

[54] WHEELCHAIR DRIVE PACKAGE

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[51] Int. Cl. B62d 11/04

[58] Field of Search 180/6.5, 74, 11, 19 R

[56] References Cited

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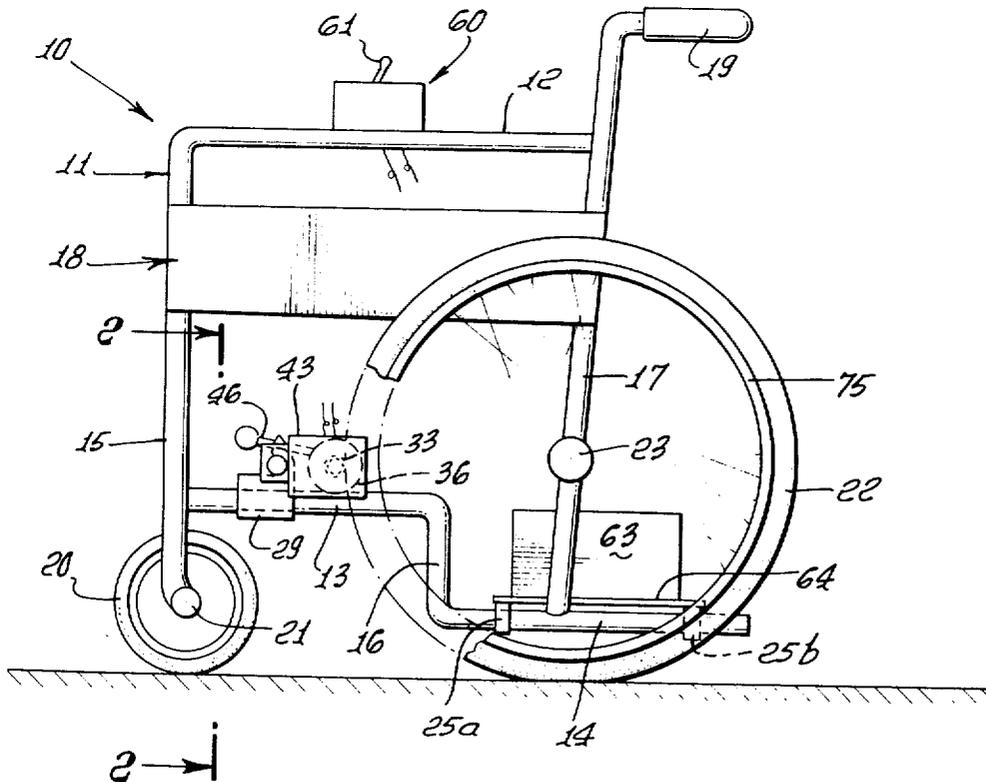
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[57] ABSTRACT

A drive assembly package to be connected to a wheelchair, on which there are supports, comprises;
 a. a horizontal mounting bar of a length to be removably received by the supports,
 b. drive motors carried on the bar and including a pair of drive rotors, and
 c. clamping members carried on the bar for urging the drive motors relatively about an axis parallel to the bar to effect clamping engagement of the rotors with the peripheries of the wheels, respectively.

8 Claims, 6 Drawing Figures



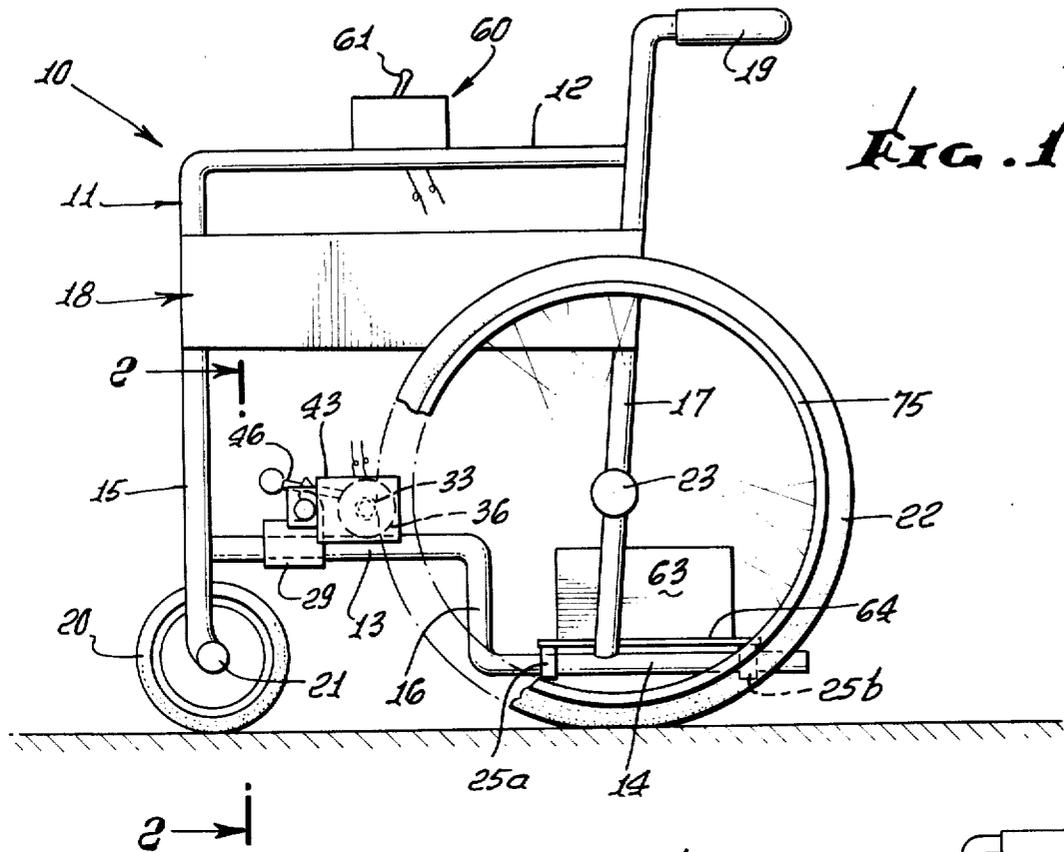


FIG. 1.

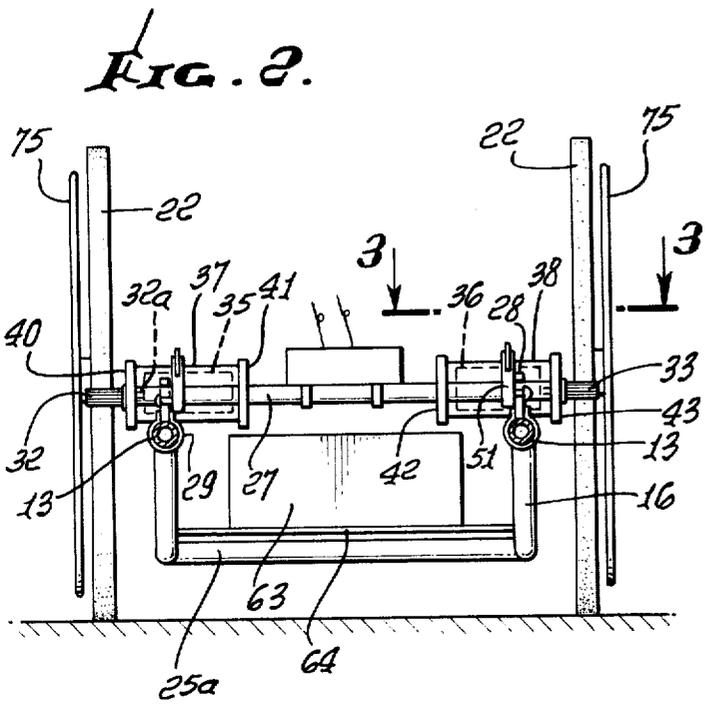


FIG. 2.

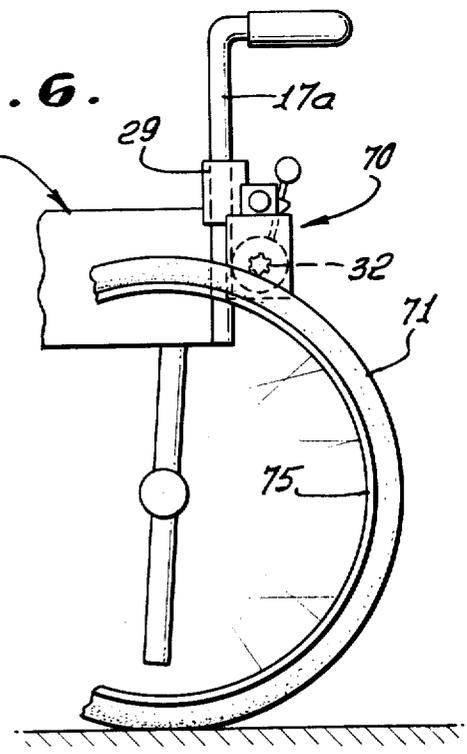


FIG. 6.

FIG. 3.

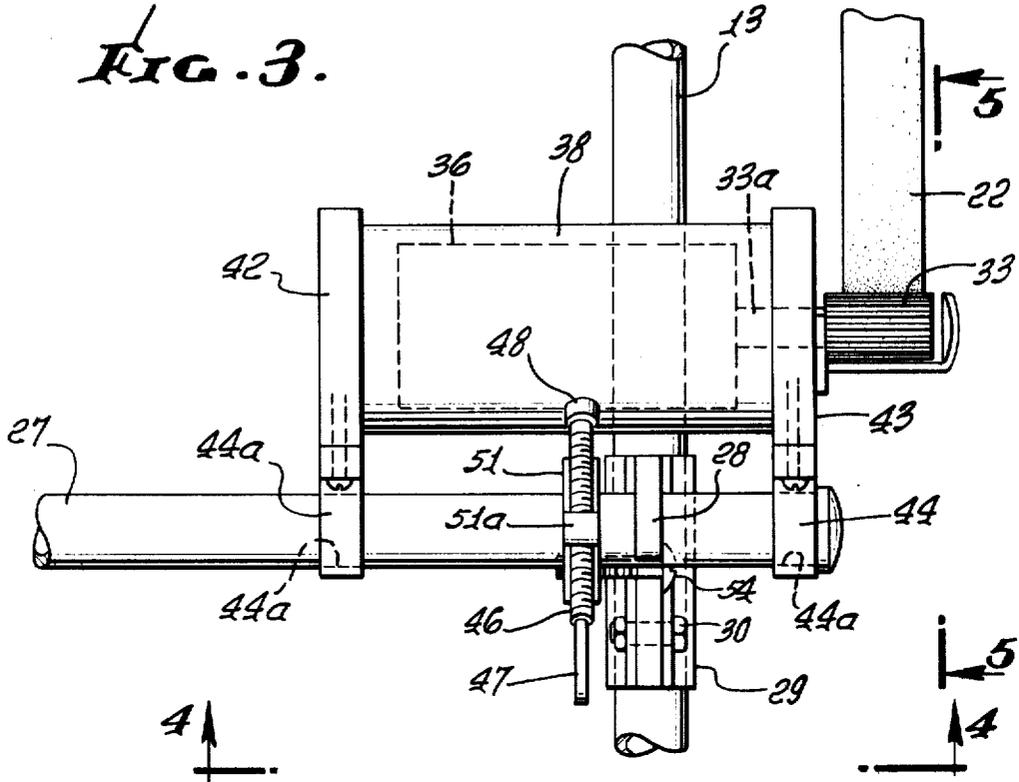


FIG. 4.

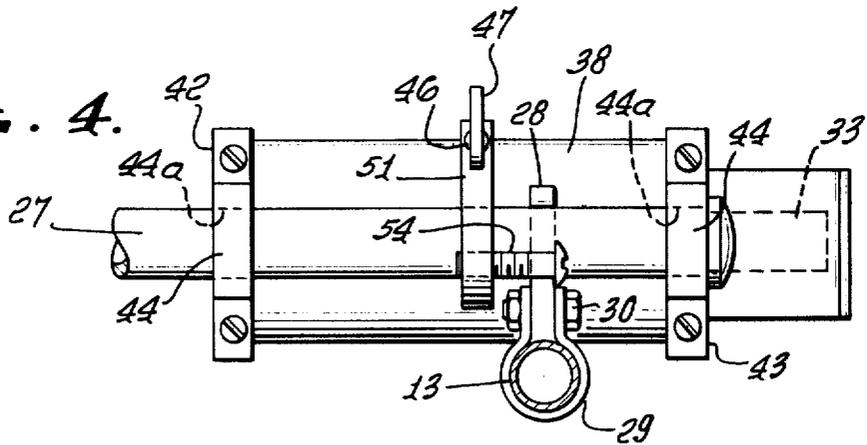
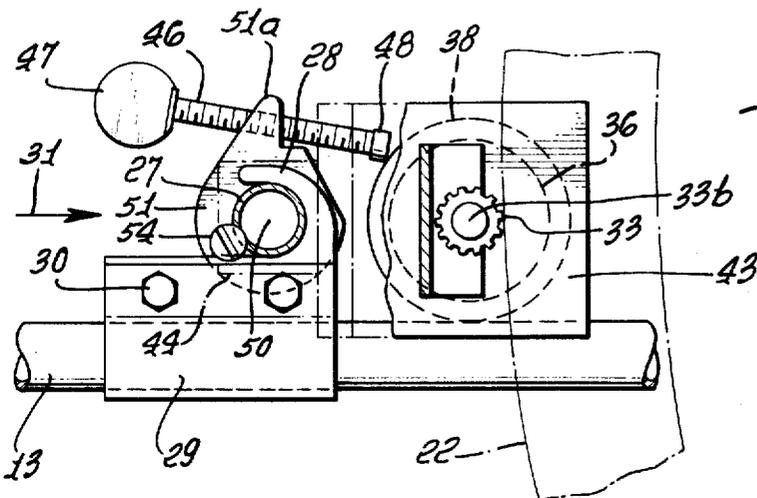


FIG. 5.



WHEELCHAIR DRIVE PACKAGE

BACKGROUND OF THE INVENTION

This invention relates generally to drives for wheelchairs, and more particularly concerns a drive package readily attachable to and detachable from a wheel chair.

Considering the large number of hand-driven wheelchairs in existence, there is a need for a simple means to convert such chairs to power driven mode. In addition there is a need for a relatively simple and inexpensive power drive package which is readily attachable to conventional hand powered wheelchairs enabling them to be optionally power driven. No such package embodying the advantageous features of the invention has previously been available, to our knowledge.

SUMMARY OF THE INVENTION

It is a major object of the invention to provide a wheelchair drive package or kit enabling optional power drive, or hand drive of a conventional hand driven wheelchair. Basically, the package is adapted for connection onto a wheelchair to drive the chair large wheels, there being supports removably attached to the chair frame, the package including:

a. horizontal mounting bar of a length to be removably received by the supports,

b. drive means carried on the bar and including a pair of drive rotors, and

c. clamping means carried on the bar for urging the drive means relatively about an axis parallel to the bar to effect clamping engagement of the rotors with the peripheries of the wheels, respectively.

As will be seen, the supports may have U-shaped configuration for reception of the horizontal bar; the clamping means may include hand adjusted jack screws engageable with housings for motors that drive the rotors, the latter having axes offset from the bar axis; the supports may have removable attachment with different frame members to allow optional positioning of the package above or forwardly of the large wheels; and jack screw carriers may be integrally carried by the bar, with parts on the carriers being engageable with the supports to block reverse rotation of the bar about its axis in response to jack screw urging of the drive means to carry the rotors into driving engagement with the wheels.

These and other objects and advantages of the invention, as well as the details of an illustrative embodiment, will be more fully understood from the following description and drawings, in which:

DRAWING DESCRIPTION

FIG. 1 is a side elevation showing one mode of application of the invention;

FIG. 2 is a vertical frontal elevation taken on lines 2—2 of FIG. 1;

FIG. 3 is an enlarged plan view on line 3—3 of FIG. 2;

FIG. 4 is a view looking upward on lines 4—4 of FIG. 3;

FIG. 5 is a side elevation taken on lines 5—5 of FIG. 3; and

FIG. 6 is a fragmentary elevation showing another mode of application of the invention.

DETAILED DESCRIPTION

In FIGS. 1—5, a wheelchair 10 is shown as including a main frame 11 including generally horizontal bars or tubes 12—14, generally vertical bars or tubes 15—17, and horizontal cross members 25a and 25b, seat structure at 18 and handles 19. Small forward wheels 20 are axle supported by the frame at 21, and large rear wheels 22 are axle supported by the frame at 23. The invention is applicable to many different forms of wheelchairs, so that the frame and wheel arrangements may take other shapes.

In accordance with the invention, a drive assembly to drive the rear wheels comprises a horizontal bar, as for example bar or tube 27, of length to be removably received by supports on the chair. Such supports may take the form of hook or U-shaped members 28 integral with clamping bases 29 attached to chair frame bars, such as forward and rearwardly extending bars 13, as by fasteners 30. The arrangement is such that transverse bar 27 is removably received into members 28 in a direction (indicated by arrow 31 in FIG. 5) toward the closest peripheral portions of wheels 22.

Further in accordance with the invention, drive means is carried on the bars, and includes a pair of drive rotors 32 and 33 respectively to have clamping engagement with the peripheries of the wheels 22, as is seen in FIG. 2. The rotors may be toothed, as shown, and may be defined by pinion gears on axles 32a and 33a driven by electric motors indicated at 35 and 36, respectively. Housings for the motors appear at 37 and 38. Carriage of the drive means on the bar may be effected as by plates attached to the motor housings and journaled to the bar as by journal blocks. See for example plates 40 and 41 integral with opposite ends of motor housing 37, and plates 42 and 43 integral with opposite ends of motor housing 38. Typical journal blocks 44 are attached to the plates, as for example are seen in FIGS. 3—5, and contain bores 44a to pass the circular cross section shaft.

The invention also contemplates the provision of clamping means carried on the bar for urging the drive means relatively about an axis parallel to the bar, to effect clamping engagement of the rotors with the peripheries of the respection wheels 22. Such clamping means may with unusual advantage include jack screws 46 which are manually rotatable at 47 to bring their forward extents 48 into eccentric engagement with the housings 37 and 38, to selectively urge the housings in directions carrying the rotors 32 and 33 toward the wheel peripheries. Note in this regard that the rotors have axes (as at 33b in the case of rotor 33) which are offset from and parallel to the bar axis 50 about which the drive means is rotatable in response to such urging by the jack screws. The clamping means also includes jack screw carriers 51 which are integral with the bar and located in transversely offset relation to the supports 28. Note that the jack screws have threaded engagement with ear-like extensions 51a on the carriers.

As the jack screws are rotated to effect driving engagement of the rotors with the wheels 22, reaction torque tends to rotate the bar reversely, i.e., counterclockwise in FIG. 5; this counterclockwise rotation is, however, blocked by parts 54 on the carriers and engaging the supports. Parts 54 may take the form of bolts threaded into carriers 51 and extending transversely to

overlie the bases 29 of the supports, as is clear from FIGS. 4 and 5.

FIGS. 1 and 2 also show the provision of control means for independently controlling energization of the motors 35 and 36. Such control means, indicated at 60, includes a toggle or joy stick 61, and as well as structure such as is described in U.S. Pat. No. 3,749,192 to Karchak. Electric battery structure 63 may be carried on a plate 64 supported by frame members 25a and 26b.

Finally, FIG. 6 shows a similar drive assembly 70 with rotors 32 and 33 located adjacent upper extents of the main wheels 71 of the wheelchair 72. The clamping bases 29 are in this instance attached to upright frame members 17a.

As is clear from the foregoing, if hand powered mode is desired, the jack screws 46 may be rotated to free the drive rotors 32 and 33 from clamping engagement with wheels 23. The hand ring 75 may then be turned, in the conventional manner.

We claim:

1. A drive assembly adapted for connection onto a wheelchair to drive the chair relatively large wheels, said assembly comprising,

- a. supports to be carried on the chair and a horizontal mounting bar of a length to be removably received by the supports, each support having a recess for reception of the bar,
- b. drive means carried on the bar and including a pair of drive rotors, and
- c. clamping means carried on the bar for urging the drive means relatively about an axis parallel to the bar to effect clamping engagement of the rotors with the peripheries of the wheels, respectively, the clamping means transmitting force to the drive means in offset relation to said axis and including rotatably adjustable members engageable with housings defined by the drive means, and rotatable to effect said urging, the rotors having axes offset from said axis which is defined by the bar.

2. The assembly of claim 1 wherein said drive means includes a pair of electric motors, each motor driving one of said rotors, and including control means for independently controlling energization of the motors.

3. The assembly of claim 1 including said wheel chair, the rotors located adjacent upper extents of the wheels and behind the chair seat.

4. The assembly of claim 1 including said wheel chair, the rotors located adjacent forward extents of the wheels and beneath the chair seat.

5. The assembly of claim 1 including said wheel chair having frame members, said supports having removable connection to certain of said wheelchair frame members.

6. A drive assembly adapted for connection onto a wheelchair to drive the chair relatively large wheels, said assembly comprising,

- a. supports to be carried on the chair and a horizontal mounting bar of length to be removably received by the supports, each support having U-shaped configuration for reception of the bar,
- b. drive means carried on the bar and including a pair of drive rotors, and
- c. clamping means carried on the bar for urging the drive means relatively about an axis parallel to the bar to effect clamping engagement of the rotors with the peripheries of the wheels, respectively, the clamping means transmitting force to the drive means in offset relation to said axis and including jack screws engageable with housings defined by the drive means, and rotatable to effect said urging, the rotors having axes offset from said axis which is defined by the bar.

7. The assembly of claim 6 wherein said clamping means includes jack screw carriers integral with the bar and located in offset relation to the supports, there being parts on the carriers and engaging the supports to block rotation of the bar about said axis in response to said urging of the drive means by the jack screws.

8. A drive assembly adapted for connection onto a wheelchair to drive chair relatively large wheel means, the assembly comprising

- a. support means to be carried on the chair and a horizontal mounting bar of a length to be received by the support means which is recessed to receive the bar,
- b. drive means carried on the bar and including drive rotor means, and
- c. clamping means on the bar for urging the drive means relatively about an axis parallel to the bar to effect clamping engagement of the rotor means with the periphery of the wheel means, the clamping means transmitting force to the drive means in offset relation to said axis, and including rotatably adjustable jack screw means engageable with housing structure defined by the drive means, and rotatable to effect said urging, the rotor means having an axis offset from said axis which is defined by the bar.

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