



US 20060071531A1

(19) **United States**

(12) **Patent Application Publication**
Groth

(10) **Pub. No.: US 2006/0071531 A1**

(43) **Pub. Date: Apr. 6, 2006**

(54) **LEG AMPUTEE SUPPORT ASSEMBLY FOR USE WITH A WHEELCHAIR**

(52) **U.S. Cl. 297/423.26**

(75) **Inventor: Michael C. Groth, Brookfield, WI (US)**

(57) **ABSTRACT**

Correspondence Address:
JOSEPH S. HEINO, ESQ.
DAVIS & KUELTHAU, S.C.
111 E. KILBOURN
SUITE 1400
MILWAUKEE, WI 53202-6613 (US)

An amputee support assembly includes a seat, a limb support and a pivot point disposed between the seat and limb support. The seat is attached to a first pivot member, a second pivot member, and a cam lock mechanism. The first pivot member and the second pivot member are adapted to rotatably engage one another when the cam lock mechanism is used. Each pivot member includes a hub portion having a circular face and a number of teeth defined within the face. The first pivot member includes a hub recess that is designed to receive a hub extension of the second pivot member. The outer periphery of the hub portion of the second pivot member also includes a lip that precludes access to the teeth that lie between the first and second pivot members. The cam lock mechanism includes a cam lock lever that is pivotally attached to a lock post. Rotation of the cam lock lever effects a pulling force on the lock post, forcing the pivot members together to prevent rotation between them. The second pivot member is attached to the limb support.

(73) **Assignee: Marken International, Inc., Bozeman, MT**

(21) **Appl. No.: 10/958,104**

(22) **Filed: Oct. 4, 2004**

Publication Classification

(51) **Int. Cl.**
A47C 7/50 (2006.01)

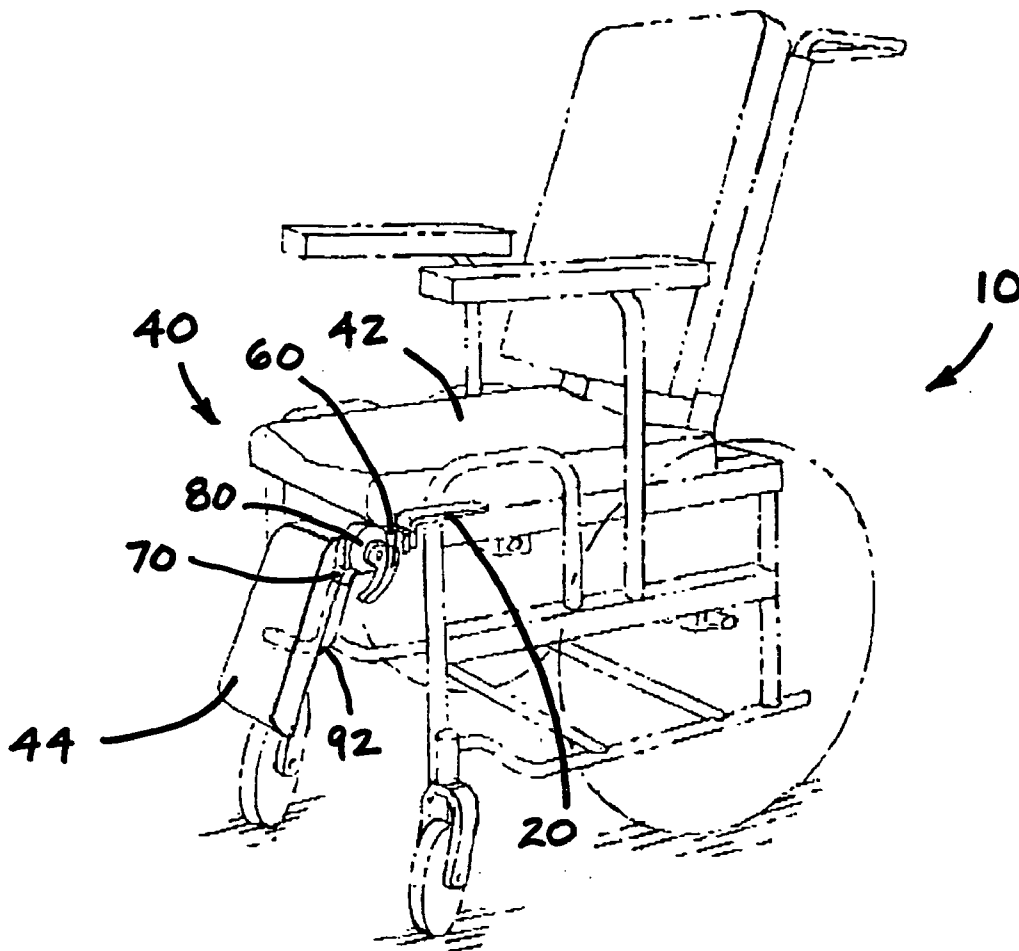


FIG. 1

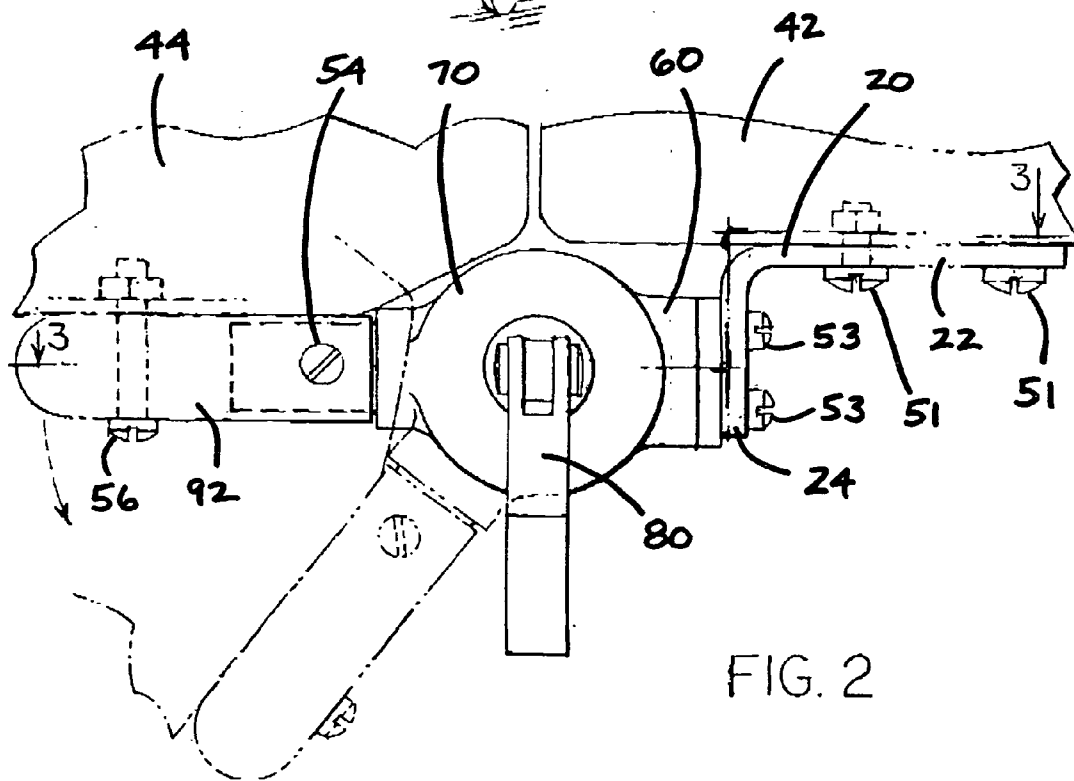
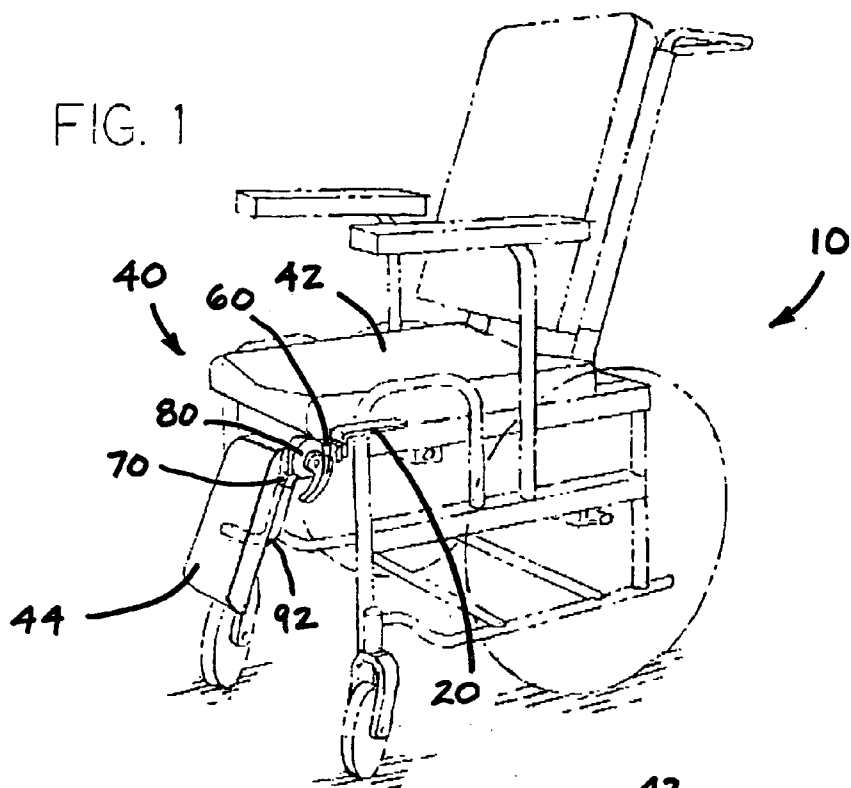
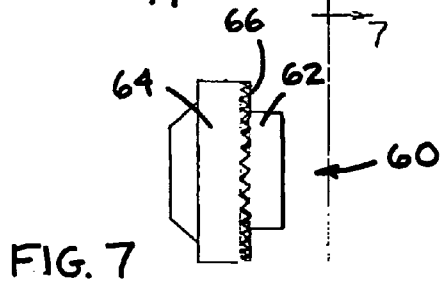
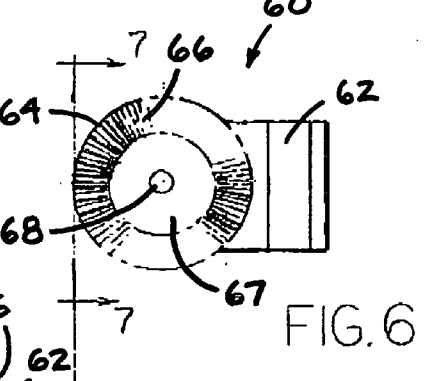
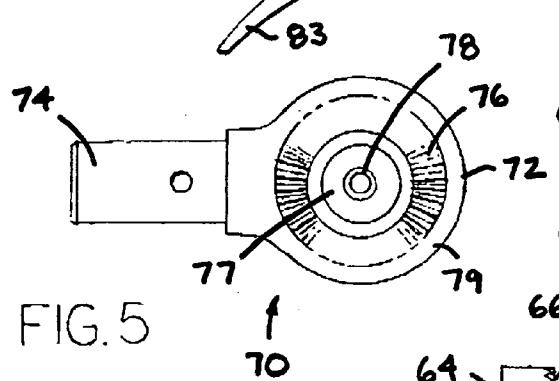
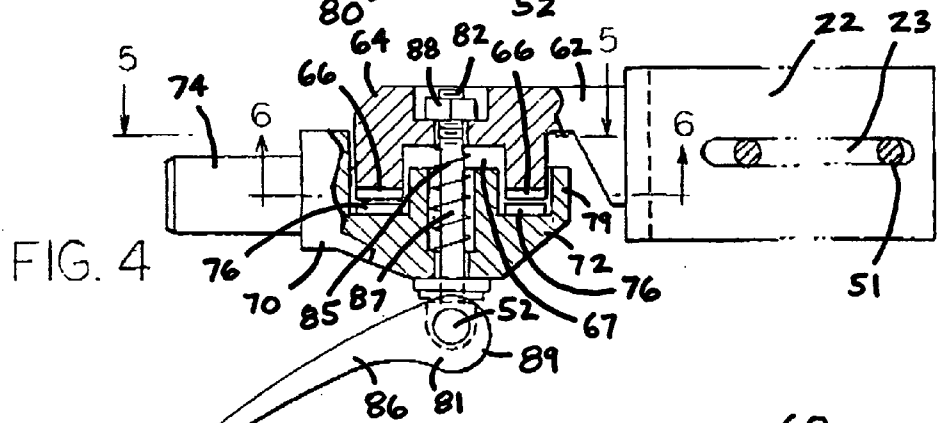
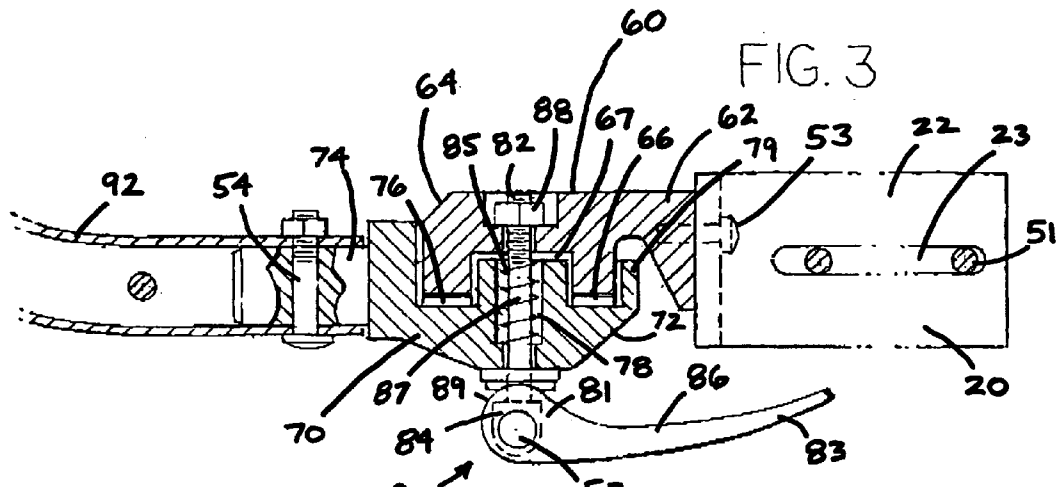


FIG. 2



LEG AMPUTEE SUPPORT ASSEMBLY FOR USE WITH A WHEELCHAIR

FIELD OF THE INVENTION

[0001] This invention relates generally to wheelchairs and to accessory items and assemblies for use with wheelchairs. More particularly, it relates to a leg amputee support assembly that can be easily used with a wheelchair for quickly and easily adjusting the support position of an amputee wheelchair user's residual leg portion. It also relates to a leg amputee support assembly that can be removed from the wheelchair for use with chairs or other seating devices.

BACKGROUND OF THE INVENTION

[0002] Conventional wheelchairs are normally equipped with a main tubular frame having a seat and two generally upright support members located to the rear of the wheelchair seat and adjacent the user's back. Conventional wheelchairs also have two generally upright support members located to the front of the wheelchair. These supports are typically used to provide footrests for wheelchair users. In the experience of this inventor, however, there is also a need to provide quick and versatile movement for the comfortable positioning of limb stumps in the case of a wheelchair user who also happens to be a leg amputee. There is also a need for a support that is infinitely adjustable between a wide variety of angles to provide for the comfort of the wheelchair occupant. Additionally, there is need for a leg support that can be quickly and easily moved out of the way to allow the user to transfer in and out of the wheelchair without being encumbered by the leg support. Furthermore, there is a need for an easy way to accomplish such versatile movement without cumbersome equipment and complicated steps.

SUMMARY OF THE INVENTION

[0003] It is, therefore a principal object of the present invention to provide a new, useful, and uncomplicated assembly for a variably adjustable support for the residual leg of an amputee wheelchair user. It is a further object of this invention to provide such an assembly whereby the user can adjust the limb position by a simple release of a lever. It is also an object of this invention to provide such an assembly that requires only a minimal number of elements and a minimal number of steps to utilize. It is yet another object of this invention to provide such an assembly that can readily be used by a wide variety of wheelchair occupants, including those having upper body weakness. It is still another object of this invention to provide such an assembly that is readily and quickly adjustable so as to accommodate the many shapes and sizes of persons needing to use the wheelchair that is equipped with the assembly of the present invention. It is an additional object to provide an assembly that can be quickly and easily moved out of the way of the wheelchair occupant to facilitate transfers in and out of the wheelchair. And it is yet another object of this invention to provide such an assembly that can be used with chairs and seating devices other than wheelchairs.

[0004] The present invention has obtained these objects. It provides for an amputee support assembly that includes a seat, a limb support and a pivot point assembly disposed between the seat and the limb support. The seat is attached to a first pivot member, a second pivot member, and a cam

lock mechanism. The first pivot member and the second pivot member are adapted to movably engage one another when the cam lock mechanism is used. Each pivot member includes a hub portion having a circular face and a number of teeth defined within the face. The first pivot member includes a hub recess that is designed to receive a hub extension of the second pivot member. The outer periphery of the hub portion of the second pivot member also includes a lip that precludes access to the teeth that lie between the first and second pivot members. The cam lock mechanism includes a cam lock lever that is pivotally attached to a lock post. Rotation of the cam lock lever effects a pulling force on the lock post which forces the first and second pivot members securely together to prevent rotation between them. In this fashion, the cam lock mechanism can be locked and unlocked to secure or allow movement between the two pivot members. When a desired position is found by the wheelchair user, the cam lock lever can be urged downwardly toward the second pivot member. This will rotate a cam portion of the cam lock lever thereby exerting a tension force on the lock bolt and urging the meshed teeth of the pivot members together and preventing movement between them. This position will be maintained until a change of position is desired or required by the wheelchair user. The foregoing and other features of the assembly of the present invention will be apparent from the detailed description that follows.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 is a front, top and right side perspective view of a conventional wheelchair that includes an amputee support assembly constructed in accordance with the present invention.

[0006] FIG. 2 is an enlarged side elevational view of the cam lock portion of the amputee support assembly shown in FIG. 1.

[0007] FIG. 3 is a top plan and cross sectioned view of the cam lock portion of the amputee support assembly taken along line 3-3 of FIG. 2 and showing the cam lock in the "locked" position.

[0008] FIG. 4 is another top plan and cross sectioned view of the cam lock portion of the amputee support assembly illustrated in FIG. 3 and showing the cam lock in the "unlocked" position.

[0009] FIG. 5 is a side elevational view of the second pivot member of the amputee support assembly taken along line 5-5 of FIG. 4.

[0010] FIG. 6 is a side elevational view of the first pivot member of the amputee support assembly taken along line 6-6 of FIG. 4.

[0011] FIG. 7 is a front elevational view of the first pivot member taken along line 7-7 of FIG. 6.

DETAILED DESCRIPTION

[0012] The following detailed description is intended to describe the preferred embodiments that are depicted in the figures. It is to be understood that changes could be made to that which is specifically described and shown that would still fall within the scope of the present invention.

[0013] Referring now to the drawings in detail, wherein like numbered elements refer to like elements throughout, **FIG. 1** illustrates a typical wheelchair, generally identified **10**, with which the assembly of the present invention is intended to be used. It is to be understood that the specific type or model of wheelchair **10** is not particularly important for purposes of this detailed description. Important is the fact that the wheelchair **10** have a seat and be functionally adapted to use an amputee support assembly, generally identified **40**, of the type disclosed herein. In the view of this inventor, the limb support assembly **40** is most efficiently used in a setting wherein the wheelchair user is an amputee and the limb support assembly **40** is used to comfortably support a limb stump. The versatility of movement and adjustability of the assembly **40** of the present invention makes it an ideal device for such an application. It is to be understood, however, that the use of the assembly is not so limited. The assembly **40** can be used with chairs and seating devices other than wheelchairs.

[0014] Again referring to **FIG. 1**, the amputee support assembly **40** of the present invention is employed as a part of the wheelchair **10** by simply placing it upon the seat (not shown) of the wheelchair **10**. A belt or ties (not shown) may be used to secure the assembly **40** to the chair **10**. The support assembly **40** generally includes a seat portion **42** and a limb support portion **44**. Attachable to the underside of the seat portion **42** is a seat portion bracket **20** having a first bracket portion **22** and a second bracket portion **24**, the first bracket portion **22** being in an essentially horizontal plane and the second bracket portion **24** being in an essentially vertical plane and forming an "L" shape. See **FIG. 2**. The first bracket portion **22** includes a slot **23** and the second bracket portion **24** includes a slot or aperture (not shown). Fasteners **51** are used to attach the bracket **20** to the seat portion **42**. Similarly, fasteners **53** are used to attach the bracket **20** to a first pivot member **60**. See **FIG. 3**.

[0015] Interposed between the seat portion **42** and the limb portion **44** is a first pivot member **60**, a second pivot member **70**, and a cam lock mechanism **80**. The first pivot member **60** and the second pivot member **70** of the limb support assembly **40** are functionally adapted to movably engage one another and work together to secure the position of the members **60, 70** relative to one another when the cam lock mechanism **80** is used as intended. As shown in **FIG. 6**, the first pivot member **60** includes a proximal portion **62** and a distal hub portion **64**. The distal hub portion **64** comprises a generally circular face having a number of teeth or serrations **66** defined within the face. See **FIG. 7**. The distal hub portion **64** of the first pivot member **60** also includes a central hub recess **67** and a central aperture **68**. The purpose of that structure will be apparent further in this detailed description.

[0016] The amputee limb support assembly **40** also includes a second pivot member **70**. The second pivot member **70** includes a proximal hub portion **72** and a distal portion **74**. The proximal hub portion **72** comprises a generally circular face having a number of teeth or serrations **76** defined within the face. See **FIG. 5**. It is this proximal hub portion **72** that is functionally adapted to engage the distal hub portion **64** of the first pivot member **60**. And, in actuality, it is the teeth **76** of the proximal hub portion **72** that are functionally adapted to engage the teeth **66** of the distal

hub portion **64**. The proximal hub portion **72** of the second pivot member **70** also includes a central hub extension **77** and a central aperture **78**.

[0017] Referring again to **FIGS. 3 and 4**, it will be apparent that the first pivot member **60** and the second pivot member **70** comprise profiles that are significant in the structure of the assembly of the present invention. For example, the first pivot member **60** is, at its proximal portion **62**, attachable to the seat bracket **20**. The distal hub portion **64** of the first pivot member **60** also includes a hub recess **67** as alluded to earlier. This hub recess **67** is designed to receive the hub extension **77** of the proximal hub portion **72** of the second pivot member **70**. See **FIG. 3**. The outer periphery of the proximal hub portion **72** of the second pivot member **70** also includes a lip **79**. This lip **79** precludes access to the teeth **66, 76** that lie between the first and second pivot members **60, 70**, respectively. It is also to be understood that the configuration disclosed herein could be designed such that the hub portion is integrally formed as part of the second pivot member **70** and that the hub recess is integrally formed as part of the first pivot member **60**, the lip being formed as part of the latter as well.

[0018] The limb support assembly **40** of the present invention also includes a cam lock mechanism **80**. As shown in **FIGS. 3 and 4**, the cam lock mechanism **80** includes a lock post **87** having a first end **82** and a second end **84**. The first end **82** of the lock post **87** is threaded and has a complementary threaded nut **88** formed as a stop device. The second end **84** of the lock post **87** has an aperture (note shown) defined within it. The cam lock mechanism **80** includes a cam lock lever **86** that is pivotally attached to the second end **84** of the lock post **87** by means of a pin **52** that is inserted through a proximal end **81** of the lever **86** and through the lock post aperture. The proximal end **81** of the cam lock lever **86** includes a cam surface **89** whereby rotation of the cam lock lever **86** about the pin **52** and toward the second pivot member **70** effects a pulling force on the lock post **87**. A spring **85** is interposed between the first and second pivot members **60, 70**, respectively, to urge the pivot members **60, 70** away from one another. When the cam lever **86** is moved to an "unlocked" position which is generally perpendicular to the second pivot member **70**, the spring **85** becomes relaxed. When the cam lever **86** is moved downwardly toward the second pivot member **70** in its "locked" position, the spring **85** is under tension and secures the cam lever **86** in position. Rotation of the cam lock lever **86** is accomplished by lifting the distal end **83** of the lever **86** away from the second pivot member **70**. It should also be noted that the cam lock lever **86** is not positionally dependent. That is, when the cam lock lever **86** is in its "unlocked" position, the cam lock lever **86** can be rotated 360° about the axis formed by the lock post **87**. In this fashion, the user can select the cam lock lever **86** position that is most comfortable or useful for him or her.

[0019] The distal portion **74** of the second pivot member **70** is receivable within a receiving post **92** of the limb support **44**. See **FIGS. 2 and 3**. The receiving post **92** is secured to the distal portion **74** of the second pivot member **70** by means of a fastener **54**. When used as intended, the limb support **44** can be movable to many comfortable positions by the user, particularly to accommodate comfortable positions where the user is an amputee.

[0020] In the application of the preferred embodiment, the amputee support assembly 40 is simply placed onto the seat of the wheelchair 10 and secured using the belt or ties (not shown) as previously referred to. At his point, the limb support 44 may not be in a desired position. Accordingly, the cam lock mechanism 80 is released to allow the first pivot member 60 and the second pivot member 70 to rotate relative to one another. This is accomplished by lifting the cam lock lever 86 which effects a release of tension on the lock post 87 thereby allowing the pivot members 60, 70 to be movable relative to one another. At this point, the teeth 66, 76 of the pivot members 60, 70, respectively, are disengaged such that the pivot members 60, 70 may be rotated relative to one another. This will allow the user to change the position of the limb support 44. Assuming that the first pivot member 60 is held in fixed position relative to the seat 42, rotation between the first and second pivot members 60, 70 will be observed by the user to be the second pivot member 70 rotating about the first pivot member 60. As shown in FIG. 2, the limb support 44 will be movable upwardly or downwardly relative to the horizontal.

[0021] When a desired or required position is found, as determined by the user, the cam lock lever 86 will then be urged downwardly toward the second pivot member 70. This will rotate the cam portion 89 of the proximal portion 84 of the cam lock lever 86 thereby exerting a tension force on the lock bolt 87 and urging the meshed teeth 66, 67 of the pivot members 60, 70 together and preventing movement between them. This position will be maintained until a change of position is desired or required by the wheelchair user.

[0022] Although I have very specifically described the preferred embodiments of the invention herein, it is to be understood that changes can be made to the improvements disclosed without departing from the scope of the invention. Therefore, it is to be understood that the scope of the invention is not to be overly limited by the specification and the drawings, but is to be determined by the broadest possible interpretation of the claims.

Based on the foregoing, I hereby claim as my invention:

1. An amputee support assembly for use with a wheelchair comprising

- a seat member,
- a first pivot member,
- a second pivot member, said second pivot member being movable relative to the first pivot member,
- means for releasably fixing the position of the first pivot member relative to the second pivot member,
- means for affixing the first pivot member to the seat member, a limb support member, and
- means for affixing the second pivot member to the limb support member whereby the limb support member may be used to support one or more limbs of a user seated in the wheelchair.

2. The amputee support assembly of claim 1 wherein the first pivot member includes a generally circular face portion having a plurality of teeth defined within the face portion and extending radially outwardly from its center, the second pivot member includes a generally circular face portion having a plurality of teeth defined within the face portion

and extending radially outwardly from its center, and the means for fixing the position of the first pivot member relative to the second pivot member includes means for meshing the teeth of the first pivot member face with the teeth of the second pivot member face.

3. The amputee support assembly of claim 2 wherein the first pivot member face includes an aperture located generally within the center of the first pivot member face, the second pivot member face includes an aperture located generally within the center of the second pivot member face, said face apertures being substantially aligned when the first pivot member face is engaged with the second pivot member face, and the means for fixing the position of the first pivot member relative to the second pivot member includes a cam lock mechanism that is insertable within the aligned apertures.

4. The amputee support assembly of claim 3 wherein the cam lock mechanism further includes a lock post that extends through the aligned apertures, said lock post having a first end and a second end, and includes a stop device at the first end and a cam lever at the second end whereby actuation of the cam lever draws the stop device toward the cam lever and engages the pivot member teeth to prevent rotational movement thereby.

5. The amputee support assembly of claim 4 including a hub recess defined within the first pivot member and a hub extension defined within the second pivot member whereby the hub extension is receivable within the hub recess.

6. The amputee support assembly of claim 5 including means for preventing access to the meshing teeth of the pivot members.

7. The amputee support assembly of claim 6 wherein the access preventing means comprises a lip surrounding the outer periphery of the face portion of the second pivot member.

8. An amputee support assembly for use with a conventional wheelchair, said wheelchair including a support frame and a seat, which comprises

- a seat member,
- means for removably attaching the seat member to the wheelchair support frame such that the seat member of the assembly rests atop the wheelchair seat,
- at least one limb support member,
- a first pivot point member,
- a second pivot point member, said second pivot point member being movable relative to the first pivot point member,
- means for releasably fixing the position of the first pivot point member relative to the second pivot point member,
- means for attaching the first pivot point member to the seat member, and
- means for attaching the second pivot member to the at least one limb support member such that the angle of elevation is variably adjustable.

9. The amputee support assembly of claim 8 wherein the first pivot point member includes a generally circular face having a center and a plurality of teeth defined within the face and extending radially outwardly from the center, the second pivot point member includes a generally circular face

portion having a center and a plurality of teeth defined within the face and extending radially outwardly from the center, and the means for fixing the position of the first pivot point member relative to the second pivot point member includes means for meshing the teeth of the first pivot point member face with the teeth of the second pivot point member face.

10. The amputee support point assembly of claim 9 wherein the first pivot point member face includes an aperture located generally within the center of the first pivot point member face, the second pivot point member face includes an aperture located generally within the center of the second pivot point member face, said face apertures being substantially aligned when the first pivot point member face is engaged with the second pivot point member face, and the means for fixing the position of the first pivot point member relative to the second pivot point member includes a cam lock mechanism that is insertable within the aligned apertures.

11. The amputee support assembly of claim 10 wherein the cam lock mechanism further includes a lock post that extends through the aligned apertures, said lock post having a first end and a second end, and includes a stop device at the first end and a cam lever at the second end whereby actuation of the cam lever draws the stop device toward the cam lever and engages the pivot point member teeth to prevent relative rotational movement therebetween.

12. The amputee support assembly of claim 11 including a hub recess defined within the first pivot point member and a hub extension defined within the second pivot point member whereby the hub extension is receivable within the hub recess.

13. The amputee support assembly of claim 12 including means for preventing access to the meshing teeth of the pivot point members.

14. The amputee support assembly of claim 13 wherein the access preventing means comprises a lip surrounding the outer periphery of the face portion of the second pivot point member.

15. The amputee support assembly of claim 11 including a hub recess defined within the second pivot point member and a hub extension defined within the first pivot point member whereby the hub extension is receivable within the hub recess.

16. The amputee support assembly of claim 15 including means for preventing access to the meshing teeth of the pivot point members.

17. The amputee support assembly of claim 16 wherein the access preventing means comprises a lip surrounding the outer periphery of the face portion of the first pivot point member.

18. An amputee support pivot assembly for use with a conventional wheelchair that has a frame, said wheelchair frame having a front frame portion and a rear frame portion, a backrest and a seat, which comprises

a seat,

a first pivot member, said first pivot member being attachable to the seat and comprising a first pivot member bracket having a face portion,

a residual limb support,

a second pivot member, said second pivot member being attachable to the residual limb support and comprising a second pivot member bracket having a face portion,

a set of radially disposed teeth defined within the face portion of each pivot member, said teeth extending radially outwardly from a center point of the face portion, and

means for engaging the teeth of the first pivot member with the teeth of the second pivot member

wherein the angle of elevation of the residual limb support is variably adjustable relative to the seat.

19. The amputee support pivot assembly of claim 18 wherein the first pivot member face includes an aperture located generally within the center of the first pivot member face, the second pivot member face includes an aperture located generally within the center of the second pivot member face, said face apertures being substantially aligned when the first pivot member face is engaged with the second pivot member face, and the teeth engagement means includes a cam lock mechanism that is insertable within the aligned apertures, the cam lock mechanism further including a lock post that extends through the aligned apertures, said lock post having a first end and a second end, and including a stop device at the first end and a cam lever at the second end such that actuation of the cam lever draws the stop device toward the cam lever and engages the pivot member teeth to prevent rotational movement therebetween.

20. The amputee support pivot assembly of claim 19 including a hub recess defined within the first pivot member, a hub extension defined within the second pivot member whereby the hub extension is receivable within the hub recess, and a lip surrounding the outer periphery of the face portion of the second pivot member to prevent access to the meshing teeth.

* * * * *