that of U.S. Pat. No. 6,148,971, with a different handle, and an even greater loss of payload space inside the suitcase because of the V-shaped design of the bottom surface of the suitcase. Further, U.S. Pat. No. 6,129,365 discloses in FIG. 10 two pairs of wheels on the bottom surface of a suitcase. However, this arrangement requires the person pulling the suitcase to maintain the suitcase in a perfectly upright position substantially 90° to the ground. Also, moving the luggage in such an arrangement makes it difficult to walk in a normal fashion because there is insufficient clearance for the movement of the legs in a normal gait. The complete disclosures of the aforementioned U.S. patents are incorporated herein for all purposes by their reference.

[0006] Moreover, when the suitcase is in such a standing position suitable for pulling the suitcase, it is difficult, particularly in the case of a larger suitcase or of an elderly or frail person operating the suitcase, to open the suitcase and view its contents without squatting on the floor alongside the suitcase. Also, packing or unpacking the contents of the suitcase requires the use of a table, bed, stool or other such structure, on top of which the suitcase must be lifted and placed. A

suitcase, and suitcase undercarriage system that overcomes these problems would be advantageous.

SUMMARY OF THE DISCLOSURE

[0007] In order to overcome these and other deficiencies of the prior art, provided according to the present disclosure is a suitcase having a body with opposing front and back sides, connected to one another by opposing top and bottom sides. A pair of main wheels is disposed on or adjacent to the bottom side of the suitcase. One or more support legs are adjustable from a first position against the back side of the suitcase, to a second position extending away from the suitcase, with one or more secondary wheels rotatably secured to the support leg. The suitcase stands inclined on the pair of main wheels and the secondary wheels.

[0008] In an alternate embodiment of the present disclosure, a suitcase includes a frame securable to a suitcase, having a ledge extending from a bottom portion of the frame. An optional pair of main wheels is permanently or removably attached to a bottom portion of frame, and one or more support legs are adjustable from a first position in the plane of the frame, to a second position extending away from the suitcase. One or more secondary wheels are rotatably secured to the support legs. The suitcase stands on the pair of main wheels and the one or more secondary wheels, in an inclined position. The suitcase can further include releasable straps, latches, clips, buckles and the like for securing the suitcase to the frame. The frame may include adjustable length members to accommodate various sizes of suitcases.

[0009] Either embodiment may include a handle secured on or adjacent to a top side of the suitcase or the frame, optionally telescopically extendable through a plane comprising to the top side of the suitcase or otherwise adjustable in length. Additionally, the handle may pivot about a lateral axis of the suitcase or suitcase frame or cart. The support legs may be urged towards the respective first position by a variable bias force, to accommodate variable weight of the suitcase.

[0010] The suitcase of the present disclosure may form a cart having a pair of secondary legs, optionally adjustable in length, pivotable between a first position against the back side of the suitcase, i.e., in the plane of the suitcase or frame, and a second position extending away from the suitcase, preferably substantially perpendicular to the back side of the suitcase. In a further embodiment, the secondary legs include tertiary wheels secured adjacent a distal end of the secondary legs.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] These and other features, advantages, and benefits of the present disclosure will become apparent from the following detailed description of the disclosure, which refers to the accompanying drawings, in which like reference numerals refer to like structures across the several views, and wherein:

[0012] FIG. 1 is a side view of a suitcase in a rolling position, according to the related art;

[0013] FIG. 2 is a side view of a movable suitcase, including main wheels, legs with auxiliary wheels and a handle, in a stable leaning/rolling position, according to a first embodiment of the present disclosure;

[0014] FIG. 3 is a perspective view of a suitcase, illustrating structures on and extending from the back suitcase surface, according to a second embodiment of the present disclosure;

[0015] FIG. 4 is a line drawing of the movable suitcase illustrated in FIG. 3 in a table mode, according to the second embodiment of the present disclosure;

[0016] FIG. 5 is a side view of a movable suitcase in a table mode, according to a third embodiment of the present disclosure;

[0017] FIG. 6 is a plan view of a wheeling frame attachable to a suitcase according to a fourth embodiment of the present disclosure;

[0018] FIG. 7 is a perspective view of a wheeling frame attachable to a suitcase similar to the frame illustrated in FIG. 6, according to the fifth embodiment of the present disclosure;

[0019] FIG. 7a is a side view of the wheeling frame of FIG. 7, in a collapsed mode;

[0020] FIG. 8 is a side view of a wheeling frame of FIG. 7, attached to a suitcase and in a leaning/wheeling mode;

[0021] FIG. 9 illustrates a perspective view of a wheeling frame according to a sixth embodiment of the present disclosure; and

[0022] FIG. 10 is a perspective view of a suitcase, illustrating structures on and extending from the suitcase, particularly a protective cover, according to yet another embodiment of the present disclosure.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE DISCLOSURE

[0023] Referring to FIG. 2, illustrated is a side view of a movable suitcase, generally 30, in a leaning/rolling position according to a first embodiment of the present disclosure. Suitcase 30 includes main wheels 51 located at or near an intersection of the bottom surface 50 and the back surface 60 of the suitcase. A set of bumpers 53 is provided on the bottom surface 50, preferably comprising two bumpers located on either side of the bottom surface 50 and spaced from main wheels 51, more preferably at or near the intersection of the bottom surface 50 and the front surface 80.

[0024] A retractable handle 43 is mounted in the body 41 or on the back surface 60 at or near the top surface 70. Handle 43 extends up from suitcase 30 through a plane including the top surface 70 of the suitcase. Suitcase 30 may also have an additional handle 45 at the top surface 70 thereof and another lifting handle 45a. The handle 43 may be collapsible or telescoped and may be retractable into the main body 41 when not used. As is known, the handle 43 may be pulled out from the main body and extended when the user wishes to move the suitcase 30 in the standing/leaning position, by either pulling or pushing the suitcase.

[0025] A support leg 61 extends from the back surface 60 with an auxiliary wheel 63 at the distal end thereof. Auxiliary wheel 63 may comprise a plurality of wheels, and may be rotably mounted to the support leg 61 on a fixed axis, or in a further embodiment, may be mounted by a pivotable castor in order to improve the rolling maneuverability of the suitcase 30. FIG. 2 shows one support leg 61, though two are preferred, more preferably symmetrically disposed on the back surface 60 at or near either lateral side of the main body 41, for greater stability. In such an embodiment, the side view thereof would be unchanged. Three or more support legs are possible within the scope of the present disclosure, configured symmetrically or in some other fashion.

[0026] Leg 61 is shown in FIG. 2 extending from a point near to and preferably below the center of the bottom surface 60 of the suitcase 30. In the embodiment of FIG. 2 support leg 61 has a pivot 62 and is pivotably mounted to the suitcase 30,

and pivotable between a first stowed position adjacent the back surface 60 of the main body 41, or more preferably recessed into the back surface 60 to be flush therewith, to a second deployed position extended away from the main body 41. The support leg 61 is preferably pivotably securable in at least the deployed position, and more preferably also in the stowed position, and even more preferably at a plurality of adjustable positions therebetween. The support leg 61 may further be arranged and secured at a position substantially perpendicular to the back surface 60, which perpendicular position optionally is coincident with the deployed position.

[0027] Optionally, the pivot 62 can be a ratcheting type of connection that allows selection of the precise angular position of a leg(s) 61 relative to the bottom surface of the suitcase. Further, the length of the leg 61 may be adjustable by constructing it as several telescoping members as indicated symbolically by reference numeral 64. As another option, for increased strength and adjustability, a lateral bar 65 extends between the leg 61 and the bottom surface of the suitcase. A hinge 66 allows the lateral bar 65 to fold and to collapse when the leg 61 is folded toward the bottom of the surface. Reference numeral 67 indicates that the lateral bar has a length which is telescopically adjustable to adjust and hold the angle of inclination of the leg 61 relative to the suitcase. The lateral bar may be fixed to the bottom surface by a variable length spring which provides a shock absorbing and inherent adjustment of the angle. Alternatively, the spring can be provided separately between the leg and the suitcase. If the spring has sufficient "give", the separation distance between the main wheels and the support legs would be adjusted by applying a force to the suitcase handle, to cause the two to separate further. This feature enables a user to "walk" the suitcase up a staircase without having to "lift" the suitcase, as one or the other of the main wheels or the wheels on the support legs rests on the steps. This similarly allows the suitcase to be "walked" down a staircase.

[0028] As the suitcase 30 rests in a leaning/rolling position supported by each of main wheels 51 and auxiliary wheel(s) 63 inclined to the back surface 60, its center of mass is stably located above a perimeter circumscribing and defined by main wheels 51 and auxiliary wheels 63. Therefore, a user may roll the suitcase 30 by acting upon handle 43 (pulling or pushing) without bearing any of the weight of the suitcase 30, thereby increasing mobility and ease of use, and reducing user fatigue. At the same time, the user pulling the handle 43 may be able to maintain a normal gait because sufficient clearance for his/her legs may be provided.

[0029] Turning now to FIG. 3, illustrated in perspective view is a suitcase 130, with structures on and extending from the back surface 160 thereof, according to a second embodiment of the present disclosure. FIG. 3 shows a first pair of support legs 61a and 61b, located on either side of the back surface 160. Auxiliary wheels 63a and 63b may be located at distal ends of the legs 61a and 61b, respectively, secured as described in the previous embodiment. Thus, when legs 61a and 61b are in the deployed position as shown in FIG. 3, the suitcase 130 may be rolled on main wheels 51a and 51b and auxiliary wheels 63a and 63b by the user pulling or pushing on the handle 43. Similar benefits inure to this embodiment as to the first embodiment described above.

[0030] In the embodiment shown in FIG. 3, support legs 61a and 61b are illustrated in a deployed position, and are pivotably connected with the suitcase body 141 at or near the intersection of the back surface 160 and the bottom surface

(not shown) of the suitcase 130. Support legs 61a and 61b may be pivoted to a stowed position wherein they are flush, sunken into, or substantially near the back surface 160 of the suitcase 130. In a further embodiment, in the stowed position support legs 61a and 61b are received within guides 71a and 71b. Guides 71a, 71b may be grooves, recesses, rods or other types of structures at, in or on the back surface 160. Guides 71a, 71b more preferably additionally accommodate auxiliary wheels 63a, 63b, respectively, for example at latches 91a, 91b. When in the stowed position within guides 71a, 71b, support legs 61a, 61b are generally flush with the back surface 160. Support legs 61a, 61b may be secured into place in this stowed position by latches anywhere along the length of the support legs 61a, 61b, including at the point of pivotal attachment 97a, 97b. In that case, a single latch (per leg or collectively) may selectively secure the support legs 61a, 61b in the stowed, deployed, or at some other position. Alternatively, guides 71a, 71b may be dispensed with, and securing latches at recesses 91a, 91b alone could be designed to do the job of securing the support legs 61a and 61b in the stowed position.

[0031] Alternately, or in addition to guides 71a, 71b, a further transverse guide 65, or several of them, may be provided. Rather than collapse longitudinally into guides 71a, 71b, support legs 61a, 61b may fold laterally into a stowed position within transverse guide 65.

[0032] In a further embodiment, auxiliary wheels 63a, 63b may be rotated upon folding support legs 61a, 61b into the stowed position, so as to be folded into or be flush with the bottom surface. That is, auxiliary wheels 63a, 63b are generally disposed to point in the same direction as the main wheels 51a, 51b when in the deployed position, but may be rotated about the axis of support legs 61a, 61b so that they align with the back surface 160 and are thus less obtrusive in the stowed position.

[0033] In a further embodiment of the present disclosure, alternately or additionally to above, the bases of the support legs 61a, 61b may be slidably moved in their respective guides 71a, 71b, to a desired position, in order to control the angle of inclination of the suitcase. In yet a further embodiment, alternately or additionally to above, the support legs 61a, 61b are adjustable in length, thereby further controlling the angle of inclination of the suitcase 130 in a standing/rolling position. The angle between the support legs 61a, 61b and the back surface 160 may be selectively fixed by a latching mechanism at the point of pivotal attachment 97a, 97b, at the extremes of the range of pivotal motion of the support legs 61a, 61b, which is typically, though not exclusively, the stowed and deployed positions, but more preferably at any position therebetween. The deployed position may also coincide with an approximately perpendicular position between the support legs 61a, 61b, and the back surface 160, which is also useful for a table configuration to be explained, infra.

[0034] In yet a further embodiment, the support legs 61a, 61b, or even a third or more of the support legs can be slidably disposed in a single guide 71a, preferably centrally disposed on a back side 160. The deployed position of each support leg 61a, 61b can be extending away from the back surface 160 of the suitcase 130, and also away from each other, particularly with respect to auxiliary wheels 63a, 63b. More preferably in the embodiment having a single guide 71a, when support legs 61a, 61b are in the deployed position, the points of pivotal attachment 97a, 97b are as close with one another on the single guide 71a as is practicable.

[0035] Also illustrated in FIG. 3, is a second pair of guides 73a, 73b, associated with a second pair of support legs 95a, 95b, each optionally having optional, auxiliary wheels 77a, 77b. Alternately, guides 71a, 71b may extend the length of the back surface 160, effectively guides 71a, 73a, and 71b, 73b, into a single pair of guides. A second transverse guide 75 is also illustrated, and is analogous to transverse guide 65 as previously described. Second support legs 95a, 95b are pivotally attached to guides 73a, 73b, respectively, and are more preferably selectively securable in a stowed position at one end of the pivotal range of motion and against the back surface 160, and also in an extended position, which is preferably at an opposite end of the range of motion, and more preferably approximately perpendicular to the back surface 160. Second support legs 95a, 95b are further preferably adjustable in length. Auxiliary wheels 77a, 77b, if provided, are receivable within latches 93a, 93b to be flush with back surface 160. Alternately, auxiliary wheels 77a, 77b are rotatable about the axes of the second support legs 95a, 95b, to be flush with back surface 160, as described with reference to auxiliary wheels 63a, 63b.

[0036] FIG. 4 illustrates a perspective line drawing of the movable suitcase illustrated in FIG. 3 in a table mode. In the table mode, suitcase 130, with support legs 61a, 61b in the deployed position, and also showing second pair of legs 95a, 95b at a generally opposite side of the back surface 160 of the suitcase 130. In such a table mode, it is unnecessary to place the suitcase 130 on a table, bed, stool or other such structure, since the support legs 61a, 61b and secondary support legs 95a, 95b provide a built-in stand when opened to provide for convenient viewing and packing and unpacking access to the main body 141.

[0037] When all four legs 61a, 61b and 95a, 95b have auxiliary wheels 63a, 63b and 77a, 77b, it is easier to move the suitcase 130 in the table mode. For example in a hotel room, after the suitcase 30 is in the table mode, it is easier to roll the suitcase 32 to other positions or places in the room when all the legs have wheels. In the table mode the contents of the main body 141 are easier to access, remove or replace because in their elevated table mode. It is comparatively easier to tilt the suitcase 130 into a table mode, with all support legs extended, than to lift it onto a separate supporting structure. Alternatively, when legs 95a, 95b are not provided with auxiliary wheels 77a, 77b, the legs 95a, 95b and the undercarriage system as a whole may be less cumbersome and less costly. Even with only auxiliary wheels 63a, 63b, it is comparatively easier to lift only one end of the suitcase 130 while in table a mode, and reposition it on a single pair of auxiliary wheels 63a, 63b, than to lift the entire suitcase 130. Any or all of support legs 61a, 61b and secondary legs 95a, 95b may be adjustable in length, to choose a desired table height, e.g. 30 to 36 inches. While it is preferred that the legs be substantially perpendicular to the back surface 160, this is not necessary, and the height of the suitcase 130 in table mode may be adjusted by adjusting the position of support legs 61a, 61b or secondary legs 95a, 95b, illustrated for example in FIG. 5.

[0038] Referring now back to FIG. 4, a stabilizer bar 81 may be provided to connect the support legs 61a, 61b, as shown in FIG. 4. Stabilizer bar 81 may be disposed at or near the centers of support legs 61a, 61b to provide stability and longer use for the support legs 61a, 61b. Similarly, a second stabilizer bar 82 may be provided to connect legs 95a, 95b, with similar benefit. According to an aspect of the present

disclosure, the stabilizer bar may be more important on the legs whose wheels are primarily used in the first position for moving the suitcase in the standing mode because they would bear more stress.

[0039] According to another embodiment of the present disclosure, secondary support legs **95a**, **95b** may be moved to a deployed position and along guides **71a**, **71b** to position auxiliary wheels **77a**, **77b** in place of auxiliary wheels **63a**, **63b**, for the leaning/rolling mode of the suitcase **130**. That is, secondary support legs **95a**, **95b** may be used, in addition to or instead of support legs **61a**, **61b**, as the legs on whose wheels suitcase **130** is rolled in the standing/rolling mode shown in FIG. 2.

[0040] According to yet a further embodiment of the present disclosure, the support legs **61a**, **61b** are elastically biased against the weight of the suitcase **130**. The bias acts to increase the size of the perimeter circumscribing and defined by main wheels **51** and auxiliary wheel **63**, and thus improve stability, when the weight of the suitcase **130** is particularly heavy. In one particular embodiment, the design criteria call for a strong frame capable of supporting at least a suitcase weight of 150 pounds. One means of bias is a torsion or tension spring acting on the support legs **61a**, **61b**, and tending to bias them in a clockwise direction, as viewed in FIG. 2. Alternately or additionally, where the point of attachment **97a**, **97b** is freely longitudinally slidable with guides **71a**, **71b**, that point of attachment may be biased towards the bottom surface **150**, to resist an increased weight of suitcase **130** while spreading the distance between auxiliary wheels **53a**, **53b** and main wheels **51**.

[0041] Referring now to FIG. 6, illustrated in plan view is a wheeling frame, generally **200**, attachable to a suitcase according to a further embodiment of the present disclosure. Wheeling frame **200** has many features generally in common with the previous embodiments, the structure and operation of which will be apparent with simply a naming thereof, in view of the forging discussion. Wheeling frame **200** has longitudinal frame members **202a**, **202b**, which may optionally be adjustable in length as indicated at **203a**, **203b**, to accommodate suitcases of various sizes. Top lateral frame member **204** and bottom lateral frame member **206** each connect longitudinal frame members **202a**, **202b** with each other, and both may also be adjustable in length as indicated at **205** and **207**, respectively. Main wheels **251a**, **251b** are rotatably mounted to bottom lateral frame member **206**. A handle **243** is pivotably attached to the top lateral frame member **204**, and may be adjusted in length as indicated at **244**, or width, either together with or separately from top lateral frame member **204**. The handle **243** is preferably selectively fixable in position with respect to top lateral frame member **204**. A further pivotable hand pull **246** may depend from handle **243**. The features of handle **243** may also be incorporated into the foregoing embodiments of the present disclosure, or alternately, a telescoping handle as described with respect to those embodiments may be substituted in the embodiment of FIG. 6.

[0042] Secondary support legs **295a**, **295b** are pivotably attached to longitudinal frame members **202a**, **202b**, respectively, and as exemplary only, are pivoted laterally into a stowed position. Secondary support legs **295a**, **295b** may also be longitudinally slidable or repositionable along longitudinal frame members **202a**, **202b**, as well as adjustable in length. Support legs **261a**, **261b** are pivotably attached to longitudinal frame members **202a**, **202b**, respectively, and

attached to one another by stabilizer bar **281**. The points of attachment **297a**, **297b** between support legs **261a**, **261b** and longitudinal frame members **202a**, **202b** may also be longitudinally slidable or repositionable. Stabilizer bar **281** is connected by a brace member **283**, which may be adjustable in length, to medial lateral frame member **207**. Medial lateral frame member **207** may be longitudinally slidable or repositionable along longitudinal frame members **202a**, **202b**. Additionally, the stowed position of the support legs **261a**, **261b** may orient the auxiliary wheels **253a**, **253b** upwards towards the top lateral frame member **204**, for example as shown in FIGS. 6 and 7A, or downwards towards bottom lateral support member **206**.

[0043] From a stowed position, support legs **261a**, **261b** are deployable to an extended position for a leaning/rolling mode in a number of ways. Brace member **283** may be lengthened to extend the support legs **261a**, **261b** by pivoting at **297a**, **297b**. Alternately or additionally, medial lateral frame member **207** may be positioned downward to accomplish a similar effect. Alternately or additionally, the points of attachment **297a**, **297b** may be relocated upward to extend support legs **261a**, **261b**.

[0044] Turning to FIG. 7, illustrated is a perspective view of the wheeling frame **200** of FIG. 6, in a table mode. In table mode, the frame **200** stands upon support legs **261a**, **261b** and secondary legs **295a**, **295b**, which can be, but need not be, substantially perpendicular to the plane of the wheeling frame **200** as defined by frame members **202a**, **202b**, **204** and **206**.

[0045] Also visible in FIG. 7 are two halves of a first strap **209a**, **209b**, which together encircle and secure a suitcase (or even two suitcases) to the wheeling frame **200**. Optionally a plurality of such straps, including both halves of a second strap **211a**, **211b**, can secure the suitcase to the wheeling frame **200**. Optionally, strap halves **209a**, **211a** can be secured to opposing halves **209b**, **211b** by a releasable buckle. Alternately or additionally, in place of the described straps, straps may extend from a suitcase(s) to secure it (them) to the wheeling frame **200**. Alternately or additionally, straps may extend longitudinally, heightwise relative to the suitcase to secure it to the wheeling frame **200**. In a further embodiment, in place of or in addition to straps on either the suitcase or the wheeling frame **200**, releasable latches, clips, buckles or the like may connect the wheeling frame **200** to the suitcase.

[0046] Also illustrated in FIG. 7 are one or more support shelves **285a**, **285b**, upon which the suitcase is supported when secured to the wheeling frame **200** and in the standing/rolling mode. To improve the compact profile of the wheeling frame **200** in a folded mode, the support shelves **285a**, **285b** preferably extend out of the plane of the wheeling frame **200**, as defined by frame members **202a**, **202b**, **204** and **206**, the minimum amount necessary to reliably support the suitcase (s). Optionally, support shelves **285a**, **285b** can fold into the plane of the wheeling frame **200** when not in use.

[0047] Also shown in FIG. 7 is an optional plumb bob **287**. Plumb bob **287** is pivotably attached to the wheeling frame **200** to pivot at least about an axis parallel to the bottom lateral frame member **206**. In the embodiment shown, merely as an example, the plumb bob **287** is pivotably attached to the medial lateral frame member **207**. The plumb bob **287** serves a visual indicator of the approximate center of mass of the wheeling frame **200**, particularly when attached to a suitcase, and help to visually confirm the center of gravity being within the perimeter circumscribing and defined by main wheels **251a**, **251b**, and auxiliary wheels **253a**, **253b** when the wheel-

ing frame is in a leaning/rolling mode. The plumb bob **287** is also optionally movable to approximately coincide with the center of gravity of the particular suitcase depending upon weight and loading for each instance. Moreover, the plumb bob **287** may also be adapted to any of the foregoing embodiments of the present disclosure.

[0048] Turning now to FIG. 7a, illustrated is a side view of the wheeling frame **200** of FIG. 7, in a collapsed mode. In the collapsed mode, support legs **261a**, **261b** and secondary support legs **295a**, **295b** fold substantially or completely into the plane of the wheeling frame **200** as defined by frame members **202a**, **202b**, **204** and **206**. In fact, if the wheels are casters, they will automatically become flush with the frame with no protruding portion. Handle **243** is also in the same plane, and can extend outward as shown, or alternately fold inward within the area defined by frame members **202a**, **202b**, **204** and **206**. Support shelves **285a**, **285b**, extend out of plane the minimal amount necessary, and may optionally fold into the plane of the wheeling frame **200** as defined by frame members **202a**, **202b**, **204** and **206**. Moreover, in accordance with a further embodiment, the wheels **251a**, **251b** and their supports may be folded into the frame. It is contemplated that the main load bearing components including the wheels be made of a very strong but light metal, e.g. steel, aluminum, titanium, or alloys having one or more of these, among other suitable materials. The folded thickness of the frame is preferably an inch or no more than 2-4 inches. The wheels and their bearing balls may be made of strong metal (with a plastic/synthetic cover), rendering them virtually indestructible.

[0049] Referring now to FIG. 8, illustrated is a side view of a wheeling frame of FIG. 7, attached to a suitcase and in a standing/wheeling mode. In the description of the embodiment of FIGS. 7, 7a and 8, the wheeling frame is shown with main load bearing wheels **251a**, **251b** and with support shelves **285a** and **285b**. In accordance with a further implementation of the wheeling frame of the present disclosure, the same can be constructed without including the aforementioned structure such that the suitcase would be attached to the frame solely with the straps **211b**, **209b**, etc. In this instance, the suitcase would be able to be rolled along on its own wheels, with the wheels **253a** and **253b** being utilized for inclining the suitcase as shown in FIG. 8.

[0050] Referring now to FIG. 9, illustrated in perspective view is a wheeling frame, generally **300**, according to further embodiment of the present disclosure. Wheeling frame **300** has many features generally in common with the previous embodiments, the structure and operation of which will be apparent with simply a naming thereof, in view of the foregoing discussion. Wheeling frame **300** is intended to be secured to a suitcase, for example by straps, clips, or the like, as shown in the prior figures. The wheeling frame **300** includes a back side **301** and a bottom side **303**. Main wheels **351a**, **351b** are rotatably mounted at or near an intersection of back side **301** and bottom side **303**. Bottom side **303** may optionally include fold-out panels **303a**, **303b** to increase the surface area for carrying a suitcase. A further fold-out panel (not shown) may extend from a forward edge of the bottom side **303**. Back side **301** extends only as far as necessary to support the proximal ends of pivotable support legs **361a**, **361b**, with auxiliary wheels **353a**, **353b**, for example, a foot or so. A stabilizer bar **381** connects support legs **361a**, **361b** with one another, and is itself connected with the back side **301** of wheeling frame **300** by scissor link **305**. Other con-

figurations are possible, particularly those including features described with respect to the embodiments disclosed above.

[0051] When secured to a suitcase, the suitcase and wheeling frame **300** stand in a stable manner supported on the main wheels **351a**, **351b** and auxiliary wheels **353a**, **353b**. In this standing/rolling mode, the suitcase and wheeling frame **300** may be pulled, for example by a handle already provided on the top of the suitcase. For transit of the suitcase by other means, for example when handled by baggage handling personnel of a common carrier airline, the wheeled frame can remain attached to the suitcase. Support legs **361a**, **361b** fold to a stowed position adjacent the back side **301**. Preferably, one or both of fold-out panels **303a**, **303b** extend over bottom side **303** in a stowed position to cover and/or protect the main wheels **351a**, **351b**. In one embodiment, each of two panels may cover only one wheel. As compared to the previous embodiments, the reduced size of wheeling frame **300** makes it lighter and easier to transport, particularly in connection with an eventual lifting of the suitcase. Towards that end, any of back side **301**, bottom side **303**, or fold-out panels **303a**, **303b** may have material removed therefrom to reduce weight without sacrificing function.

[0052] It will further be appreciated that the wheeled frame **300** may be integrated with the suitcase itself, and further that the deployment of support legs **361a**, **361b** can be triggered by a remote action, for example by extending a telescoping handle **43**.

[0053] As described above, the present disclosure provides suitcases and/or wheeling frames for suitcases that facilitate one's ability, particularly the elderly or frail person's ability, to carry larger size suitcases over long walkways in airports and the like. Prior art suitcases which have front and rear rolling wheels spaced along the width of the suitcase are notoriously unstable with the suitcase oftentimes falling to the right or to the left. The embodiments illustrated in FIGS. 2-5 integrate in such suitcases a second pair of wheels which allow the suitcase to lean without falling, while enabling the user to pull or push the suitcase by holding the handle **43**. In any of the foregoing embodiments, one can rest along any long pathway in a walkway in an airport without having to return the suitcase to an upright position. The tilting angle is adjustable and the mechanism is made out of extremely light and highly durable components. If desired, the handle **43**, can be constructed not only to pull out of the suitcase but also to tilt relative to the suitcase to adjust the height of the distal end of the handle to suit the needs of different people.

[0054] The suitcase design of the aforementioned FIGS. 2-5 also provides the benefit of an optional extra pair of legs which allow the suitcase to be tilted and to be held in a table mode as described.

[0055] The various embodiments of the wheeling frames which are illustrated in FIGS. 6-9 provide similar benefits and additional benefits as well. For example, if the wheeling frames are provided without their main load bearing wheels **251a** and **251b**, the suitcase can be rolled on its own wheel and the frame used merely for supporting a conventional suitcase in an inclined position, with the frame being able to be collapsed or folded into a very flat and thin construction whereby it does not have to be removed from the suitcase and can travel with the suitcase, in the suitcase bin of an airplane. For example, the aforementioned wheeling frames can have covers at the bottom of the wheel frame when the auxiliary wheel and the support legs are folded in their stowed position.

This will enable a suitcase to be handled by luggage handlers at the airport without having to remove the wheeling frame from the suitcase.

[0056] The embodiments where the main wheels **251a** and **251b** are included provide the benefit to luggage makers of selling suitcases which do not have wheels at their bottom, relying on only the wheeling frame. This enables providing to the traveling public less expensive and lighter suitcases which do not have to be reinforced at their bottom to support wheels. The wheeling frames described herein can be made of extremely strong material yet light as described above, and be virtually unbreakable. This would avoid the consumers having to constantly buy new luggage because of the tendency of the wheels of the standard luggage breaking or being damaged. As noted, at least two suitcases can be strapped to a single wheeling frame.

[0057] Relative to the embodiment of FIG. 9, it bears mentioning that the structure that provides for the frame to incline is merely an optional feature. The frame can be provided in the form whereby it merely supports the rolling wheels **351a** and **351b** and has the means, e.g. various straps and the platform on which a suitcase can be supported and to which the frame can be attached. Again, the concept of this embodiment is that luggage makers need not provide wheels and merely use the device of FIG. 9 to attach wheels to suitcases that only have handles but no wheels. Since the wheeling frame of FIG. 9 can be made of very strong, virtually unbreakable materials, it can be simply attached to any suitcase that does not have rolling wheels but only a handle. This will assure that suitcases will last longer as their weakest component, the wheels, are not present and the suitcase does not need to have an especially strong bottom to support wheels. This frame can be easily moved from suitcase to suitcase, so it suffices for an individual or family to have fewer frames than suitcases.

[0058] Referring now to FIG. 10, any of the foregoing embodiments can include as a feature a retractable and/or stowable cover **410** associated with the suitcase, generally **400**. The cover **400** is preferably flexible, and more preferably durable, for example a ballistic nylon fabric. When the suitcase **400** is no longer to be rolled by the user, for example where it is checked as baggage or shipped as freight to be handled by a common carrier, the support legs **461** would be placed in a stowed position adjacent the suitcase **400**.

[0059] The cover **410** would be extended from its storage location **420**, which may be a pouch or more preferably a chamber having the cover **410** wound about a spring-loaded retracting cylinder **430**. The storage location may be at a back surface **460** of suitcase **400**, or top surface **470**, in which case the cover **410** would encompass a retractable handle **443** when deployed. In the cart embodiments previously discussed, the cover may be stored on or in, for example, one of the lateral or top frame members, adjacent to the suitcase, and perform the same function.

[0060] Once extended, the cover **410** is of a size and shape to cover the back surface **460** (and optionally at least part of top surface **470**) of the suitcase **400**. Cover **410** is secured in its deployed position to the suitcase **400** along at least one distal edge **412** of the cover **410**, but preferably also along lateral edges **414**, **416** of the cover **410**. The cover **410** may be secured, for example, by VELCRO (generically, hook and loop) fastener, or by a zipper, or other such equivalents known in the art. Secured to the suitcase **400**, the cover **410** protects the undercarriage of the suitcase **400** during transit.

[0061] Although the present disclosure has been described with respect to particular or preferred embodiments thereof, many other variations, modifications, other and different

combinations of the recited features, and other uses will become apparent to those skilled in the art in light of Applicant's instant disclosure. The disclosed embodiments are meant solely as illustrative of, and not limiting upon, the scope of the present disclosure, which is defined solely with reference to the appended claims.

What is claimed is:

1. A suitcase comprising:

a suitcase body having opposing front and back sides connected with one another by opposing top and bottom sides;

main wheels disposed on or adjacent to the bottom side of the suitcase;

one or more support legs affixed to the suitcase body and being adjustable from a first position against the back side of the suitcase, to a second position extending away from the suitcase; and

a respective secondary wheel rotatably secured to each of the support legs,

wherein the suitcase is able to stand and to be moved on the main wheels and the support legs.

2. The suitcase according to claim 1, further comprising a handle secured on or adjacent to the top side.

3. The suitcase according to claim 2, wherein the handle is pivotable about an axis substantially parallel to the line of intersection between the top side and back side.

4. The suitcase according to claim 1, wherein the support legs consist of legs, each of which is at a respective lateral end of the suitcase.

5. The suitcase according to claim 1, wherein the support legs are pivotably mounted on the back side of the suitcase.

6. The suitcase according to claim 5, wherein the support legs are urged towards a stowed position by a first force that increases in magnitude with increased angular displacement of the support legs away from the back side of the suitcase.

7. The suitcase according to claim 1, wherein the support legs are slidably mounted to a guide extending at least partially between the top and bottom sides, on or adjacent to the back side.

8. The suitcase according to claim 6, wherein the first force is provided by one or more of a spring and a gas cylinder spring extending between a proximal end of the support leg and a point along the guide between the proximal end and the top side.

9. The suitcase according to claim 1, further comprising a pair of secondary legs pivotable between a first position against the back side of the suitcase and a second position extending away from the suitcase.

10. The suitcase according to claim 9, wherein the secondary legs are adjustable in length.

11. The suitcase according to claim 10, wherein the secondary legs comprise respective wheels.

12. The suitcase according to claim 1, further comprising a cover structured and sized to selectively cover at least part of the back side of the suitcase, including the support legs.

13. A suitcase carrier, comprising:

a frame defining a frame plane, the frame being removably securable to a suitcase;

support legs adjustable from a first position in the frame plane, against the back side of the suitcase, to a second position extending away from the suitcase; and

respective support leaning wheels secured to the support legs,

wherein the carrier enables rolling the suitcase in an inclined position on the leaning wheels.

14. The suitcase carrier of claim **13**, including main wheels, located so that the suitcase is rollable on the main wheels and on the leaning wheels.

15. The suitcase carrier according to claim **14**, including a carrier ledge for the suitcase.

16. The suitcase carrier according to claim **13**, further comprising releasable straps, enabling securing the carrier to the suitcase.

17. A suitcase carrier according to claim **13**, wherein the frame comprises at least four members rigidly connected with one another and defining a perimeter of the frame.

18. A suitcase carrier according to claim **17**, wherein at least two of the members are adjustable in length.

19. The suitcase carrier according to claim **13**, further comprising a carrier handle.

20. The suitcase carrier according to claim **19**, wherein the handle is pivotable about a lateral axis of the suitcase carrier.

21. The suitcase carrier according to claim **13**, further comprising secondary legs pivotable between a first position in the plane of the carrier and a second position extending away from the suitcase, the support legs and secondary legs enabling the suitcase to be supported horizontally at an elevated position.

22. The suitcase carrier according to claim **21**, wherein the secondary legs are adjustable in length.

23. The suitcase carrier of claim **14**, including releasable straps for securely holding the suitcase to the carrier and a cover which covers the main wheels of the support legs in a stowed position of the support legs.

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