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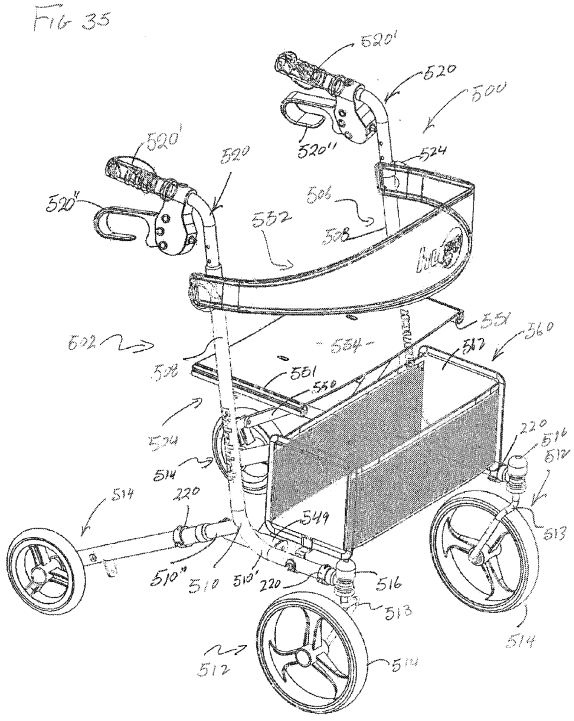
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(54) A mobile support assembly

(57) A mobile support assembly (500) structured to facilitate an individual's mobility comprises a frame (502) assembly disposable between operative and collapsed orientations and includes two side assemblies (504, 506) each including support wheels (512, 514) connected thereto. Adjustable linkage (540) movably interconnects the side assemblies (504, 506) for disposition in said operative and collapsed orientations, wherein the operative orientation comprises a maximum lateral spacing of the two side assemblies (504, 506) and the collapsed orientation comprises a closer lateral spacing and substantially adjacent disposition of said two side assemblies (504, 506) than said maximum lateral spacing thereof when in the operative orientation. A chair assembly (552) is connected to the frame assembly (502) and includes a seat (554) and a backrest (555) connected to and movable with the side assemblies (504, 506) between the operative and collapsed orientations.



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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] This invention is directed to a mobile support assembly which is structured to be used as a walker/wheelchair combination or as a walker with a seat structure and may be selectively disposed into a collapsed orientation for storage, transport, shipment, etc. when not in use or in an operative orientation when intended for use. When in the collapsed orientation the assembly will be reduced in dimension and the configuration thereof will be altered from that when in the operative position.

DESCRIPTION OF THE RELATED ART

[0002] Numerous individuals suffer from a lack of mobility because of age, medical conditions or the like. As a result, such individuals frequently require some type of mechanical aid or device in order to facilitate their ability to move from one location to the next. Known devices which are readily available on the commercial market include "walker" assemblies which typically allow an individual to support oneself in an upright, substantially stable orientation while standing or walking. For the less infirmed, known walker assemblies allow the individual to safely traverse over both interior and exterior support surfaces, such as floors, sidewalks, streets, etc. Also, conventionally structured walkers may or may not include supporting wheel assemblies. When such wheel assemblies are present they may facilitate the mobility of a user. However, the presence of such wheel assemblies, depending on their structural features and also on whether or not there is safety measures associated therewith, may lessen the stability of the walker. This is especially true when all four legs of the walker frame include a wheel, roller or like structure attached to the lower end thereof.

[0003] Yet another category of devices used to facilitate the mobility of individuals that may have more significant physical limitations include mobile chair structures or "wheelchairs". An increased use of the wheelchair has occurred in recent years, due at least in part, to an increasingly aging population. As such, the development of the wheelchair, in various forms, has progressed from the smaller, less bulky wheelchair structures of somewhat lightweight construction to the heavier, larger chair assemblies. In addition, more sophisticated wheelchair designs are motorized and while more expensive, they are still relatively common. Clearly, the larger more complex and/or motorized wheelchair assemblies have distinct advantages in terms of facilitating mobility without requiring significant manual exertion by the user. In addition, control assemblies associated with the steering and operation of the more sophisticated motorized wheelchair structures are capable of allowing the substantially independent use thereof by individuals who are significantly disabled and are almost totally paralyzed.

[0004] Mobile support structures including both walkers and wheelchairs have independently developed to a point where their use is more efficient and reliable. However, there appears to be an absence of a combined structure having multi-use capabilities such that a single mobile support assembly may be utilized as both a walker and a wheelchair by assuming different orientations of the structural components of which such an assembly is comprised. Accordingly, despite the developments and advancements in mobility aiding devices of the type set forth above, there is still a need for an improved mobile support assembly which provides significant support and stability, whether used as a walker and/or a wheelchair. A proposed mobility aid structured to satisfy such need should be capable of being easily and quickly configured into an operative position for use and possibly into a collapsed position for storage.

[0005] Further, a proposed multi-use mobile support assembly should have its various structural components cooperatively configured, disposed and structured such that selective positioning thereof into a plurality of different orientations is easily accomplished. As such, the mobile support assembly may be converted for use as a walker or a wheelchair assembly. In addition, such a proposed multi-use mobile support assembly could also have additional, supplementary features such that when the support assembly is in a walker configuration it is also structured to allow at least temporary support of a user in a seated orientation, wherein the user may require temporary, short term rest periods while not requiring the use of a wheelchair, per se. If developed, such a proposed, multi-use mobile support assembly should comprise a frame, as well as other operative components which are cooperatively structured and relatively operable to allow selective use of the support assembly as either a walker or a wheelchair assembly.

SUMMARY OF THE INVENTION

[0006] In at least one of a plurality of preferred embodiments a foldable walker provides an apparatus for assisting a user with mobility. The foldable walker comprises a frame selectively positionable between an operative orientation and a stored orientation. The frame of the walker assembly is at least partially defined by a front leg assembly, including at least a first front leg, and rear leg assembly, including at least a first rear leg connected to the first front leg. The first rear leg includes an upper member having a first end and a second end and a lower member having a first end and a second end. The first end of the upper member is pivotally connected to the first end of the lower member, and the lower member is preferably pivotal between an extended use position and a folded storage position.

[0007] In addition, yet another preferred embodiment of the present invention comprises the walker assembly including a front wheel assembly connected to the front leg assembly and a rear wheel assembly connected to the rear leg assembly. Additional structural features associated with the front and rear wheel assemblies are their ability to be selectively disposed in a position which reduces at least the longitudinal dimension and overall configuration of the walker assembly when in a stored orientation. More specifically, the various embodiments of a walker assembly of the present invention include the front wheel assembly being removably secured to the front leg assembly. Similarly, the rear wheel assembly can be connected to at least a portion of the rear leg assembly such that it is movable therewith into and out of a folded storage position. Alternatively, the rear wheel assembly may be disconnected from the rear leg assembly. In either structural variation the configuration and at least the longitudinal dimension of the frame of the walker assembly is further reduced in order to facilitate storage and transport of the walker assembly.

[0008] Yet additional structural features include a handle assembly which may be adjustably and/or removably secured to the frame of one or more embodiments of the walker assembly. Moreover, a seat is movably connected to the frame and may be associated with a storage compartment. As such, the seat may be selectively disposed in a position such that it supports the user of the walker assembly. When in such a supporting position, the seat overlies and at least partially covers an access opening of a storage compartment. Other associated structural features may include a backrest disposed and structured to support the back of a user when supported in a seated position on the seat of the walker assembly. The structural features of the seat, storage compartment and backrest are such as to further facilitate the compact reduction in configuration and dimension of the walker assembly when disposed in the aforementioned stored orientation so as to facilitate storage and/or transport of the walker assembly, as desired.

[0009] Yet another preferred embodiment of the present invention comprises a mobile support assembly which is structured to have multi-use capabilities and which is also capable of being selectively disposed between operative and stored orientations, as with the above described embodiments. More specifically, the mobile support assembly of this preferred embodiment is capable of being selectively used as either a walker or a wheelchair dependent on the orientation of the frame and/or one or more components associated with the frame. Moreover, the frame comprises at least one adjustable portion or adjustable frame segment which is partially rotatable or pivotal relative to a remainder of the frame. Therefore, the frame generally and the adjustable portion or adjustable frame segment specifically can be selectively disposed in either a first orientation or a second orientation. The disposition of the frame and/or adjustable frame segment in the first orientation enables the use of the mobile support assembly as a walker, wherein the disposition of the frame and/or adjustable portion or frame segment in the second orientation enables the use of the mobile support assembly as a wheelchair.

[0010] Additional structural and operative features of this preferred embodiment of the mobile support assembly comprise the frame also including two side frame segments which are at least partially configured, structured and disposed to define a portion of a chair assembly. The chair assembly comprises the main support for an individual disposed in a seated orientation, when the mobile support assembly is in the second orientation and is used as a wheelchair. Further, the chair assembly comprises a seat and a back support which are disposed and structured to provide the proper support and at least a certain degree of comfort to a seated individual. The mobility of the support assembly of this preferred embodiment is facilitated by the frame including a front leg assembly and a rear leg assembly each of which is connected to a wheel assembly. The wheel assembly comprises a plurality of wheels equal in number to the number of legs which comprise the front and rear wheel assemblies. Therefore, the wheel assembly movably supports the mobile support assembly, when utilized as either a walker or a wheelchair, over any of a variety of different ground or other support surfaces.

[0011] Yet another preferred embodiment of the present invention comprises a mobile support assembly primarily in the form of a walker assembly which, as with previously described embodiments, includes a frame structured to facilitate stable travel of an individual over a variety of different surfaces. In addition, the frame includes a front leg assembly and a rear leg assembly each preferably including two spaced apart legs. The front and rear leg assemblies are moveably interconnected to one another such that the frame may be selectively disposed into either an operative orientation or a stored orientation. When in the operative orientation, the front and rear leg assemblies are positioned to facilitate stable support and/or travel of an individual on and over a variety of different surfaces.

[0012] When in the stored orientation, the front and rear leg assemblies are folded or otherwise relatively disposed so as to be at least partially aligned or coextensive. Therefore the stored orientation allows the frame to assume at least a reduced transverse dimension. Moreover, the stored orientation may also facilitate the frame assuming a reduced longitudinal dimension by a selected adjustment of the one or more wheel assemblies relative to the leg assemblies to which they are connected. In addition, the stored orientation of the frame may also be at least partially defined by an at least partial detachment of one or more of the wheel assemblies from their corresponding leg assemblies to further accomplish a reduced longitudinal dimension of the frame.

[0013] Yet another preferred embodiment of the present invention is directed to a mobile support assem-

bly which is operative to facilitate the movable support of an individual over any of a variety of different surfaces. When the individual is in a standing, walking orientation this preferred embodiment serves as a "walker" operatively similar to the additional preferred embodiments as set forth herein. In contrast, this preferred embodiment incorporates a chair comprising a seat and a backrest intended to support an individual in a substantially seated orientation, wherein the mobile support assembly may move or remain stationary when an individual is seated.

[0014] Accordingly, the mobile support assembly of this preferred embodiment of the present invention includes a frame assembly structured to be selectively positioned between an operative orientation and a collapsed orientation. As such, the frame assembly includes two side frame assemblies each including support wheels connected thereto and disposed to engage the surface over which the mobile support assembly travels. Moreover, each side frame assembly includes a front wheel assembly and a rear wheel assembly both of which may be removably connected to the corresponding side assembly so as to facilitate the detachment and reduction in size and change in configuration when in the aforementioned collapsed orientation.

[0015] Each of the two side assemblies are moveably and adjustably connected to one another by adjustable linkage. More specifically, the adjustable linkage includes two elongated links pivotally or rotationally interconnected intermediate their opposite ends. Further each of the elongated link members include a first opposite end and a second opposite end, wherein the first and second opposite ends of each elongated link member is movably connected to a different one of the side assemblies. When in the collapsed orientation, the size and configuration of the frame is significantly altered so as to be sufficiently reduced and/or changed to facilitate transport and/or travel thereof. In contrast, in the operative position the frame of the mobile support assembly can be used as a walker and/or to support an individual in a seated orientation as also indicated above.

[0016] Selective disposition between the operative and collapsed orientations is accomplished by interaction of the two movably interconnected, elongated link members which at least partially define an adjustment linkage. Therefore, the operative orientation comprises a substantially maximum lateral spacing of the two side assemblies away from one another due to the two elongated link members being disposed in a laterally extended or expanded orientation between the side assemblies. As such, the first opposite ends and the second opposite ends of the link members are disposed a maximum lateral spacing from one another, as are the side assemblies to which the link members are attached.

[0017] In contrast, the collapsed orientation comprises a substantially adjacent disposition of the two side assemblies into closer relative spacing than the maximum lateral spacing of the side assemblies, when in the operative orientation. The collapsed orientation further comprises the two elongated link members of the adjustable linkage being disposed in a substantially adjacent, longitudinally extended alignment or orientation. Therefore, when in the collapsed orientation the two side assemblies are brought much closer together thereby reducing the transverse dimension of the frame assembly. Further the collapsed orientation may also be defined by a disconnection of the front and/or rear wheel assemblies from one or both of the two side assemblies. Similarly handle members extending outwardly, at selectively variable distances, from each of the two side assemblies, may also be detached to further reduce the overall size and/or configuration of the frame when in the collapsed orientation.

[0018] Additional structural features include the chair comprising the aforementioned seat cooperatively disposed relative to a backrest, so as to concurrently support an individual when seated. Both the seat and the backrest may be formed of a flexible material and are disposed in interconnected relation between each of the side assemblies so as to move therewith between the operative and collapsed orientations. Accordingly, both the seat and the backrest, being flexible, will fold and thereby effectively collapse as the two side assemblies are selectively disposed in the closely spaced, substantially adjacent relation to one another when in the collapsed orientation. In contrast both the seat and the backrest will be outwardly and/or longitudinally extended, such that sufficient tension will be exerted thereon to facilitate their support of corresponding portions of the individual's body.

[0019] Yet additional structural features of this preferred embodiment of the mobile support assembly include a storage container also interconnected between laterally spaced apart side assemblies in a supported orientation. The storage compartment may also be formed of a flexible material such that it collapses into a reduced size and/or configuration upon the two side assemblies being brought into the closer laterally spaced relation, as they are selectively positioned in the aforementioned collapsed orientation.

[0020] These and other objects, features and advantages of the present invention will become clearer when the drawings as well as the detailed description are taken into consideration.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] For a fuller understanding of the nature of the present invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

Figure 1 is a front perspective view of an embodiment, among others, of a foldable walker in an operative position.

Figure 2 is a rear perspective view of the foldable walker as shown in Figure 1.

Figure 3 is a side view of the foldable walker shown

in Figure 1.

Figures 4a and 4b are front and side views of an upper portion of an embodiment of a hinge assembly as used on the foldable walker shown in Figure 1.

Figures 5a and 5b are front and side views of a lower portion of an embodiment of a hinge assembly as used on the foldable walker shown in Figure 1.

Figures 6a-6d are partial, cutaway side views of an embodiment of a hinge assembly, including upper and lower portions as shown in Figures 4a-4b and 5a-5b, respectively, as used with the foldable walker shown in Figure 1.

Figure 7 is a rear perspective view of the foldable walker shown in Figure 1, when partially folded as it is being disposed into a stored orientation.

Figure 8 is a rear perspective view of the foldable walker shown in Figure 1, when fully folded and in the stored orientation.

Figure 9 is a top plan view of a retaining connector used in at least one preferred embodiment of the present invention to retain a wheel assembly in connected relation to a corresponding leg assembly.

Figure 10 is a front view in partial cutaway of corresponding connecting portions of the front and/or rear leg assemblies with the front and/or rear wheel assemblies.

Figure 11 is a side view in partial cutaway of the embodiment of Figure 10.

Figure 12 is a front view in partial cutaway of the embodiments of Figures 10 and 11 in a connected or assembled position.

Figure 13 is a front view in partial cutaway of the embodiment of Figure 12 with the retaining connector, represented in Figure 9, disposed in a retaining position relative to the correspondingly connected leg and wheel assemblies.

Figure 14 is a sectional view along line 14-14 of Figure 13.

Figure 15 is a front perspective view of yet another preferred embodiment of the present invention directed to a multi-use mobile support assembly capable of being used as either a walker or a wheelchair.

Figure 16 is a side perspective view of the embodiment of Figure 1, wherein the mobile support assembly has assumed a first orientation enabling its use as a walker.

Figure 17 is a rear perspective view of the embodiment of Figure 16.

Figure 18 is a detailed view in partial cutaway of portions of a wheel assembly associated with the mobile support assembly and a foot pedal or support which may be associated therewith.

Figure 19 is a detailed view in partial cutaway of one handle of an adjustable handle assembly, the position of which may be selectively varied.

Figure 20 is a perspective view of yet another preferred embodiment of the present invention structured to efficiently assume a compact orientation of significantly reduced size so as to facilitate storage and/or transport.

Figure 21 is a perspective view in detail of an armrest associated with the preferred embodiment of Figure 20 as well as other embodiments described hereinafter.

Figure 22 is a detailed view in partial cutaway of the embodiment of Figure 20, wherein certain structural components thereof are disposed in a collapsed and compact orientation.

Figure 23 is a detailed view in partial cutaway of a connector associated with the collapsible nature of the embodiment of Figure 22.

Figure 24 is a perspective view in detail of one of two side frame segments connected to the handle assembly and an armrest of the embodiment of Figure 20.

Figure 25 is a perspective view of yet another preferred embodiment of the mobile support assembly of the present invention, in the form of a walker and including a frame and associated components, absent the attachment of normally included wheel assemblies.

Figure 26 is a rear perspective view of the embodiment of Figure 25.

Figure 27 is a side view of the embodiment of Figures 25 and 26.

Figure 28 is a perspective view in partial cutaway of portions of both front and rear leg assemblies of the embodiments of Figures 25 through 27 with corresponding wheel assemblies in a position to be mounted thereon.

Figure 29 is a top sectional view of another embodiment of a retaining connector similar to but distinguishable from the embodiment of Figures 13 and 14.

Figure 30 is a front view in partial cutaway of corresponding connecting portions of the front and/or rear leg assemblies with the front and/or rear wheel assemblies of the embodiment of Figures 25 through 28.

Figure 31 is a side view in partial cutaway of the embodiment of Figure 30.

Figure 32 is a front view in partial cutaway of the embodiment of Figures 30 and 31 in a connected or assembled position.

Figure 33 is a side view in partial cutaway of a bracket assembly associated with the front and rear leg assemblies of the embodiment of Figures 25 through 29, when the support assembly is in an operative orientation.

Figure 34 is a top end view of the embodiment of Figure 33 wherein the bracket assembly is in a folded position so as to dispose the support assembly of the embodiment of Figures 25 through 29 in a stored orientation.

Figure 35 is a perspective view of yet another pre-

ferred embodiment of the mobile support assembly of the present invention.

Figure 36 is a perspective view of the embodiment of Figure 35 in exploded form.

Figure 37 is a front view of the mobile support assembly of the present invention as represented in the embodiment of Figures 35 and 36.

Figure 38 is a rear perspective view in partial cutaway representing the mobile support assembly being positioned from the operative orientation of Figure 1 into a collapse orientation.

Figure 39 is a rear perspective view in partial cutaway of the mobile support assembly of the embodiment of Figure 38 in a closer laterally spaced position to at least partially define the collapsed orientation.

[0022] Like reference numerals refer to like parts throughout the several views of the drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0023] Referring now in more detail to the drawings, Figures 1-3 illustrate an embodiment of a foldable walker 100 in an operative orientation. As shown, the foldable walker 100 comprises a frame at least partially defined by a front leg assembly and a rear leg assembly. More specifically, the front leg assembly comprises a first front leg 110a and a second front leg 110b secured to each other by at least a first cross member 128. The first front leg 110a and a second front leg 110b are each pivotally connected to the rear leg assembly, which comprises a first rear leg 120a and a second rear leg 120b, respectively. The first and second rear legs 120a, 120b each include an upper member or portion 122a, 122b, which in at least one preferred embodiment, are hingedly attached to a respective lower member or portion 130a, 130b by hinge assemblies 150a, 150b, respectively, as is discussed in greater detail hereinafter. Preferably, the first upper member 122a and a second upper member 122b are connected by a second cross member 136 which is positioned so as to be the same height above a support surface beneath the foldable walker 100 as the first cross member 128. Additional cross members, such as cross member 129, may (though not necessarily in all embodiments) be provided between the first and second front legs 110a, 110b and the first and second upper members 122a, 122b to provide additional stability to the foldable walker 100. Preferably, the first cross member 128, the second cross member 136, and cross member 129 are welded to brackets 127 which are in turn welded to their respective legs of the foldable walker 100. Of course, other connection structures are also considered to be within the scope of the present invention. Further, the first and second front legs 110a, 110b are preferably connected to the first and second upper members 122a, 122b, respectively, by folding brackets 116a and 116b. The first and second folding brackets 116a, 116b are preferably connected to each other with a tie rod 118 and are configured such that the folding brackets 116a, 116b only collapse when the tie rod 118 is pushed upwardly away from the support surface beneath the foldable walker 100.

[0024] A previously noted, and as best shown in Figure 2, the first and second upper members or portions 122a, 122b are hingably connected to the first and second lower members or portions 130a, 130b by first and second hinge assemblies 150a, 150b, respectively. For purposes of clarity, only the first rear leg 120a will be described, it being understood that the second rear leg 120b has equivalent structural and operative features. As shown, the second end 126a of the first upper member 122a is preferably rotatably connected through a pivot structure, such as a pivot assembly 125a, to the front leg 110a. Similarly, pivot assembly 125b rotatably connects the second end 126b to the second front leg 110b. The upper portion 152a (Figures 4a and 4b) of the first hinge assembly 150a is secured to the first end 124a of the upper member 122a. Similarly, the lower portion 160a (Figures 5a and 5b) is mounted to the first end 132a of the first lower member 130a. By passing an axle 166 through corresponding axle apertures 159a in the upper portion 152a and a corresponding axle channel 166a in the lower portion 160a, the upper and lower portions 152a, 160a are hingably secured to each other. As such, the first lower member 130a is secured to the first member 122a, as shown in Figures 1-3. As shown in Figures 6a-6d, the lower portion 160a includes a biased locking pin 170 that is threadably secured to a low profile button 172 to facilitate operating the first hinge assembly 150a. As well, the locking pin 170 is biased by a spring 174. Operations of the first and second hinge assemblies 150a, 150b and the foldable walker 100 are discussed in greater detail hereinafter.

[0025] Again referring to Figures 1-3, preferred embodiments of the foldable walker 100, when in the operative orientation as shown, may include a seat 142 movably connected to and supported by the first and second cross members 128, 136. As represented, the seat assembly 142 is in a supporting position for allowing a user to be seated thereon. A backrest 144 supported between the first and second front legs 110a, 110b may also be disposed in supporting relation to the back of a seated user and therefore may include a cushion or pad 146 for the comfort of the user. Preferably, the seat assembly 142 is configured to rotate about the first cross member 128 such that the seat 142 can be rotated toward the backrest 144 and be disposed in substantially confronting relation thereto, when the frame of the walker assembly is in the stored orientation of Figures 7 and 8.

[0026] When so disposed, an interior of a storage compartment 148 normally disposed beneath the seat 142 is accessible and exposed. Preferably, the storage compartment 148 is supported by the first and second cross members 128, 136 and is formed of a flexible material secured to the first and second cross members 128, 136

with a plurality of snaps 149 that permit the storage compartment 148 to be removed. In a preferred embodiment the flexibility of the storage compartment 148 is such as to be disposed in an expanded position when the frame is in the operative orientation of Figures 1-3 and in a collapsed position, between the front and rear leg assemblies, when the frame is in the stored position of Figure 8. However, other embodiments are envisioned wherein the storage compartment 148 comprises a wire mesh basket or other like structure.

[0027] As represented through out the accompanying Figures, the walker assembly 100 preferably includes a front wheel assembly comprising wheel structures 188 and a rear wheel assembly comprising wheel structures 180. More specifically, first and second front legs 110a, 110b each include a different one of the front wheel structures 188 disposed at the second end 114a, 114b of each leg. As shown, front wheel structures 188 are preferably caster-mounted such that they are fully rotatable about the first and second front legs 110a, 110b, thereby increasing the maneuverability of the foldable walker assembly 100. The first and second rear legs 120a, 120b are each connected to one of the rear wheel structures 180 which are disposed on the second end 134a, 134b of the first and second lower members or portions 130a, 130b. Preferably, the rear wheel assemblies 180 are not caster-mounted and therefore do not pivot about the first and second rear legs 120a, 120b.

[0028] As shown in Figures 1-3, at least one preferred embodiment of the foldable walker assembly 100 is configured to assist a user to walk while the first and second lower members or portions 130a, 130b are locked in their fully extended use position by virtue of the structural features of hinge assemblies 150a and 150b. For ease of description, only the first hinge assembly 150a is discussed, it being understood that the hinge assembly 150b is the duplicate and/or structural equivalent thereof. During use, first hinge assembly 150a is configured as shown in Figure 6a, as viewed from the front of the walker 100. The core 162 of lower portion 160a is disposed within sleeve 154 of the upper portion 152a. The core 162 is secured in position by a locking pin 170 that extends through both the upper portion 152a and a lower portion 160a. As shown, when the core 162 is properly seated within the sleeve 154, a locking channel 164 that houses the biased locking pin 170 aligns with a locking aperture 156 formed in the sleeve 154. The locking channel 164 also houses a spring 174, which biases the locking pin 170 such that a portion of the locking pin 170 extends outwardly from the locking channel 164 and engages the locking aperture 156.

[0029] When it is desired to transport or store the walker assembly 100, the transverse dimension of the walker assembly 100 may be reduced by folding it into a compact configuration. Moreover, folding of the walker assembly 100 from the operative orientation of Figures 1-3, wherein the front and rear leg assemblies are in a substantially angular orientation relative to one another, into the stored orientation of Figures 7 and 8, may be accomplished by the user first pushing upwardly on one of the folding brackets 116a, 116b or the tie rod 118. As the tie rod 118 moves upwardly the first and second rear legs 120a, 120b rotate toward the first and second front legs 110a, 110b about the pivot points adjacent the second ends 126a, 126b of the first and second upper members 122a, 122b. The first and second rear legs 120a, 120b will rotate inwardly until the frame of the walker assembly is configured in the manner shown in Figures 7 and 8 wherein the front and rear leg assemblies are substantially aligned or at least partially aligned along the length of the frame. The walker is shown in Figures 7 and 8 without the storage compartment 148 in order to more clearly show the folding operation.

[0030] To further reduce the longitudinal dimension of the foldable walker 100, a user can fold the lower portions 130a, 130b of the first and second rear legs 120a, 120b and their associated rear wheel assemblies 180 inwardly toward one another. When in such a folded position, the lower portions 130a and 130b as well as their corresponding wheel assemblies 180 are disposed in substantially overlapping relation to one another, as represented in Figure 8. In order to fold first lower member 130a into storage position, the user first pulls button 172 inwardly toward the center line of the foldable walker 100. In doing so, the user compresses the spring 174 and causes the locking pin 170 to be disengaged from the locking aperture 156 of the upper portion 152a, as shown in Figure 6b. After the locking pin 170 is disengaged from the locking aperture 156 the lower portion 160a is pivotal about the axis 166 (Figure 6c), thereby allowing lower member 130a to be swung or pivoted from a coaxially aligned relation with an upper portion of the rear leg 120a, as represented in Figure 7, into its storage position as set forth above and as also shown in Figure 8. Similar steps are performed on the second hinge assembly 150b so that lower member 130b can be swung into its storage position.

[0031] Once a user releases the button 172, the spring 174 causes the locking pin 170 to be urged outwardly from the core 162 into its fully extended position. To lock the wheels in place for use once again, the user may pivot the first lower member 130a downwardly from its storage position until the locking pin 170 encounters camming surface 158, as shown in Figure 6d. As lower member 130a continues to be rotated into alignment with upper member 122a, the locking pin 170 travels along the camming surface 158, subsequently causing the spring 174 to be compressed and the button 172 to be urged away from the lower portion 160a of the first hinge assembly 150a. Eventually, the locking pin 170 encounters the locking aperture 156 and extends therethrough because of the biasing effect of the spring 174, as shown in Figure 6a. After the lower member 130b has been similarly positioned, the first and second front legs 110a, 110b and the first and second rear legs 120a, 120b are urged outwardly away from each other thereby causing

folding brackets 116a, 116b to become fully extended. With the lower members 130a, 130b so positioned, the foldable walker 100 is configured to assist a user in walking.

[0032] Preferably, the locking pin 170 is configured such that it is not likely to be inadvertently disengaged from the locking aperture 156. For example, as shown in Figures 6a-6d, the button 172 is shaped such that it is of a low profile and is therefore not prone to being snagged or pulled during use. As well, it is preferable that the button 172 is shielded by a portion of the hinge assembly 150. As best shown in Figure 6a, the button 172 is shielded by the portion of the hinge assembly 150a that houses the axle 166. However, the button as shown is merely one embodiment and numerous other shapes are envisioned.

[0033] Yet another preferred embodiment of the present invention is represented in Figures 9 through 14 and may be substituted, at least in part, for the use of the hinge assemblies 150A and 150B as explained above and as represented in detail in the above-described figures. More specifically, in order to compact the configuration and reduce at least the longitudinal dimension of the frame of the walker assembly 100, and possibly the transverse dimension thereof as well, the front and rear wheel assemblies may be removed from the front and rear leg assemblies. For purposes of clarity, the structure represented in Figures 9 through 14 represents a single lower leg portion. However, it is emphasized that in describing this particular structure, each of the front and rear legs, 114A, 114B, 132A, 132B is the duplicate and/or structural equivalent of one another such that the description of one lower leg portion is meant to be descriptive of each of the corresponding leg structures. Further, member 200 defines the outwardly extending shaft to which each of the front and rear wheel structures 188 and 180 are secured.

[0034] Accordingly as clearly shown in Figures 10 through 13, the transverse dimension of the shaft 200 is at least minimally less than the interior transverse dimension of the lower portion 114A, etc, of the front and rear leg assemblies. This relative dimensioning allows for the shaft 200 to be inserted within and removed from the interior of the lower portion 114A, etc, as demonstrated by a comparison of the unassembled and assembled structures respectively represented in Figures 10-11 and 12. Further, the shaft 200 includes spring biased fingers 202 which are retractable, at least partially, into the interior of the shaft 200 as they pass along the interior surface 204 of the lower portion of the leg 114A, etc. However, upon the spring biased fingers 202 being aligned with coaxial apertures 206, the fingers 202 will extend outwardly thereby removably locking or retaining the shaft 200 within the interior of the leg lower portion 114A, etc. Removal of the shaft 200 from the interior of the leg lower portion 114A, etc. is accomplished by inwardly depressing the fingers 202 such that they are removed from the apertures 206 and are allowed to slide along the interior surface 204. However, once the fingers 202 are aligned with and extend outwardly from the apertures 206, apertures 208 and 210, respectively formed in the shaft 200 and the leg lower portion 114A, etc, will be axially aligned. Such axial alignment between the apertures 208 and 210 will facilitate the connection of a retaining connector or bracket 220 in its intended, retaining position as best shown in Figures 13 and 14.

[0035] More specifically, the retaining connector or bracket 220 comprises central connecting or retaining pin 222 spaced inwardly from curved arms 224 and 226. The free ends of the each of the arms 224 and 226 are disposed in spaced relation to one another so as to facilitate passage of lower leg portion 114A, etc. there between and into the interior 228 of the retaining connector structure 220 and between the arms 224 and 226. Further, the retaining connector or bracket 220 preferably includes the arms 224 and 226 being formed from a flexible material and as such may expand outwardly to further facilitate passage of the lower leg portion 114A, etc. into the interior 208 of the retaining connector 220. In the connected position shown in Figures 13 and 14, the retaining pin 222 therefore passes through axially aligned apertures 208 and 210. Also, the retaining pin 222 is preferably of sufficient length to pass outwardly from the outermost aperture 210' as shown in Figures 13 and 14.

[0036] Additional structural features include an axially adjustable and removable handle assembly, comprising a first and second handlebar 140a, 140b adjustably connected to the first end 112a, 112b of each front leg 110a, 110b, respectively. Preferably, the first and second handlebars 140a, 140b are secured to the walker assembly 100 with easily manipulated threaded knobs 143, as are other parts of the walker 100. The first and second handlebars 140a, 140b are connected to the first and second front legs 110a, 110b such that they can be axially adjusted based upon the height of the user. Also, each handlebar 140a, 140b includes a lever 184, which is used to activate a brake 182 that is adjacent the rear wheel assemblies 180. By urging the lever 184 upwardly toward the respective handlebar 140a, 140b, a cable 186 is pulled which in turn causes the brake 182 to engage the rear wheel assembly 180, thereby preventing the foldable walker 100 from rolling. Further, the levers 184 may be manipulated such that the brakes 182 are activated although the user is no longer exerting force on the lever 184.

[0037] With primary reference to Figures 15 through 24, the present invention comprises yet another most preferred embodiment including a mobile support assembly generally indicated as 300. Moreover, the mobile support assembly 300 demonstrates a significant degree of versatility by its selective use as either a walker or a wheelchair, dependent upon the disposition of at least one adjustable portion or adjustable frame segment 370 of the frame generally indicated as 302, as will be described in greater detail hereinafter. For purposes of clarity, Figure 15 represents the orientation of the adjustable

frame segment 370, as well as other structural and operative components of the mobile support assembly 300, so as to facilitate its use as a wheelchair. In contrast, Figures 16 and 17 represent the orientation of the frame 302, specifically including the adjustable portion or adjustable frame segment 370, as well as other structural and operative components of the mobile support assembly 300 facilitates its use as a walker.

[0038] More specific details include the frame 302 comprising two spaced apart side frame segments 304 and 306 each of which include a substantially oblong or "eye" shaped configuration. This configuration of each of the side frame segments is at least partially defined by an upper side frame segment 308 and a lower side frame segment 310 having an outwardly bowed or curvilinear configuration. As will also be explained in greater detail hereinafter, side frame segments 304 and 306 and more specifically the upper and lower side frame segments 308 and 310 may include connecting structures 312, 313, 315 and 319, which facilitate the disposition or arrangement of the mobile support assembly 300, specifically including portions the frame 302 into a compact, reduced size stored orientation for storage, transport, etc, at least partially similar to the one or more embodiments of Figures 1 through 14. The stored orientation will be described in greater detail hereinafter with primary reference to the mobile support assembly 300 as represented in Figures 20 through 24.

[0039] The mobile support assembly 300 further includes a handle assembly generally indicated as 314 including two handles 316 disposed in spaced relation to one another such that an open spacing 318 may be formed there between so as to facilitate placement of an individual in a proper orientation to propel the mobile support assembly 300 when used as either a wheelchair as demonstrated in Figure 15 or a walker as demonstrated in Figures 16 and 17. As will be more specifically explained and described hereinafter, the spacing 318 is rendered more accessible when the frame 302, or at least one or more structural components thereof is selectively disposed to facilitate use of the mobile support assembly 300 as the walker.

[0040] Other features of the handle assembly 314 include each of preferably two handles 316 having a handlebar 317 preferably structured in the form of handgrips. In addition and with reference to the embodiment of Figures 1 through 3, the handle assembly 314 may include levers 184 used to activate a one or more brake structures 182 that are operative to exert a braking force on the rear wheel assembly 320. Moreover, the brake structures 182 may be disposed in operative relation to the rear wheels 330 of the embodiment of Figures 15 through 17. While this hand activated or operated brake assembly is not represented in the embodiments of Figures 15 through 20, it may be readily adapted for connection to or mounting on the mobile support assembly 300 so as to facilitate hand actuation of the braking assembly 182, as described with specific reference to the embodiment of Figures 1 through 3. As such, manipulation of the levers 184 upwardly towards the respective handlebars 317 serves to pull a mechanical connecting cable 186 which in turn causes the brake 182 to engage the rear wheel 330 of the rear wheel assembly 329, thereby restricting movement of the mobile support assembly 300. When the hand activated brake assembly or brakes 182 are not utilized on the preferred embodiment of Figures 15 through 20, a foot activated brake assembly may be utilized, wherein a foot activated lever 332 is associated with brake structures mounted on or connected to each of the rear wheels 330.

[0041] As also clearly depicted in Figures 15 though 17 and 20, the mobile support assembly 300 also includes a front wheel assembly 334 comprising front wheels 336 connected to the front legs, which are at least partially defined by a lower end portion of the upper side frame segments 308. For purposes of clarity the frame 302 may also be described as including a trailing portion and a leading portion, wherein the terms "trailing" and "leading" are described with reference to the normal or conventional, forward direction of travel of the mobile support assembly 300, whether used as a walker or a wheelchair. More specifically, the leading portion of the frame 302 is generally and at least partially defined by the location of the front wheel assembly 334, including the front wheels 336. In contrast the trailing portion of the frame 302 is generally and at least partially defined by the location of the handle assembly 314, the rear wheel assembly 329 and/or the rear legs 333.

[0042] In order to facilitate the maneuverability of the mobile support assembly 300, each of the front wheels 336 are rotatably connected to the frame 302 and more specifically interconnected to the outer or lower ends of the upper side frame segments 308 by means of a castor like structure shown in detail in Figures 18. More specifically, a castor base or housing 340 connected to the axis of rotation of each of the wheels 336 allows the wheels to swivel appropriately to assume a desired angular orientation for forward, rearward or other directional traveling of the mobile support assembly 300 as desired. As set forth above, the propelling force applied to the handle assembly 314 may either be a pushing force, a pulling force or a combination of both in order to accomplish desired and selected directional traveling.

[0043] With further reference to Figure 18, at least one preferred embodiment and/or structural modification of the mobile support assembly 300 comprises a foot pedal or like foot support assembly, generally indicated as 342. The foot support assembly 342 includes a pedal portion 344 and a support arm 346. The support arm 346 is rotatably or pivotally connected to the lower end of the upper side frame as at 308 by means of a rotatable connecting assembly or pivotal hinge generally indicated as 348. As such, the leg or foot support assembly 342 may be pivoted into or out of either the operative position represented in Figure 18 or the folded, collapsed position, at least partially defining a stored orientation of the mobile

support assembly as represented in Figure 15. As set forth above, the stored orientation of the mobile support assembly 300 will be described in greater detail hereinafter.

[0044] As set forth above, the versatility of the mobile support assembly 300 is facilitated by its selective use as either a walker, as represented in Figures 16 and 17, or as a wheelchair, as represented in Figure 15. Accordingly, and with primary reference to Figure 15, the mobile support assembly 300 includes a chair assembly generally indicated as 350 comprising a seat 352 and a back support 354. The seat 352 is supported by at least a portion of the frame 302 and more specifically by an upper or inner end or portion 333' of the rear leg structure 333 as well as other cooperatively disposed portions of the frame 302, such as one or more cross braces or members 335. The seat 352 is connected to the frame 302 in the manner described so as to be securely supported on the frame 302 until or unless the chair assembly 350 is disassembled or separated from the frame 302.

[0045] In contrast, the back support 354 is movably or pivotally attached preferably about a lower junction or connection area 360 located on each of the lower corners of the back support 354 generally adjacent the junction of the seat 352 and the back support 354. Moreover, back support 354 may be positioned in the orientation demonstrated in Figures 16 and 17 when the adjustable portion or adjustable frame segment 370 is disposed in a first orientation as also demonstrated in Figures 16 and 17. As such, the first orientation of the adjustable frame segment 370 facilitates or enables the use of the mobile support assembly 300 as a walker as demonstrated. In contrast, the adjustable frame segment 370 may be disposed in a second orientation represented in Figure 15 wherein the adjustable frame segment 370 is disposed in substantial alignment with the handle assembly 314 and within the spacing 318 between the individual spaced apart handles 316.

[0046] The mobile support assembly of the present invention includes an additional structure which facilitates the secure but removable disposition of the adjustment frame segment 370 in each of the first and second orientations. More specifically and with primary reference to Figures 16, 21 and 24, each of the armrest structures 380 includes an outer end generally indicated as 390 having an indented area 392 which serves to form an outwardly and/or laterally projecting lip or like structure, as at 394. As best shown in Figure 16, each of the inwardly projecting ends 390 of the oppositely disposed, spaced apart armrests 380 are disposed in interruptive relation to the opposite sides of the adjustable frame segment 370. Accordingly, when the frame segment 370 is in the aforementioned first orientation, the sides will abut against and be retained by the projecting lips 394 of the inwardly extending or projecting ends 390 of each of the armrests 380. With further reference to Figure 16, the adjustable frame segment 370 is maintained in the second orientation, as demonstrated in Figure 20, by the provision of outwardly extending hook-like brackets or like structures 396. Each of the brackets 396 is attached to one of the two spaced apart side members of the adjustable frame segment 370. Further, each of the brackets 396 is disposed to engage the lower side frame segment 310 about an upper end thereof as at 310'. Accordingly, when the adjustable frame segment 370 is in the second orientation the outwardly extending brackets 396 each engage a correspondingly positioned one of the upper ends 310' of the lower side frame segments 310 so as to retain the adjustable frame segment 370 in substantially aligned relation with and between the handles 316.

[0047] It is also emphasized that the configuration, dimension and placement of the armrest 380 determines the position and/or angular inclination of the adjustable frame segment 370 when in the aforementioned first orientation, such as when the mobile support assembly 300 is being used as a walker. It is further emphasized that hook like brackets 396 may assume a variety of different structural configurations such as a U-shaped structure having a certain inherent flexibility or bias, so as to effectively clip onto or otherwise be removably connected to the upper ends 310' of the lower side frame segments 310, as described above.

[0048] Therefore, the first orientation of the adjustable frame segment 370 is defined by its inward, substantially angular orientation towards the leading portion of the frame 302 and away from the trailing portion thereof and handle assembly 314. The first orientation of the adjustable frame segment 370 is further defined by its substantially overlying, spaced relation above the seat 352 and the back support 354, when the back support 354 is disposed in confronting engagement with the seat 352, as clearly represented in Figures 16 and 17. Accordingly, when the mobile support assembly 300 is intended for use as a walker, the adjustable frame segment 370, being in its first orientation, allows access through the spacing 318 to the exterior surface of the back support 354. As such, the back support 354 may be used as a temporary seat or like support area, on which an individual may rest while assuming a seated position. Concurrently, a cushion or pad 372 may be mounted on the upper end of the adjustable portion or frame segment 370 to serve as a backrest for an individual while that individual is supported in a seated orientation on the back support 354.

[0049] With primary reference to Figure 15, when the adjustable frame segment 370 is in the second orientation it is disposed upright substantially within the spacing 318 in aligned relation with the handle assembly 314 and the spaced apart handles 316. Similarly, the back support 354 is disposed in an upright orientation as represented and may be at least partially supported on or by the adjustable frame segment 370 when it is in the second orientation. As such, the chair assembly 350 is readily accessible thereby enabling and facilitating the use of the mobile support assembly as a wheelchair, as described.

[0050] Other structural and operative features which

are at least partially similar to the embodiments of Figures 1 through 14 include the vertical adjustment or removal of the handle assembly 314 by facilitating the vertical adjustment of each of the handles 316. As such, the elongated portions of the handles 316 may include a plurality of apertures as at 319, each of which may receive a spring biased lock member 321 disposed on the interior of the elongated portion 316' of the handle 316, or within the upper end 310' of the lower side frame segment 310 so as to facilitate the vertical adjustment of the grips or handlebar portions 317. A structural modification of the handle assembly 314 and an associated portion of the frame are represented in Figure 24. As disclosed each of the handles 316 may be connected in an immediate adjacent relation to the upper end 310' of the lower side frame segment 310, rather than being connected in axial alignment therewith, as represented in Figures 16, 19 and 20. In either structural variation, the handles 316 may be vertically or longitudinally adjusted along their respective lengths so as to adapt to different individuals, which are positioned to propel the mobile support assembly 300 in any preferred direction. Figures 16 and 17 further demonstrate the adjustable features of the handle assembly 314 wherein each of the handles 316 is located at a different height. Disengagement of the biased lock member 321 from any of the apertures 319 allows the complete removal of the handles 316 from the frame.

[0051] As set forth above, the present invention demonstrates significant versatility by virtue of its multi-use construction as well as the structuring of the various components thereof so as to facilitate the mobile support assembly 300 being easily and quickly disposed into the stored orientation. As such, various components, to be described in greater detail hereinafter, may be selectively disposed from their normal, operative orientation, whether the mobile support assembly 300 is used as a walker or a wheelchair, or into a compact position so as to at least partially define the stored orientation.

[0052] By way of example, the rear legs 333 and the rear wheels 330 associated therewith are adjustably interconnected to the remainder of the frame 302 and more specifically to the frame segments 333' used to at least partially support the seat 352. This adjustable and movable interconnection is accomplished through the provision of hinge like connector structures 319 which allow the rear legs 333 to be folded inwardly, substantially under the seat 352 or a portion of the frame 302 associated with the seat 352.

[0053] Selective positioning of various portions or components of the frame 302 in the aforementioned stored orientation is further demonstrated in Figures 22 through 24. As shown therein, the stored orientation may also be partially defined by the back support 354, the adjustable frame segment 70, the handles 316, arm rests 380 and upper ends 308' and 310' of the upper and lower side frame segment 308 and 310 respectively, being disposed in predetermined relation to one another, as described in greater detail hereinafter. More specifically and with reference to Figure 24, fixedly interconnected portions of frame 302 include the arm rest 380 connected to and supported by the upper end 308' of the upper side frame segment as well as the upper end 310' of the lower side frame segment and the correspondingly positioned handle 316. This collection of components represents a "sub-unit" of the frame 302 which may be collectively positioned between an operative orientation as demonstrated in Figure 20 and a collapsed position as demonstrated in Figure 22, wherein portions of the frame 302 assume the aforementioned stored orientation.

[0054] In order to accomplish the compact position of the sub-unit demonstrated in Figure 24, a plurality of connectors 313 and 315 are disposed and structured to movably or adjustably connect the sub-unit of Figure 24 to the remainder of the frame 302. More specifically, as represented in Figure 23, the connector 312 is separable and comprises removably attached portions 313' and 313". A secure but removable connection or attachment of the connector segments 313' and 313" may be accomplished utilizing a retaining connector or bracket 220 as disclosed and described in detail with reference to the embodiment of Figures 9 and 14. As such, a central member or shaft 222 associated with the separate retaining connectors 220 passes through apertures 312 formed in the connector segment 313' and extends into the interior of segment 313". The curved arms 224 and 226 of separate ones of the retaining connectors 220 will thereafter surround the segments 313' and 313" when in the connected or assembled position as demonstrated in Figure 23. The removal of the retaining connector 220 will allow the segments 313' and 313" to be separated, wherein segment 313" is fixedly or integrally connected to the lower extremity of the upper end 308' of the upper side frame segment as disclosed in Figure 22. In addition, a hinge type connector 315 is structured such that the upper end 310' of the lower side frame segment 310 is pivotal inwardly in overlying relation to the seat 352 as well as the back support 354 and adjustable frame segment 370 when the back support 354 and the frame segment 370 are disposed in overlying and/or confronting relation to the seat 352 as clearly disclosed in Figure 22.

[0055] It is recognized that Figure 22 discloses only one of the sub-units represented in Figure 24 as being disposed in the compact position. However, Figure 22 is intended to be representative of the structural and operative features of both of the oppositely disposed sub-units represented in Figure 24, located on opposite sides of the mobile support assembly 300. As such, both of the Figure 24 sub-units are pivotal or foldable inwardly into a compact position, so as to at least partially define the aforementioned stored orientation.

[0056] It is also recognized that the adjustable frame segment 370 is normally or typically retained in its first orientation, as represented in Figure 16, by the inwardly projecting lip 394 of the end 390 of each of the arm rests 380. However, in order for the adjustable frame segment 370 to assume the position demonstrated in Figure 22

the arm rest 380 may be forced at least a minimal distance outwardly such that side portions 370' of the adjustable frame segment 370 may pass beyond the inwardly projecting ends 390 of each of the arm rests 380 to assume the folded or collapsed position demonstrated in Figure 22.

[0057] The selective and efficient disposition of certain components or portions of the frame 302 in a collapsed position so as to define the stored orientation of significantly reduced dimension thereby greatly facilitates the storage or transport of the mobile support assembly 300. In addition, the overall configuration and dimension of the mobile support assembly 300 is sufficiently reduced so as to allow its placement in a small storage or travel carton or container of a size which renders the storage or transport of the mobile support assembly 300, when in the stored orientation, effective and efficient.

[0058] Yet another most preferred embodiment of the present invention comprises a mobile support assembly generally indicated as 400, being primarily in the form of a walker assembly. The mobile support assembly 400 comprises a frame generally indicated as 402 which is structured to include a seat 142 as well as a depending compartment 148 located beneath the seat 142 as clearly disclosed in the additional preferred embodiments of Figures 1-3. For purposes of clearly and accurately describing the various components of the frame 402, the seat 142 and the compartment 148 are not shown in Figures 25 through 27. However, it is emphasized that the overall frame structure, as will be apparent hereinafter, is clearly adapted for receipt of the seat 142, compartment 148 and backrest portion 146. More specifically, the seat 142 is designed to be connected to and partially supported on the cross bars 404 by appropriate connecting strips as demonstrated in Figures 1-3 or by other appropriate connecting structure. As such, the compartment 148 will be located beneath the seat 142 and between the cross-bars 404 in somewhat of a dependent relation to the seat 142.

[0059] Further, the frame 402 includes the back support member 406 on which the back supporting pad 146 is mounted. The frame also includes a front wheel assembly, generally indicated as 408 and a rear wheel assembly, generally indicated as 410. As with the embodiments of Figures 1-3, the front leg assembly 408 includes two spaced apart legs 409 which vary in dimension and/or configuration relative to the embodiment of Figures 1-3.

[0060] More specifically, each of the legs 409 includes an elongated upper or primary portion 409' and a fixedly or integrally connected lower portion 412. As is clearly represented in Figures 25 through 27, the upper portion 409' is angularly oriented relative to the lower portions 412. Further, the lower portion 412 is disposed in a substantially upright or at least partially vertical orientation when the frame 402 is disposed in an upright, operative orientation as represented in the accompanying figures. In contrast, the two spaced apart legs 411 at least partially define the rear leg assembly 410. The rear legs 411 differ in dimension and configuration from the front legs 409 in that they have substantially linear, elongated configuration with a greater longitudinal dimension then the overall length of the front legs 409. Accordingly, each of the rear legs 411 includes a lower portion 413 disposed in coaxial alignment with the primary or upper portion thereof.

[0061] As set forth above, frame 402, as represented in Figures 25 through 27, is absent the inclusion of front and rear wheel assemblies 420 and 420' respectively. With specific reference to Figure 28 and as similarly represented in the embodiments of Figures 1-3, each of the legs 409 and 411 include front wheel assemblies 420 and rear wheel assemblies respectively connected to corresponding lower portions 412 and 413. Each of the wheel assemblies 420' has an elongated connecting shaft 200' and appropriately sized wheel structure 422. Moreover, each of the front legs 409 of the front leg assembly 408 includes a wheel assembly 420 secured to the lower portions 412 thereof. Similarly, each of the rear legs 411 includes individual wheel assemblies 420' connected to the lower portion 413 thereof. Accordingly, the support assembly 400 can be said to have a front wheel assembly defined by two of the wheel assemblies 420 and a rear wheel assembly defined by an additional two wheel assemblies 420' connected to the lower portions 412 and 413 of the respective front and rear legs 409 and 411.

[0062] One feature of the walker of the mobile support assembly 400 is the ability to efficiently adjust the height of the frame 402 relative to any supporting surface on which the frame 402 is positioned as demonstrated in Figures 25-27. Accordingly, the varying of the height of the frame 402 relative to any supporting surface facilitates its use by individuals of varying heights and sizes, whether the user/individual is standing relative to the support assembly 400 or sitting on the seat 142. Such variable height adjustment of the frame 402 is accomplished by virtue of the fact that the front wheel assemblies 420 and the rear wheel assemblies 420' and each of the wheel structures 422 associated therewith are adjustably and removably connected to the respective lower portions 412 and 413 of the front and rear legs 409 and 411.

[0063] For purposes of clarity the structures represented in Figures 30 through 32 are intended to depict a single one of the lower leg portions 412 and 413. However, it is emphasized that in describing this particular structure, each of the front and rear legs 409 and 411 is the duplicate or structural equivalent of the other, at least in terms of establishing an adjustable interconnection with corresponding ones of the wheel structures 422 and associated shaft 200'. Accordingly, the description of one lower leg portion 412 or 413 is meant to be descriptive of each of the corresponding leg structures.

[0064] Accordingly, the transverse dimension of each of the shafts 200' is at least minimally less than the interior transverse dimension of the lower portions 412 and 413 of the front and rear legs 409 and 411. This relative dimensioning allows the shafts 200' to be inserted within

and removed from the interior of the lower portions 412 and 413 as demonstrated by a comparison of the unassembled and assembled structures respectively represented in Figures 30 through 32. Further, the shaft 200' includes spring biased fingers 202' which are retractable, at least partially, into the interior of shaft 200' as they pass along the interior surface 204' of the lower portions 412 and 413 of the front and rear legs. However, upon the spring biased fingers 202' being aligned with coaxial apertures 206', the fingers 202' will extend outwardly thereby removably locking or retaining the shaft 200' within the interior of the lower portions 412 and 413. Removal of the shaft 200' from the interior of the lower portions 412 and 413 is accomplished by inwardly depressing the fingers 202' such that they are removed from the apertures 206' and are allowed to slide along the interior surface 204'. Once the fingers 202' are aligned with and extend outwardly from the apertures 206', apertures 208' and 210' respectively formed in the shaft 200' and the lower portions 412 and 413, will be axially aligned. Such axial alignment between the apertures 208' and 210' will facilitate the connection of a retaining connector or bracket 220' as represented in Figure 29, in its intended, retaining position.

[0065] By virtue of this adjustable and variable connection as demonstrated in Figures 30 through 32, the height of the frame 402, such as when it is in its operative position as demonstrated in Figures 25 through 27, can be easily varied or adjusted to accommodate users of various sizes and heights merely by placing the fingers 202' in different ones or pairs of the apertures 206'. To facilitate an adjustment of the frame 402 at different heights, the lower portions 412 and 413, or other portions of the legs 409 and 411 include a plurality of such pairs of apertures 206'. Accordingly, the corresponding wheel assemblies 420 and 420' can extend outwardly from and along the length of each of corresponding ones of the legs 409 of the front leg assembly 408 and corresponding ones of the legs 411 of the rear leg assembly 410. Such variable outward extension is schematically represented by directional arrows 430 in Figure 28.

[0066] With primary reference to Figure 29, a retaining connector or bracket 220' is disposed and structured to reliably but removably retain the intended connection between the wheel assemblies 420 and 420' and the corresponding legs 409 and 411 of the front and rear leg assemblies 408 and 410. Accordingly, the retaining connector 220' comprises a central connecting pin 222' spaced on the interior of curved arms 224' and 226'. This embodiment is structurally distinguishable but functionally similar from the retaining connector or bracket 220 represented in Figure 9. As such, either embodiment of the connecting bracket can be used with one or more of the different preferred embodiments of the present invention, as set forth herein.

[0067] More specifically, the curved arms 224' and 226' have a sufficient longitudinal dimension so as to surround a portion of the front or rear legs, as at 412, 413 thereby further facilitating the placement of the connecting pins 222' in their intended retaining position as they extend through aligned apertures 210', formed in the leg portions 412, 413, and 208', formed in the shaft 200', when the shaft 200' and leg portions 412, 413 are assembled as represented in Figures 29 and 32. In addition, the free ends of each of the curved arms 224' and 226' include a connector or latch configuration 415, which enables the free ends to be removably connected to one another. The provision of the latch configuration 415 at the free ends further serves to maintain the retaining connector or bracket 220' in its intended operative position. Moreover, when in its operative position of Figure 29, the retaining pin 222' serves to prevent inadvertent removal or relative positioning of the shaft 200' from its intended, retained placement within the corresponding leg portion 412, 413, as set forth above.

[0068] Yet another feature of the present invention is demonstrated in Figures 33 and 34. More specifically, the mobile support assembly 400 and the frame 402 include a bracket assembly generally indicated as 450. The bracket assembly 450 is movably interconnected between the front leg assembly 408 and the rear leg assembly 410. In a most preferred embodiment and as represented in Figures 25-27, two such bracket assemblies 450 are provided. However, it is within the spirit of scope of the present invention that the mobile support assembly 400, being primarily in the form of a collapsible walker assembly, may include only a single one of the bracket assemblies 450.

[0069] When the frame 402 is in its operative position, the bracket assembly 450 assumes a substantially elongated, linear configuration including bracket segments 454 and 456 disposed in substantially linearly aligned relation to one another. Further, each of the bracket segments 454 and 456 have their opposite or outer, distal ends pivotally or otherwise movably connected to the corresponding legs 409 and 411 of the front and rear leg assemblies 408 and 410 respectively. The opposite or correspondingly positioned inner, proximal ends of each of the bracket segments 454 and 456 are pivotally or otherwise movably connected to one another by a pivot or linking pin 459.

[0070] Moreover, when the frame 402 is disposed from the operative position, represented in Figures 25-27 and 33, into a stored orientation, the bracket segments 454 and 456 will assume a folded position. The folded position of the bracket assembly 450 is more specifically described by their upward movement, as schematically indicated by the directional arrow 460. Therefore, when in the fully collapsed, stored orientation, the front and rear leg assemblies 408 and 410 are disposed in a somewhat aligned or at least coextending position as clearly demonstrated in embodiments of Figures 7 and 8. In such a stored orientation, the bracket segments 454 and 456 will also be somewhat aligned and disposed in coextending relation to one another as represented in Figure 34. In order to maintain the bracket assembly 450 and more

specifically the bracket segments 454 and 456 in the folded position, and thereby maintain the frame 402 in its stored orientation, a lock assembly generally indicated as 452 is provided.

[0071] The lock assembly 452 comprises a female member or portion 462 including a flange having an aperture 462' connected to and movable with one of the bracket segments, such as at 454. The lock assembly 452 further includes a male portion or member 464 including a finger or pin 464' connected to and movable with the other of the two bracket segments, as at 456. When the bracket assembly 450 is in the linearly aligned operative position represented in Figure 33 the female portion 462 and the male portion 464 are disposed in spaced relation to one another. However, when the bracket assembly 450 is reconfigured to allow the frame 402 to assume its stored orientation, the bracket segments 454 and 456 will be disposed in at least a partially coextending position as indicated in Figure 34. In such position, the female portion 462 will become substantially aligned with the male portion 464 to the extent that they may be brought into movable, retaining engagement with one another.

[0072] More specifically, the female portion 462 comprises the apertured flange and the male portion 464 comprises a spring biased, retractable finger 464'. When the aperture 462' is disposed in aligned relation with the connecting or retaining finger 464', manipulation of the male portion 464 in a reciprocal or retractable manner, as schematically indicated by directional arrow 465, will serve to dispose the retaining finger 464' through the aperture 462'. The female and male portions 462 and 464 will thereby be removably connected together facilitating maintenance of the bracket segments 454 and 456 in the folded position. When so retained, the front and rear leg portions 408 and 410 will be "locked" in the stored orientation. In order to reorient the frame 402 and more specifically the front and rear leg portions 408 and 410 in its operative position as demonstrated in Figure 33, a manual manipulation of the spring biased, male portion 464 can be accomplished at least to the extent of removing the retaining finger 464' from the aperture 462' thereby releasing the bracket segments 454 and 456 from one another and allowing them to assume an operative, linear configuration.

[0073] Many variations and modifications may be made to the above-described embodiments of the foldable walkers 100 and 400 and the multi-use mobile support assembly 300, without departing from the spirit, principles and intended scope of theses embodiments. Since many modifications, variations and changes in detail can be made to the described preferred embodiment of the invention, it is intended that all matters in the foregoing description and shown in the accompanying drawings be interpreted as illustrative and not in a limiting sense. Thus, the scope of the invention should be determined by the appended claims and their legal equivalents.

[0074] With primary reference to Figures 35 through 39, yet another preferred embodiment of the mobile support assembly of the present invention is generally indicated as 500. As such, the mobile support assembly 500 includes a frame assembly generally indicated as 502 including two laterally spaced and moveably interconnected side assemblies 504 and 506. Each of the side assemblies may have elongated frame segment 508 extending at least a majority of the length of the respective side assemblies 504 and 506. A lower or supporting end of each of the frame segments 508 includes a bifurcated structure or configuration as at 510 to which support wheels are connected.

[0075] More specifically, the support wheels include a front wheel assembly generally indicated as 512 and a rear wheel assembly generally indicated as 514. Each of the front and rear wheel assemblies 512 and 514 are removably connected to corresponding lower bifurcated portions 510' and 510" of the frame segment 508, of each side assembly 504 and 506. Removable connection, as clearly represented in Figure 36, is accomplished by a connecting bracket or like member 220 as described in greater detail with reference to Figures 13 and 14 herein. Preferred features of the front wheel assembly 512 is the structuring thereof in the form of castors, wherein a connecting stem 513 serves to movably, rotatably and/or pivotally connect each of the castor wheels 514' to a mounting hub 516. The use of castors on the front, forward or leading portion of the mobile support assembly 500 facilitates its steering and maneuverability, whether an individual is utilizing the mobile support assembly 500 in a standing orientation, as a walker, or in a seated orientation, as a mobile chair.

[0076] In order to properly steer and/or maneuver the mobile support assembly 500 especially, but not exclusively, when an individual is in a standing orientation, the frame assembly 502 includes a pair of handle structures 520. Each of the handle structures 520 is adjustably and possibly removably connected to the correspondingly disposed frame segments 508. Accordingly, a user of the mobile support assembly 500 can raise or lower each of the handles 520 independently of one another. This facilitates the outward extension of each handle assembly 520 a sufficient distance from a remainder of the frame assembly 502 to accommodate the height, size, etc. of an individual, especially when in a walking orientation. Further, each of the handle structures 520 may include grips 520' and braking controls 520" which may be manipulated by the corresponding hand of an individual to facilitate a braking of the mobile support assembly 500, when in motion. Further, the height or outward distance of the handle structures 520 from the remainder of the frame assembly 502 may be selectively varied by the inclusion of an elongated stem or like member 522 including a plurality of openings or notches 522'. The notches or openings 522' are disposed and structured to interact with a spring like connector and/or adjustment knob of handle 524, mounted on each frame segment 508 associated with each of the side assemblies 504 and

506.

[0077] The laterally adjustable and/or selectively positionable side assemblies 504 and 506 are movably interconnected to one another by an adjustment linkage generally indicated as 540. More specifically, the adjustment linkage 540 includes two elongated link members 542 and 544 each including a first opposite end 546 and a second opposite end 548. As represented throughout the Figures, each of the first and second opposite ends 546 and 548 associated with each of the elongated link members 542 and 544 are directly or indirectly movably connected to a different one of the side assemblies 504 and 506. More specifically, the first opposite end 546 of each of the links 542 and 544 is directly connected to a corresponding one of the side assemblies 504 and 506 by a substantially pivotal connection 549. In contrast, the second opposite end 548 of each of the link members 542 and 544 is movably or pivotally interconnected to corresponding ones of the side assemblies 504 and 506 by a different, correspondingly positioned attachment link 550. Further, the extremities of each of the second opposite ends 548 are connected in direct supporting relation to side mounts or like portions 551 of a seat 554 associated with chair assembly generally indicated as 552 of the frame 502. As also represented, when in the operative orientation, the second ends 548 of each of the link members 542 and 544 are brought into confronting relation, while possibly not actually engaging, the corresponding side assemblies 504 and 506, as they force the seat ends 551 outwardly, away from one another.

[0078] With primary reference to Figure 35, the mobile support assembly 500 and the frame assembly 502 are shown in an operative position. In contrast Figures 38 and 39 represent the mobile support assembly 500 and the frame assembly 502 in an at least partially collapsed orientation. Accordingly, the collapsed orientation is at least partially defined by the elongated link members 542 and 544 being disposed in a substantially adjacent longitudinal alignment or orientation relative to one another. The collapsed orientation of the frame assembly 502 may also be described as the first opposite ends 546 of each of the side assemblies 504 and 506 being disposed in a spacing or distance from one another than when the frame assembly 502 is in the operative orientation. Similarly, in the collapsed orientation of the frame assembly 502, the second opposite ends 548 of each of the side assemblies 504 and 506 are disposed in a closer spacing or distance from one another than when the frame assembly 502 is in the operative orientation. In contrast, the operative orientation of Figures 35 and 37 show the elongated link members 542 and 544 in a laterally extended or expanded orientation. As such, when in the operative orientation the two side assemblies 504 and 506 are disposed in a maximum lateral spaced apart relation to one another. In contrast, in the collapsed or at least partially collapsed orientation the side assemblies 504 and 506 are disposed in a substantially adjacent but significantly closer spaced relation to one another than are the side assemblies 504 and 506 when in the maximum lateral spaced relation of the operative orientation of Figures 1 and 3.

[0079] As used herein, the term(s) "maximum lateral spaced" relation is meant to describe the farthest distance that the link members 542 and 544 can be laterally extended in separating the side assemblies 504 and 506 from one another, when in the frame assembly 502 is in operative orientation. The "maximum lateral spaced" relation of the operative orientation of the frame assembly 502 may also be described as the first opposite ends 546 of each of the side assemblies 504 and 506 being disposed at a greater distance or "maximum" distance from one another than when the frame assembly 502 is in the collapsed orientation. Similarly, maximum lateral spaced" relation of the operative orientation of the frame assembly 502 may also be described as the second opposite ends 548 of each of the side assemblies 504 and 506 also being disposed at a greater distance or "maximum" distance from one another than when the frame assembly 502 is in the collapsed orientation. As such, the first opposite ends 546 and the second opposite ends 548 of the link members 542 and 544 are disposed a maximum lateral spacing from one another, as are the side assemblies 504 and 506 to which the link members 542 and 544 are adjustably attached.

[0080] With reference to Figure 36 and as described above, each of the front and rear wheel assemblies 512 and 514 are removably connected to the frame 502. As such, the aforementioned collapsed orientation may also be at least partially defined by the side assemblies 504 and 506 being disposed in a closer, substantially or at least partially adjacent, laterally spaced relation to one another and the wheel assemblies 512 and 514 and possibly as well as the handle assembly 520 being disconnected from the remainder of the frame 502.

[0081] With regard to the chair assembly 552, the seat 554 is interconnected between the side assemblies 504 and 506 and supported in an outwardly extended orientation by the second opposite ends 548 of each of the elongated link members 542 and 544. Similarly, the backrest, generally indicated as 555, has its opposite ends adjustably or fixedly connected to different ones of the side assemblies 504 and 506. Therefore, when the side assemblies 504 and 506 are disposed in their maximum lateral spaced apart relation due to the lateral expansion or extension of the interconnected elongated links 542 and 544, sufficient tension will be placed on the backrest 555 to support the back or other appropriate portion of the individual when disposed in a seated orientation.

[0082] Also, a storage compartment generally indicated as 560 is disposed on a frontal portion of the frame 502 adjacent to the adjustable linkage 540 comprising the two elongated link members 542 and 544. As also indicated, the storage compartment 560 is also disposed substantially forward in supported relation on the bifurcated portions 510' of each of the side assemblies 504 and 506. Further, the support compartment 560 may

have an open top or access 562. In order to facilitate selective disposition of the mobile support assembly 500 in the collapsed position, the seat 554 the backrest 555 and the storage compartment 560 may each be formed of a flexible material. As such, an inward, close, substantially adjacent spacing between the side portion 504 and 506, will result in an effective collapse or at least partial folding of the seat 554, backrest 555 and storage compartment 560 as at least partially represented in Figures 38 and 39.

[0083] Since many modifications, variations and changes in detail can be made to the described preferred embodiment of the invention, it is intended that all matters in the foregoing description and shown in the accompanying drawings be interpreted as illustrative and not in a limiting sense. Thus, the scope of the invention should be determined by the appended claims and their legal equivalents.

Claims

1. A mobile support assembly (500) structured to facilitate an individual's mobility, said mobile support assembly comprising:

a frame assembly (502) structured for selective positioning between an operative orientation and a collapsed orientation,
said frame assembly (502) including two side assemblies (504,506) each including support wheels connected thereto,
adjustable linkage (540) movably interconnecting said two side assemblies (504,506) relative to one another in both said operative and collapsed orientations,
said operative orientation comprising a maximum lateral spacing of said two side assemblies (504,506) from one another concurrent to interconnection by said adjustable linkage (540),
said collapsed orientation comprising a closer lateral spacing and substantially adjacent disposition of said two side assemblies (504,506) than said maximum lateral spacing of said two side assemblies (504,506) when in said operative orientation, and
a chair assembly (552) connected to said frame assembly (502) and including a seat (554) and a backrest (555).

2. A mobile support assembly as recited in claim 1 wherein said seat (554) is formed of a flexible material and disposable with said two side assemblies (504,506) into and out of a longitudinally extended, supporting orientation concurrent to disposition of said frame assembly (502) between said operative and collapsed orientations.

3. A mobile support assembly as recited in claim 1 or 2 wherein said adjustable linkage (540) comprises two elongated link members (542,544) each having a first opposite end (546) and a second opposite end (548) movably connected to different ones of said two side assemblies (504,506), said two elongated link members (542,546) movably interconnected to one another intermediate corresponding ones of said opposite ends (546,548).

4. A mobile support assembly as recited in claim 3 wherein said seat (554) is disposed in interconnecting relation and movable with said second opposite ends (548) of each of said elongated link members (542,544) into and out of said supporting orientation, concurrent to disposition of said frame assembly (502) between said operative and collapsed orientations.

5. A mobile support assembly as recited in claim 3 or 4 wherein each of said second opposite ends (548) include an outer extremity movable into and out of confronting relation with corresponding ones of said two side assemblies (504,506) concurrent to disposition of said side assemblies (504,506) into and out of said operative orientation.

6. A mobile support assembly as recited in claim 5 wherein said adjustable linkage (540) further comprises attachment links (550) disposed in movable interconnection between each of said second opposite ends (548) and corresponding ones of said two side assemblies (504,506).

7. A mobile support assembly as recited in any preceding claim wherein said backrest (555) is formed of a flexible material and disposable with said two side assemblies (504,506) into and out of a longitudinally extended, supporting orientation concurrent to disposition of said frame assembly (502) between said operative and collapsed orientations.

8. A mobile support assembly as recited in any preceding claim wherein said collapsed orientation further comprises said adjustable linkage (540) disposed into a longitudinally extended orientation.

9. A mobile support assembly as recited in any preceding claim further comprising a storage compartment (560) connected in supported relation to and between said two side assemblies (504,506).

10. A mobile support assembly as recited in claim 9 wherein said storage compartment (560) is connected to said two side assemblies (504,506) adjacent to and forwardly of said adjustable linkage (540) and substantially beneath said seat (554) when said frame assembly (502) is in said operative orientation.

11. A mobile support assembly as recited in any preceding claim wherein said support wheels comprise a front wheel assembly (512) and a rear wheel assembly (514) connected to each of said side assemblies, wherein, optionally, each of said front and rear wheel assemblies is removably connected to a corresponding one of said two side assemblies, said collapsed orientation further comprising at least one of said front and rear wheel assemblies disconnected from a corresponding one of said side assemblies.

12. A mobile support assembly as recited in any preceding claim wherein each of said two side assemblies (504,506) includes a handle structure (520) adjustably connected thereto; each of said handle structures (520) extendable outwardly from corresponding ones of said two side assemblies (205,506) a selectively variable distance; wherein, optionally, each of said handle structures (520) is removably connected to a corresponding one of said side assemblies and said collapsed orientation further comprising at least one of said handle structures (520) disconnected from a corresponding one of said side assemblies (504,506).

13. A mobile support assembly as recited in any preceding claim wherein said adjustable linkage (540) comprises two elongated link members (542,544) each having a first and a second opposite end (546,548) movably connected to a different one of said two side assemblies (504,506); said maximum lateral spacing of said two side assemblies (504,506) comprising said first opposite ends (546) and said second opposite ends (548) of said two elongated link members (542,544) being disposed at a greater spacing from one another in said operative orientation than when in said collapsed orientation.

14. A mobile support assembly (500) structured to facilitate an individual's ability, said mobile support assembly comprising:

a frame assembly (502) structured for selective positioning between an operative orientation and a collapsed orientation,
said frame assembly (502) comprising two side assemblies (504,506) each including a front wheel assembly (512) and a rear wheel assembly (514) connected thereto,
an adjustable linkage (540) comprising two elongated link members (542,544) pivotally connected to one another intermediate opposite ends (546,548) thereof,
each of said elongated link members (542,544) including a first opposite end (546) and a second opposite end (548); each of said first and second opposite ends (546,548) of each of said of elongated link members (542,544) movably connected to and movable with a different one of said two side assemblies (504,506), concurrent to movement of said frame assembly (502) between said operative and collapsed orientations,
said operative orientation comprising a maximum lateral spacing of said two side assemblies (504,506) relative to one another and said adjustable linkage (540) disposed into a laterally extended orientation,
said collapsed orientation comprising a substantially adjacent disposition of said two side assemblies (504,506) into a closer relative spacing than said maximum lateral spacing of said two side assemblies (504,506) when in said operative orientation and said two elongated link members (542,544) disposed into substantially adjacent, longitudinally extended orientation relative to one another, and
a chair assembly (552) connected to said frame assembly (502) and including a seat (554) and a backrest (555); said seat (554) and said backrest (555) each connected to both of said two side assemblies (504,506) and extending therebetween.

15. A mobile support assembly as recited in claim 14 wherein said seat (554) is movable with said two side assemblies (504,506) and disposable into and out of an extended supporting orientation concurrent to disposition of said frame assembly (502) between said operative and collapsed orientations.

16. A mobile support assembly as recited in claim 14 or 15 wherein said backrest (555) is movable with said two side assemblies (504,506) and disposable into and out of an extended supporting orientation concurrent to disposition of said frame assembly (502) between said operative and collapsed orientations.

17. A mobile support assembly as recited in any preceding claim wherein said seat (554) and said backrest (555) are formed of a flexible material.

18. A mobile support assembly as recited in any of claims 14 to 17 wherein said seat (554) is disposed in interconnecting relation and movable with said second ends (548) of said elongated link members (542,544) into and out of a supporting orientation, concurrent to disposition of said frame assembly (502) between said operative and collapsed orientations.

19. A mobile support assembly as recited in any of claims 14 to 18 wherein said collapsed orientation further comprises said adjustable linkage (540) disposed into a longitudinally extended orientation.

20. A mobile support assembly as recited in any of claims 14 to 19 further comprising a storage compartment

(560) connected in supporting relation to and between said two side assemblies (504,506) and movable therewith between said operative and collapsed orientations.

21. A mobile support assembly as recited in any of claims 14 to 20 wherein said maximum lateral spacing of said two side assemblies (504,506) comprises said first opposite ends (546) and said second opposite ends (548) of said two elongated link members (542,544) being disposed at a greater spacing from one another in said operative orientation than when in said collapsed orientation.

FIG.1

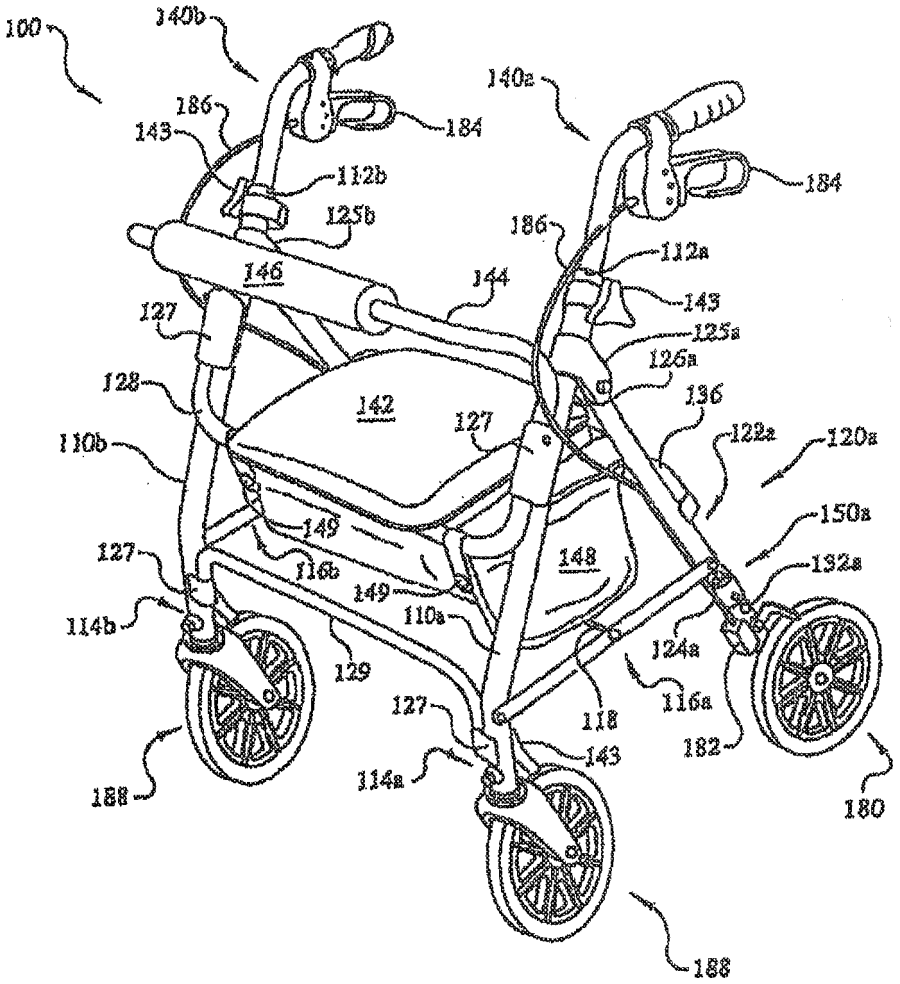

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FIG.2

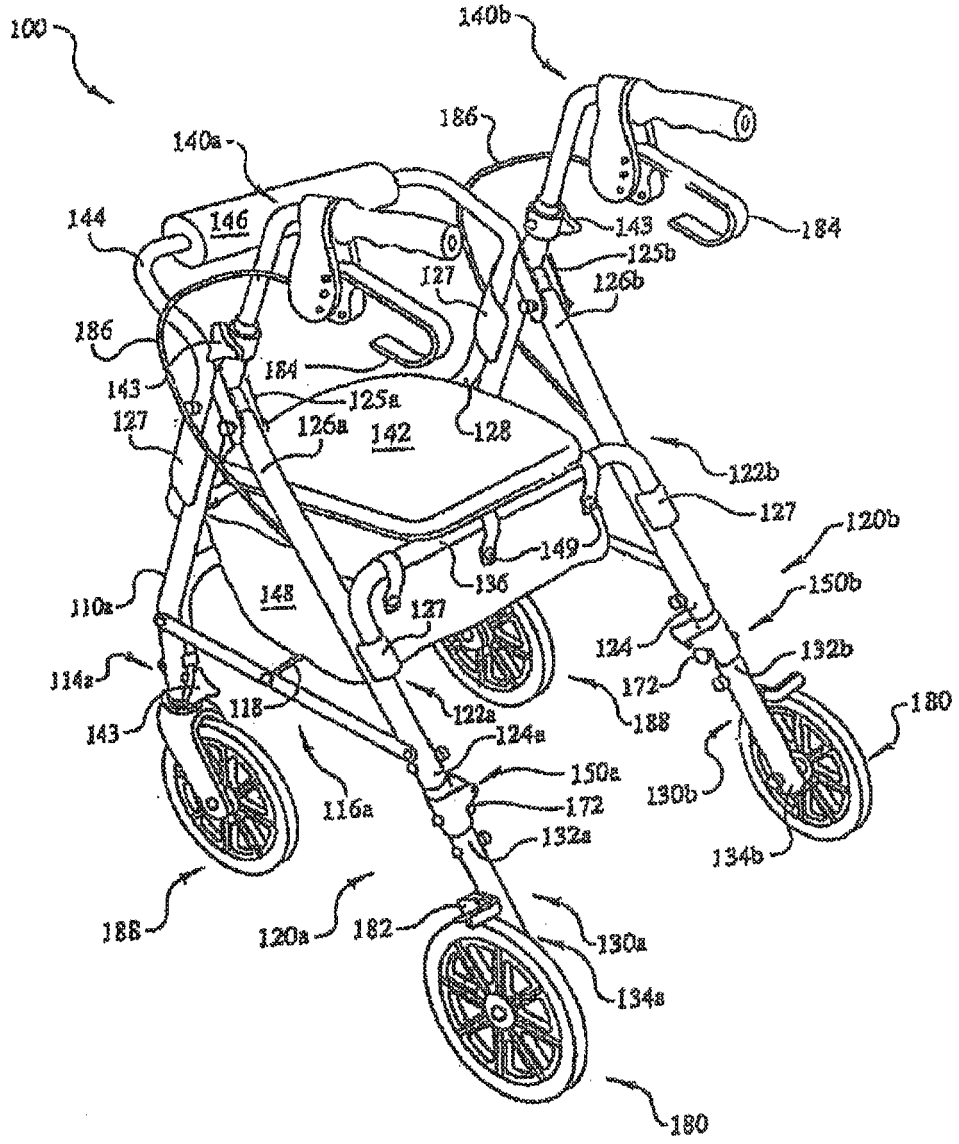

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172
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122a
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134a
180

FIG.3

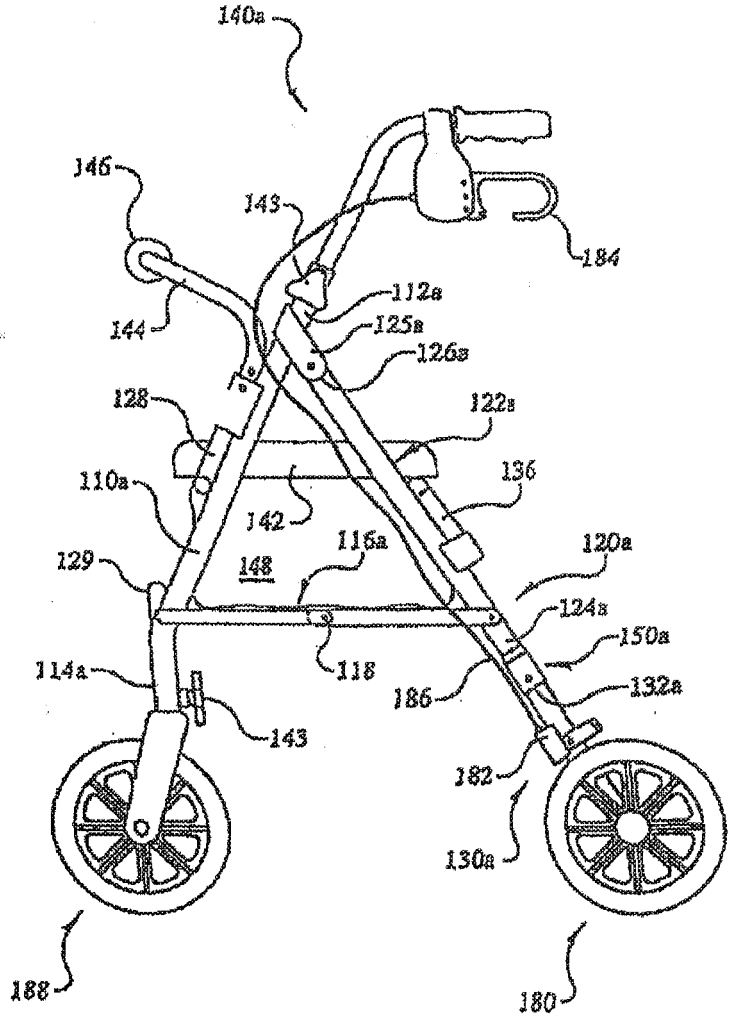

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150a
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130a
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180

FIG.4A

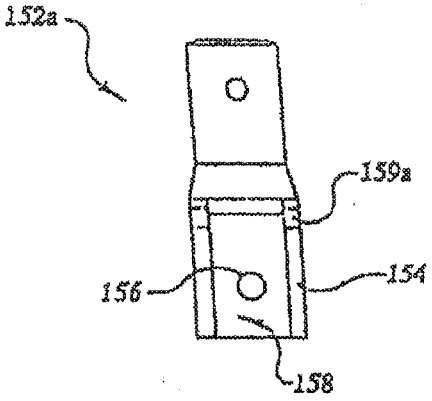


FIG.4B

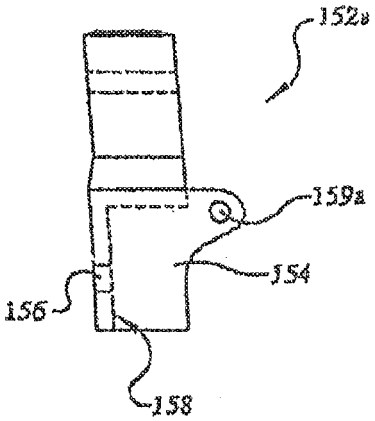


FIG.5A

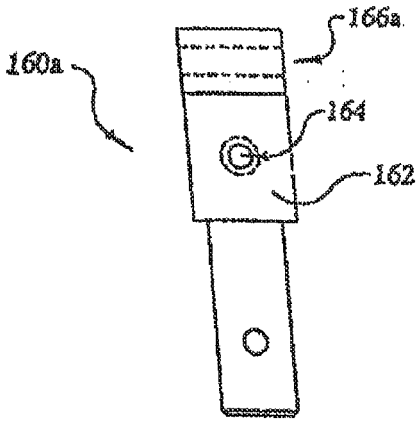


FIG.5B

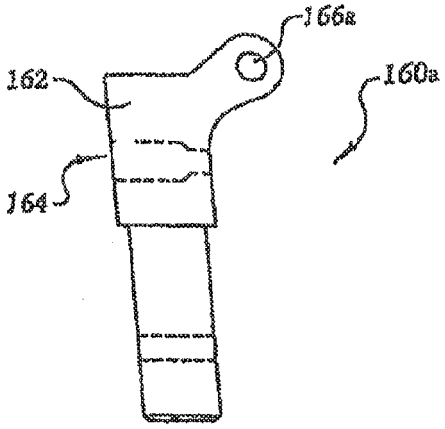


FIG.6A

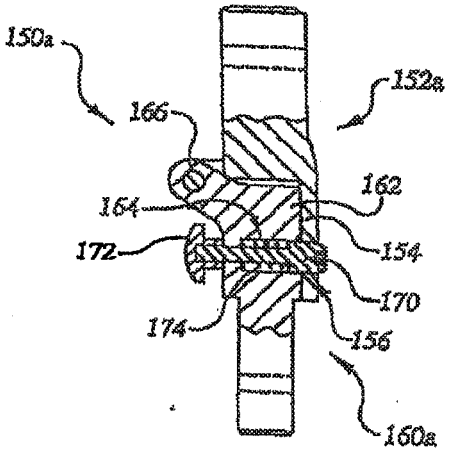


FIG.6B

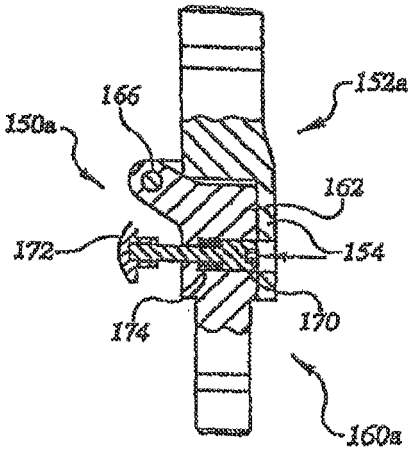


FIG.6C

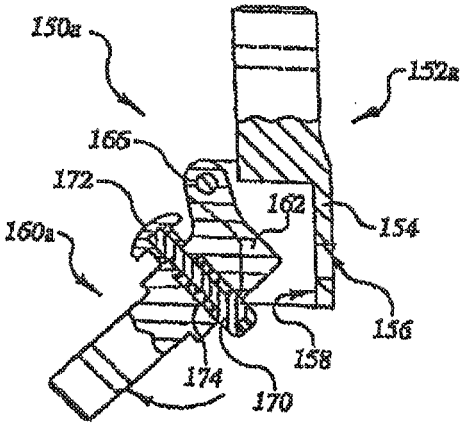


FIG.6D

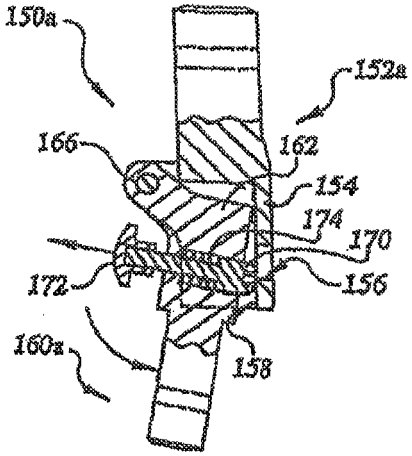


FIG. 7

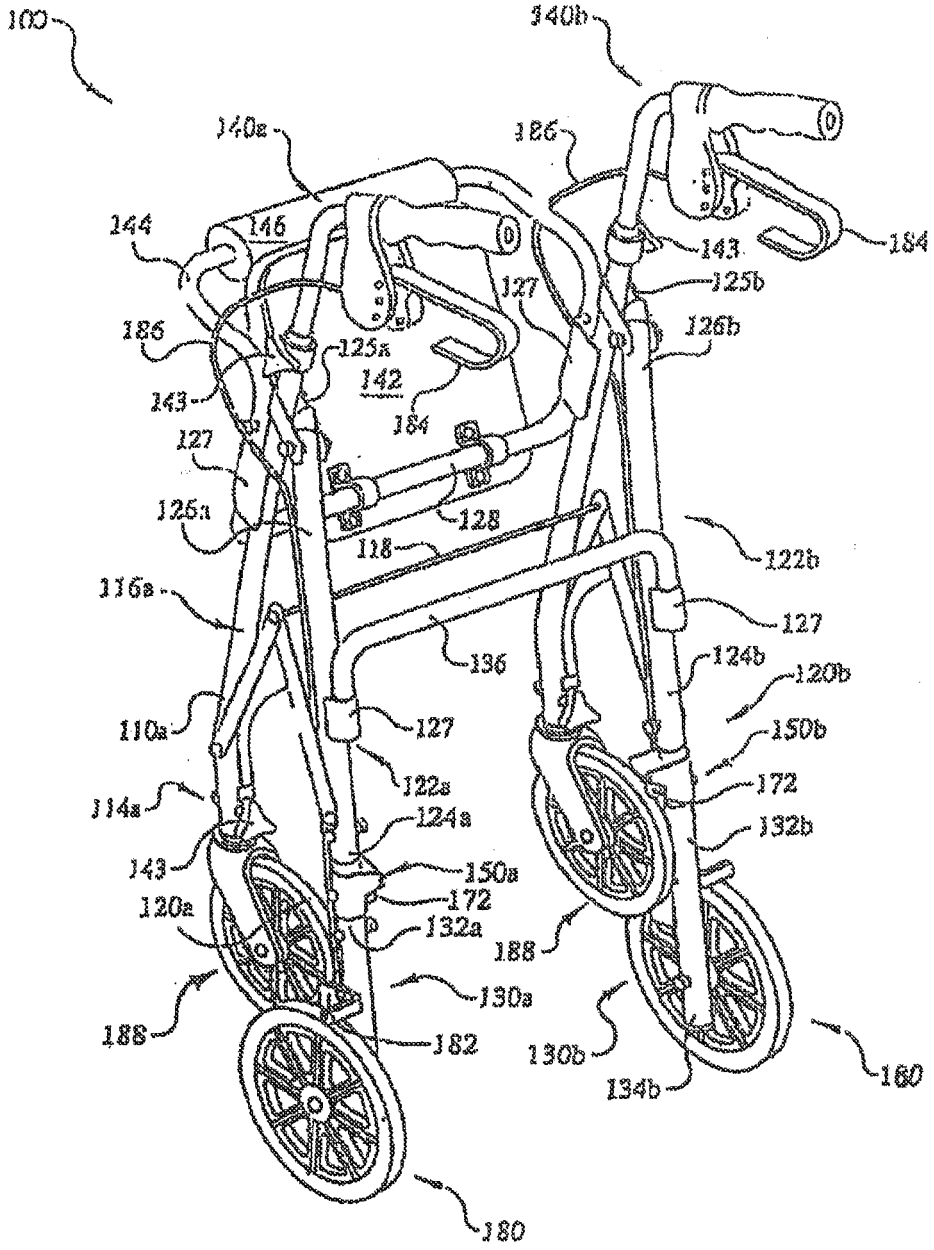
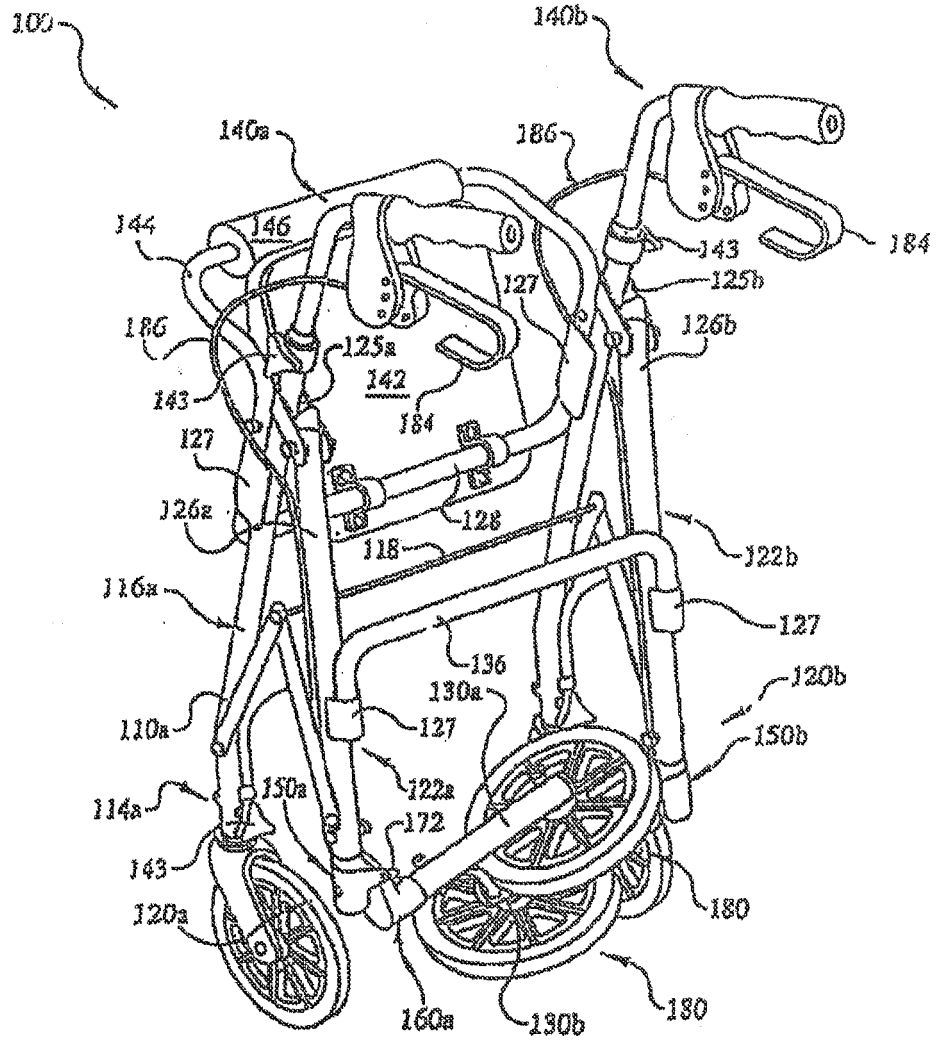

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150b
122a
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114a
124a
132b
143
150a
120a
172
132a
188
130a
188
182
130b
160
134b
180

FIG.8


100
140b
140a
186
144
146
143
184
127
125b
186
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126b
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126a
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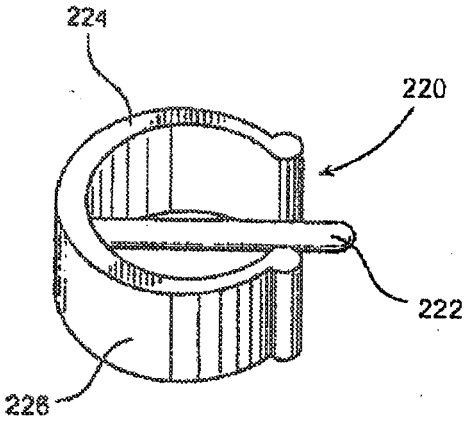


FIG. 9

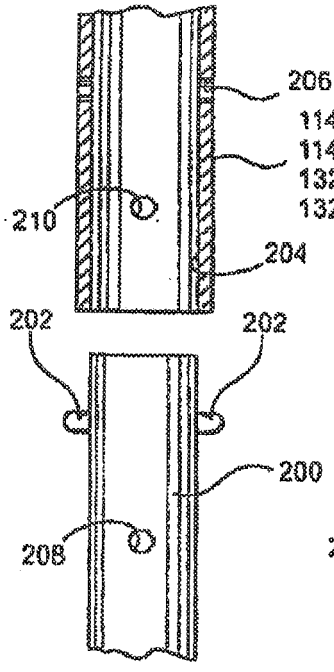


FIG. 10

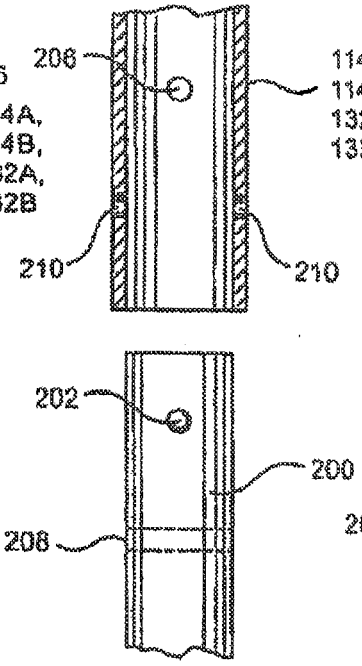


FIG. 11

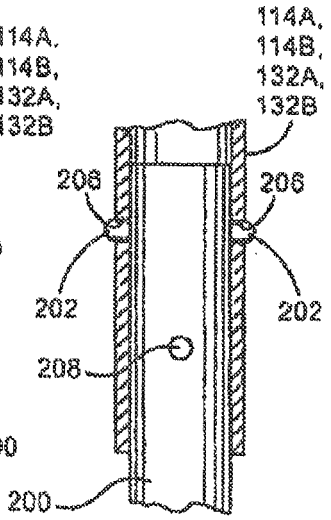


FIG. 12

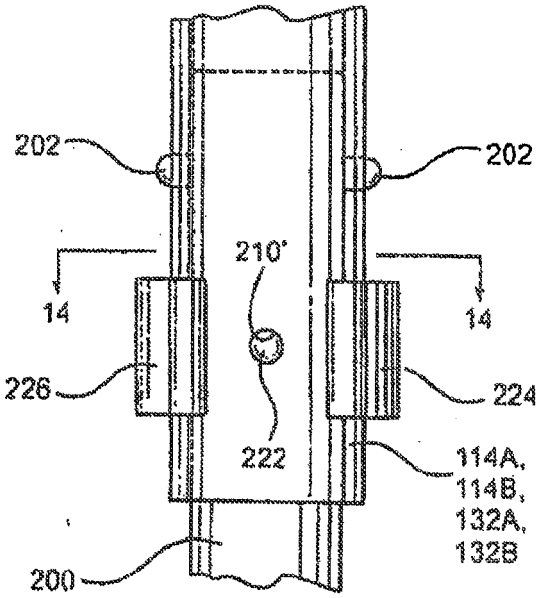

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202
210'
14
14
226
224
222
114A,
114B,
132A,
132B
200

FIG. 13

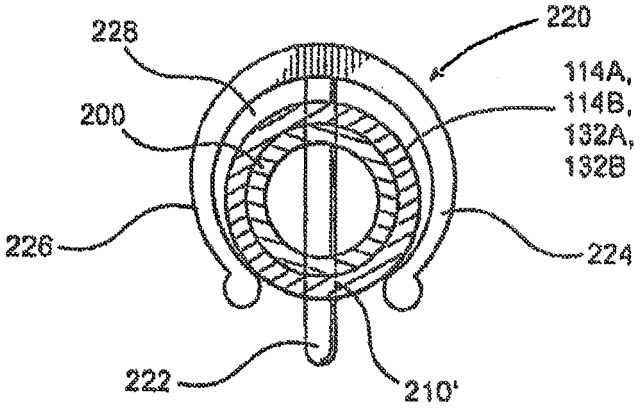

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228
114A,
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224
222
210'

FIG. 14

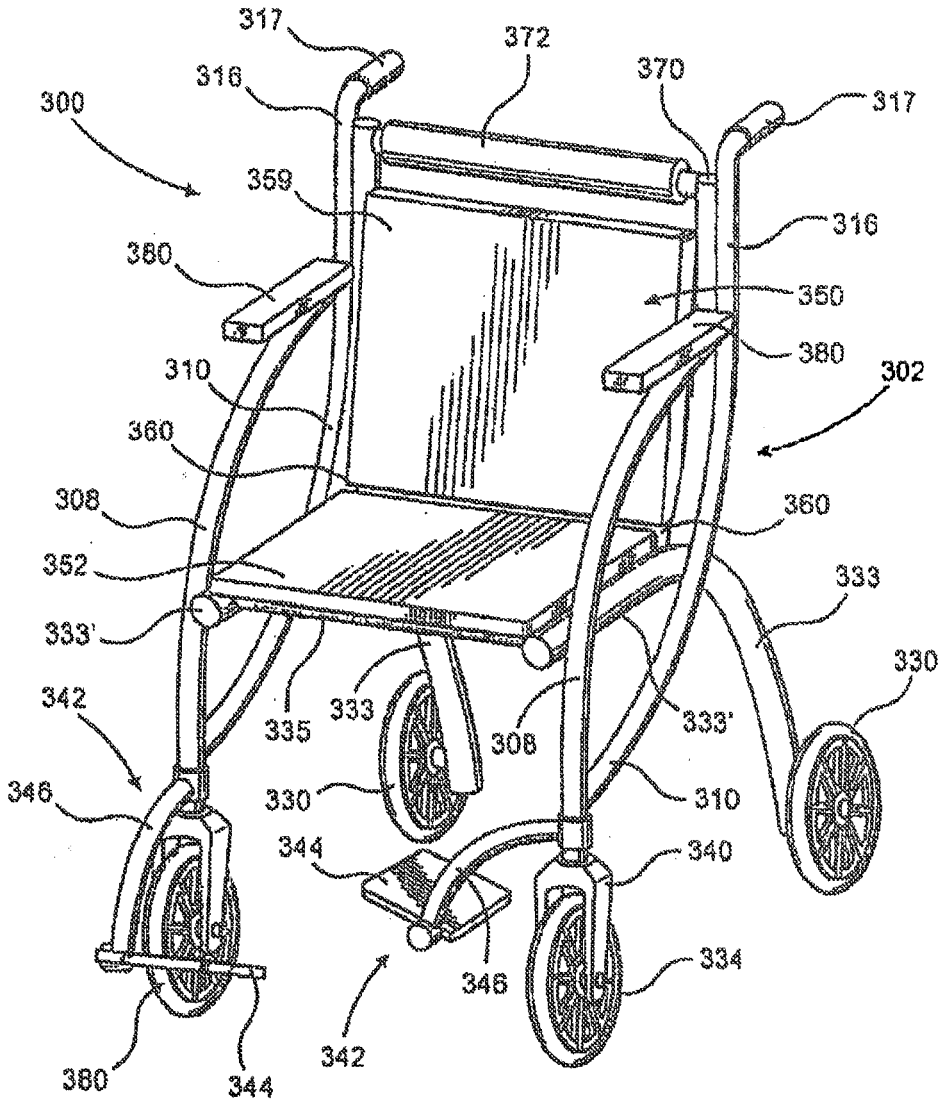

317
372
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300
359
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380
350
380
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302
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360
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352
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333'
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342
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333'
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330
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380
344

FIG. 15

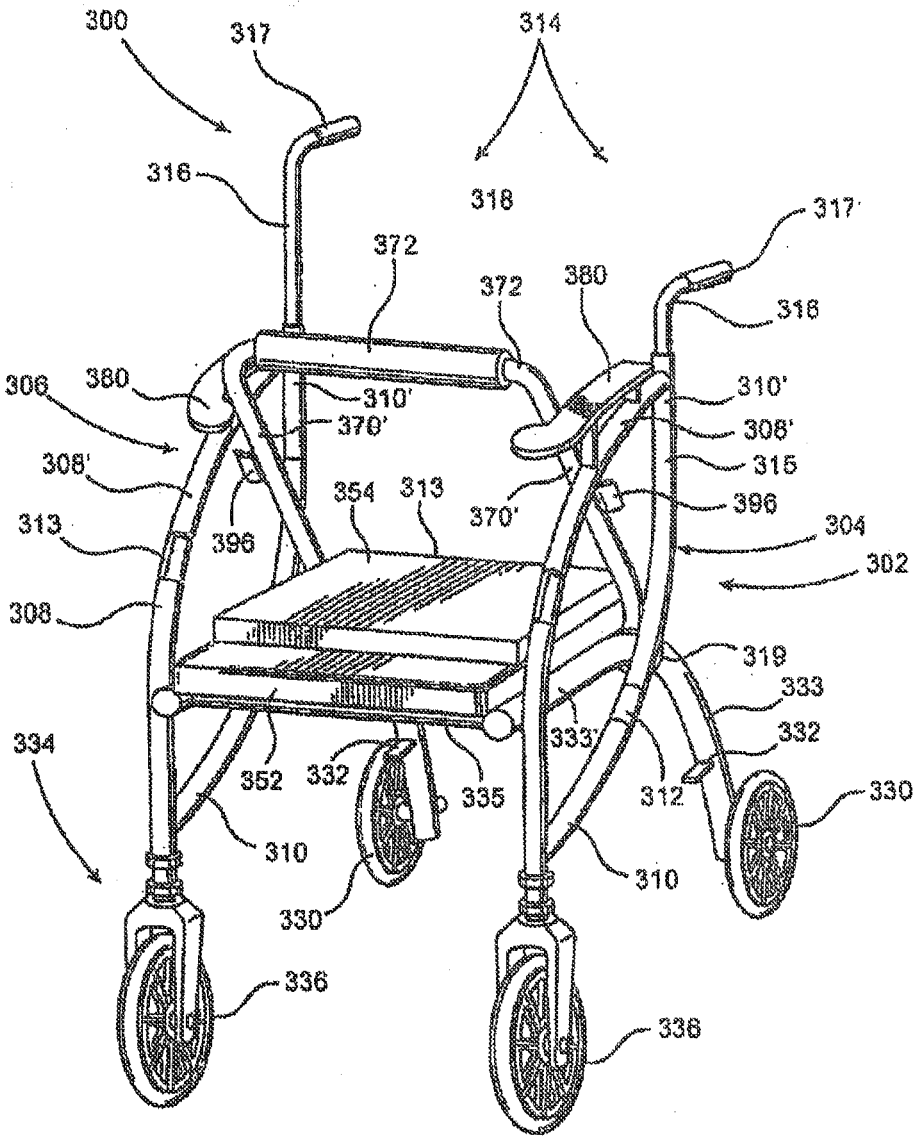

300
317
314
316
318
317'
372
372
380
316
306
380
310'
310'
370'
308'
308'
315
354
313
370'
396
313
396
304
302
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330
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336

FIG. 16

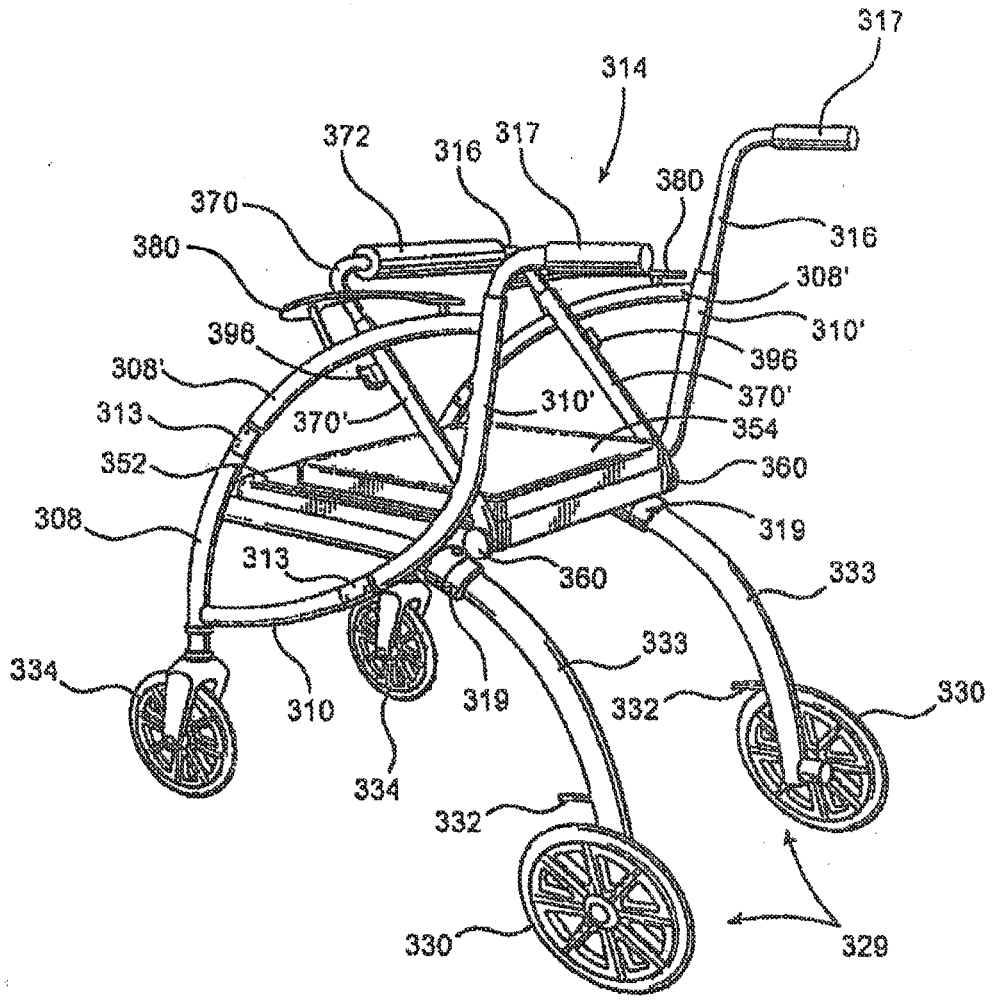

317
314
372
316
317
380
370
316
380
308'
310'
396
396
308'
370'
313
310'
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329

FIG. 17

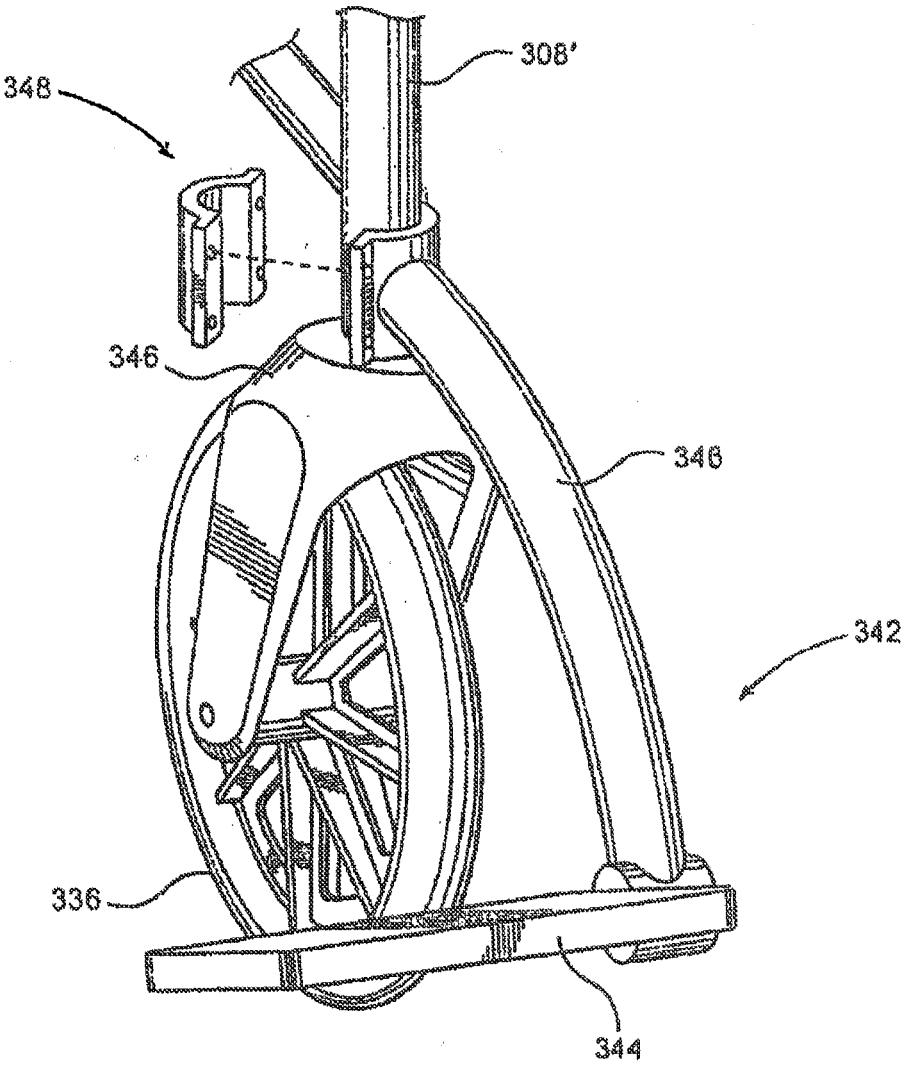


FIG. 18

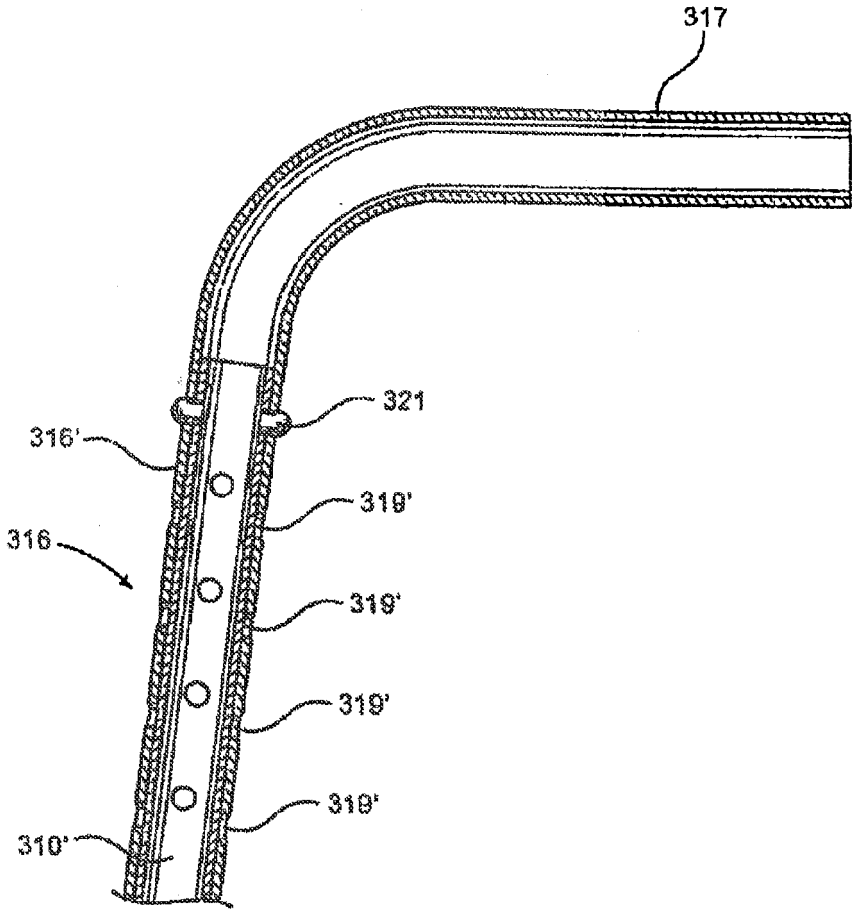


FIG. 19

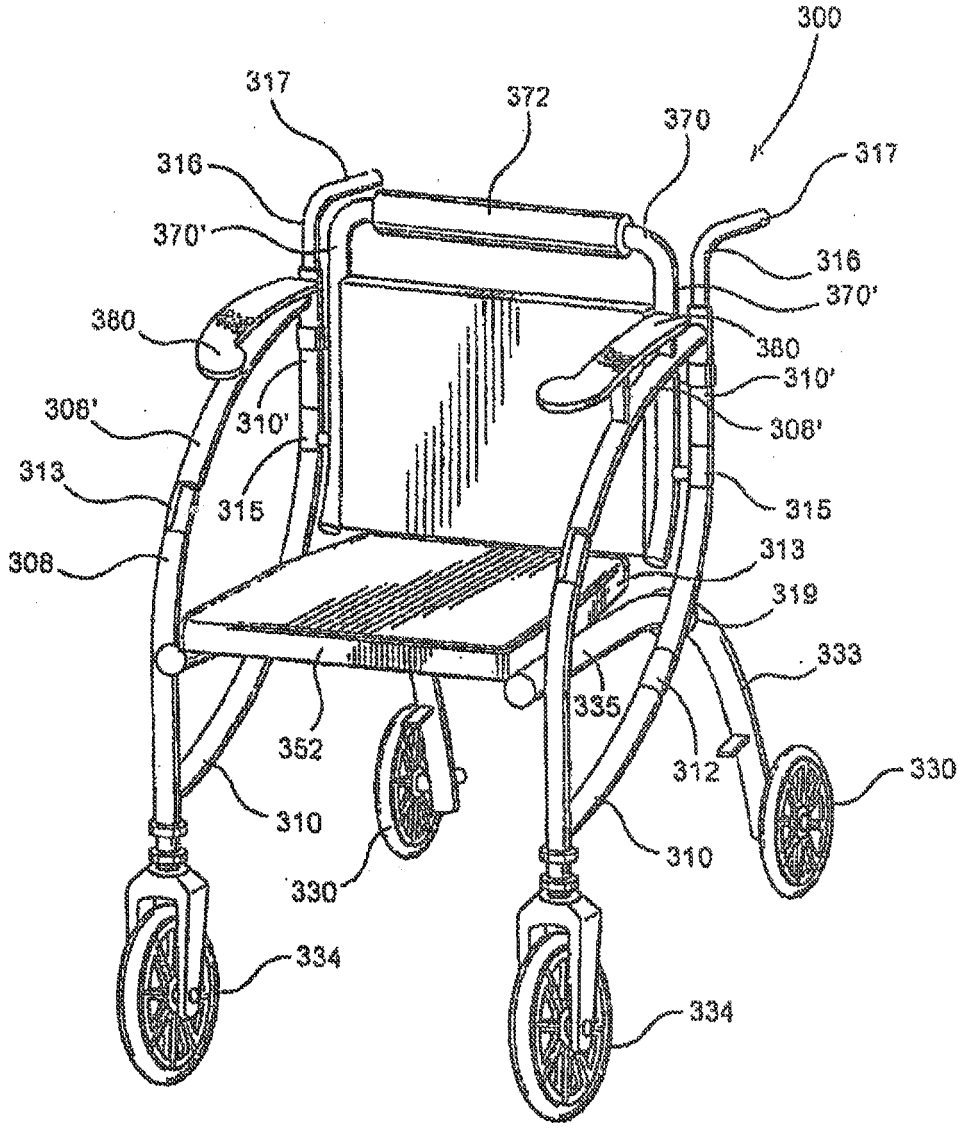

300
317
372
370
316
317
370'
316
370'
380
380
310'
308'
310'
308'
313
315
315
308
313
319
333
335
352
312
330
310
310
330
334
334

FIG. 20

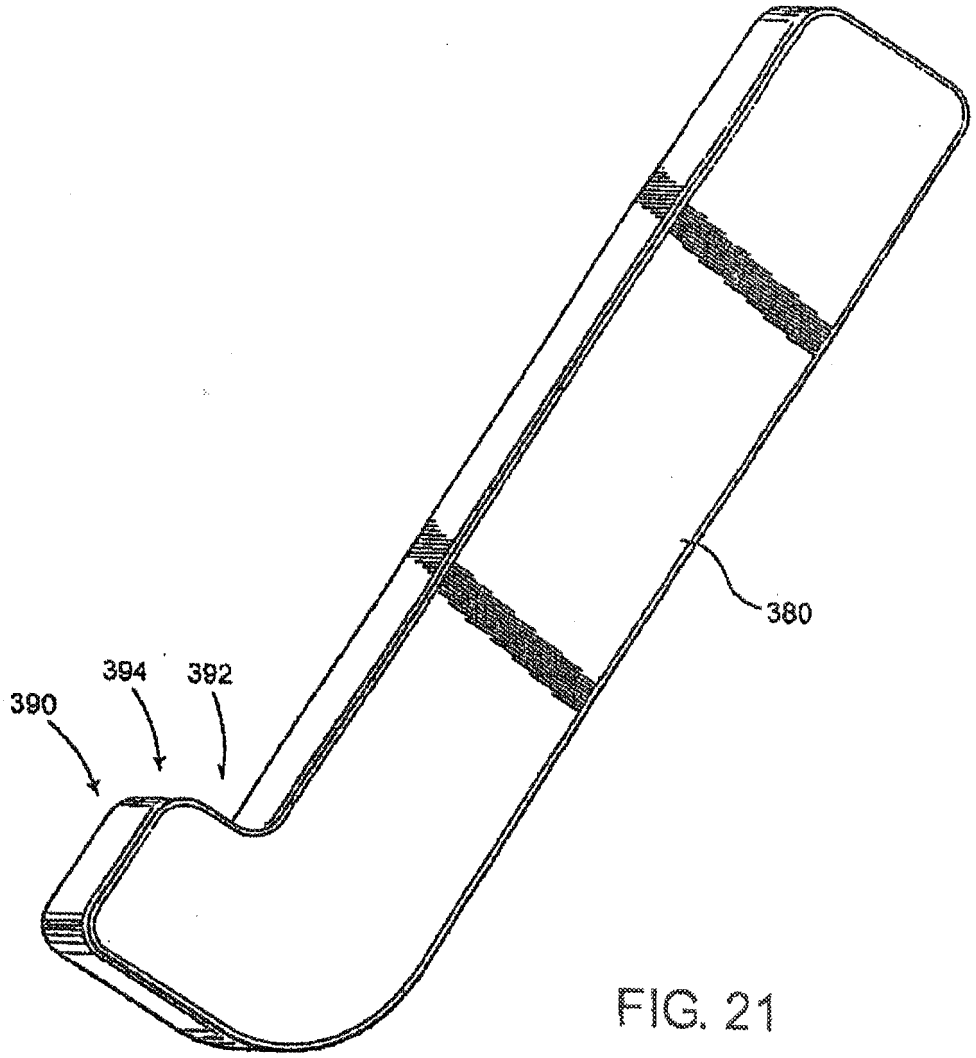


FIG. 21

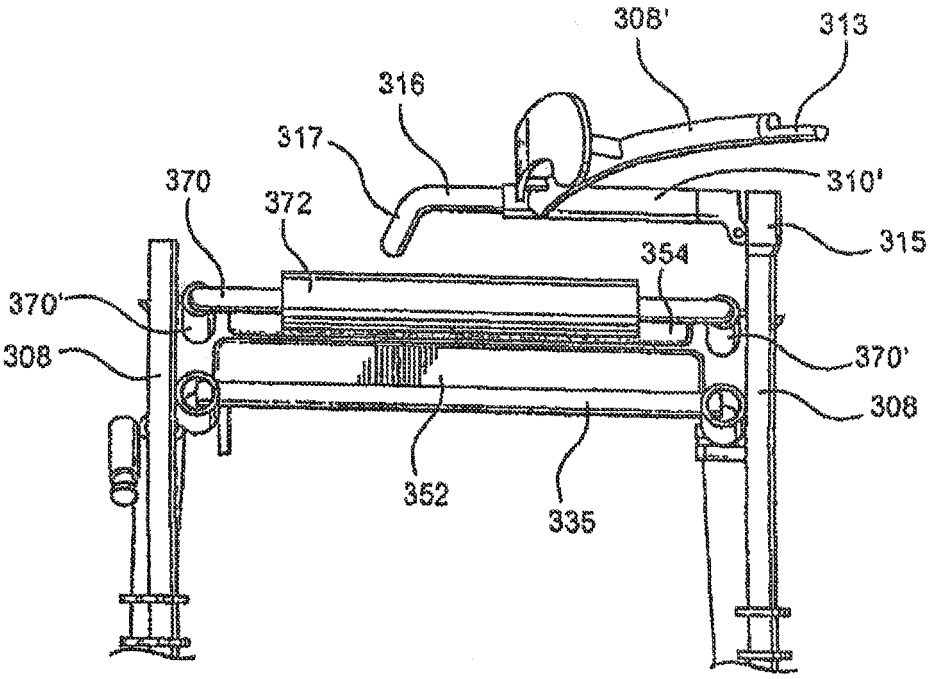


FIG. 22

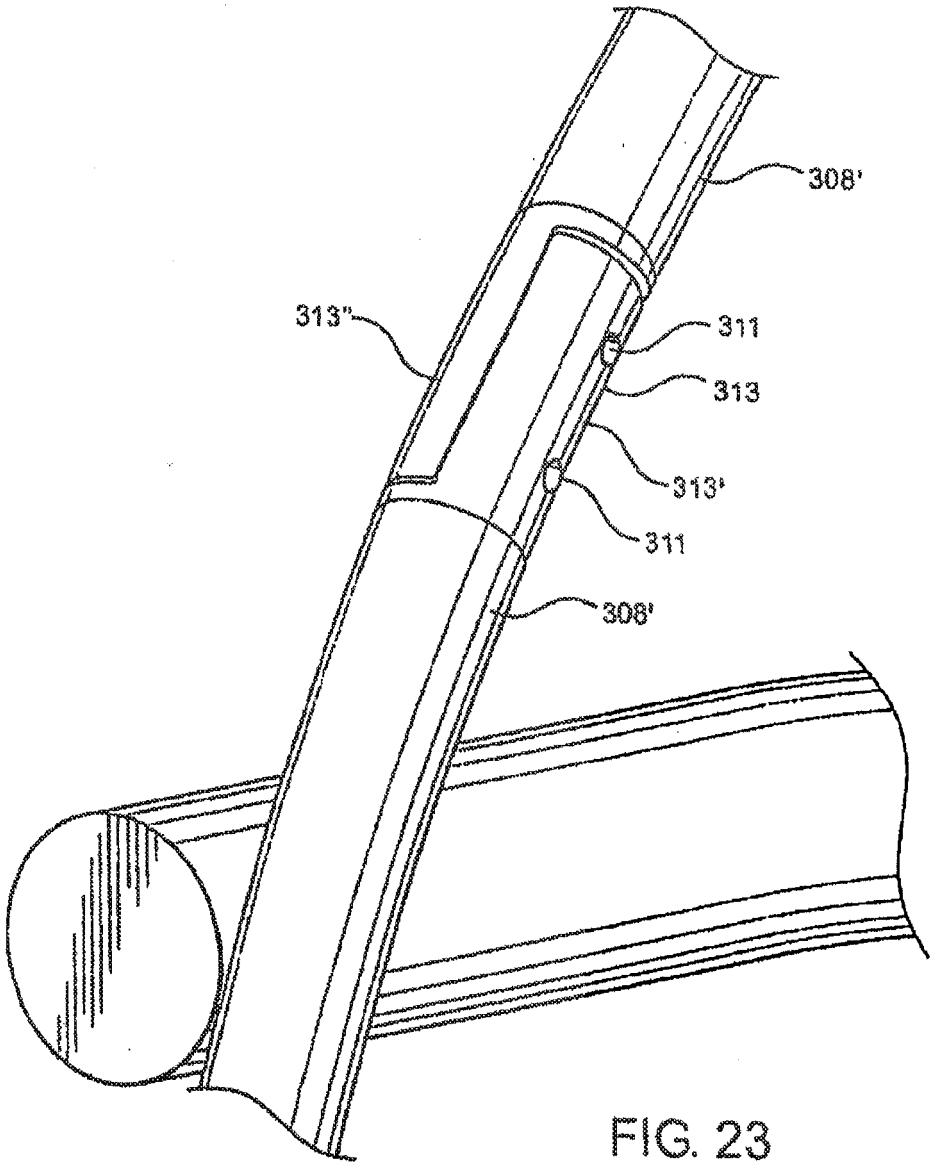


FIG. 23

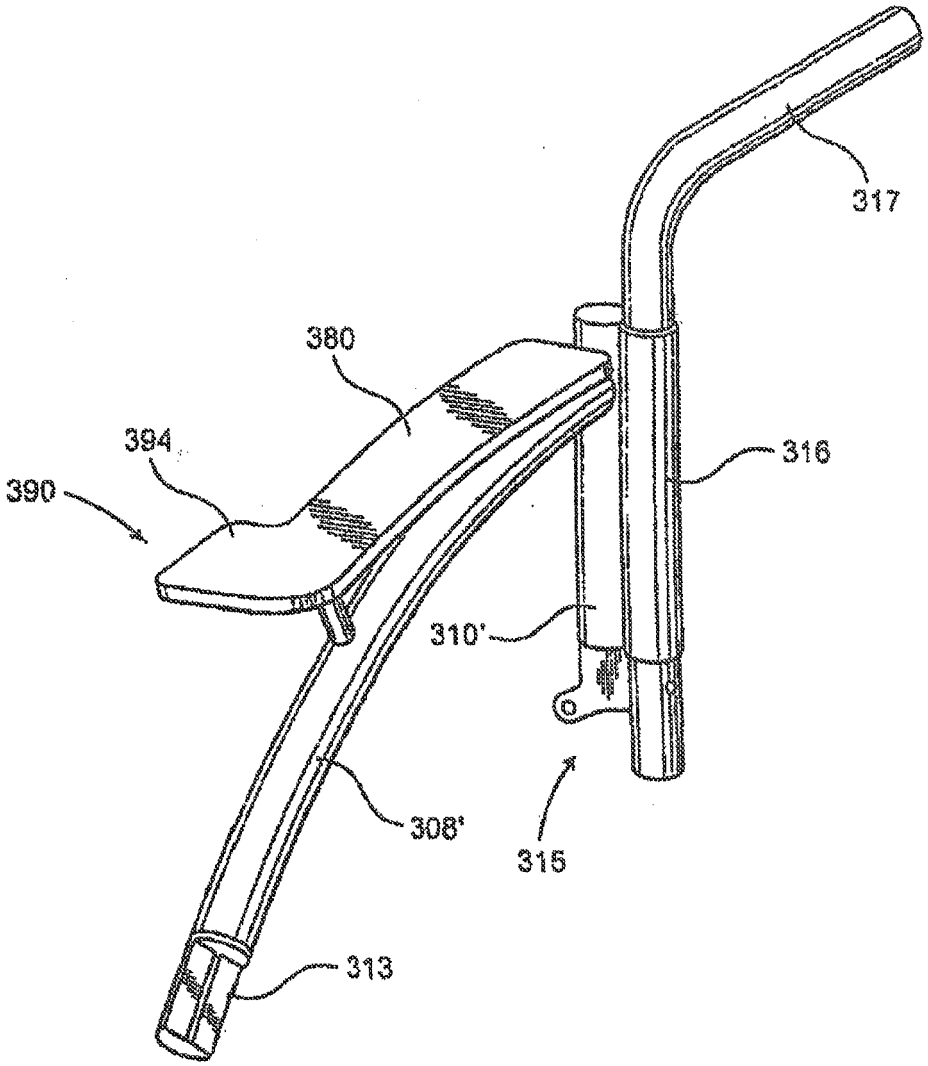


FIG. 24

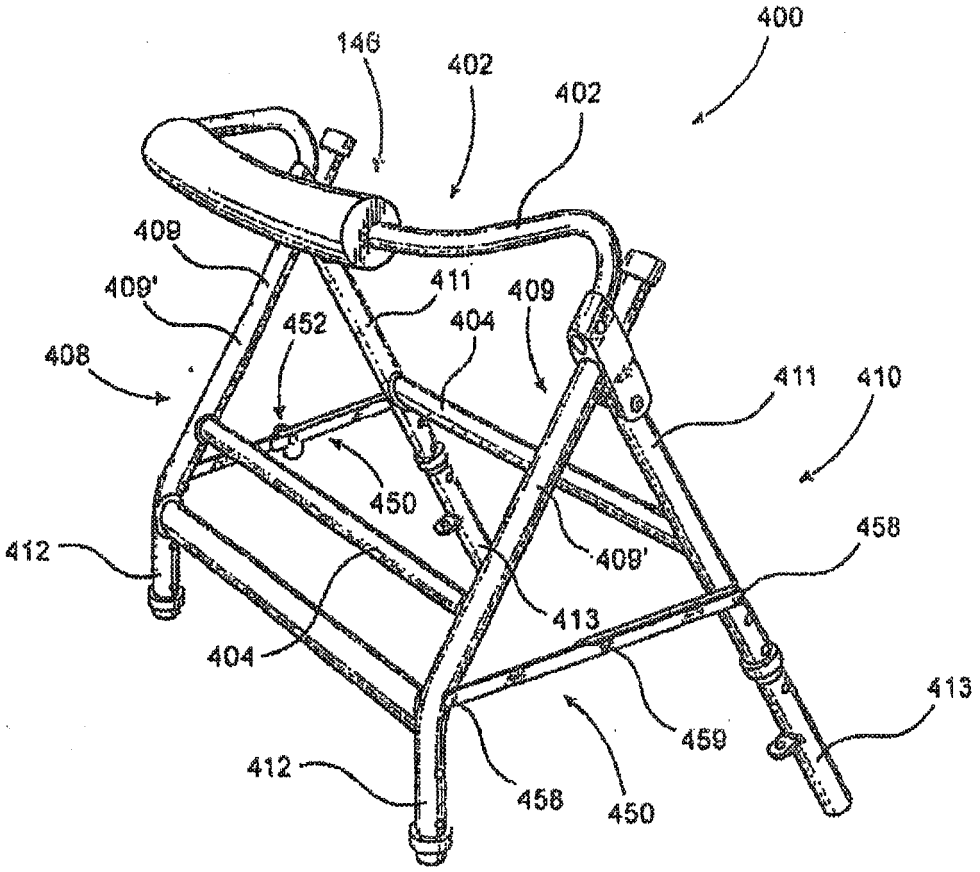

400
146
402
402
409
409'
411
409
452
404
408
411
410
450
458
412
409'
413
404
413
459
412
458
450

FIG. 25

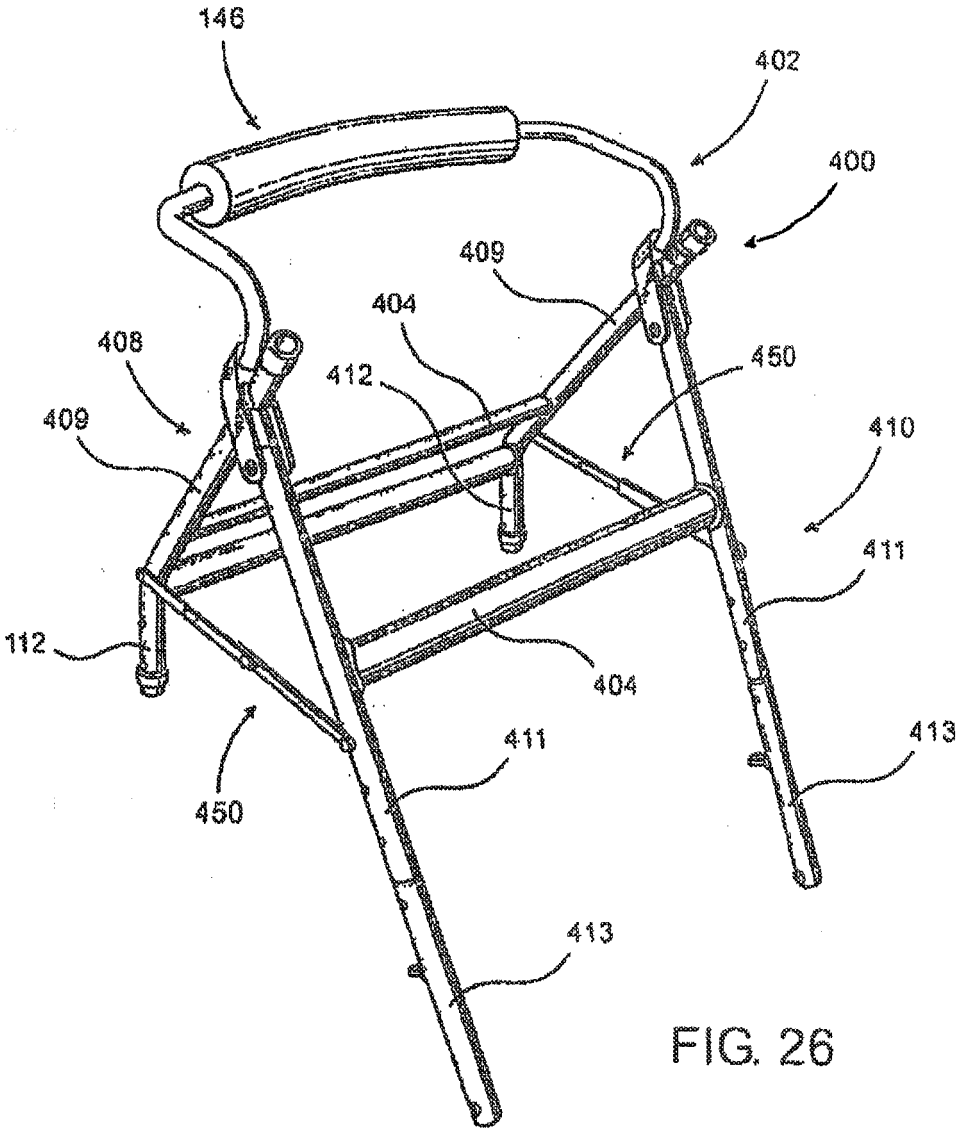

146
402
400
409
404
408
412
450
409
410
411
112
404
411
413
450
413

FIG. 26

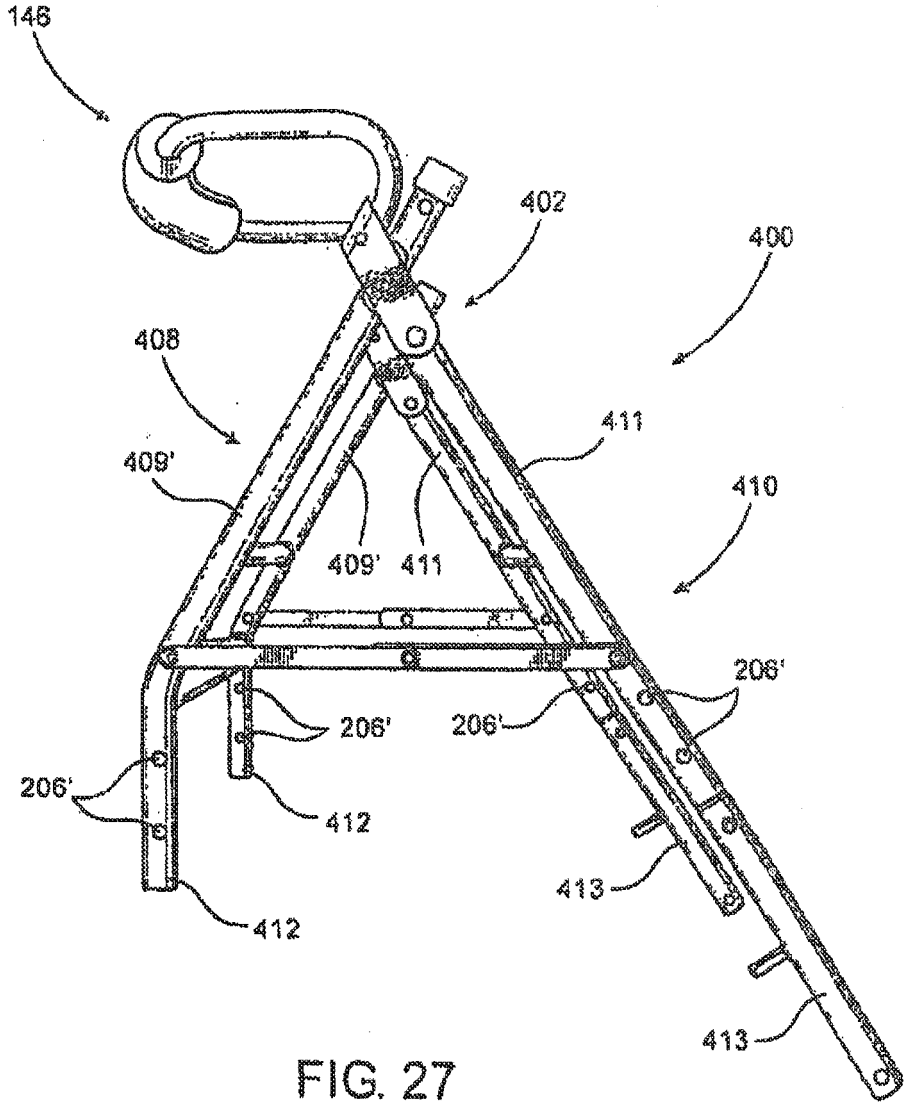

146
402
400
408
411
409'
410
409'
411
206'
206'
206'
206'
412
412
413
413

FIG. 27

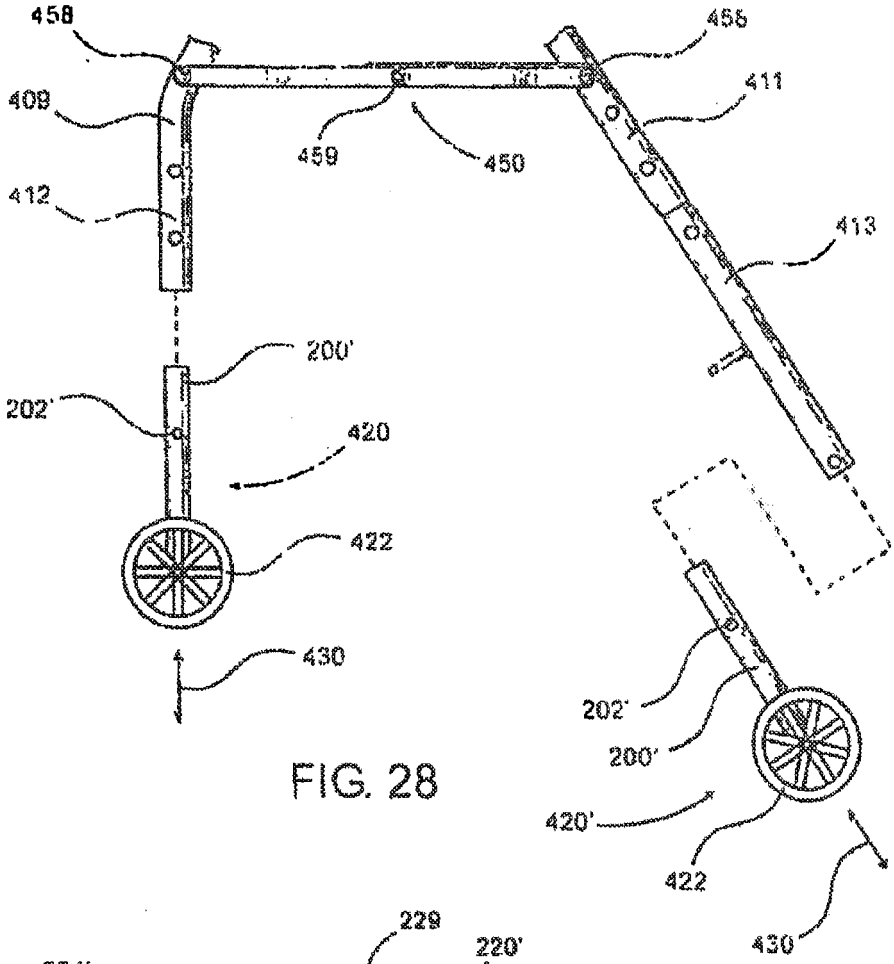

458
456
409
411
459
450
412
413
200'
202'
420
422
430
202'
200'
420'
422
430

FIG. 28

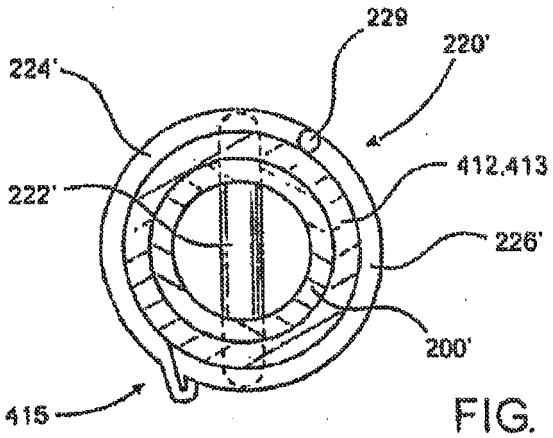

229
220'
224'
412.413
222'
226'
200'
415

FIG. 29

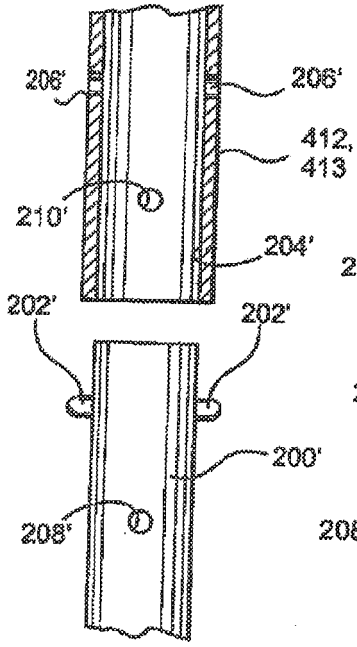


FIG. 30

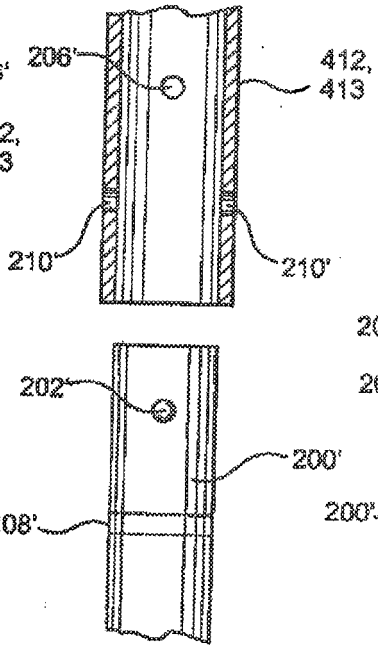


FIG. 31

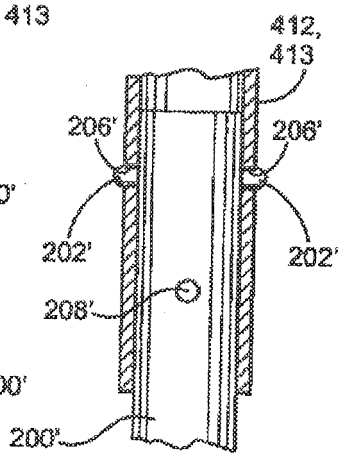


FIG. 32

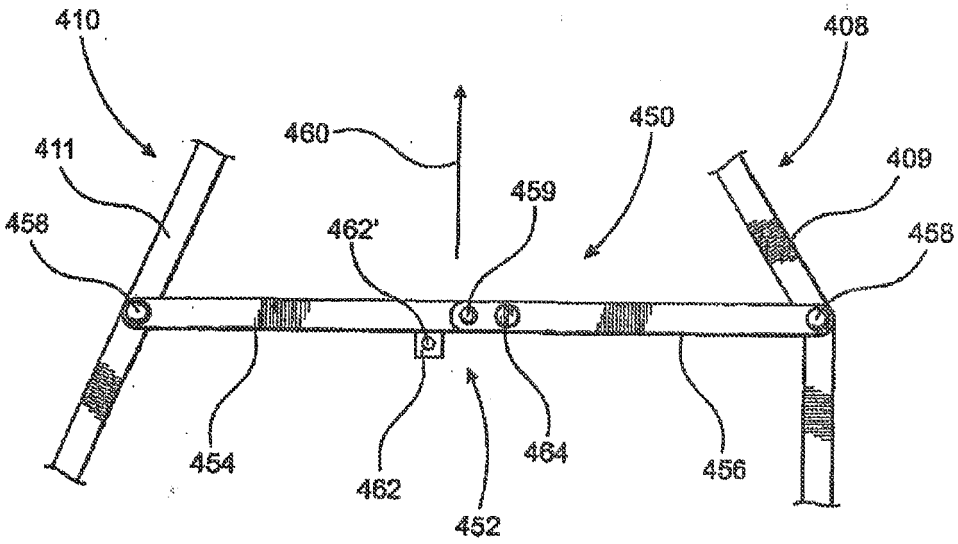

410
408
460
450
411
459
409
458
462'
458
454
462
464
456
452

FIG. 33

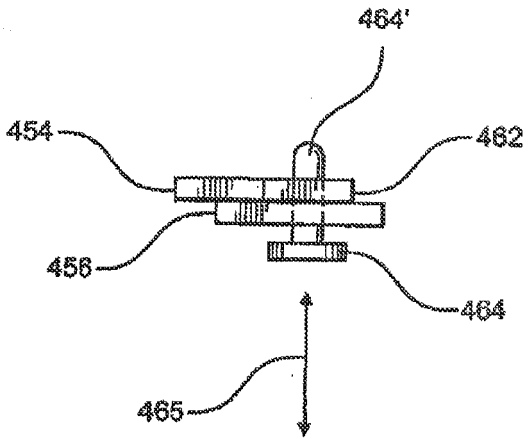

464'
454
462
456
464
465

FIG. 34

FIG 35

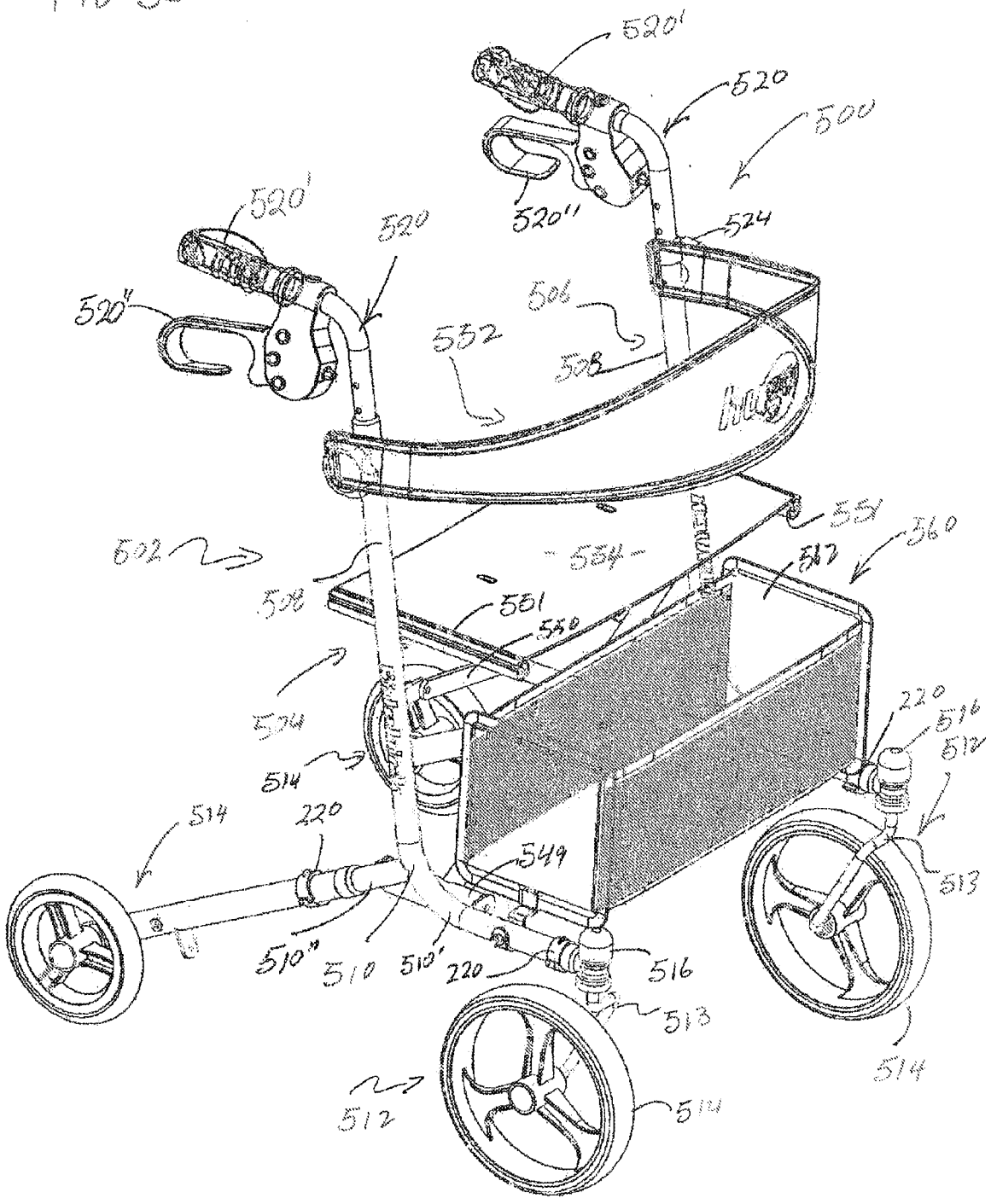
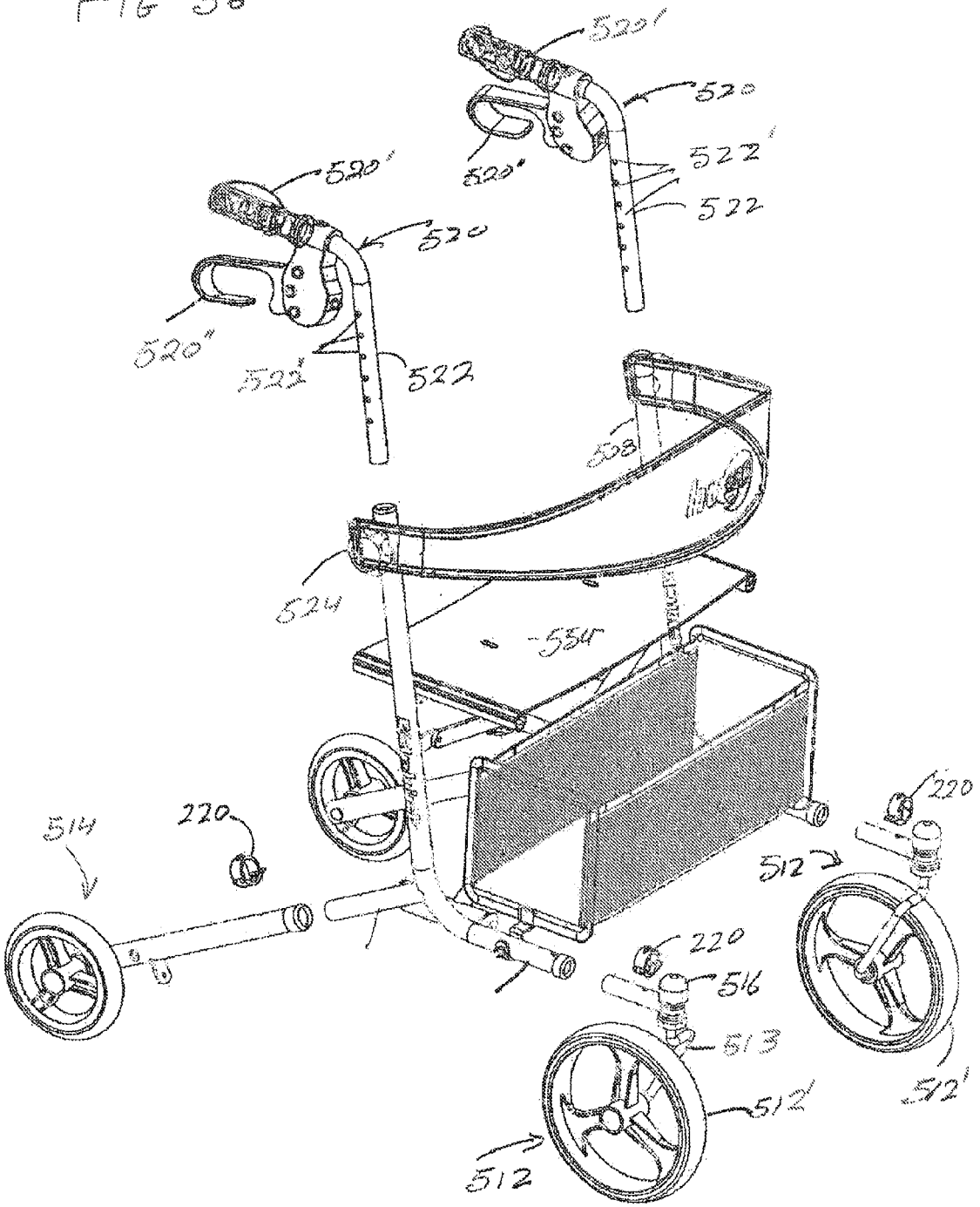

520'
520
500
520''
524
520'
520
506
532
528
552
554
560
502
528
551
550
524
514
220
516
512
549
513
510''
510
510'
518

FIG 36


520'
520
522'
522
520'
520
520"
521'
522
528
524
554
514
220
512
220
516
513
512'
512

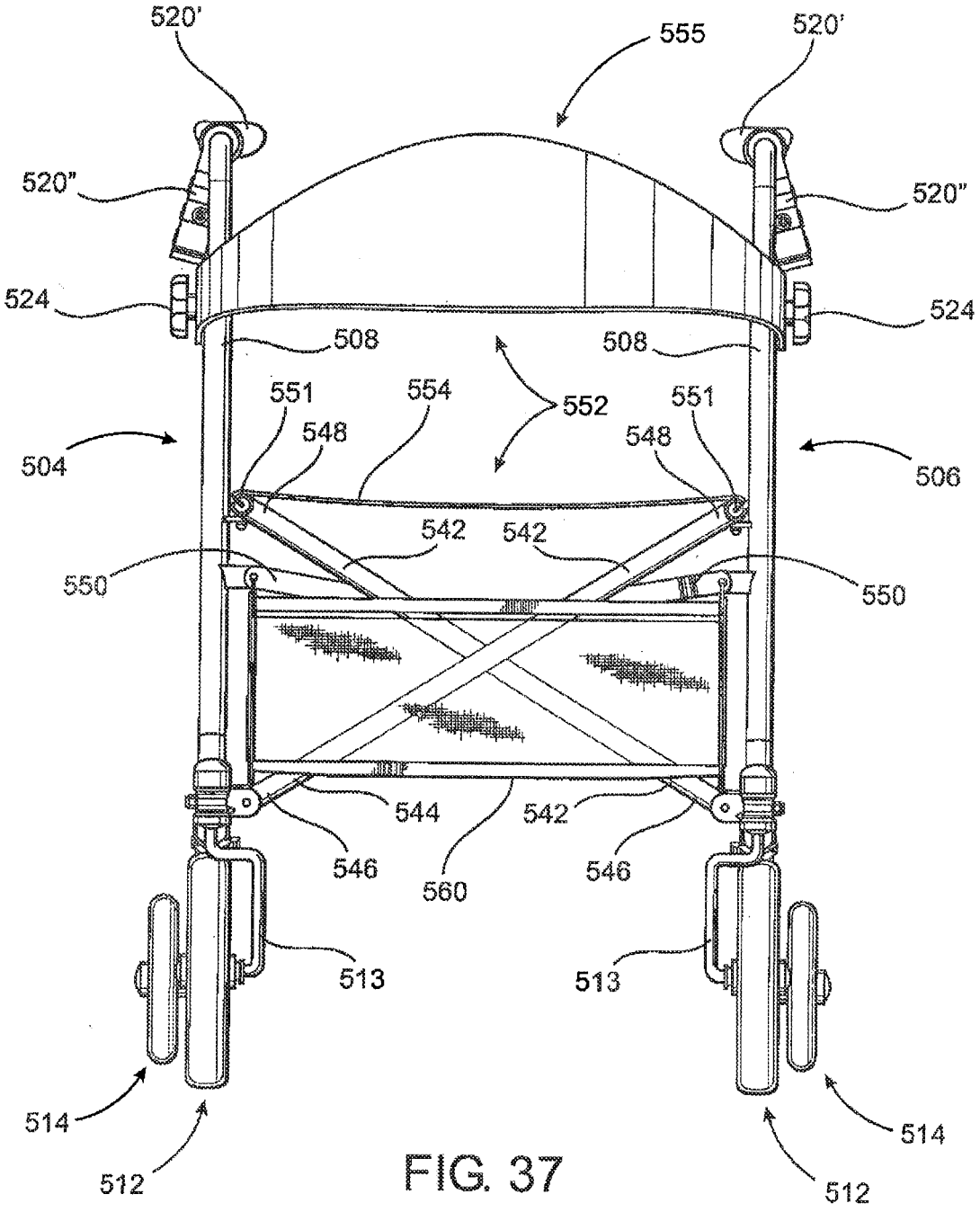

520'
555
520'
520"
520"
524
524
508
508
551
554
552
551
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504
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512

FIG. 37

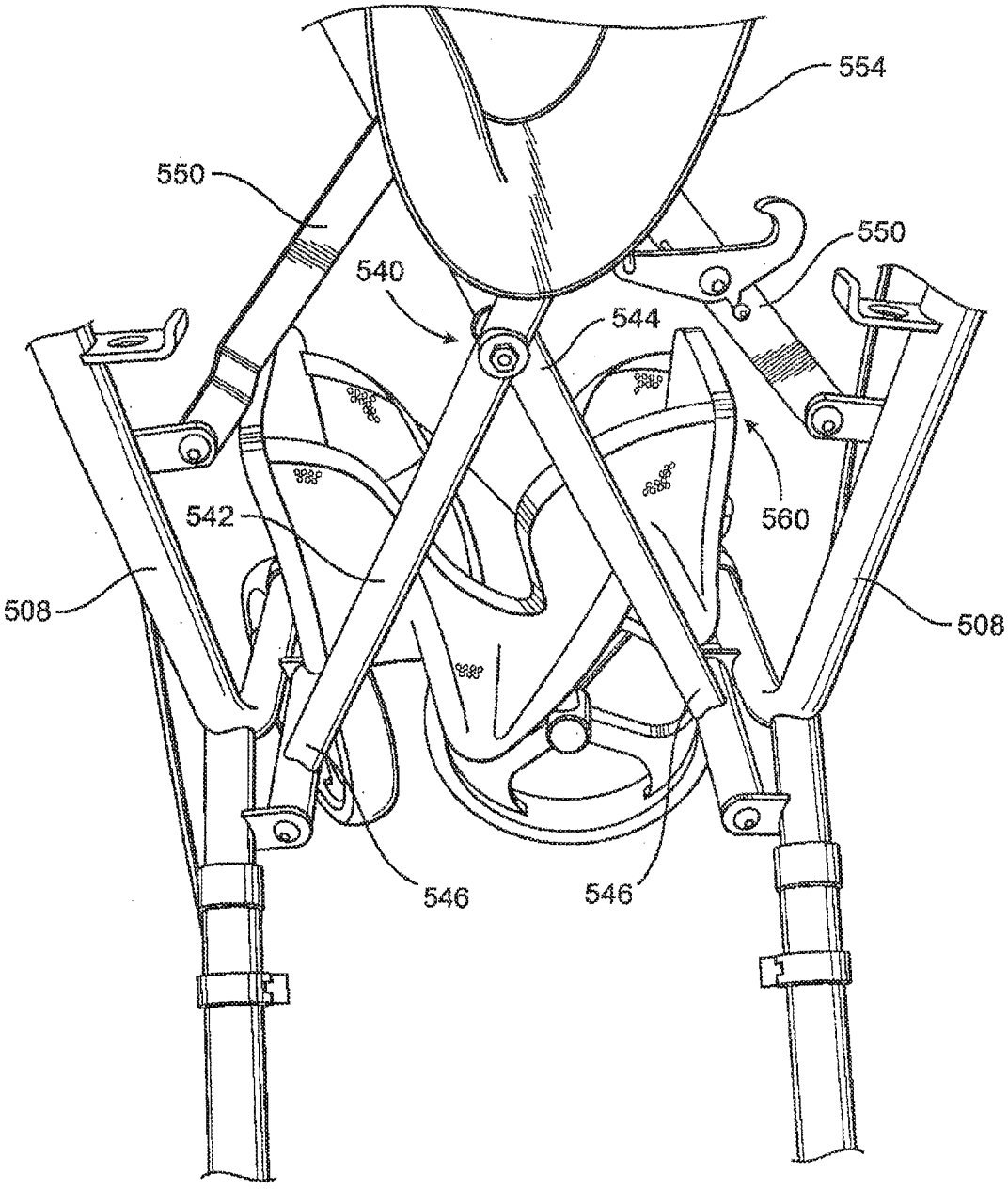


FIG. 38

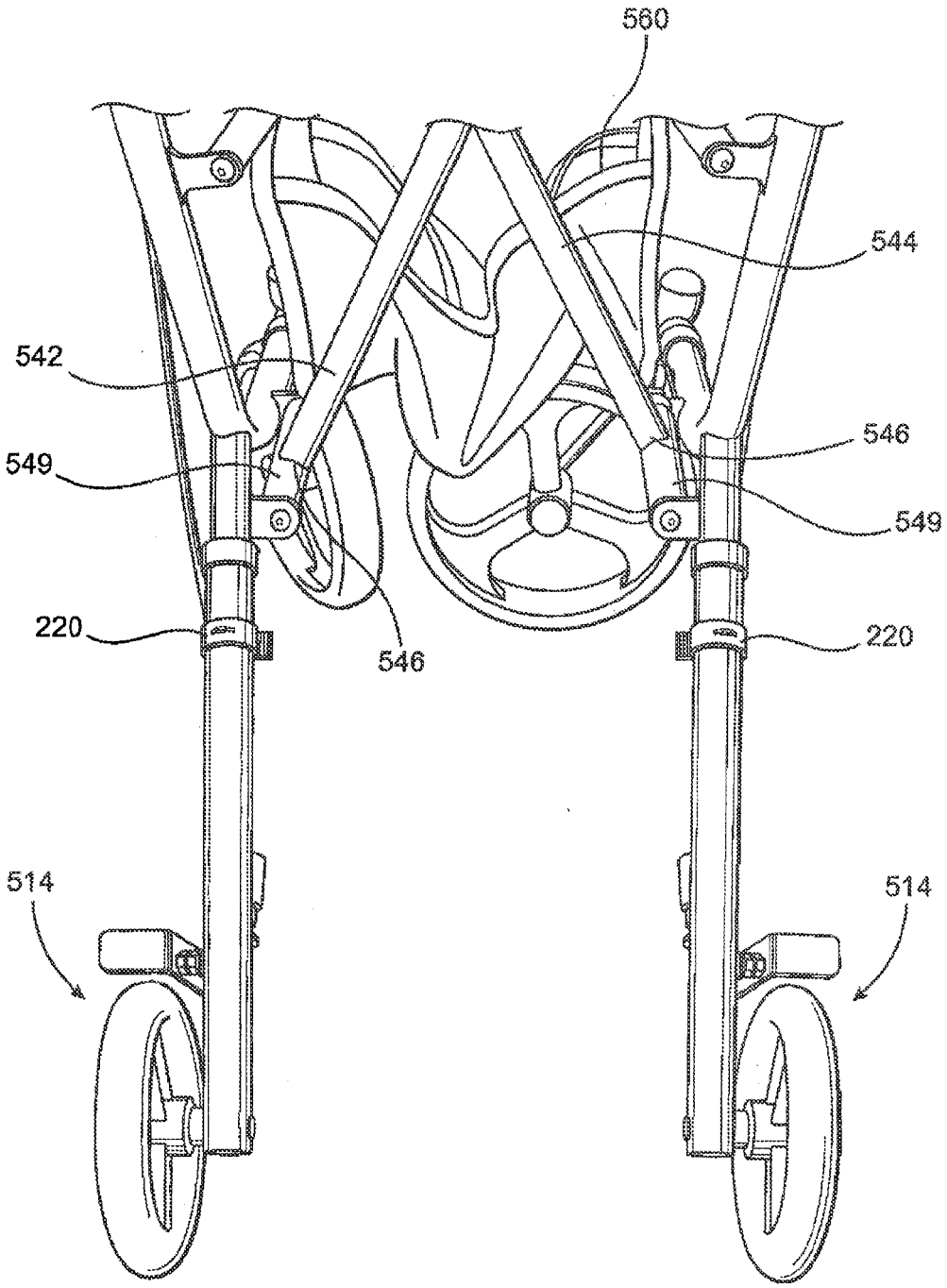


FIG. 39

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EUROPEAN SEARCH REPORT

Application Number
EP 14 15 9770

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 20 2006 006621 U1 (GENTEEL HOMECARE PRODUCTS CO L [CN]) 17 August 2006 (2006-08-17) * paragraphs [0023] - [0027]; figures *	1-8, 11-19,21	INV. A61H3/04 A61G5/08
X	WO 2012/089694 A1 (BEGER UDO [DE]) 5 July 2012 (2012-07-05) * page 9, lines 23-37 - pages 10-26; figures *	1-5,7-9, 11-19,21	
X	US 2007/163633 A1 (GALE BRADLEY D [US]) 19 July 2007 (2007-07-19) * paragraphs [0063] - [0143]; figures *	1-8, 11-19,21	
X	US 2008/093826 A1 (WILLIS PHILLIP M [US] WILLIS PHILLIP MINYARD [US]) 24 April 2008 (2008-04-24) * paragraphs [0068] - [0082]; figures *	1,3-5, 9-13,20	

TECHNICAL FIELDS SEARCHED (IPC)

A61H
A61G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 June 2014	Teissier, Sara

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17-06-2014

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