A convertible cart for transporting objects including a frame, a first handle connected to the frame adjacent a first end of the frame, a second handle connected to the frame adjacent a second end of the frame, a first plurality of wheels connected to the frame adjacent the first end of the frame and a second plurality of wheels connected to the frame adjacent the second end of the frame. The first plurality of wheels are rotatably mounted to a tubular axle. The first plurality of wheels are casters rotatably interconnected to the frame. The handles are selectively movable between a first position perpendicular to the frame and a second position generally coplanar to the frame. The frame has a generally rectangular configuration and includes frame members which are telescopically connected to each other.
LIGHTWEIGHT CONVERTIBLE TRANSPORT CART

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to hand trucks, dollies, and other land vehicles. More particularly, the present invention relates to lightweight, telescoping foldable and convertible hand trucks and/or platform carts which are used for transporting objects.

[0003] 1. Description of Related Art

[0004] Many improvements have been made in the area of hand trucks and dollies for material handling. However, none of these improvements have efficiently and effectively addressed the needs of professional musicians. Professional musicians are required to transport wide varieties of musical instruments and related gear often utilizing small cars and trucks over various terrains and changing environments while travelling to and from performance sites. Due to the virtual explosion in technology over the last ten years regarding P.A. systems, electronic keyboards, effects and the like, musical groups require more equipment than ever before. The problems of transporting the above-mentioned equipment have become increasingly difficult. It is desirable to create a specialized dolly or cart that can satisfy the criteria of musicians.

[0005] In the past few years, mini-vans and small trucks have been placed in common use for the transport of musical and other equipment. As such, space limitations have become of great concern to musicians. Any transport carts must now have a size which can carry large loads yet collapse to a small storage size so as to leave maximum room for equipment with the mini-van. Space is at a premium within a mini-van or a small truck.

[0006] Initially, it is desirable to produce a lightweight cart weighing under thirty-five pounds. It has been found that professional musicians experience finger stiffening and muscle stiffening in the hands and forearms when lifting objects over forty pounds which is deleterious to musical performance. In addition, the carrying of heavy equipment can contribute to back problems and related physical impairment. In addition, it also limits the flexibility and, thus, hampers singing performance.

[0007] When transporting musical equipment, any cart or dolly should be capable of supporting at least five hundred pounds or more. Musical equipment is delicate and should be transported smoothly and without shock. In addition, the musical equipment should be properly supported and handled with care. Any handtruck or dolly must be able to reduce to a size of three feet of length or less with one side flat so as to facilitate receipt in small cars or trucks and/or baggage handling in airports.

[0008] In order to effectively accommodate keyboards and large P.A. cabinets, a cart must have the ability to extend to approximately fifty-four inches. It should also be short enough to maneuver through labyrinth-like corridors and elevators, often found in hotels and stage areas. Support should be provided on each end of the cart so as to maintain the expensive and delicate equipment within the confines of the frame of the dolly. Tall foldable sides can be useful for securing equipment such as drums, guitars, horns and the like, as well as acting as a hanger for various stage clothes. Also, the cart should be able to act as a "platform cart" so that the bed of the cart is flat with one side upright so as to accommodate long 24-channel mixing consoles or lighting trusses that would overhang the ends of the cart.

[0009] Since the equipment must be transported over various terrains, the cart should have the quality suitable for rolling smoothly, shock-free and quietly over such various terrains. The wheeled mechanism of the dolly or cart should be suitable for traversing curbs, stairs, grass, dirt and rough pavement. The cart should provide a broad frame surface so as to easily receive the equipment. A non-skid surface is useful in order to prevent odd-shaped instruments and widely-used polyethylene cases (which are notoriously slippery) from slipping and falling off during transport. The cart should be able to be converted from a two-wheel hand truck to a four-wheel cart or any other configuration both extremely quickly and efficiently. Since the cart must be loaded and unloaded often between musical performances, complete assembly into any loading configuration should be completed within ten seconds.

[0010] It is often the requirement of musicians that they must set up extremely quickly and must break down the equipment quickly. As such, it is a requirement for a musical instrument transport cart that the cart be able to be assembled into its proper position for receiving equipment very quickly and easily. Undue manipulation of screws, nuts, bolts, and other items wastes a great deal of time and is generally unsuitable for the purposes of the musician. A musical instrument transport cart must be capable of rapid assembly. The cart should also be capable of assuming any configurations within ten seconds or less. The cart should also be able to carry small objects on the frame without falling through.

[0011] It is also important for musical equipment to be maintained on a surface parallel to the surface on which the cart is travelling. As such, the frame of the cart should be supported on wheels which maintain the frame in parallel relationship to the earth. Any angling of the frame will tend to cause the equipment to move to the lowest end of the cart. The angling may also cause excessive and unexpected pressures to be applied to cart components. In order to enhance the ability to maintain the parallelism of the cart to the surface, the handle should be foldable in such a way so as to maintain this parallelism.


[0013] U.S. Pat. No. 5,228,716, issued on Jul. 20, 1993 to the present inventor, teaches a convertible transport cart. After experimentation with the transport cart of this patent, it was found that several improvements were possible. First, it was found that the rectangular frame, although strong, lacked a certain degree of structural integrity. Additionally, it was found that the rectangular frame of this patent inhibited the ability to transport certain small articles (i.e., those articles that had a length less than the width between the bars of the frame). Often, musicians would complain that certain small objects could not be conveniently transported by the cart because of the wide spacing between the sides of the frame. Another problem which was noted was when the cart was configured in its “hand truck” position, there were occasions when the telescoping U-shaped members would slide from one another, especially if the thumbscrews were not sufficiently tightened. The lack of a safeguard mechanism to prevent the members from telescoping apart was a concern to certain users of the cart.

[0014] U.S. Pat. No. 5,476,282, issued in Dec. 19, 1995 to the present inventor, teaches an improved convertible cart for transporting objects having a frame, a first handle connected to the frame, a second handle connected adjacent an opposite end of the frame and a plurality of wheels attached to the frame. Each of the handles is selectively movable between a first position generally perpendicular to the frame and a second position generally aligned with the frames. The wheels support the frame at a position parallel to the surface on which the wheels are placed. The frame has a longitudinal member extending centrally of the frame. The longitudinal member has an end which is offset from overlapping relationship with one end of the frame. A snap button is provided with the longitudinal member so as to limit telescoping movement of one portion of the longitudinal member with respect to the other portion.

[0015] The present inventor has experienced considerable success with the sale of the convertible transport carts identified in U.S. Pat. Nos. 5,228,716 and 5,476,282. However, it was noted that certain improvements could be made in the cart so as to enhance the ability of the cart to satisfy the needs of the consumers. In particular, it is very important and desirable for the convertible transport cart to be made as lightweight as possible while maintaining the full structural integrity of the cart. It has also been found important to be able to configure the cart so that it can be suitably folded for transport in overhead bins of aircraft. As such, the present invention should be configured so as to be as narrow as possible. It has further been found that the wheels of the cart should be configured so as to minimize weight and noise. Along with the ability to minimize the weight of the transport cart, it was found important to create structures which optimally minimize the cost of the production of the cart while maintaining and/or enhancing the structural integrity of the cart. It is important to be able to configure the cart to have eight configurations that can be easily assembled in a minimal amount of time.

[0016] It is an object of the present invention to provide a convertible cart designed to be use in combination with the transport of musical equipment.

[0017] It is an object to provide a cart that will carry up to five hundred pounds, will extend to fifty-two inches in length, weigh less than thirty-five pounds, and collapse to thirty-six inches in length for storage, be durable, and be relatively inexpensive.

[0018] It is another object of the present invention to provide a telescoping and collapsible cart for easy storage.

[0019] It is another object of the present invention to provide foldable handles having a sufficient height to allow for efficient stacking and carrying of delicate musical equipment as well as for allowing for easy storage.

[0020] It is another object of the present invention to provide a cart that is long enough so that the handle folds flat within the framework of the cart.

[0021] It is a further object of the present invention to provide a locking mechanism for the handles of a cart which allows the handles to be positioned up or down within one second each.

[0022] It is a further object of the present invention to provide a cart having handles and a frame that can be arranged so as to maintain a parallel relationship with the earth.

[0023] It is still a further object of the present invention to provide a cart that can be easily transported through airports and the like by having a folded length of three feet or less and a flat side for airport transport belts.

[0024] It is another object to provide a cart that has minimal protrusions for the prevention of snagging, scraping, and injury.

[0025] It is another object to provide a cart that will carry smaller objects as well as larger objects without slipping through the frame, telescoping movement and for preventing telescoping separation of the cart.

[0026] It is still a further object of the present invention to provide a cart that minimizes the weight of the cart.
[0027] It is a further object of the present invention to provide such a cart that minimizes the noise produced by the wheels of the cart.

[0028] It is still a further object of the present invention to provide a cart that is convertible between a short furniture dolly, a two wheel hand truck, a storage/transport configuration, a short hi-stacker cart, a short platform cart, a long platform cart, a long hi-stacker cart, and a longer furniture dolly.

[0029] These and other objects and advantages of the present invention will become apparent from a reading of the attached specification and appended claims.

BRIEF SUMMARY OF THE INVENTION

[0030] The present invention is a convertible cart for transporting objects that comprises a frame, a first handle connected to the frame adjacent a first end of the frame, a second handle connected to the frame adjacent a second end of the frame, a first plurality of wheels connected to the frame adjacent to the first end of the frame, and a second plurality of wheels connected to the frame adjacent the second end of the frame. The first handle is selectively movable between a first position perpendicular to the frame and a second position generally coplanar with the frame. The frame has a first axle member in engagement with the first handle. The frame has a second axle member in engagement with the second handle. The first handle is rotatable between the first and second positions about the first axle member. The second handle is rotatable between the first and second positions about the second axle member. The first plurality of wheels are rotatably mounted about a tubular axle. The second plurality of wheels are casters rotatably interconnected to the frame.

[0031] In the preferred embodiment of the present invention, each of the first plurality of wheels is a pneumatic tire affixed around the hub. The hub is formed of a polymeric material having a central aperture therein. The central aperture receives roller bearings therein. The roller bearings receive the exterior surface of the tubular axle therein. The tubular axle has a pair of holes formed therein. These holes serve to receive a cotter pin therein at an end of the tubular axle outwardly of the wheel. Each of the second pair of wheels has a caster frame pivotally connected to the frame and extending downwardly therefrom. The caster is rotatably mounted within the caster frame. The caster frame specifically includes a generally flat surface in parallel relationship with the frame. The flat surface is pivotally connected to the frame. A first wing member extends transversely outwardly from the flat surface on one side of the flat surface. A second wing member extends transversely outwardly from the flat surface on an opposite side of the flat surface in parallel relationship to the first wing member. The caster is rotatably mounted between the first and second wing members. Each of the first and second wing members has a plurality of holes formed therein and therethrough in spaced relationship downwardly from the flat surface. The caster has a thermoplastic tread bonded to a polymeric hub. The polymeric hub has a plurality of holes formed therein and therethrough and extending in generally spaced radial relationship around the center of the caster.

[0032] The frame has a first frame member and a second frame member in telescopic relationship to each other. The frame has a generally rectangular configuration. The frame is fixable in either a telescoped position or in a retracted position. The second frame member has an end surface extending between the second plurality of wheels. This end surface has a plurality of holes formed therein and therethrough. The plurality of holes are in spaced relationship to each other and extending such that the central axis of the plurality of holes are colinear with each other. The first frame member has a stair climber frame member affixed directly thereto and extending directly outwardly therefrom on an underside of the first frame member. The first frame member also has a second stair climber frame member on an opposite side of the first frame member. The second stair climber frame is in parallel relationship to the first stair climber frame.

[0033] In an alternative embodiment of the present invention, each of the first pair of wheels has a thermoplastic tread bonded to a polymeric hub. The polymeric hub has a central aperture suitable for receiving the tubular axle therein. A plurality of holes are formed therein and therethrough and extend in spaced radial relationship around the central aperture. The polymeric hub has a domed outer surface suitable for contact with an underlying surface. The first pair of wheels are no more than eleven inches apart. The first handle has a length which is less than a length of the second handle.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0034] FIG. 1 is a perspective view of the present invention illustrating the expandable operation for use as a dolly.

[0035] FIG. 2 is a perspective view of the present invention illustrating the configuration of the present invention as used as a two-wheeled hand truck.

[0036] FIG. 3 is a perspective view of the present invention showing the handles in their collapsed position.

[0037] FIG. 4 is an isolated view showing the caster of the present invention.

[0038] FIG. 5 shows the caster and caster frame as used in the present invention.

[0039] FIG. 6 is a perspective exploded view of the pneumatic wheel as used in the present invention.

[0040] FIGS. 7A-7G show the perspective views of the various configurations into which the present invention can be assembled.

[0041] FIG. 8 is a perspective view of an alternative embodiment of the present invention.

[0042] FIG. 9 is an upper end perspective view of the alternative embodiment of FIG. 8.

[0043] FIG. 10 is an isolated side view of the wheels of the alternative embodiment of FIG. 8.

[0044] FIG. 11 is an end view of the alternative embodiment of the FIG. 8.

DETAILED DESCRIPTION OF THE INVENTION

[0045] With reference to the drawings, FIG. 1 illustrates the present invention in its fully extended position. The
frame 11 of cart 10 is made of preferably a mild square tubular steel which is structurally light. The frame 11 is comprised of slidably cooperating U-shaped square tubing divided into two sections. The main frame bed 12 and the telescoping frame section 13 are provided so as to form the frame 11. Telescoping frame section 13 slidably engages the main frame 12. The frame 11 may be welded or bonded by mechanical means such as by bolts 14. The main frame bed 12 includes a non-skid surface 19 for reduced possibility of accidental slipping of equipment.

[0046] A stair climber attachment 15 is secured directly to the bottom of the main frame bed 12. The stair climber attachment 15 includes tubular axle 16 for supporting two primary pneumatic wheels 17 and also serving as a lateral support bar 18 for bracing the main frame bed 12. Another lateral support bar 20 is placed where the telescoping frame section 13 and the main frame bed interconnect. This reinforces the mid-section of the frame 11. Additional reinforcement is provided by the use of heavy duty thumbnuts 21. The thumbnuts 21 are threadedly received on the underside of main frame bed 12 on each side of the frame bed. A single thumbnut 21 could also be used for securing a frame section in a desired position. Thumbnuts 21 can be rotated so as to move in abutment with the telescoping frame section 13. This serves to lock the telescoping frame section 13 in position relative to the main frame bed 12. The thumbnuts 21 are located on the underside of the main frame bed 12 so as to avoid snagging of equipment or objects located on the top or sides of the cart 10.

[0047] A brace 22 extends down from and is attached to the front or top end of the telescoping frame section 13. Brace 22 is of a suitable size to serve as a support 23 for the secondary wheels 24. Secondary wheels 24 are preferably pivoting casters for ease in direction change. Brace 22, in combination with secondary wheels 24, allows for uniform balance of the front and back of cart 10.

[0048] Inverted U-shaped handles 25 and 25a are symmetrically placed on opposite ends of frame 11. The handles 25 and 25a are releasably attached to the frame by suitable hinges 26 for ease in collapsing handles 25 and 25a. The handles 25 and 25a are also locked in place by suitable mechanical means such as was described in U.S. Pat. No. 5,476,282, incorporated herein by reference.

[0049] The handles 25 and 25a are supported on respective axle members 27. Handles 25 and 25a can rotate about axles 27 from a first position to a second position. The first position of handles 25 and 25a is illustrated in FIG. 1. Handles 25 and 25a are in a position perpendicular to the frame 11 of cart 10. The second position of handles 25 and 25a is shown in FIG. 3 in which the handles 25 and 25a are rotated about axles 27 so as to assume a position parallel to and aligned with the frame 11. The ability to rotate the handles 25 and 25a about axles 27 enhances the capabilities of the present invention. A specialized mechanism is provided for locking the handles in proper position.

[0050] As can be seen in FIG. 1, there is a longitudinal member 29 extending centrally of the frame 11. This longitudinal member 29 has one end 31 which overlies a top surface of an end portion 33 of frame 11. Another end 35 of longitudinal member 29 is offset from the overlying relationship with the end 37 of the frame 11. As can be seen, the longitudinal member 29 includes a first portion 41 and a second portion 43. The first portion 41 slidably receives the second portion 43 therein. As a result, when it is necessary to extend the length of the frame 11, the portions 41 and 43 of the longitudinal member 29 can slide with the sliding of the remaining U-shaped portions of the frame. The addition of the longitudinal member 29 greatly enhances the capacity of the cart to carry heavy loads. Additionally, the longitudinal member 29 allows the frame 11 to retain objects thereon that have a length less than the width between the sides of the frame. As was stated previously, it had been a problem where small objects could fall between the sides of the frame 11. The longitudinal member 29 now serves to retain objects that would otherwise fall between the sides of the frame. The offset relationship between the end 35 of the longitudinal member 29 and the top surface of the end 37 of frame 11 allows the handle 25 to be properly lowered so as to be in coplanar relationship with the frame 11.

[0051] In FIG. 2, it can be seen that the handle 25a is rotated about axle 27 so as to be aligned with the frame 11. The handle 25 is contained within the parameter formed by frame 11. The other handle 25 is placed in its first position perpendicular to the frame 11. In the position illustrated in FIG. 2, the cart 10 assumes a hand truck configuration.

[0052] FIG. 3 illustrates the cart 10 in its configuration as a four-wheel flatted cart. In FIG. 3, the handles 25 and 25a are both rotated about respective axles 27 so as to be placed in their second position. The second position is a flat position on the frame 11. It can be seen that one handle 25 is received within the area of frame 11 and is generally coplanar with the area of frame 11. The offset relationship between the end 35 of longitudinal member 29 and the end 37 of frame 11 permits handle 25 to be folded in this coplanar relationship with frame 11. The other handle 25a is hinged to axles 27 slightly above the top surface of frame 11. This causes the other handle 25 to assume a position juxtaated against the top surface of frame 11 and arranged parallel to frame 11. In either of the configurations, the top surface of the cart 10 of the present invention will be flat and parallel to the surface upon which the cart 10 rests.

[0053] The stair climber attachment 15 supports the frame 11 a distance above pneumatic wheels 17. The stair climber attachment 15 extends generally diagonally from the wheels 17 to the frame 11. Similarly, the brace 22 and the support 23 supports the frame 11 a distance above the caster wheels 24. It is important to the embodiment of the present invention that the frame 11 be supported so as to be parallel above the surface upon which the cart 10 rests. As such, the structural members are configured so as to provide this levelling of the frame 11 above the wheels. The primary wheels 17 are positioned on opposite sides of frame 11. Similarly, the caster wheels 24 are placed on opposite sides of frame 11. The pneumatic wheels 17 allow the cart 10 to be moved along various types of terrain. The pneumatic wheels 17 allow the cart to be moved without shock to the contents on the frame 11. The wheels 17 can be inflated to any desired pressure.

[0054] The use of the mild durable square tubular steel material is, by structural design, light enough in weight to be manually lifted onto a truck or into an automobile trunk. It is also structurally sound enough to withstand and support 350 pounds of equipment. The overall empty weight of the cart 10 should not exceed forty pounds. The square tubular
Steel is preferred because it allows for a larger surface area on the frame 11 than does rounded tubing. Non-skid adhesive tape, or the like, is applied to the top surface of the main frame bed 12 so as to reduce the possibility of equipment slipping from the cart.

The telescoping frame 11 allows for compact storage when the cart 10 is not in use. This is important given the limited space often available to musicians. The cart achieves maximum hauling capacity when the frame 11 is fully extended. The ends of the cart 10 are designed to be bilaterally symmetrical and are of sufficient height to allow for efficient stacking of musical equipment. The ends releasably collapse to the frame 11 for convenient storage.

The stair climbing device 15 is attached to the bottom of the cart 10 to aid in ascending and descending stairs. The primary wheels 17 are located at the bottom end of the cart and use part of the stair climbing device as an axle. These primary wheels are preferably pneumatic for a smooth ride on rough terrain. The secondary wheels 24 are located on the opposite end of the cart and are preferably pivoting caster wheels for ease and direction change and maneuverability.

The lateral support bars 18 and 20 are placed perpendicular in the frame to help support equipment and reinforce the structural stability of the frame 11. The frame 11 is actually made of two separate pieces, the main frame bed 12 and the telescoping frame bed 13. The attachment of the telescoping frame section 13 to the main frame bed 12 is further enhanced by the use of the heavy-duty thumbnut which affixes the sections in position relative to each other. Additionally, as will be described hereinafter, a snap button is received within a portion of the telescoping longitudinal member 29. This snap button serves to limit and safeguard the relative movement of the telescoping sections of frame 11.

FIG. 4 shows an isolated view of a single caster wheel 24. Caster wheel 24 has a polymeric hub 50 having bearings 52 formed in a central aperture thereof. A plurality of holes 52 are formed in spaced relationship extending radially around the central aperture 52. The incorporation of the holes 54 minimizes the weight of the polymeric hub 50. The use of the polymeric material for the hub 50, in place of the steel material of the outer form of the present invention, minimizes the weight associated with the respective casters 24. A thermoplastic tread 56 is bonded around the perimeter of the hub 50. As such, the formation of the casters 24 can be carried out in a very convenient and easy manner. Importantly, the use of the thermoplastic tread 56 around the hub 50 will minimize the noise produced by the casters 24 when the cart 10 is rolled along a surface.

FIG. 5 shows a detailed view on how the caster 24 is connected to the frame 11. The caster 24 includes the wheel 51 which is rotatably mounted within the caster frame 58. The caster frame includes a flat surface 60 which is pivotally mounted to the frame 11 and extends in generally parallel relationship to the frame 11. A wing member 62 extends transversely downwardly from one side of the flat surface 60. The wing member 62 has a plurality of holes 64 formed therein and therethrough. The holes 64 extend downwardly from the flat surface 60. The caster wheel 51 is mounted by a rivet 66 to the caster frame 58. The use of the holes 64 also provides a desirable aesthetic appearance to the configuration of the caster frame 58.

FIG. 6 is an exploded view showing the configuration of the wheel 17. As can be seen, the wheel 17 has a pneumatic tire 68 affixed around a polymeric hub 70. The use of the polymeric hub 70 serves to minimize the weight of the wheel 17 and to reduce the cost associated with manufacturing the wheel 17. The polymeric hub 70 has a central aperture 72. Unlike the costly ball bearings associated with the steel hub of the prior form of the present invention, the present invention utilizes roller bearings 74 that are positioned within the central aperture 72. The roller bearings 74 will have an inner surface contacting the tubular axle 16. Unlike the previous form of the present invention, the tubular axle 16 minimizes the weight by providing a "tubular axle" having a central passageway 78. As such, the present invention avoids the cost and weight associated with the solid steel rod axle of the prior form of the present invention. A pair of holes 80 are formed through the wall of the axle 16 so as to allow cotter pin 82 to be inserted thereinto for securing the roller bearing 74 and the wheel 17 into its desired position on the end of the tubular axle 16. It has been found that the use of the tubular axle 16 provides sufficient structural integrity for the cart 10. A cap 84 is inserted over the end of the roller bearings 74. The end of the tubular axle 16 can extend outwardly therefrom so that the cotter pin 82 will reside juxtaposed against the outer surface of the cap 84. The use of the roller bearings 74 allows the hub 70 to be formed of a polymeric material by providing a large surface area of contact between the inner surfaces of the hub 70 at the central aperture 72 with the outer surfaces of the rollers associated with roller bearing 74.

FIGS. 7A-7G show the various configurations to which the present invention can be adapted. Original FIG. 3 shows the present invention for use as a short furniture dolly. The short furniture dolly can be particularly useful for moving office equipment, such as file cabinets. FIG. 7A shows the present invention to be configured to be a long furniture dolly. The long furniture dolly frame is extendable and the handles fold flat so as to accommodate long bulky items, such as large boxes. FIG. 7B shows the configuration of the present invention as a long hi-stacker cart. This long hi-stacker cart is particularly useful for carrying lumber within the area of the handles or other long items that can be propped between the upwardly extending handles. FIG. 7C shows the present invention configured as a long platform cart. The long platform has one handle extended upwardly so as to allow a person to move long bulky furniture, such as sofas. FIG. 7D shows the present invention configured as a short platform cart with the frame in its retracted position and a single handle extending upwardly. The short platform cart allows for the movement of shorter items, such as arm chairs. FIG. 7E shows the cart configured as a short hi-stacker with the frame retracted and both handles extending upwardly. This short hi-stacker easily adapts to odd-shaped cargo, such as water bottles. FIG. 7F shows the cart with both handles folded downwardly and the frame retracted. In this configuration, the cart stands upwardly for easy storage and transport.

FIG. 7D shows the cart in its configuration suitable as a two wheel hand truck. In this configuration, one handle is folded outwardly, the frame is telescoped and extends...
upwardly. This two wheel hand truck includes its stair climbers so as to move large bulky objects and boxes. As can be seen in FIGS. 7A-7G, along with FIGS. 1-3, the present invention has a plurality of configurations which are all adaptable for the movement of various items.

[0063] FIG. 8 shows an alternative embodiment 110 of the present invention. This alternative embodiment 110 is a convertible transport cart that is particularly configured to be of a relatively small size and especially adapted for use in airports or on airplanes. The cart 110 can be folded so that the width is no more than ten inches wide (suitable for airplane transportation). The frame 111 is comprised of slightly cooperating U-shaped tubing divided into two sections. The main frame bed 112 and the telescoping frame section are provided so as to form the frame 111. Telescoping frame section 113 slidably engages the main frame 112. A stair climber attachment 115 is directly secured to the lower surface of the main frame bed 112. Another lateral support bar 120 is placed where the telescoping frame sections 113 and the main frame bed 112 interconnect. This reinforces the midsection of the frame 111. Additional reinforcement is provided by the use of thumbnut 121. The thumbnut 121 is threadedly received on the underside of the main frame bed 112. The thumbnut 121 is used in the same manner described in association with the prior embodiment of the present invention. Inverted U-shaped equipment support handles 125 are placed at the opposite ends of the frame 111. The equipment support handles 125 are releasably attached to the frame in the manner described in association with the prior embodiment. Importantly, in this alternative embodiment of the invention there is a plan, the wheels 117 are not pneumatic wheels but include a thermoplastic tread 127 mounted to a polymeric hub 129. The polymeric hub 129 includes a plurality of holes 131 formed therein so as to minimize the weight of the polymeric hub 129. The axle 116 extends between the wheels 117 and is connected thereto in the manner described in association with the prior embodiment of the present invention. The use of the thermoplastic tread 127 on the polymeric hub 129 minimizes the noise associated with the respective wheels 117. Each of the wheels 117 should be no more than ten inches apart. To accommodate this positioning, the stair climber members 115 are directly affixed to the frame sections 119.

[0064] The alternative embodiment 110 uses front casters 124 having a similar configuration to that described in the prior embodiment of the present invention. A front frame section 126 extends between the casters 124. The front frame section 126 has a plurality of holes 128 formed therein so as to minimize the weight of this forward frame section. The formation of holes 128 for the casters 124 and in the front frame section 128 minimizes the weight of the alternative embodiment 110.

[0065] FIG. 9 shows particularly the configuration of the front frame section 128 associated with the frame 111 of the alternative embodiment of cart 110. It can be seen that the casters 124 include caster wheels 140 that are rotatably mounted between the wing members 142 and 144. Each of the wing members 142 and 144 will have holes formed therethrough in the manner described in the previous embodiment of the present invention.

[0066] FIG. 10 shows an isolated view of the wheel 117. It can be seen that the wheel 117 has the thermoplastic tread 127 bonded around the polymeric hub 129. Holes 131 are formed in the polymeric hub 129 so as to minimize the weight of the wheel 117. A central aperture 133 is formed therein so as to accommodate the roller bearings for joining the wheel 117 with the tubular axle 116. The holes 131 are spaced radially around the central aperture 133.

[0067] In the design of the alternative embodiment of the cart 110, it was important to be able to configure the wheels 117 so that they could accommodate the loads while being spaced apart by no more than ten inches. As a result, the thermoplastic tread 127 of the wheels 117 has a domed outer surface. As a result, the wheels 117 can be placed closer to the side frames 119 of the cart 110. This positioning is further accomplished by moving the stair climber frame members 115 to a position extending directly below the bottom of the side frames 119. As such, the outer surface of the wheels 117 will not contact the frame 119 but will be positioned as close as possible. The tubular axle 116 will extend between the wheels 117 below the frame 111. Importantly, as can be seen in FIG. 8, handle 125 is shorter than the other handle. As a result, the cart 110 is particularly adaptable for moving golf bags or elongated luggage. For example, various items of luggage can be positioned between the handle 125. If a golf bag is a part of the luggage, then it can be placed on top of the luggage and have one end extending outwardly and over the top of the shorter handle 125. Since the handle 125 is shorter, the flexibility of the upright members 150 and 151 of handle 125 is much more rigid. As a result, the axles 154 and 156 are suitably shortened so that the upright members 150 and 151 need only be squeezed together a shorter distance by a force applied to the cord 166.

[0068] The foregoing disclosure and description of the invention is illustrative and explanatory thereof. Various changes in the details of the illustrated construction may be made within the scope of the appended claims without departing from the true spirit of the invention. The present invention should only be limited by the following claims and their legal equivalents.

I claim:

1. A convertible cart for transporting objects comprising:
   a frame;
   a first handle connected to said frame adjacent a first end of said frame;
   a second handle connected to said frame adjacent a second end of said frame, said first handle selectively movable between a position perpendicular to said frame and a second position generally coplanar within said frame, said frame having a first axle member in engagement with said first handle, said frame having a second axle member in engagement with said second handle, said first handle rotatable between said first and second positions about said first axle member, said second handle rotatable between said first and second positions about said second axle member;
   a first pair of wheels connected to said frame adjacent said first end of said frame, said first pair of wheels being rotatably mounted to a tubular axle; and
a second pair of wheels connected to said frame adjacent said second end, each of said second pair of wheels being a caster rotatably interconnected to said frame.

2. The cart of claim 1, each of said first pair of wheels having a pneumatic tire affixed around a hub.

3. The cart of claim 2, said hub being formed of a polymeric material having a central aperture, said central aperture receiving roller bearings therein, said roller bearings receiving said tubular axle therein.

4. The cart of claim 3, said tubular axle having a pair of holes formed therein, said pair of holes receiving a cotter pin therein at an end of said tubular axle outwardly from the wheel.

5. The cart of claim 1, each of said first pair of wheels having a thermoplastic tread bonded to a polymeric hub.

6. The cart of claim 5, said polymeric hub having a central aperture therein, said central aperture receiving roller bearings therein, said roller bearings receiving said tubular axle therein, said polymeric hub having a plurality of holes formed therein therethrough and extending in spaced radial relationship around said central aperture.

7. The cart of claim 5, said thermoplastic tread having an outer surface suitable for rolling contact with an underlying surface, said outer surface having a domed configuration, said first pair of wheels being no more than eleven inches apart.

8. The cart of claim 1, each of said second pair of wheels having a caster frame pivotally connected to said frame and extending downwardly therefrom, said caster being rotatably mounted within said caster frame.

9. The cart of claim 8, said caster frame comprising:

a generally flat surface in parallel relationship with said frame, said flat surface being pivotally connected to said frame;

a first wing member extending transversely outwardly from said flat surface on one side of said flat surface; and

a second wing member extending transversely outwardly from said flat surface on the opposite side of said flat surface in parallel relationship to said first wing member, said caster being rotatably mounted between said first and second wing members.

10. The cart of claim 9, each of said first and second wing members having a plurality of holes formed therein therethrough and extending in spaced parallel relationship downwardly from said flat surface.

11. The cart of claim 8, said caster having a thermoplastic tread bonded to a polymeric hub.

12. The cart of claim 11, said polymeric hub having a plurality of holes formed therein therethrough and extending in spaced radial relationship around said caster.

13. The cart of claim 1, said frame having a first frame member and a second frame member in telescopic relationship to each other, said frame having a generally rectangular configuration, said frame being fixable in either a telescoped position or a retracted position.

14. The cart of claim 13, said second frame member having an end surface extending between said second plurality of wheels, said end surface having a plurality of holes formed therein therethrough, said plurality of holes being in spaced relationship to each other and having a colinear central axis.

15. The cart of claim 13, said first frame member having a first stair climber frame member affixed directly to and extending directly outwardly from an underside of one side of said first frame member, said first frame member having a second stair climber frame member affixed directly to and extending directly outwardly from an underside of an opposite side of said first frame member, said second stair climber frame being in parallel relationship to said first stair climber frame.

16. The cart of claim 15, said first plurality of wheels being positioned adjacent respective outer surfaces of said first and second stair climber frames.

17. The cart of claim 1, said first handle having a length which is less than a length of said second handle.

18. A convertible cart for transporting objects comprising:

a frame;

a first handle connected to said frame adjacent a first end of said frame;

a second handle connected to said frame adjacent a second end of said frame, said first handle selectively movable between a first position perpendicular to said frame and a second position generally coplanar with said frame;

a first plurality of wheels connected to said frame adjacent said first end of said frame, each of said first plurality of wheels being a pneumatic tire affixed around a hub, said hub being formed of a polymeric material; and

a second plurality of wheels connected to said frame adjacent said second end, each of said second plurality of wheels being a caster rotatably interconnected to said frame.

19. The cart of claim 18, said first plurality of wheels being rotatably mounted to a tubular axle, said hub having a central aperture receiving roller bearings therein, said roller bearings receiving said tubular axle therein.

20. A convertible cart for transporting objects comprising:

a frame;

a first handle connected to said frame adjacent a first end of said frame;

a second handle connected to said frame adjacent a second end of said frame, said first handle selectively movable between a first position perpendicular to said frame and a second position generally coplanar with said frame;

a first plurality of wheels connected to said frame adjacent said first end of said frame; and

a second plurality of wheels connected to said frame adjacent said second end, each of said second plurality of wheels comprising:

a caster pivotally connected to said frame and extending downwardly therefrom; and

a caster rotatably mounted within said caster frame, said caster having a thermoplastic tread bonded to a polymeric hub, said polymeric hub having a plurality of holes formed therein therethrough and extending in spaced radial relationship around said caster.

* * * * *