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ONE-ARM DRIVE FOR WHEEL CHAIRS

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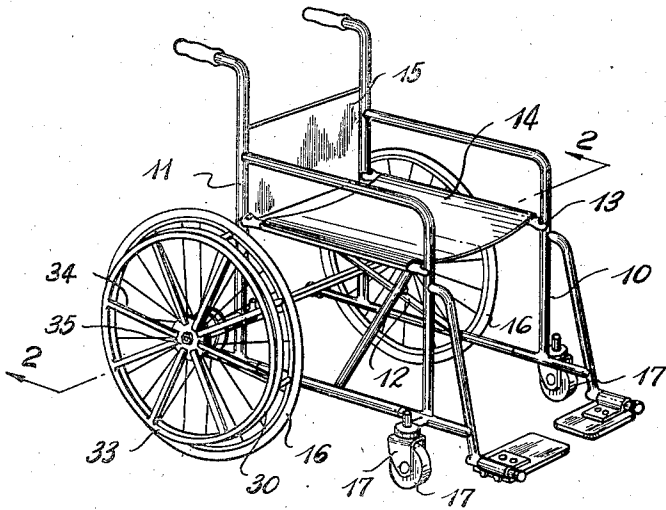


Fig. 1

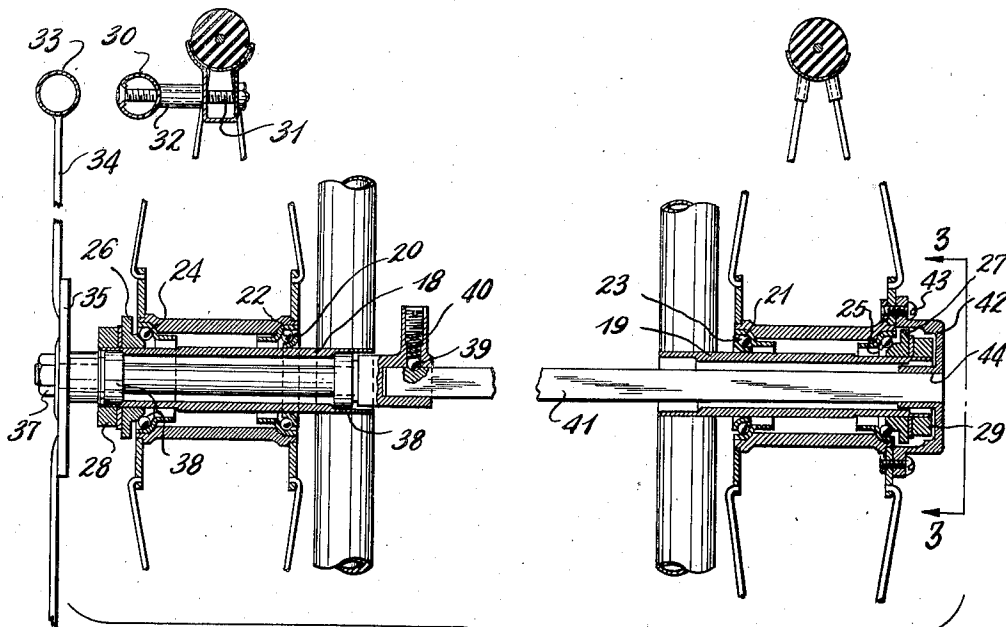


Fig. 2

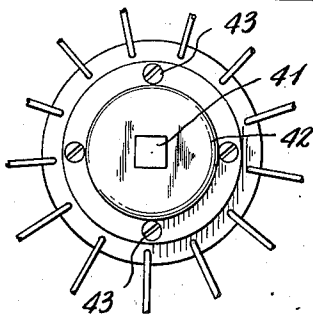


Fig. 3

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ONE-ARM DRIVE FOR WHEEL CHAIRS

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4 Claims. (Cl. 280-211)

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This invention relates to improvements in a one-arm drive for invalids' wheel chairs.

An object of the invention is to provide a wheel chair wherein there are two drive wheels or main traction wheels, and to provide a pair of closely adjacent hand rims near one of the wheels, the two hand rims being operatively connected to each of the drive or main traction wheels whereby each traction wheel may be driven independently by its respective hand rim. In this manner, invalids who have either lost an arm or lost the use of an arm may drive either wheel independently of the other in effecting turns or drive both wheels simultaneously and perform these operations by the remaining single arm and hand.

Another object of the invention is to provide a wheel chair having a drive for driving either or both of the drive wheels or main traction wheels of the chair by means of one arm wherein the connection from one hand rim across the chair to the remote drive wheel is detachable and removable to permit of collapse of the chair.

Still another object of the invention is to provide a one-arm drive for wheel chairs which is so constructed that the drive may be located on either side of the chair so that the same chair with proper adjustment can be used by invalids who have lost the use of either arm.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Figure 1 is a perspective view of a wheel chair embodying the present invention;

Fig. 2 is a vertical section, parts being broken away and taken substantially upon the line 2-2 upon Fig. 1; and

Fig. 3 is a partial view in end elevation and may be regarded as having been taken upon the line 3-3 upon Fig. 2, in the direction indicated.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, the general construction of the wheel chair may be of any preferred or conventional design. The construction illustrated comprises a pair of opposed side frames having front legs 10 and rear legs 11. These side frames are connected by an X-brace 12 the lower ends of which are pivotally connected to bottom rungs on the side frames and the tops of which carry slides 13 that are slidable on the front and rear legs. The tops of the X-brace suspend therebetween a flexible seat 14 and a flexible backrest

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15 connects the upper portions of the rear legs 11. The drive wheels or main traction wheels are indicated at 16 and caster wheels 17 are mounted on the side frames. While the drive wheels or main traction wheels are shown as being mounted at the back of the chair or on the rear legs 11, the invention is not restricted to wheel chairs having these wheels in this position, and it will be readily understood that the main drive wheels 10 may be located in front of the caster wheels 17 or may be mounted on the front legs 10.

As illustrated on the drawing hollow axles 18 and 19 are welded or otherwise rigidly secured to their respective side frames on the rear legs 11. These hollow axles may be welded to either the front or rear side of the rear legs but on reversely locating the wheels of the chair they may be welded to the front or rear sides of the front legs 10. The hollow axles 18 and 19 have stationary cones 20 and 21 thereon each of which provides one race for ball bearings 22 and 23, respectively, between the axles and the hubs of the drive wheels or main traction wheels 16. Outer ball bearings 24 and 25 are also provided which are adjusted by means of movable cones 26 and 27 that are adjusted by means of nuts 28 and 29, respectively. One of the drive wheels 16 has a hand rim 30 secured thereto in any conventional manner, such as by bolts 31 and spacers 32. Adjacent this hand rim there is a second hand rim 33 which is operatively connected to the remote drive wheel 16. This hand rim is connected by spokes, 34, to a hub or plate 35 that is mounted on the outer end of a stub shaft 36 such as by a nut 37. The stub shaft extends through the hollow axle 18 and is preferably mounted on anti-friction bearings 38 therein. The inner end of the stub shaft has a socket 39 welded or otherwise rigidly secured thereto, and at one side of this socket there is provided a spring-actuated ball lock 40, the ball of which is receivable in a depression on a squared shaft 41 that extends from the socket 39 across the chair and through the hollow axle 19. A hub cap 42 is provided which encloses the adjusting nut 29 and which is rigidly secured to the hub of the remote drive wheel as by bolts 43. This hub has a squared aperture 44 therethrough through which the outer end of the squared shaft 41 slidably extends.

In use, an invalid having only the use of his right arm and hand may grasp either or both of the closely adjacent hand rims 30 and 33. If both hand rims are simultaneously grasped and turned both traction wheels 16 will be forcibly

driven to propel the chair in a straightforward direction. On grasping and propelling only the outer hand rim 33 the remote drive or traction wheel 16 will alone be propelled causing the chair to turn to the right as illustrated in Fig. 1. On the other hand, if hand rim 30 alone is grasped and propelled only the adjacent drive wheel 16 will be propelled causing the chair to effect a left-hand turn.

In collapsing the chair the shaft 41 can be forcibly disengaged from the ball lock 40 and caused to slide outwardly through the hub cap 42. This permits the two side frames to be forced towards each other by collapsing the X-brace and causing the slides 13 to slide upwardly on the legs of the side frames. It is possible to collapse the chair by first forcing the side frames towards each other during which movement shaft 41 merely slides outwardly through the hub cap 44. The shaft 41 may then be withdrawn so that it does not form an objectionable protuberance from the side of the collapsed chair.

The chair illustrated has the two hand rims 30 and 33 located on the right-hand side of the chair. However, it may be readily converted to a left-hand drive by removing the stub shaft 35 and its bearings from within the hollow axle 18 and installing the stub shaft and its bearings in the axle 19, it being understood that these two axles are identical. The hand rim 33, its spokes 34 and plate 35 are removed to permit removal of the stub shaft and its application to the hollow axle 19 after which they are again applied to the stub shaft. The hub cap 42 is of course removed from the remote drive wheel and applied to the right-hand drive wheel and the shaft 41 is then utilized to connect the stub shaft axle 19 to the hub cap on the right-hand wheel. It will be appreciated that on converting the wheel from a right-hand drive to a left-hand drive, or vice versa, and removing shaft 41 to effect a collapse of the chair that the wheels and the adjustments of their bearings on the hollow axles are in no way disturbed.

While the hand rims 30 and 33 are illustrated as being of the same diameter, this is not essential and it frequently is advantageous to make the hand rim 33 of slightly smaller diameter than the hand rim 30 so that the hand rims may be readily distinguished from each other by touch or feel instead of observation in selecting the hand rims to effect the desired turn.

From the above-described construction it will be appreciated that an improved wheel chair is provided wherein either or both of the drive wheels on opposite sides of the chair may be propelled independently of the other from hand rims located on the same side of the chair so as to be accessible by a single arm of the invalid. Furthermore, the construction is relatively simple and durable and does not materially interfere with the collapse of the chair. The same chair may be easily converted from right-hand drive to a left-hand drive, and while the shafts 36 and 41 are illustrated and described as being squared for purposes of ease of construction, it will be readily understood that shaft 36 may have a keyed or other non-circular formation to connect it to the hub or plate 35 and similarly shaft 41

may have a slidably keyed or otherwise non-circular connection with the hub cap 42. The outer end of shaft 41 is prevented from being withdrawn inwardly through the hub cap 42 by the effect of the seat 14 in limiting the spreading of the side frames.

Various changes may be made in the details of construction without departing from the spirit and scope of the invention as defined by the appended claims.

We claim:

1. A wheel chair having adjacent one of the drive wheels thereof two closely adjacent hand rims, there being hollow axles on the chair on which the drive wheels are rotatably mounted, one of the hand rims being rigidly fastened to the adjacent drive wheel, a stub shaft extending through the hollow axle on which the mentioned wheel is mounted, means mounting the other hand rim on said stub shaft, and means operatively connecting said stub shaft to the other drive wheel.

2. A wheel chair having hollow axles thereon, drive wheels rotatably mounted upon said axles, means extending through said axles providing a shaft rotatable therein, hand rims arranged adjacent one of said drive wheels, means connecting one hand rim to the mentioned drive wheel, means connecting the other hand rim to said shaft, and means connecting the shaft to the other drive wheel whereby the last-mentioned drive wheel may be driven by the last-mentioned hand rim.

3. A collapsible wheel chair having hollow axles on which drive wheels are rotatably mounted, a pair of hand rims located adjacent one of the drive wheels, one of the hand rims being operatively connected to the adjacent drive wheel, means connecting the other hand rim through the hollow axles to the other drive wheel so as to be able to rotate the other drive wheel, said means being detachable between the axles.

4. A collapsible wheel chair having hollow axles on which drive wheels are rotatably mounted, a pair of hand rims located adjacent one of the drive wheels, means operatively connecting one hand rim to one drive wheel, a stub shaft rotatably mounted in the axle of the mentioned drive wheel, means connecting the other hand rim to the stub shaft, a shaft detachably connected to the stub shaft, said shaft having a slidably but non-rotatable connection with the other drive wheel and extending through its hollow axle.

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