

AN EASY ACCESS WHEELCHAIR

Field of the Invention

This invention relates to a wheelchair. Particularly, this invention relates to a
5 mechanism for a wheelchair to adjust the position of a self-propel wheel of the wheelchair.
More particularly, this invention relates to a wheelchair provided with a mechanism to
move the self-propel wheel in order to facilitate the transfer operation of a wheelchair
bound patient from or to the wheelchair.

Prior Art

10 A typical wheelchair has a pair of small forward castor wheels for directional
control and a pair of larger rear wheels with outer rails for propelling the wheelchair. The
rear wheels are relatively large to allow the user to easily access the outer rails in order to
move the wheelchair as and when desired. However, such wheelchairs do not allow a
15 user to move the rear wheels out of the way in order for the user to have a clear path of
access into and out of the wheelchair.

Hence, those skilled in the art are striving to provide an improved mechanism to
move the rear wheel to provide an unobstructed path into and out of a wheelchair.

Summary of the Invention

20 The above and other problems are solved and an advance in the art is made by a
rotatable assembly for a self-propelled wheelchair in accordance with this invention. A
first advantage of the rotatable assembly for a self-propelled wheelchair in accordance
25 with this invention is that the rotatable assembly can be retrofitted to existing wheelchair.
A second advantage of the rotatable assembly for a self-propelled wheelchair in
accordance with this invention is that the rotatable assembly allows movement of rear

wheel to provide a clear path for transfer of a wheelchair bound user. Other advantages may be gleaned from the detailed description provided below.

In accordance with an aspect of the invention, a rotatable assembly for a self-propelled wheelchair is provided in the following manner. The rotatable assembly comprises a holder, a mounting adaptor, a rotating block and a securing means. The holder has a cutout defining a C-shape base. The mounting adaptor is secured to the holder and adapted to be mountable on a frame of the wheelchair. The rotating block is arranged within the cutout of the holder and rotatably coupled to the holder. Further, the rotating block has a through opening adapted for mounting onto a rear wheel of the wheelchair. The rotating block and the holder are arranged such that the rotating block is rotatable between a first position in which the rear wheel is adjacent to the side of the wheelchair and a second position in which the rear wheel is adjacent to the rear of the wheelchair. The securing means is adapted for locking the rotating block when in the first position.

In accordance with an embodiment of this invention, the securing means is a spring loaded match mechanism.

In accordance with an embodiment of this invention the rotating block comprises a block having an elongated through opening defining a C-shape channel and a moving block movable within the C-shape channel wherein the through opening is provided on the moving block such that the rear wheel is slidable along the C-shape channel when in the second position.

In accordance with an embodiment of this invention, the rotatable assembly further comprises an elevation mechanism adapted to elevate the rear wheel off a ground.

The elevation mechanism comprises a lever, a fulcrum, and a rod extending through a through opening of the C-shape base and arranged such that actuating the lever in a first direction causes the fulcrum to drive the rod towards the ground elevating the rear wheel off the ground and actuating the lever in a second direction opposing the first direction causes the fulcrum to release the rod.

Brief Description of the Drawings

The above and other features and advantages in accordance with this invention are described in the following detailed description and are shown in the following drawings:

Figure 1 illustrating a perspective view from the front of a conventional wheelchair having a pair of rotatable assembly in accordance with an embodiment of this invention;

Figure 2 illustrating a perspective view from the rear of a conventional wheelchair with one of the rear wheels being rotated in accordance with an embodiment of this invention;

Figure 3 illustrating a perspective view from the front of a conventional wheelchair with both rear wheels being rotated in accordance with an embodiment of this invention;

Figure 4 illustrating a perspective view of the rotatable assembly in accordance with an embodiment of this invention;

Figure 5 illustrating a partially exploded view of the rotatable assembly in accordance with an embodiment of this invention;

Figure 6 illustrating a perspective view of a holder of the rotatable assembly in accordance with an embodiment of this invention;

Figure 7 illustrating a perspective view from the front of a rotating block of the rotatable assembly in accordance with an embodiment of this invention;

Figure 8 illustrating a perspective view from the rear of a rotating block of the rotatable assembly in accordance with an embodiment of this invention;

It is envisioned that a wheelchair is provided with a rotatable assembly to allow one of the rear wheels of wheelchair to rotate to a desired position to provide an unobstructed path. With one of the rear wheels moved to provide an unobstructed path, a user can easily access from or to the wheelchair, or a care-giver is able to assist in transferring the user from or to the wheelchair.

Figure 1 illustrates a perspective view of a wheelchair 190 with two rotatable assemblies 100 in an operative position. Figure 2 illustrates a perspective view of a wheelchair 190 in a transfer position in which the left rear wheel is being swivelled anti-clockwise by about 90 degrees. Figure 3 illustrates a perspective view of a wheelchair 190 in a transfer position in which the left rear wheel is being swivelled anti-clockwise by about 90 degrees and the right rear wheel is being swivelled clockwise by about 90 degrees.

In the operative position, both rear wheels are parallel to each other allowing a user to propel forwardly or rearwardly. In other words, the left rear wheel is adjacent to the left side of the wheelchair while the right rear wheel is adjacent to the right side of the wheelchair when in the operative position. In the transfer position, at least one of the rear wheels is being swivelled about the rotatable assembly as shown in arrow 210 such that the rear wheel is about 90 degrees displaced from the side of the wheelchair. Alternatively, both rear wheels may be swivelled about respective rotatable assemblies as shown in arrows 210 and 310 such that the rear wheels are about 90 degrees displaced from respective sides of the wheelchair. In other words, the left rear wheel and the right rear wheel are adjacent to the rear of the wheelchair when in the transfer position.

Figure 4 illustrates a perspective view of the rotatable assembly 100 in accordance with an embodiment of this invention. Figure 5 illustrates a partially exploded

view of the rotatable assembly 100 in accordance with an embodiment of this invention. The rotatable assembly 100 comprises a holder 410, a rotating block 420, a mounting adapter 430 and a securing means 440.

5 Figure 6 illustrates a perspective view of the holder 410. As shown in figure 6, the holder 410 is a C-shape base. The holder 410 is essentially a block having cutout 411 at one side of the block forming the C-shape base. In other words, the holder 410 has a pair of parallel blocks 412 and 413, and a linking block 414 bridging opposing ends of the parallel blocks 412 and 413 to form the C-shape base. The cutout 411 of the holder 410
10 defines a void to receive the rotating block 420. The holder 410 has a through opening 415. The through opening 415 is provided to receive a shaft of the securing means 440. Through openings 416 and 417 are provided on the holder 410 for rotatably coupling the rotating block 420. Particularly, through openings 416 and 417 are provided at proximate ends of each of the parallel blocks 412 and 413. Apertures 418a-418d are provided at
15 corners of the C-shape base 410. Apertures 418a-418d have threaded inner surface adapted for securing the plate 430 onto the holder 410.

 Figure 7 illustrates a perspective view from the front of the rotating block 420. The rotating block 420 is a block 421 having a first through opening 422 extending from the
20 front surface to the rear surface of the rotating block 420 and a second through opening 423 extending from the top surface to the bottom surface of the rotating block 420 and a cavity 424 at the top surface of the rotating block 420. The block 421 of rotating block 420 has rounded ends 425 and 426. Figure 8 illustrates a perspective view from the rear of the rotating block 420. As shown, the first through opening 422 has a larger diameter at
25 the rear to receive a nut. A shaft is inserted through the first through opening 422 securing the rotating block 420 to a rear wheel with the nut. Another shaft is inserted

through the through openings 416 and 417 of the C-shape base 420 and second through opening 423 rotatably coupling the rotating block 420 to the C-shape base 410.

The cavity 424 is configured to receive an extension of the securing means 440 for locking the rotating block 420. One skilled in the art will recognise that the rotating block 420 needs to be rotatably coupled to the C-shape base, shaped according to the cutout 411 of the C-shape base to allow rotation within the cutout 411 of the C-shape base, and secured to a rear wheel. Hence, other shapes and dimensions of the rotating block 420 may be implemented without departing from the invention.

Essentially, the rotating block 420 is provided to secure the rear wheel to the rotatable assembly 100 and to allow the rear wheel to rotate about the shaft inserted through the through openings 416 and 417 of the C-shape base 410 and second through opening 423.

The mounting adaptor 430 couples the C-shape base 410 to the frame of the wheelchair. The mounting adaptor 430 comprises a plate 431 having four threaded screws 432-435 at each of the corners of the plate 431, and a threaded screw 436 at the centre of the plate 431. The four threaded screws 432-435 are provided for securing the plate 430 to the C-shape base 410. The threaded screw 436 is provided for securing the plate 430 to the frame of the wheelchair. One skilled in the art will recognise that mounting adapter 430 is essentially provided for mounting the rotatable assembly 100 to the frame of the wheelchair

Figure 9 illustrates the securing means 440 coupled to the C-shape base 410. The securing means 440 is provided to lock the rotating block 420, preventing the rotating block 420 from moving. As shown in figure 9, securing means 440 is a spring loaded latch

mechanism 441 inserted through the through opening 415 of the C-shape base 410. It is noted that rotating block 420 has been rotated away from the transfer position in order to show the extension 442. When the securing means 440 is in the locking position, an extension 442 of the spring loaded latch mechanism 441 extends into the cavity 424 of the rotating block 420 preventing the rotating block 420 from any movements. When unlocking the securing means 440, the extension 442 moves out of the cavity 424 allowing the rotating block 420 to move. Essentially, the securing means 440 acts as a safety mechanism to lock the rear wheel when in the operative position. One skilled in the art will recognise that the securing means 440 may be modified with other latches without departing from the invention.

The wheelchair with the rotatable assembly 100 is used in the following manner. To deploy the wheelchair for the transfer of wheelchair bound user, the securing means 440 is first unlocked. The wheel is then rotated from the side to the rear to create a clear path of transfer for the wheelchair bound user. Subsequently, the armrest is removed and the wheelchair bound user may be transferred out of the wheelchair.

With one of the rear wheels being rotated away from the side of the wheelchair, a clear path is provided to allow user to access to or off the wheelchair. It is important to note that the rotatable assembly 100 in accordance with this invention is provided for wheelchairs with rear wheels having a large diameter to the extent that the rear wheels obstruct the side of the wheelchair impeding the transfer of a wheelchair bound user to or off the wheelchair. Typically, such wheelchairs are self-propelled wheelchairs.

Figures 10-15 illustrate another embodiment of a rotatable assembly 900. Figure 10 illustrates the rotatable assembly 900 for a left rear wheel when in the operative position. Figure 11 illustrates the rotatable assembly 900 for a left rear wheel when in the

transfer position. Figure 15 illustrates a left rear wheel coupled to the rotatable assembly 900 when in the transfer position. Similar to the rotatable assembly 100, the rotatable assembly 900 comprises a holder 910, a rotating block 920, a mounting adapter 930 and a securing means 940. The rotatable assembly 900 further comprises an elevation
5 mechanism 950.

Figure 12 illustrates a perspective view of the holder 910. As shown in figure 12, the holder 910 is a C-shape base. The holder 910 is essentially a block having cutout 911 at one side of the block forming the C-shape base. In other words, the holder 910 has a
10 pair of parallel blocks 912 and 913, and a linking block 914 bridging opposing ends of the parallel blocks 912 and 913 to form the C-shape base. The cutout 911 of the holder 910 defines a void to receive the rotating block 920. The holder 910 has a through opening 915. The through opening 915 is provided to receive an extension of the securing means 940. Through openings 916 and 917 are provided on the holder 910 for rotatably coupling
15 the rotating block 920. Particularly, through openings 916 and 917 are provided at proximate ends of each of the parallel blocks 912 and 913. Apertures 918a-918b are provided at proximate corners of the linking bridge 914 and apertures 918c and 918d are provided on the parallel blocks 913 and 912 respectively. It is important to note that the apertures 918c and 918d are spaced apart from the end of the parallel blocks 913 and
20 912 respectively to provide a clearance for the wheel rotator 920 when in the transfer position. Apertures 918a-918d have threaded inner surface adapted for securing the plate 930 onto the holder 910. A further through opening 919 is provided at the linking block 914 to receive the rod of the elevation mechanism 950.

25 Figure 13a illustrates a perspective view from the front of the rotating block 920. Figure 13b illustrates a perspective view from the rear of the rotating block 920. The rotating block 920 is a block 921 having an elongated through opening defining a C-

channel 923. A moving block 924 is movable within the C-channel 923. A stopper is provided at both ends 928 and 929 of the rotating block 920 to prevent moving block 924 from escaping out of the C-shape channel. Figure 14a illustrates a perspective view of the moving block 924. The moving block 924 includes a through opening 9241. Figure 5 14b illustrates a perspective view from the rear of the moving block 924. As shown, the through opening 9241 has a larger diameter at the rear to receive a nut. A shaft is inserted through the through opening 9241 securing the moving block 924 to a rear wheel with the nut. The moving block 924 has a cavity 9242 at the top surface to receive the extension of the securing means 940.

10 The block 921 further includes a first aperture 925 at a top surface of the block 921, a second aperture 922 at a bottom surface of the block 921 and a through opening 927 at the top surface. A top shaft is inserted through the through opening 916 of the C-shape base 910 and into the first aperture 925 and a bottom shaft is inserted through the 15 through opening 917 and into the second aperture 922, rotatably coupling the rotating block 920 to the C-shape base 910. In other words, the rotating block 920 is rotatable about the top and bottom shafts. The through opening 927 is configured to receive an extension of the securing means 940 for locking the rotating block 920 and moving block 924.

20 Essentially, the rotating block 920 secures the rear wheel to the rotatable assembly 900 and allows the rear wheel to rotate about the shafts inserted through the through openings 916 and 917 of the C-shape base 920. The C-shape channel 923 allows a left rear wheel to slide towards the right side of the wheelchair as shown by 25 arrow 211 in figure 2. This allows the wheelchair to be positioned closer to the target destination.

The mounting adaptor 930 couples the C-shape base 910 to the frame of the wheelchair. Similar to the mounting adaptor 430, mounting adaptor 930 comprises a plate having four threaded screws at each of the corners of the plate, and a centre threaded screw at the centre of the plate. The four threaded screws are provided for securing the plate to the C-shape base 910 via the apertures 918a-918d. The centre threaded screw is provided for securing the plate to the frame of the wheelchair. Unlike the mounting adapter of 430, the plate of the mounting adapter 930 extends further from one side for elevation mechanism to be mounted onto. One skilled in the art will recognise that other types of mounting adapters may be used for mounting the rotatable assembly 900 to the frame of the wheelchair.

The securing means 940 is provided to lock the rotating block 920 and moving block 924, preventing the rotating block 920 and moving block 924 from any movements. As shown in figures 10 and 11, the securing means 940 is a spring loaded latch mechanism inserted through the through opening 915 of the C-shape base 920. When the securing means 940 is in the locked position, an extension of the spring loaded latch mechanism extends through the through opening 927 and into the cavity 9242 preventing the rotating block 920 and moving block 924 from any movements. When the securing means 940 is in the unlocked position, the extension of the spring loaded latch mechanism moves out of the cavity 9242 and the through opening 927 allowing the rotating block 920 to be rotatable and moving block 924 to be slidable within the C-shape channel. Essentially, the securing means 940 acts as a safety mechanism to lock the rear wheel when in the operative position. One skilled in the art will recognise that the securing means 940 may be modified with other latches without departing from the invention.

The elevation mechanism 950 is provided to elevate the wheelchair. With the rear wheel elevated, it will be easier to rotate and slide the rear wheel. The elevation mechanism 950 comprises a lever 951, a fulcrum 952 and a rod 953 extending through the through opening 919 of the C-shape base 910. The lever 951 and fulcrum 952 are secured to the mounting adaptor 930. The elevation mechanism 950 is arranged such that actuating the lever 951 in a first direction causes the fulcrum 952 to drive the rod 953 downwardly and in turn elevating the rear wheel off the ground. Subsequently, actuating the lever 951 in a second direction, opposing the first direction, causes the fulcrum 952 to release the rod 953.

The rotatable assembly 900 is modified from the rotatable assembly 100 in order to reduce the space between the wheelchair and the target location during a transfer process. The wheelchair with the rotatable assembly 900 is used in the following manner. To deploy the wheelchair for the transfer of wheelchair bound user from the left side of the wheelchair, the user actuates the lever 951 to elevate the left rear wheel. Subsequently, the user unlocks the securing means 940, rotates the left rear wheel anti-clockwise and further slides the left rear wheel to the right side of the wheelchair to create a clear path of transfer for the wheelchair bound user. Subsequently, the armrest is removed and the wheelchair bound user may be transferred out of the wheelchair.

The rotatable assemblies 100 and 900 can be retrofitted onto most of the existing wheelchair by modifying the mounting adaptors 430 and 930. It provides a simple and low cost solution to convert a conventional wheelchair to an easy access wheelchair. One skilled in the art will also recognise that the rotatable assemblies 100 and 900 may also be provided as part of the assembly of a wheelchair without departing from the invention. For example, the C-shape bases 410 and 910 can be coupled directly to the frame of the wheelchair and hence doing away with the mounting adaptors 430 and 930.

The rotatable assembly 100 and 900 creatively employs a latchable rotating mechanism to enable the rear wheel to rotate perpendicularly to the user's sitting position to clear a path for transfer process.

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The above is a description of exemplary embodiments of a wheelchair in accordance with this invention. It is foreseeable that those skilled in the art can and will design alternative devices based on this disclosure that infringe upon this invention as set forth in the following claims.

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Claims:

1. A rotatable assembly for a self-propelled wheelchair comprising:

a holder having a cutout defining a C-shape base;

5 a mounting adaptor secured to said holder and adapted to be mountable on a frame of said wheelchair;

a rotating block arranged within said cutout of said holder and rotatably coupled to said holder, said rotating block having a through opening adapted for mounting onto a rear wheel of said wheelchair, wherein said holder and said rotating block are arranged
10 such that said rotating block is rotatable between a first position in which the rear wheel is adjacent to the side of the wheelchair and a second position in which the rear wheel is adjacent to the rear of the wheelchair; and

a securing means for locking said rotating block when in said first position and unlocking said rotating block to move between said first and second positions.

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2. The rotatable assembly according to claim 1 wherein said securing means is a spring loaded match mechanism.

3. The rotatable assembly according to claim 1 wherein said rotating block
20 comprises:

a block having an elongated through opening defining a C-shape channel; and

a moving block movable within said C-shape channel wherein said through opening is provided on said moving block such that said rear wheel is slidable along said C-shape channel when in said second position.

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4. The rotatable assembly according to claim 1 further comprising:

an elevation mechanism adapted to elevate said rear wheel off a ground.

5. The rotatable assembly according to claim 4 wherein said elevation mechanism comprises:

a lever, a fulcrum, and a rod extending through a through opening of said C-shape
5 base and arranged as such that actuating said lever in a first direction causes said fulcrum to drive said rod towards said ground elevating said rear wheel off said ground and actuating said lever in a second direction opposing the first direction causes the fulcrum to release said rod.